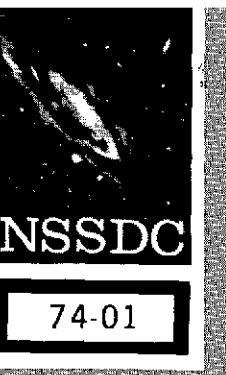
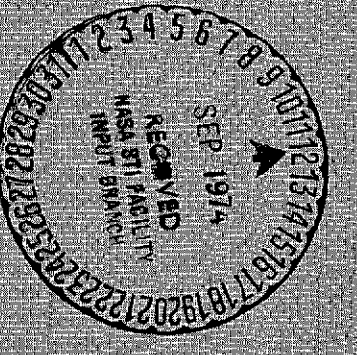
TMX-69915



Report on Active and Planned Spacecraft and Experiments

JANUARY 1974



NATIONAL SPACE SCIENCE DATA CENTER

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

NSSDC 74-01

REPORT ON ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

Edited by

Julius J. Brecht

National Space Science Data Center
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, Maryland 20771

January 1974

FOREWORD

This Report on Active and Planned Spacecraft and Experiments provides the professional community with information on current as well as planned spacecraft activity in a broad range of scientific disciplines. The document provides brief descriptions for these spacecraft and experiments, as well as approximate time periods when data are being accumulated. The performance information for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1973. The National Space Science Data Center (NSSDC) has attempted to update all performance information to that date.

I would like to acknowledge the cooperation of the Acquisition Scientists and others at NSSDC in obtaining information and offering suggestions for this Report. I am most appreciative of the effort of the personnel of NSSDC's on-site contractor, PMI Facilities Management Corporation, in preparing this document for publication. Also, the cooperation of the project offices and experimenters in supplying documentation of their spacecraft and experiments is gratefully acknowledged.

NSSDC plans to publish a Supplement to this Report within six months and a cumulative edition within one year; subsequently, plans call for quarterly supplements and an annual cumulative edition.

January 1974

Julius J. Brecht

TABLE OF CONTENTS

*Because of the number of entries in Sections 1 and 2, only the pages on which spacecraft brief descriptions can be found are listed in the Table of Contents. For a complete listing of the spacecraft and experiment brief descriptions in Sections 1 and 2, please refer to the first index, "Sequential Listing of Spacecraft and Experiments," (ordered by NSSDC ID No.), beginning on page 359.

TABLE OF CONTENTS (continued)

*Because of the number of entries in Sections 1 and 2, only the pages on which spacecraft brief descriptions can be found are listed in the Table of Contents. For a complete listing of the spacecraft and experiment brief descriptions in Sections 1 and 2, please refer to the first index, "Sequential Listing of Spacecraft and Experiments," (ordered by NSSDC ID No.), beginning on page 359.

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF BAR GRAPHS

TABLE OF CONTENTS (continued)

INTRODUCTION

Purpose

This Report on Active and Planned Spacecraft and Experiments provides the professional community with information on current as well as planned spacecraft activity in a broad range of scientific disciplines. By providing brief descriptions of the spacecraft and experiments, as well as the approximate time periods when data are being accumulated, it is hoped that this document will be useful to many people interested in the scientific, applied, and operational uses of such data. Furthermore, for those planning or coordinating future observational programs employing a number of different techniques such as rockets, balloons, aircraft, ships, and buoys, this document can provide some insight into the contributions that may be provided by orbiting instruments. One such program in which this Report will be utilized is the International Magnetospheric Study, which will occur in the 1976 - 1978 time interval.

Contents

This document includes information dealing with active and planned spacecraft and experiments known to the National Space Science Data Center (NSSDC). Included is information concerning a wide range of disciplines: astronomy, earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. These spacecraft represent the efforts and funding of individual countries, as well as cooperative arrangements among different countries.

Specifically not included in this Report are navigational and communications satellites or passive satellites which are still actively tracked by optical or laser methods for geodetic or atmospheric drag studies. Also not included are spacecraft which contain only continuous radio beacons used for ionospheric studies. Many of these spacecraft are listed in the bi-weekly SPACEWARN Bulletin*. No attempt has been

*The SPACEWARN Bulletin is published by the World Data Center A for Rockets and Satellites, Code 601, Goddard Space Flight Center, Greenbelt, Maryland 20771, U.S.A. It is intended to serve as an international communications mechanism for the rapid distribution of information on satellites and space probes. It is published on behalf of the Committee on Space Research (COSPAR) by the International Ursigram and World Days Service (IUWDS), a permanent service of the International Scientific Radio Union in association with the International Astronomical Union and the International Union for Geodesy and Geophysics.

made to include classified spacecraft or experiments. Finally, certain planned spacecraft or continuing series for which no information except the names are known have not been included other than to reference their launching.

The Acquisition Scientists at NSSDC have collected the information contained in this document from a variety of sources during the past several years; e.g., project offices, principal investigators and their staff, publications, etc. The spacecraft and experiments performance information for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1973. NSSDC has attempted to update all performance information to that date.

Organization

This Report includes four sections; an introduction is included with each section.

Section 1, "Descriptions of Active Spacecraft and Experiments," is a chronological listing of descriptions of the spacecraft and experiments that were active as of September 30, 1973, and for which NSSDC has at least minimal documentation.

Similarly, Section 2, "Descriptions of Planned Spacecraft and Experiments," includes those planned missions for which NSSDC has some documentation.

Section 3, "Indexes for Active and Planned Spacecraft and Experiments," contains the following series of indexes to the information presented in Sections 1 and 2 of this Report: (1) a sequential listing of spacecraft and experiments, (2) a listing of spacecraft ordered by common name and alternate names, (3) a listing of the investigators associated with the experiments and their current affiliations, (4) a listing of current experiment institutions ordered by institution name, giving the experiments with which each is associated, and (5) phenomenon measured indexes in the form of bar graphs and listings which provide an indication of active and planned space sciences measurements.

Section 4, "Spacecraft and Experiment Status Changes between October 1, 1972, and September 30, 1973," contains three listings of pertinent information concerning (1) launched spacecraft, (2) spacecraft and/or experiments placed in an "operational off" mode, and (3) spacecraft and/or experiments which became "inoperable."

All four sections were generated from NSSDC automated files.

Availability of this Report

Upon request, NSSDC will provide copies of this Report and future supplements to an individual or organization resident in the United States who can establish a need, in writing or by telephone, for this information. In addition, the same services are available to professionals outside the United States through the World Data Center A (WDC-A) for Rockets and Satellites. NSSDC's official address for requests is:

National Space Science Data Center
Code 601.4
Goddard Space Flight Center
Greenbelt, Maryland 20771

Phone: 301 982-6695

Users who reside outside the United States should direct requests to:

World Data Center A for Rockets and Satellites
Code 601
Goddard Space Flight Center
Greenbelt, Maryland 20771
U.S.A.

Phone: 301 982-6695

Recipients are requested to inform potential users of the availability of this Report. Because of continuing costs involved in publishing a document of this size on a periodic basis, NSSDC encourages individuals colocated in the same organization to share this document.

Request for Additions/Corrections

NSSDC continually strives to increase the usefulness of this Report by improving the spacecraft and experiment descriptions and by including additional spacecraft and experiments as they become known to NSSDC. The Report is complete and reasonably accurate concerning NASA and NASA-cooperative programs. However, descriptions of other spacecraft and experiments may be rather terse and incomplete because of a lack of information available to NSSDC. Although in some cases the status of such spacecraft or experiment may have been in doubt, nevertheless it has been included here. It should be noted that the information concerning the planned spacecraft and experiments is very often general in nature and subject to change.

NSSDC would welcome comments as to errors or omissions in this Report. Recommendations regarding the overall contents and organization of this Report would also be appreciated. In particular, it is hoped that principal investigators and project offices will cooperate in bringing such matters to NSSDC's attention.

Definitions

Several words and phrases are used in this Report in a precise and specific sense. These terms are defined here to clarify the intended meaning to the reader.

Active - As applied to a spacecraft mission or one of its experiments pertinent to this Report, a general status-of-operation term which means that the spacecraft or experiment was last reported to NSSDC to be in either a "normal" or "partial" status.

Apoapsis - The distance from the surface of the reference body to the furthest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system, e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.

Approved Mission - A planned spacecraft mission status term which means that the spacecraft mission has been approved and funding is or will be available to perform the mission.

Experiment Brief Description - A description of an experiment containing a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data. Information about the performance of individual components of the instrumentation is often included.

Inclination - The angle (in degrees) between the satellite orbital plane and the equatorial plane of the primary gravitational body. For satellites with heliocentric orbits, the ecliptic plane is used in lieu of the equatorial plane.

Inoperable - As applied to a spacecraft, a status-of-operation term which means that the spacecraft is no longer capable of producing any useful scientific data because of malfunction or failure of the spacecraft system, because of the completion of the phase of the spacecraft trajectory in which useful measurements could be performed, or because network support (tracking, command, and telemetry) has been discontinued, etc. As applied to an experiment, a status-of-operation term which means that the experiment is no longer capable of producing any useful scientific data because of a malfunction or failure of the experiment system or critical parts of the spacecraft system, or the completion of the phase of the spacecraft trajectory in which useful measurements could be performed.

Normal - As applied to an active spacecraft, a status-of-operation term which means that the spacecraft and other required systems are capable of working, so that the data would be suitable for all of the scientific studies planned for the spacecraft when the spacecraft is turned on and the data are recorded. As applied to an active experiment, a status-of-operation term which means that all experiment and spacecraft systems are working, so that the data would be suitable for all of the scientific studies originally planned for the experiment.

NSSDC ID Code - An identification code used in the NSSDC information system. In this system, each successfully launched spacecraft and experiment is assigned a code based on the launch sequence of the spacecraft. Subsequent to 1962, this code, e.g., 72-012A for the spacecraft Pioneer 10, corresponds to the COSPAR international designation. The experiment codes are based on the spacecraft code. For example, the experiments carried aboard the spacecraft 73-019A (Pioneer 11) are numbered 73-019A-01, 73-019A-02, etc. Each prelaunch spacecraft and experiment is also assigned an NSSDC ID Code based on the common name of the spacecraft. For example, the proposed NASA launch, Mariner Jupiter/Saturn A, would be coded MARN77A. The experiments to be carried aboard this spacecraft would be coded MARN77A-01, MARN77A-02, etc. Once a spacecraft is launched

NSSDC ID Code - (continued) its prelaunch designation is, of course, changed to a postlaunch designation, e.g., Pioneer G which was launched on April 6, 1973 was given the NSSDC ID Code of 73-019A, corresponding to the launch spacecraft common name, Pioneer 11.

Operational Off - As applied to a spacecraft, a status-of-operation term which means that the spacecraft can still be operated, but it is either turned off or not being used. As applied to an experiment, a status-of-operation term that means that when last tested, the experiment and other required systems were capable of producing at least partially usable data, but the experiment is either turned off or telemetered data are not being recorded. The systems could be activated at some future time to obtain usable data.

Orbit Type - A word or phrase indicating the most important phase of the trajectory of a given spacecraft mission. The orbit type may be any one of the following: geocentric, selenocentric, heliocentric, venuscentric, marscentric, lunar lander, Venus lander, Mars lander, Jupiter lander, lunar flyby, Venus flyby, Mars flyby, Mercury flyby, Jupiter flyby.

Partial - As applied to a spacecraft, a status-of-operation term which means the spacecraft and other required systems are working, but not all systems are working as well as the design required. If the spacecraft were turned on and the data recorded, the data would be suitable for only a portion of the scientific studies planned for the spacecraft. As applied to an experiment, a status-of-operation term defined similarly to that for a spacecraft.

Periapsis - The distance from the surface of the reference body to the nearest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system, e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.

Planned - As applied to a future space science spacecraft mission pertinent to this Report, a general status term which means that the spacecraft mission was last reported to NSSDC as either "approved" or "proposed." As applied to an experiment, an experiment associated with a planned space science spacecraft mission pertinent to this Report.

Proposed Mission - A planned spacecraft mission status term which means that the mission is under study or detailed design; however, no funds have been approved to perform this mission.

Spacecraft Brief Description - A description of a spacecraft, containing a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. Information about the performance of individual components of the spacecraft are often included.

Standard - As applied to a spacecraft or experiment data acquisition rate, a term which means that the data that can be processed and made available to the experimenters are being acquired at the rate or percentage of coverage required to accomplish the planned scientific studies.

Substandard - As applied to a spacecraft or experiment data acquisition rate, a term which means that the data that can be processed and made available to the experimenters are not being acquired at the rate or percentage of coverage required to accomplish the planned scientific studies.

Unknown - As a general term, indicates information either unknown or unavailable at NSSDC.

Abbreviations and Acronyms

The abbreviations and acronyms listed on the following pages include those used in this Report. In addition the list contains, for the convenience of the reader, the more common abbreviations used in the context of space science satellite experiments. That is, the list includes spacecraft name acronyms, experiment affiliation acronyms and abbreviations, funding agency acronyms and abbreviations, etc. All abbreviations are in upper case letters to correspond to the computer-produced entries in Sections 1, 2, 3, and 4. Note that the same abbreviation is used for both the singular and plural forms. Note also that the same abbreviation may indicate two different definitions; these are separated by a semicolon.

A	angstrom
ABMA	Army Ballistic Missile Agency
ACIC	Aeronautical Chart and Information Center
ACS	attitude control system
A/D	analog to digital
AE	Atmosphere Explorer (satellite, NASA-GSFC)
AEC	Atomic Energy Commission
AFB	Air Force Base
AFCRL	Air Force Cambridge Research Laboratories
AFSC	Air Force Systems Command
AGC	automatic gain control
AIMP	Anchored Interplanetary Monitoring Platform (satellite, NASA-GSFC)
ALOSYN	Alouette topside sounder synoptic (data)
ALSEP	Apollo Lunar Surface Experiments Package (NASA)
ALT	altitude
AM	amplitude modulation
AMP	ampere
AMU	atomic mass unit; astronaut maneuvering unit
ANIK	Telecommunications Satellite; also referred to as TELSAT
ANNA	Army, Navy, NASA, Air Force Geodetic Satellite
ANS	Astronomical Netherlands Satellite (Netherlands - NASA, joint project)
AP	magnetic activity index A_p
APL	Applied Physics Laboratory of Johns Hopkins University
APT	automatic picture transmission
A/R	acquisition/reference
ARC	Ames Research Center (NASA)
ARC-MIN	arc-minute
ARC-SEC	arc-second
ARDC	Air Research and Development Command (now AFSC)

ARPA	Advanced Research Projects Agency
AS&E	American Science & Engineering, Inc.
ASOS	antimony-sulfide oxy-sulfide
ASTP	Apollo-Soyuz Test Project (USSR-NASA, joint project)
ATCOS	Atmospheric Composition Satellite (NASA); also referred to as OV3-5, OV3-6
AT+T	American Telephone & Telegraph
ATDA	Alternate Target Docking Adapter
ATM	atmosphere
ATS	Applications Technology Satellite (NASA)
AU	astronomical unit
AVCS	advanced vidicon camera system
AVG	average
AVHRR	advanced very high resolution radiometer
AWRE	Atomic Weapons Research Establishment
BCD	binary coded decimal
BE	Beacon Explorer (satellite, NASA); beryllium
BERK	Berkeley
BEV	billion electron volts
BIC	barium iodide cloud
BIOS	Biological Satellite (NASA)
BPI	bits per inch
BPS	bits per second
BTL	Bell Telephone Laboratories
BUV	backscatter ultraviolet
BV	billion volts
B/W	black and white
CAL	calorie
CALSPHERE	calibration sphere
CAL TECH	California Institute of Technology
CAS	Cooperative Applications Satellite (France-NASA); also referred to as EOLE
CAV	composite analog video
CDA	command and data acquisition (station)
CDC	Control Data Corporation
CDS	cadmium sulfide
CENS	Centre d'Etudes Nucleaires de Saclay
CM	command module; centimeter
CNES	Centre National d'Etudes Spatiales
CNET	Centre National d'Etudes des Telecommunications
CNRS	Centre National de la Recherche Scientifique
COMS	see COMSAT
COMSAT	Communications Satellite Corporation

CORSA	Cosmic-Ray Satellite (Japan)
COSPAR	Committee on Space Research
CPKF	Cape Kennedy (also referred to as the Eastern Test Range)
CPS	cycles per second
CPU	central processing unit
CRC	Communications Research Center
CRPL	Central Radio Propagation Laboratories (later ITSA; formerly part of ESSA; now a subdivision of NOAA)
CRREL	Cold Region Research & Engineering Laboratories
CRT	cathode ray tube
CSI	cesium iodide
CSM	command service module
DAC	data acquisition camera
DANISH INST SPACE RSCH	Danish Institute for Space Research
DASA	Defense Atomic Support Agency
DATS	Despun Antenna Test Satellite (DOD)
DB	decibel
DCP	data collection platform(s)
DCS	direct couple system
DEG	degree
DENPA	Density Phenomena (satellite, Japan)
DFVLR	Deutsche Forschung und Versuchzanstalt fur Luft-und Raumfahrt; English translation, Research Laboratory for Aeronautics and Astronautics, Germany
DIAL/MIKA	Diament Allemande/Mini Kapsel (satellite, Germany-France, joint project)
DIAL/WIKA	Diament Allemande/Wissenschaftliche Kapsel (satellite, Germany-France, joint project)
DIAM	diameter
DIAPO	Diapason (satellite, France)
DIT	Drexel Institute of Technology
DME-A	Direct Measurements Explorer A (satellite, NASA)
DOD	Department of Defense
DODGE	Department of Defense Gravity Experiment (satellite, DOD)
DRID	direct readout image dissector (camera system)
DRIR	direct readout infrared radiometer
DRTE	Defence Research Telecommunications Establishment (now CRC)
DSCS	Defense Satellite and Communications System (DOD)
DSIR	Department of Science and Industrial Research
DV	digital video

E	energy
EASEP	Early Apollo Scientific Experiment Package
EGO	Eccentric (Orbiting) Geophysical Observatory (satellite, NASA)
EL	electric
ELDO	European Launch Development Organization
ELECTRO-OPT SYS	Electro-Optical Systems, Inc.
EME	environmental measurement experiment
ENV RSCH + TECH INC	Environmental Research & Technology, Inc.
EOF	end-of-file
EOGO	Eccentric Orbiting Geophysical Observatory (satellite, NASA)
EPE	Energetic Particle Explorer (satellite, NASA)
E/Q	energy per unit charge
ERB	earth radiation budget (experiment)
ERDC	Earth Resources Data Center
ERGS	Earth Geodetic Satellite (USAF-USA)
ERL	Environmental Research Laboratory (NOAA)
ERS	Environmental Research Satellite (USAF)
ERTS	Earth Resources Technology Satellite (NASA)
ESGEO	see GEOS
ESMR	electrically scanning microwave radiometer
ESOC	European Space Operations Centre
ESRO	European Space Research Organization
ESSA	Environmental Science Service Administration (now NOAA)
ESTEC	European Space Technology Center
ETR	Eastern Test Range (also referred to as Cape Kennedy)
EUV	extreme ultraviolet
EV	electron volt
EVA	extravehicular activity
EVM	earth viewing (equipment) module
EXOS	Exospheric Satellite (Japan)
FARO	Flare-Activated Radiobiological Observatory
FLT-SAT	Fleet Satellite (USN)
FM	frequency modulation
FMRT	final meteorological radiation tape(s)
FOV	field of view
FPR	flat plate radiometer
FR	French Research (satellite, France)
FRC	Flight Research Center (NASA)
FSK	frequency shift key
FWS	filter wedge spectrometer

GARP	Global Atmospheric Research Program
GE	General Electric (Company)
.GE.	greater than or equal to
GEMS	Geostationary European Meteorological Satellite (ESRO)
GEOPHYSICS CORP	Geophysics Corporation of America
GEOS	Geodetic Earth-Orbiting Satellite (NASA); Geostationary Earth-Orbiting Satellite (ESRO)
G.E.T.	ground elapsed time
GGSE	gravity gradient stabilization experiment
GGTS	Gravity Gradient Test Satellite (NASA)
GHZ	gigahertz
GISS	Goddard Institute for Space Studies (NASA)
GM	Geiger-Mueller; gram
GMT	Greenwich Mean Time
GOES	Geosynchronous Operational Environmental Satellite (NASA) (also called SMS)
GRE	ground reconstruction equipment
GREB	Galactic Radiation Experiment Background (Navy transit satellite)
GRI	Groupe de Recherche Ionospherique
GRS	German Research Satellite (NASA-Germany)
GSCHAFT FUR WELTFORSCH	Geselschaft fur Weltraumforschung (Center for Space Research, Germany)
GSFC	Goddard Space Flight Center (NASA)
GSM	geocentric solar magnetospheric
.GT.	greater than
GUGMS	Glavnoye Upravleniye Gidrometeorologicheskoi Sluzhby (Main Administration of the Hydrometeorological Service, USSR)
GV	gigavolt
GVHRR	geosynchronous very high resolution radiometer
HAO	High Altitude Observatory
HCO	Harvard College Observatory
HDRSS	high data rate storage system
HE	helium
HEAO	High-Energy Astronomical Observatory (NASA)
HEOS	High-Eccentricity Earth-Orbiting Satellite (ESRO)
HFE	heat-flow experiment; heat-flow electronics
HR	high resolution; hour
HRIR	high-resolution infrared radiometer
HRIRS	high-resolution infrared radiation sounder
HZ	hertz (cycles per second)

IAP	Institue of Atmospheric Physics
IBM	International Business Machines
ICBM	intercontinental ballistic missile
ICSU	International Council of Scientific Unions
ID	identification
IDC	image dissector camera
IDCS	image dissector camera system
IDCSP	Initial (or Interim) Defense Communication Satellite Program (or Project) (DOD)
IE	Ionospheric Explorer (satellite, NASA-NBS)
IGRF	International Geomagnetic Reference Field
IME	International Magnetospheric Explorer (satellite, NASA-ESRO)
IMP	Interplanetary Monitoring Platform (satellite, NASA)
INDASAT	Indian Scientific Satellite (ISRO-USSR)
INOP	inoperable
INSAT	Indian National Satellite (ISRO-USSR)
INST	institute
INTA	Instituto Nacional de Tecnica Aeronautica (Spain); the National Institute of Aeronautical Science
INTASAT	Satellite (INTA, Spain)
INTELSAT	International Telecommunications Satellite (NASA-COMS)
ION COMP	Ionospheric Composition (satellite--see DIAPO)
IPA	Institute for Physics of the Atmosphere (SAS)
IQSY	International Quiet Sun Year
IR	infrared
IRBM	intermediate range ballistic missile
IRIG	Inter-Range Instrumentation Group
IRIS	infrared-interferometer spectrometer
IRLS	interrogation, recording, and location system
IRR	infrared radiometry
IRTRN	infrared transmission
ISAS	Institute of Space & Aeronautical Science (Japan)
ISIS	International Satellite for Ionospheric Studies (NASA-Canada)
ISRO	Indian Space Research Organization
ISS	Ionospheric Sounding Satellite (Japan)
ITCZ	intertropical convergence zone
ITOS	Improved Tiros Operational Satellite (ESSA)
ITPR	infrared temperature profile radiometer
ITR	incremental tape recorder
ITSA	Institute for Telecommunication Sciences and Aeronomy (formerly a subdivision of ESSA; now NOAA)
IU	instrument unit
IUE	International Ultraviolet Explorer (satellite, NASA-UK-ESRO, joint project)

JOB	Johannesburg, South Africa
JPL	Jet Propulsion Laboratories (NASA)
JSC	Johnson Space Center (NASA)
KBS	kilobits per second
KEV	kiloelectron volt
KG	kilogram
KHZ	kilohertz
KM	kilometer
KP	magnetic activity index K_p
KPNO	Kitt Peak National Observatory
KSC	John F. Kennedy Space Center (NASA)
LA	Los Angeles
LAB	laboratory
LAGEOS	Laser Geodetic Earth-Orbiting Satellite (NASA-MSFC)
LARC	Langley Research Center (NASA)
LAS	Large Astronomical Satellite (ESRO)
LASL	Los Alamos Scientific Laboratory
LCS	Lincoln Calibration Sphere
.LE.	less than or equal to
LEM	lunar excursion module
LEPEDEA	low-energy proton and electron differential energy analyzer
LERC	Lewis Research Center (NASA)
LES	Lincoln Experimental Satellite (DOD) (Lincoln Laboratory, MIT)
LL	Lincoln Laboratory
LM	lunar module
LMD	Laboratory of Meteorological Dynamics
LOCKHEED	Lockheed Palo Alto Research Laboratory
LOFTI	Low-Frequency Trans-Ionospheric Satellite (USN-NRL)
LOGACS	Low-G Accelerometer Calibration System (USAF)
LRC	Lewis Research Center
LRIR	limb radiance inversion radiometer; low-resolution infrared radiometer
LRL	Lunar Receiving Laboratory
LRV	lunar roving vehicle
.LT.	less than
LTV	Ling-Temco-Vought (company)

M	meter, milli- (prefix)
MA	Mercury Atlas
MAD	Madrid, Spain
MARENTS	Modified Advanced Research Environmental Test Satellite (USAF)
MAS	Ministry of Aviation Supply, UK
MASC	magnetic attitude spin coil
MC	megacycle
M-D	McDonnell-Douglas Corporation
METEC	Meteoroid Technology (satellite, NASA)
MEV	million electron volts
MG	milligram
MHZ	megahertz
MIDAS	Missile Defense Alarm System (USAF)
MIN	minute
MIT	Massachusetts Institute of Technology
MM	millimeter
MPI, GARCHING	Max Planck Institute for Extraterrestrial Physics
MPI, HEIDELBG	Max Planck Institute for Nuclear Physics
MPI, LINDAU	Max Planck Institute for Aeronomy---Max Planck Institute for Stratospheric Physics
MR	medium resolution
MRIR	medium-resolution infrared radiometer
MS	microsecond
MSC	Manned Spacecraft Center (now Johnson Space Center)
MSEC	millisecond
MSFC	Marshall Space Flight Center (NASA)
MSS	Magnetic Storm Satellite (AFCRL-NASA); multispectral scanner
MSSCC	multicolor spin-scan cloudcover camera
MTS	Meteoroid Technology Satellite (NASA)
MULLARD SS	Mullard Space Science Laboratory, Dorking, Surrey, UK
MUSE	monitor of ultraviolet solar energy
MW	milliwatt

NADUC	Nimbus/ATS Data Utilization Center (now NESS)
NASA	National Aeronautics and Space Administration (Washington, D.C., headquarters)
NASA OFFICES:	
NASA-OA	NASA Office of Applications
NASA-OART	NASA Office of Advanced Research and Technology
NASA-OAST	NASA Office of Aeronautics and Space Technology
NASA-OMSF	NASA Office of Manned Space Flight
NASA-OSS	NASA Office of Space Science
NASA-OSSA	NASA Office of Space Science and Applications (now two separate offices)
NASA-OTDA	NASA Office of Tracking and Data Acquisition

NASA Research Centers:

NASA-ARC	NASA-Ames Research Center
NASA-FRC	NASA-Flight Research Center
NASA-GISS	NASA-Goddard Institute for Space Studies
NASA-GSFC	NASA-Goddard Space Flight Center
NASA-JPL	NASA-Jet Propulsion Laboratory
NASA-JSC	NASA-Johnson Space Center
NASA-KSC	NASA-John F. Kennedy Space Center
NASA-LARC	NASA-Langley Research Center
NASA-LERC	NASA-Lewis Research Center
NASA-MSFC	NASA-Marshall Space Flight Center
NASA-WS	NASA-Wallops Station
NASC	National Aeronautics and Space Council
NASDA	National Space Development Agency
NATL RSCH CNCL, ITALY	National Research Council, Italy
NATO	North Atlantic Treaty Organization
NBS	National Bureau of Standards
NCAR	National Center for Atmospheric Research
NCC	National Climatic Center
NDRE	Norwegian Defence Research Establishment
NEMS	Nimbus-E Microwave Spectrometer; Near-Earth Magnetospheric Satellite (ESRO)
NESC	National Environmental Satellite Center (now NESS)
NESS	National Environmental Satellite Service (NOAA)
NETHERLANDS INST	Netherlands Institute of Nuclear Physics Research
NHC	National Hurricane Center
NIH	National Institutes of Health
NMC	National Meteorological Center
NMRT	Nimbus meteorological radiation tape
NNSS	Navy Navigational Satellite System
NOAA	National Oceanographic and Atmospheric Administration (formerly ESSA)
NORAD	North American Air Defense Command
NORWEGIAN INST	Norwegian Institute of Cosmic Physics
NOTS CHLAKE	Naval Ordnance Test Station, China Lake
NRC	National Research Council
NRL	Naval Research Laboratory
NSA	National Security Agency
NSF	National Science Foundation
NSSDC	National Space Science Data Center
NWL	Naval Weapons Laboratory
NWRC	National Weather Records Center (presently NCC)

OAO	Orbiting Astronomical Observatory (satellite, NASA-GSFC)
OAR	Office of Aerospace Research (USAF)
OBS	observatory
OCC	OPLE Command Center
OFO	Orbiting Frog Otolith (NASA experimental spacecraft)
OGO	Orbiting Geophysical Observatory (satellite, NASA)
OI	other investigator
OMNI	low-resolution omnidirectional radiometer (on Explorer 7)
ONR	Office of Naval Research
OP OFF	operational off
OPEP	orbital-plane experiment package
OPLE	Omega position and location experiment
ORBIS	Orbiting Radio Beacon Ionospheric Satellite (NASA)
ORS	Octahedral Research Satellite (NASA); Orbiting Research Satellite
OSO	Orbiting Solar Observatory (satellite, NASA-GSFC)
OT	Operational Tiros (satellite, NASA-GSFC)
OV	Orbiting Vehicle (satellite, USAF)
PAC	Package Attitude Control (satellite, NASA-GSFC)
PAGEOS	Passive Geodetic Earth-Orbiting Satellite (NASA)
PAM	pulse amplitude modulation
PCM	pulse coded modulation
PEP	platform electronic packages
PFM	pulse frequency modulation
PHASR	Personnel Hazards Associated with Space Radiation (satellite, USAF)
PI	principal investigator
PIXEL	picture element
PM	pulse modulation; photomultiplier
PMR	pressure modulation radiometer; Pacific Missile Range
PMT	photomultiplier tube
P-N	positive-negative (junction)
POGO	Polar Orbiting Geophysical Observatory (satellite, NASA)
PPS	pulse per second
PSE	passive seismograph experiment
PTL	Photographic Technology Laboratory
QOMAC	quarter-orbit magnetic attitude control (system)
QUI	Quito, Ecuador

R&D	research and development
RA	Ranger
RAD	radian, radiation
RADCAT	Radar Calibration Target (satellite, ARPA)
RAE	Radio Astronomy Explorer (NASA-GSFC)
RAM	random access measurement (system)
RBV	return beam vidicon (camera)
RC	resistance capacitor
RCA	Radio Corporation of America
REXS	Radio Exploration Satellite (Japan)
RF	radio frequency
RM	Radiation Meteoroid (satellite, NASA-OART)
RMS	root mean square; also, see RM
ROS	Rosman, North Carolina
RPM	revolutions per minute
RPS	revolutions per second
RRL	Radio Research Laboratories
RSCH	research
RSRS	Radio and Space Research Station
RTG	radioisotope thermoelectric generator
RTTS	real-time transmission system
SAMOS	Satellite Mission Observation System
SAMSO	Space and Missile Systems Organization (USAF)
SAO	Smithsonian Astrophysical Observatory
SAS	Small Aeronomy Satellite (NASA); Soviet Academy of Sciences
SATAR	Satellite for Aerospace Research (NASA); OV1-2
SBRC	Santa Barbara Research Center
SCAMS	scanning microwave spectrometer
SCEL	Signal Corps Engineering Laboratories
SCMR	surface composition mapping radiometer
SCR	selective chopper radiometer
SE	Solar Explorer (satellite, NASA)
SEC	second; secondary electron conduction (vidicon tube)
SECOR	Sequential Collation of Range (satellite, USAF-USA)
SEM	space environment monitor
SERT	Spinning Satellite for Electric Rocket Test (NASA-LERC)
SESP	Space Experiment Support Program
SESPO	Space Environmental Support Project Office
SHS	Soviet Hydrometeorological Service
SIBS	Salk Institute for Biological Studies
SIM	scientific instrument module
SIRS	satellite infrared spectrometer
SKA	Fairbanks, Alaska
SM	San Marco (satellite, NASA-Italy)

SMS	Synchronous Meteorological Satellite (NASA)
SNAP	systems for nuclear auxiliary power
SNT	Santiago, Chile
SOEP	solar-oriented experiment package
SOLRAD	Solar Radiation (satellite, NASA)
SPM	solar proton monitor
SR	Solar Radiation (satellite, NASA); scanning radiometer
SRATS	Solar Radiation and Thermospheric Structure (satellite, Japan)
SRC	Space Research Council, UK
SRI	Stanford Research Institute
SSCC	spin-scan cloudcover camera
SSD	Space Sciences Division (Jet Propulsion Laboratory)
SSS	Small Scientific Satellite (NASA)
STADAN	Space Tracking and Data Acquisition Network
STARAD	Starfish Radiation (satellite, NASA)
STER	steradian
STL	Space Technology Laboratories (now TRW Systems Group)
STP	Solar Terrestrial Probe (also known as HELIOCENTRIC or IME-4, satellite, NASA-GSFC)
SUI	State University of Iowa (now University of Iowa)
SURCAL	Surveillance Calibration (satellite, DOD-NRL)
SW CTR ADV STUDIES	Southwest Center for Advanced Studies
SWRF	Sine Wave Response Filter (program)
SYNCOM	Synchronous Communication Satellite (NASA-GSFC)

T&DR	tracking & data relay
TAC	Technology Application Center
TACOMSAT	Tactical Communications Satellite (DOD)
TACSAT	Tactical Communications Satellite (DOD)
TATS	Test and Training Satellite (NASA)
TD	Thor-Delta (satellite, ESRO); launch vehicle (NASA-USAF)
TDP	Tracking Data Processor (program)
TEC	telemetry and command; transearth coast (Apollo program)
TECH	technical
TEI	transearth injection
TEMP	temporal; temperature
TETR	Test and Training (satellite, NASA)
THIR	temperature-humidity infrared radiometer
THORAD-AGE	Thor Augmented Delta Agena (launch vehicle)
TIMATION	Time Location System (USN)
TIROS	Television and Infrared Observation Satellite (NASA)
TLI	translunar injection
TOPS	Thermal Noise Optical Optimization Communication System (NASA)

TOPSI	topside (sounder) (satellite, NASA)
TOS	Tiros Operational Satellite (or System) (NASA)
TOVS	Tiros operational vertical sounder
TRAAC	Transit Research and Attitude Control (satellite, USN)
TRS	Tetrahedral Research Satellite (USAF)
TRW	TRW Systems Group
TTS	Test and Training Satellite (NASA); also called TATS, TETR
TWERLE	tropical wind energy conversion and reference level experiment
U OF CALIF, BERK	University of California at Berkeley
U OF CALIF, LA	University of California at Los Angeles
U OF CALIF, RIVER	University of California at Riverside
U OF CALIF, SD	University of California at San Diego
UCLA	University of California at Los Angeles
UHF	ultra-high frequency
UK	United Kingdom
USA	United States Army
US TOPO CMD	United States Army Topographic Command
USA TOPO COM	United States Army Topographic Command
USAECOM	United States Army Electronics Command
USAF	United States Air Force
USAF AEROPROPUL	United States Air Force Aeropropulsion Laboratory
USAF MAT LAB	United States Air Force Materials Laboratory
USAF MED	United States Air Force Medicine, Wright Patterson AFB
USAF SAMSO	United States Air Force Space and Missile Systems Organization
USAF SCH OF AEROS MED	United States Air Force School of Aerospace Medicine, Brooks AFB
USN	United States Navy
USN AEROS MED RSCH LAB	United States Navy Aerospace Medicine Research Laboratory
UT	universal time
UV	ultraviolet
UVS	ultraviolet spectrometer

V	volt
VAR	variation
VHF	very high frequency
VHRR	very high resolution radiometer
VISSR	visible infrared spin-scan radiometer
VLF	very low frequency
VNBC	Vandenberg AFB (also referred to as WTR, Western Test Range)
VTPR	vertical temperature profile radiometer
W	watt
WALI	Wallops Island
WBVTR	wideband video tape recorder
WDC	World Data Center
WEFAX	weather facsimile
WKG GRP SPC PHYS RSCH	Working Group for Space Physics Research
WMO	World Meteorological Organization
WNK	Winkfield, England
WPM	words per minute
WRESAT	Weapons Research Establishment Satellite (Australia)
WS	Wallops Station (NASA)
WSMR	White Sands Missile Range
WTR	Western Test Range (also referred to as VNBC, Vandenberg AFB)
WWW	World Weather Watch
Z	atomic number

SECTION 1 - DESCRIPTIONS OF ACTIVE SPACECRAFT AND EXPERIMENTS

This section contains descriptions of spacecraft and experiments pertinent to this Report that were active as of September 30, 1973, and for which NSSDC has at least minimal documentation. All descriptions included in this section are ordered chronologically by NSSDC ID Code, which appears in the upper right-hand corner of the description.

Each spacecraft or experiment entry in this section is composed of three parts -- a heading, a brief description, and an indication of status and data acquisition rate. The headings list characteristics of satellites and experiments, respectively. The status information is based on quarterly reports from various spacecraft project offices, as well as personal contacts with the experimenters.

Contents of Spacecraft Entries

The heading for each spacecraft description in this section includes two sets of orbit parameters, i.e., initial orbit parameters calculated shortly after launch and recent orbit parameters. Each set of parameters consists of epoch date, orbit type, orbit period, apoapsis, periapsis, and inclination for the spacecraft. In addition, the heading contains the spacecraft weight in orbit, launch date, launch site, launch vehicle, spacecraft common and alternate names, funding agency (funding country and agency), and spacecraft personnel (project manager and project scientist). The spacecraft brief description is immediately below each heading.

The last reported change in spacecraft status and data acquisition rate is given following the spacecraft brief description. The spacecraft status is given as either "NORMAL" or "PARTIAL," while the spacecraft data acquisition rate is given as either "STANDARD" or "SUBSTANDARD."

Contents of Experiment Entries

Each experiment entry heading includes the experiment name and the name and address of the principal investigator for the experiment as well as other investigators associated with the experiment. The experiment brief description is immediately below each heading. The last reported change in the experiment status and data acquisition rate follows the experiment brief description. The experiment status is given as either "NORMAL" or "PARTIAL," and the experiment data acquisition rate is given as "STANDARD" or "SUBSTANDARD." The last reported change in spacecraft status and data acquisition rate is also repeated here for the reader's convenience.

NATIONAL SPACE SCIENCE DATA CENTER
ACTIVE SPACECRAFT AND EXPERIMENTS

SPACECRAFT COMMON NAME- PIONEER 6 NSSDC ID 65-105A
ALTERNATE NAMES- PIONEER-A, 01841

LAUNCH DATE- 12/16/65 SPACECRAFT WEIGHT IN ORBIT- 63.4 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 12/16/65 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 311.3 DAYS
APOAPSIS- .936 AU RAD PERIAPSIS- .8143 AU RAD INCLINATION- .1639 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 12/16/65 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 311.3 DAYS
APOAPSIS- .936 AU RAD PERIAPSIS- .8143 AU RAD INCLINATION- .1639 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALL NASA-ARC MOFFETT FIELD, CA
PS - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 6 WAS THE FIRST IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. ITS EXPERIMENTS STUDIED THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS FOR USE AT THE TWO HIGHEST BIT RATES. ANOTHER WAS FOR USE AT THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE WAS 512 BPS FROM DECEMBER 16, 1965 TO FEBRUARY 28, 1966, 256 BPS FROM MARCH 1, 1966 TO MARCH 17, 1966, 64 BPS FROM MARCH 18, 1966 TO APRIL 13, 1966, 16 BPS FROM APRIL 14, 1966 TO MAY 9, 1966, 8 BPS FROM MAY 10, 1966 TO DECEMBER 1970, AND 16 BPS FROM DECEMBER 1970 TO JULY 1971. THE SPACECRAFT WAS IN THE VICINITY OF THE EARTH UNTIL MID-1972, WHICH ALLOWED HIGHER BIT RATES TO BE UTILIZED.

THE REAL-TIME TRANSMISSION MODE WAS USED PREDOMINANTLY THROUGHOUT THE FLIGHT WHEN TRACKING STATIONS WERE AVAILABLE. BETWEEN TRACKING PERIODS, THE DUTY CYCLE STORE MODE WAS GENERALLY USED. DATA COVERAGE AMOUNTED TO ALMOST 100 PERCENT FOR THE FIRST 23 WEEKS AFTER LAUNCH. THEN THE COVERAGE DROPPED TO BETWEEN 10 AND 20 PERCENT UNTIL JULY 1970, AT WHICH TIME THE SPACECRAFT WAS AGAIN ABLE TO BE RECEIVED ON THE SMALLER ANTENNAS SO THAT DATA COVERAGE ROSE TO BETWEEN 20 AND 50 PERCENT. PIONEER 6 LEFT THE VICINITY OF THE EARTH, PASSING THROUGH THE BOW SHOCK AT A LOCAL TIME NEAR 6 P.M. THE SPACECRAFT SPIN RATE HAS REMAINED CLOSE TO NOMINAL AS OF JULY 1971. A LEAK IN THE ATTITUDE GAS SYSTEM PREVENTED FURTHER ATTITUDE CORRECTIONS FOLLOWING AN ADJUSTMENT MADE ON JUNE 9, 1966. HOWEVER, THE SENSORS THAT DETERMINED THE SPIN AXIS DIRECTION CONTINUED TO WORK AND INDICATED THAT THE SPIN AXIS DIRECTION REMAINED CLOSE TO NOMINAL AS OF JULY 1971. THE MAGNETOMETER EXPERIMENT HAS BEEN INOPERABLE SINCE JULY 1970.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR WIND PLASMA FARADAY CUP NSSDC ID 65-105A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI - A.J.	LAZARUS	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A MULTIGRID FARADAY CUP WITH TWO SEMICIRCULAR, COPLANAR COLLECTORS WAS USED TO STUDY SOLAR WIND IONS AND ELECTRONS. THE INSTRUMENT HAD 14 CONTIGUOUS, ENERGY-PER-CHARGE (E/Q) CHANNELS BETWEEN 75 AND 9485 V FOR POSITIVE IONS AND FOUR ENERGY-PER-CHARGE CHANNELS BETWEEN 90 AND 1580 V FOR ELECTRONS. THE INSTRUMENT VIEW AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS AND PARALLEL TO THE ECLIPTIC PLANE. THE LINE SEPARATING THE TWO COLLECTORS LAY IN THE ECLIPTIC PLANE, ENABLING A ROUGH DETERMINATION OF SOLAR WIND BULK FLOW PERPENDICULAR TO THE ECLIPTIC PLANE. DURING EVERY SECOND SPACECRAFT ROTATION AND AT ONE VOLTAGE LEVEL, THE SUM OF THE CURRENTS FROM THE COLLECTORS WAS OBTAINED IN 28 CONTIGUOUS 11.25-DEG ANGULAR SECTORS (FROM -45 DEG TO 270 DEG, WITH 0 DEG BEING THE SPACECRAFT-SUN LINE). THE EIGHT MEASUREMENTS ABOUT THE SUN-EARTH LINE (-45 DEG TO +45 DEG) WERE TELEMETERED, BUT ONLY THE LARGEST MEASUREMENT IN EACH SUCCEEDING 45-DEG INTERVAL (45 DEG TO 270 DEG) WAS TELEMETERED. IN ADDITION, DURING THIS ROTATION, THE CURRENT FROM ONE OF THE COLLECTORS WAS MEASURED IN ALL TWENTY-EIGHT 11.25-DEG SECTORS, AND THE LARGEST WAS IDENTIFIED AND TELEMETERED (BOTH MAGNITUDE AND SECTOR). A COMPLETE SET OF POSITIVE ION MEASUREMENTS AND ONE ENERGY CHANNEL OF ELECTRON MEASUREMENTS WERE COMPLETED EVERY 32 SEC. THE TIME BETWEEN EACH 32-SEC GROUP OF MEASUREMENTS VARIED WITH THE BIT RATE. FOR A MORE COMPLETE DESCRIPTION, SEE J. GEOPHYS. RES., 71, 3787-3791, AUGUST 1966.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY TELESCOPE NSSDC ID 65-105A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 13.9 MEV, 13.9 TO 73.2 MEV, 73.2 TO 175 MEV, AND E.GT. 175 MEV (CORRESPONDING TO DETECTOR COINCIDENCES D1NOTD2NOTD4, D1D2NOTD3NOTD4, D1D2D3NOTD4, AND NOTD1D2D3NOTD4). THE ALPHA PARTICLE ENERGY RANGES SAMPLED WERE 2.4 TO 55.6 MEV, 55.6 TO 293 MEV, AND E.GT. 293 MEV (CORRESPONDING TO THE FIRST THREE DETECTOR COINCIDENCES GIVEN ABOVE). THE TIME RESOLUTION RANGED FROM ABOUT ONE MEASUREMENT PER 0.4 SEC TO ABOUT ONE MEASUREMENT PER 28 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED SO THAT IT MADE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. PULSE HEIGHT ANALYSIS OF DETECTOR D1 OUTPUT (128 CHANNEL) AND D3 OUTPUT (32 CHANNEL) WAS ACCOMPLISHED FOR THE LAST EVENT PRIOR TO EACH TELEMETRY READOUT FOR THE EXPERIMENT. THE D3 DETECTOR FAILED ON OCTOBER 22, 1967. THE D4 DETECTOR PERFORMED INTERMITTENTLY UP TO LATE 1969.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 10/22/67, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY RADIO RECEIVER NSSDC ID 65-105A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - T.A.	CROFT	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY LENGTHENED BY ELECTRONS ALONG THE PATH. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS SEE 68-100A-03, 67-123A-03, 66-075A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 71, P. 3325-3327, AND IN RADIO SCIENCE, VOL. 6, P. 55-63.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY DETECTION NSSDC ID 65-105A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA
OI - W.C.	BARTLEY	U OF TEXAS	DALLAS, TX
OI - U.R.	RAO	U OF TEXAS	DALLAS, TEXAS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC-RAY FLUXES. THE PARTICLE DETECTOR WAS A CSI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICOINCIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL UNACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER. THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.4 TO 44.0, 44.0 TO 77.1, AND 123.8 TO 303.8 MEV. COUNTS IN THE TWO LOWER ENERGY WINDOWS WERE DUE MAINLY TO PROTONS WITH THE WINDOW ENERGIES, WHILE ONLY PARTICLES OF Z GREATER THAN OR EQUAL TO 2 CONTRIBUTED TO THE HIGHEST ENERGY WINDOW COUNT RATE. (PROTONS ABOVE 90 MEV GAVE ANTICOINCIDENCE PULSES.) FOR EACH ENERGY WINDOW, COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 89.5 DEG IN WIDTH, WITH THE SUN IN THE MIDDLE OF ONE SECTOR. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED, EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG, WITH THE SUN NEAR THE MIDPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE, IN WHICH ALL PARTICLES DEPOSITING 7.4 MEV IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED, WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 SEC AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. SEE THE SPACECRAFT BRIEF DESCRIPTION (65-105A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38, PAGE 266, 1967, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/07/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- PIONEER 7 NSSDC ID 66-075A
ALTERNATE NAMES- PIONEER-B, 02398

LAUNCH DATE- 08/17/66 SPACECRAFT WEIGHT IN ORBIT- 63.4 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 08/17/66 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 402.9 DAYS
APOAPSIS- 1.1250 AU RAD PERIAPSIS- 1.0100 AU RAD INCLINATION- .09767 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 08/17/66 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 402.9 DAYS
APOAPSIS- 1.1250 AU RAD PERIAPSIS- 1.0100 AU RAD INCLINATION- .09767 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALL NASA-ARC MOFFETT FIELD, CA
PS - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 7 WAS THE SECOND IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED APPROXIMATELY TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF 32 SEVEN-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED FOR THE TWO HIGHEST BIT RATES. ANOTHER WAS USED FOR THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM AUGUST 17, 1966, TO OCTOBER 23, 1966, 256 BPS FROM OCTOBER 25, 1966, TO NOVEMBER 6, 1966, 64 BPS FROM NOVEMBER 9, 1966, TO DECEMBER 16, 1966, 16 BPS FROM DECEMBER 16, 1966, TO MAY 15, 1967, AND 8 BPS FROM MAY 15, 1967, AND THEREAFTER. HIGHER BIT RATES WERE POSSIBLE WHEN THE SPACECRAFT WAS BEING TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE AT THESE TIMES WAS LOW. BY FEBRUARY 1968, ALL REAL-TIME DATA WERE BEING RECEIVED AT 8 BPS. DATA COVERAGE AVERAGED BETWEEN 50 AND 100 PERCENT COVERAGE FOR THE FIRST 30 WEEKS AFTER LAUNCH. THE DATA COVERAGE THEN FELL TO BETWEEN 20 AND 30 PERCENT UNTIL SEPTEMBER 1968. AFTER THIS TIME, IT DROPPED TO BETWEEN 0 AND 20 PERCENT THROUGH JULY 1971. REAL-TIME TRANSMISSION WAS GENERALLY USED WHEN TRACKING STATIONS WERE AVAILABLE. OTHERWISE, THE DUTY CYCLE STORE MODE WAS USED. SOMETIME BETWEEN FEBRUARY 9, 1969, AND FEBRUARY 16, 1969, THE SUN SENSOR THAT GENERATED THE SPACECRAFT SUN PULSES FOR ONBOARD SECTORING OF EXPERIMENTS FAILED. HOWEVER, THE REMAINING SUN SENSORS CONTINUED TO FUNCTION, THUS PERMITTING DETERMINATION OF THE SPIN AXIS DIRECTION UNTIL ABOUT JANUARY 1972. PIONEER 7 LEFT THE

VICINITY OF THE EARTH PASSING THROUGH THE LUNAR DISTANCE AT A LOCAL TIME OF ABOUT 3 A.M. THE MAGNETOMETER EXPERIMENT HAS BEEN INOPERABLE SINCE JANUARY 1969. THE TWO-FREQUENCY BEACON WAS PUT IN AN OPERATIONAL OFF MODE ON APRIL 1, 1967. THE CELESTIAL MECHANICS EXPERIMENT WAS PUT IN AN OPERATIONAL OFF MODE IN JULY 1970. THE SUPERIOR CONJUNCTION FARADAY ROTATION EXPERIMENT WAS PUT IN AN OPERATIONAL OFF MODE IN NOVEMBER 1971. AND THE FARADAY CUP EXPERIMENT BECAME INOPERABLE IN NOVEMBER 1972.

ON 08/17/66. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER NSSDC ID 66-075A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A QUADRISPHERICAL ELECTROSTATIC ANALYZER WITH EIGHT CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 16 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 200 TO 10,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN EIGHT LOGARITHMICALLY EQUISPACED ENERGY PER CHARGE STEPS RANGING FROM 0 TO 500 V. THE EIGHT COLLECTORS MEASURED PARTICLES INCIDENT FROM EIGHT DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). THERE WERE FOUR 15-DEG INTERVALS, TWO 20-DEG INTERVALS, AND TWO 30-DEG INTERVALS. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 15 AZIMUTHAL ANGULAR SECTORS. EIGHT OF THESE SECTORS WERE 5-5/8 DEG WIDE, WERE CONTIGUOUS, AND BRACKETED THE SOLAR DIRECTION. THE REMAINING SEVEN SECTORS WERE 45 DEG WIDE. THREE DIFFERENT MODES OF DATA COLLECTION WERE USED. AT THE HIGHEST BIT RATE (512 BPS), THE FULL SCAN MODE WAS ALTERNATED WITH THE MAXIMUM FLUX MODE AT EACH E/Q STEP. IN THE FULL SCAN MODE, THE MAXIMUM FLUX OBSERVED IN EACH OF THE 15 AZIMUTHAL SECTORS AS THE SPACECRAFT ROTATED WAS RECORDED FOR A GIVEN SINGLE COLLECTOR AT A GIVEN E/Q STEP. DURING 24 SUCCESSIVE OPERATIONS OF THE FULL SCAN MODE (48 SPACECRAFT REVOLUTIONS), THE 16 ION E/Q STEPS AND EIGHT ELECTRON E/Q STEPS WERE EXERCISED FOR A GIVEN COLLECTOR. DURING EIGHT SUCCESSIVE SUCH PERIODS, EACH OF THE EIGHT COLLECTORS WAS EXERCISED. THE FULL CYCLE OF FULL SCAN MODE DATA REQUIRED 400 SPACECRAFT REVOLUTIONS (ABOUT 400 SEC). SUCH CYCLES WERE REPEATED WITHOUT INTERRUPTION AT THE HIGH BIT RATE. IN THE MAXIMUM FLUX MODE, FOR THE E/Q STEP USED IN THE PRECEDING REVOLUTION OF FULL SCAN MODE OPERATION, ALL COLLECTORS WERE OBSERVED FOR ONE REVOLUTION, AND THE MAXIMUM FLUX OBSERVED WAS REPORTED ALONG WITH THE NUMBER OF THE COLLECTOR THAT OBSERVED IT AND THE ANGULAR DIRECTION (2-13/16-DEG RESOLUTION) OF THE OBSERVATION. AT THE NEXT HIGHEST BIT RATE (256 BPS), THE SHORT SCAN MODE WAS ALTERNATED EVERY SPACECRAFT REVOLUTION WITH THE MAXIMUM FLUX MODE. THE SHORT SCAN MODE WAS THE SAME AS THE FULL SCAN EXCEPT THAT ONLY THE PEAK FLUX IN EACH OF THE EIGHT 5-5/8-DEG-WIDE AZIMUTHAL SECTORS WAS RECORDED. THUS, THIS CYCLE ALSO TOOK 400 SPACECRAFT REVOLUTIONS. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE ALONE WAS USED. THUS, NO AZIMUTHAL DISTRIBUTIONS WERE MEASURED. AT THE LOW BIT RATES, IT TOOK 32 SEC FOR A COMPLETE SET OF ION MEASUREMENTS AND 16 SEC FOR A COMPLETE SET OF ELECTRON MEASUREMENTS. AT 64 BPS, THE ION AND ELECTRON MEASUREMENTS WERE TAKEN AND TELEMETERED EVERY 84 SEC. AT 16 BPS, THEY WERE TAKEN AND TELEMETERED EVERY 336 SEC. AT 8 BPS, THEY WERE TAKEN AND TELEMETERED EVERY 672 SEC.

ON 08/17/66, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/16/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY NSSDC ID 66-075A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA
OI - W.C.	BARTLEY	U OF TEXAS	DALLAS, TX
OI - U.R.	RAO	U OF TEXAS	DALLAS, TEXAS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC RAY FLUXES. THE PARTICLE DETECTOR WAS A CSI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICOINCIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL THAT WERE NOT ACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER. THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.2 TO 47.4, 47.4 TO 64.5, AND 64.5 TO 81.2 MEV. NO POSITIVE SPECIES IDENTIFICATION WAS MADE ALTHOUGH MOST OF THE COUNTS IN EACH WINDOW WERE USUALLY DUE TO PROTONS WITH THE WINDOW ENERGIES. FOR EACH ENERGY WINDOW, COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 89.5 DEG IN WIDTH, WITH THE SUN EITHER NEAR A SECTOR BOUNDARY OR IN THE MIDDLE OF A SECTOR, DEPENDING ON THE OPERATING MODE. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED, EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG, WITH THE SUN EITHER IN A SECTOR OR NEAR THE MIDPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE, IN WHICH ALL PARTICLES DEPOSITING 7.2 MEV IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED, WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. DIRECTIONAL FLUX DATA RELIABILITY WAS REDUCED BY THE MALFUNCTION OF THE SUN PULSE MECHANISM BETWEEN FEBRUARY 9 AND FEBRUARY 16, 1969. OTHERWISE, THE INSTRUMENT FUCTIONED NORMALLY, OBTAINING USEFUL OMNIDIRECTIONAL DATA, UNTIL SPACECRAFT TRACKING WAS REDUCED TO A NEGLIGIBLE AMOUNT ON JULY 15, 1972. SEE THE SPACECRAFT BRIEF DESCRIPTION (66-075A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38, PAGE 266, 1967, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 08/17/66, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/09/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY TELESCOPE NSSDC ID 66-075A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL

01 - C.Y. FAN U OF ARIZONA TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 12.7 MEV, 12.7 TO 73.0 MEV, 73.0 TO 165 MEV, AND E.GT. 165 MEV (CORRESPONDING TO DETECTOR COINCIDENCES D1D2NOTD4, D1D2NOTD3NOTD4, D1D2D3NOTD4, AN NOTD1D2D3NOTD4). THE ALPHA PARTICLE ENERGY RANGES SAMPLED WERE 2.5 TO 52 MEV, 52 TO 280 MEV, AND E.GT. 280 MEV (CORRESPONDING TO THE FIRST THREE DETECTOR COINCIDENCES). THE TIME RESOLUTION RANGED FROM ABOUT ONE MEASUREMENT PER 0.4 SEC TO ABOUT ONE MEASUREMENT PER 28 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED TO MAKE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. THE D3 DETECTOR FAILED ON MAY 26, 1969.

ON 08/17/66, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/26/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- PIONEER 8 NSSDC ID 67-123A
ALTERNATE NAMES- PIONEER-C, 03066

LAUNCH DATE- 12/13/67 SPACECRAFT WEIGHT IN ORBIT- 63.43 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 12/13/67 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 386.6 DAYS
APOAPSIS- 1.0880 AU RAD PERIAPSIS- .9892 AU RAD INCLINATION- .0578 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 12/13/67 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 386.6 DAYS
APOAPSIS- 1.0880 AU RAD PERIAPSIS- .9892 AU RAD INCLINATION- .0578 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALL NASA-ARC MOFFETT FIELD, CA
PS - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
PIONEER 8 WAS THE THIRD IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE

ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS WERE USED PRIMARILY FOR SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES, ANOTHER WAS USED AT THE THREE LOWEST BIT RATES. THE THIRD WAS USED FOR DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT WAS USED MAINLY FOR ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM DECEMBER 13, 1967 TO MARCH 20, 1968, 256 BPS FROM MARCH 20, 1968 TO MAY 6, 1968, 64 BPS FROM MAY 6, 1968 TO AUGUST 29, 1968, 16 BPS FROM AUGUST 29, 1968 TO JANUARY 1, 1970, AND 8 BPS FROM JANUARY 1, 1970 AND THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST YEAR AFTER LAUNCH. AFTER THAT, THE DATA COVERAGE AVERAGED BETWEEN 50 AND 80 PERCENT UNTIL NOVEMBER 1970. COVERAGE THEN DROPPED TO BETWEEN 50 AND 0 PERCENT. PIONEER 8 LEFT THE VICINITY OF THE EARTH PASSING THROUGH THE LUNAR DISTANCE AT A LOCAL TIME OF ABOUT 3 A.M. DURING A REORIENTATION MANEUVER IN MARCH 1968, ONE OF THE FOUR SUN SENSORS (WHICH WAS CONNECTED TO THE ATTITUDE GAS SYSTEM USED TO KEEP THE SPIN AXIS POINTED) WAS FOUND TO BE INOPERATIVE. IT WAS NOTED AT THIS TIME THAT THE SPACECRAFT ATTITUDE WAS OFF 4 DEG. ANOTHER ORIENTATION WAS ATTEMPTED IN JUNE 1968, AND IT WAS FOUND THAT THREE OF THE FOUR ATTITUDE SUN SENSORS WERE INOPERATIVE. THE PLASMA WAVE AND CELESTIAL MECHANICS EXPERIMENTS WERE PUT IN AN OPERATIONAL OFF MODE IN JULY 1972 AND JULY 1970, RESPECTIVELY.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SINGLE-AXIS MAGNETOMETER NSSDC ID 67-123A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - S.C.	CANTARANO	U OF ROME	ROME, ITALY
OI - F.	MARIANI	U OF AQUILA	AQUILA, ITALY

EXPERIMENT BRIEF DESCRIPTION

A SINGLE, BOOM-MOUNTED UNIAXIAL FLUXGATE MAGNETOMETER, WITH MODE-DEPENDENT RANGES OF PLUS OR MINUS 32 GAMMAS AND PLUS OR MINUS 96 GAMMAS AND CORRESPONDING RESOLUTIONS OF PLUS OR MINUS 0.125 GAMMA AND PLUS OR MINUS 0.375 GAMMA, OBTAINED A VECTOR MAGNETIC FIELD MEASUREMENT BY MEANS OF THREE MEASUREMENTS TAKEN AT EQUAL TIME INTERVALS DURING EACH SPACECRAFT SPIN PERIOD (APPROXIMATELY 1 SECOND). AT TELEMETRY BIT RATES LESS THAN OR EQUAL TO 16 BPS, AVERAGES WERE COMPUTED ON BOARD FOR TRANSMISSION TO EARTH.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER NSSDC ID 67-123A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 150 TO 15,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LOGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERO E/Q, OR BACKGROUND, STEP. IN OPERATION, THE ELECTRONS WERE MEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SPACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND BRACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - POLAR SCAN, AZIMUTHAL SCAN, AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 BPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE, ALL THREE COLLECTORS WERE OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE, THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE WAS USED AT EACH E/Q STEP FOLLOWED BY EITHER (1) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED, OR (2) FOR ELECTRONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MODE, ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEPS) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEPS). AT THE HIGH BIT RATES (512 AND 256 BPS) ONE SET OF ION MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64, 16, AND 8 BPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 28 SEC. AT 64 BPS, A COMPLETE SET OF MEASUREMENTS (SEVEN ION PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 BPS, IT TOOK 1610 SEC AND AT 8 BPS, IT TOOK 3220 SEC.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER NSSDC ID 67-123A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - T.A.	CROFT	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS, SEE 68-100A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 17, P. 3325-3327, AND IN RADIO SCIENCE, VOL. 6., P. 55-63.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC DUST DETECTOR NSSDC ID 67-123A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - O.E.	BERG	NASA-GSFC	GREENBELT, MD
OI - L.	SECRETAN	NASA-LARC	HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE COSMIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S ORBIT, (3) DETERMINE THE GRADIENT, FLUX DENSITY, AND SPEED OF PARTICLES IN METEOR STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION, WHICH WAS MOUNTED IN THE EQUATOR OF THE SATELLITE WITH ITS AXIS RADIAL TO THE SATELLITE SPIN AXIS FACING IN THE ECLIPTIC PLANE, CONSISTED OF A FRONT FILM-GRID SENSOR ARRAY AND A REAR FILM-GRID SENSOR ARRAY, SPACED FIVE CM APART, AND AN ACOUSTICAL IMPACT PLATE UPON WHICH THE REAR FILM WAS MOUNTED. THE SENSOR ARRAYS CONSISTED OF FOUR VERTICAL FILM STRIPS CROSSED BY FOUR HORIZONTAL GRID STRIPS TO FORM 16 FRONT AND 16 REAR FILM-GRID ARRAYS (EACH 2.5 CM SQ),

CREATING 256 POSSIBLE COMBINATIONS. EACH GRID STRIP AND FILM STRIP WAS CONNECTED TO A SEPARATE OUTPUT AMPLIFIER WHOSE SIGNALS WERE USED TO DETERMINE THE SEGMENT IN WHICH AN IMPACT OCCURRED. THE FRONT FILM SENSOR, WHICH WAS RECESSED THREE CM INTO THE EXPERIMENT HOUSING, CONSISTED OF AN 8-LAYER COMPOSITE -- 700-A PARYLENE ENCAPSULATION, 500-A COPPER, 300-A ALUMINUM, 3000-A PARYLENE SUBSTRATE, 300-A ALUMINUM, 500-A COPPER, SUPPORT MESH, AND 500-A PARYLENE ENCAPSULATION. EACH OF THE REAR SENSOR-ARRAY FILM STRIPS CONSISTED OF A 60-MICRON MOLYBDENUM SHEET CEMENTED TO A QUARTZ ACOUSTICAL SENSOR PLATE. THE OPERATION OF THE SENSORS WAS BASED ON TWO BASIC MEASURABLE PHENOMENA THAT OCCUR WHEN A HYPERVELOCITY PARTICLE IMPACTS ON A SURFACE -- (1) FORMATION OF PLASMA AND (2) TRANSFER OF MOMENTUM. WHEN THE FRONT FILM WAS PENETRATED BY A PARTICLE, A TIME-OF-FLIGHT 4-MHZ ELECTRONIC CLOCK WAS ACTIVATED. THE CLOCK WAS SHUT OFF WHEN THE PARTICLE IMPACTED ON THE REAR FILM THUS MEASURING PARTICLE SPEED AND DIRECTION. THREE GENERAL COSMIC DUST PARTICLE TYPES WERE DETECTABLE -- (1) HIGH-ENERGY, HYPERVELOCITY PARTICLES (GREATER THAN 1 ERG), WHICH PRODUCED RESPONSES AT BOTH FRONT AND REAR FILM SENSORS, (2) LOW-ENERGY, HYPERVELOCITY PARTICLES (LESS THAN 1 ERG), WHICH PRODUCED RESPONSES ONLY AT THE FRONT FILM SENSOR, AND (3) RELATIVELY LARGE HIGH-VELOCITY PARTICLES (GREATER THAN 0.1 NANOGRAMS) WHICH COULD PASS THROUGH THE FRONT AND REAR FILM SENSOR ARRAYS WITHOUT GENERATING A DETECTABLE PLASMA BUT COULD STILL IMPART A MEASURABLE IMPULSE TO THE ACOUSTICAL SENSOR. THE ACOUSTICAL SENSORS WERE DESIGNED TO PERFORM AN IN-FLIGHT STUDY ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR IN ADDITION TO PERFORMING AS AN IMPACT SENSOR FOR THIS EXPERIMENT. IN-FLIGHT CALIBRATION WAS PROVIDED AND INITIATED BY GROUND COMMAND AND MONITORED THE EXPERIMENT ELECTRONICS IN ADDITION TO PROVIDING A CHECK ON THE PHYSICAL CONDITION OF THE PLASMA SENSORS. THE SENSORS WERE CALIBRATED PRIOR TO THE FLIGHT BY IMPACTS WITH IRON SPHERES RANGING IN MASS FROM 1 NANOGRAM TO 0.1 PICOGRAM, ACCELERATED BY A 2-MV ELECTROSTATIC ACCELERATOR TO 2 TO 10 KM/SEC. THE MASSES, DENSITIES, AND SPEEDS, HOWEVER, WERE TOO NARROW IN RANGE TO PROVIDE ANY COMPREHENSIVE CALIBRATION WHEN USING REAL DATA.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY NSSDC ID 67-123A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA
OI - U.R.	RAO	U OF TEXAS	DALLAS, TEXAS
OI - W.C.	BARTLEY	U OF TEXAS	DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SOLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCIDENCE PLASTIC SCINTILLATOR AND HAD A CONICAL APERTURE WITH A 38.2-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SOLID-STATE DETECTOR, SUCH THAT EACH OF THE FIRST THREE DETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE OF 23-DEG HALF-ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW THAT PLANE, RESPECTIVELY. TWO CONCURRENT MODES OF COUNTING WERE EMPLOYED. IN THE FIRST MODE, COUNTS WERE ACCUMULATED IN EIGHT SEPARATE

45-DEG INTERVALS DURING THE SPACECRAFT SPIN. WHILE, IN THE SECOND, SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5 MEV/NUCLEON AND 19.7 TO 63.0 MEV/NUCLEON (NO SPECIES DISCRIMINATION) WHILE EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 3.3 TO 3.6 MEV AND 3.6 TO 6.7 MEV. IN THE SECOND MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5 AND 40 MEV/NUCLEON (INTERVAL LOWER LIMITS AT 4.5, 7.0, 9.8, 13, 21, AND 28 MEV/NUCLEON). WHILE EACH OF THE SOLID-STATE TELESCOPES SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 1 TO 8, 1 TO 5, 1 TO 3, AND 4 TO 6 MEV AND ALPHA PARTICLES IN THE ENERGY RANGE 4 TO 8 MEV. DURING EACH 244-BIT MAIN TELEMETRY FRAME, TWO FIRST-MODE 9-BIT ACCUMULATORS AND ONE SECOND-MODE 9-BIT ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF SOME OF THE ELECTRONICS WAS PERFORMED DAILY. SEE BUKATA ET AL., IEEE TRANS. NUC. SCI., NS-17, 18-24, 1970, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY GRADIENT DETECTOR NSSDC ID 67-123A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W.R. WEBBER U OF NEW HAMPSHIRE DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES, PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.34 AND 8.4 MEV, PROTONS IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 3.49 AND 64.3 MEV (ONE OF FIVE COUNT RATES WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS), AND ALPHA PARTICLES IN FOUR CONTIGUOUS ENERGY INTERVALS BETWEEN 6.64 AND 64.1 MEV/NUCLEON (ONE OF THREE COUNT RATES WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS). A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. THE EXPERIMENT FUNCTIONED WELL FROM LAUNCH THROUGH JANUARY 1973, ALTHOUGH, AT THE PRESENT LOW TELEMETRY BIT RATES, ACCUMULATOR SATURATION HAS RENDERED SOME COUNTING MODES TO BE OF NO VALUE. FOR FURTHER DETAILS, SEE J. GEOPHYS. RES., VOL. 76, PAGE 1605, 1971.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/25/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 37 NSSDC ID 68-017A
ALTERNATE NAMES- SOLRAD 9, 03141

LAUNCH DATE- 03/05/68 SPACECRAFT WEIGHT IN ORBIT- 433. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 03/06/68 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 98.68 MIN
APOAPSIS- 881.000 KM ALT PERIAPSIS- 513.000 KM ALT INCLINATION- 59.43 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 01/25/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 98.025 MIN
APOAPSIS- KM ALT PERIAPSIS- 501. KM ALT INCLINATION- 59.4082 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE NRL SOLRAD 9 SATELLITE WAS ONE OF A SERIES OF SATELLITES THAT BEGAN IN 1960 TO PROVIDE CONTINUOUS COVERAGE OF SOLAR RADIATION WITH A SET OF STANDARD PHOTOMETERS. SOLRAD 9 WAS A SPIN-STABILIZED SATELLITE ORIENTED WITH ITS SPIN AXIS PERPENDICULAR TO THE SUN-SATELLITE LINE SO THAT THE 14 SOLAR X-RAY AND UV PHOTOMETERS POINTING RADIALLY OUTWARD FROM ITS EQUATORIAL BELT VIEWED THE SUN WITH EACH REVOLUTION. DATA WERE SIMULTANEOUSLY TRANSMITTED VIA FM/AM TELEMETRY AND RECORDED IN A CORE MEMORY THAT READ OUT ITS CONTENTS ON COMMAND. INDIVIDUAL SCIENTISTS AND INSTITUTIONS ARE INVITED TO RECEIVE AND USE THE DATA TRANSMITTED ON THE 136-MHZ TELEMETRY BAND ON THE STANDARD IRIG CHANNELS 3 THROUGH 8.

ON 03/05/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR RADIATION DETECTORS NSSDC ID 68-017A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF 14 DETECTORS COVERING THE RANGES 20 TO 80 KEV, 0.5 TO 60 A, AND 1080 TO 1350 A. THE DETECTORS WERE DESIGNED TO MEASURE WAVELENGTH AND FLUX SHIFTS OF SOLAR RADIATION DURING PERIODS OF LOW AND HIGH SOLAR ACTIVITY. THE DETECTORS WERE STANDARDIZED PHOTOMETERS SIMILAR TO THOSE FLOWN ON SOLRAD 8. DATA FROM THREE PAIRS OF THESE DETECTORS COVERING THE RANGE 0.5 TO 16 A WERE STORED IN THE ONBOARD MEMORY TO PROVIDE FULL TIME COVERAGE, WHILE THE OTHER DATA WERE TRANSMITTED IN REAL TIME ONLY. (REAL-TIME DATA WERE RECORDED FOR AT LEAST 10 MIN PER ORBIT.) THE UV AND 20- TO 80-KEV DETECTORS FAILED SHORTLY AFTER LAUNCH.

ON 03/05/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/30/68, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- PIONEER 9 NSSDC ID 68-100A
ALTERNATE NAMES- PIONEER-D, PL-684K, 03533

LAUNCH DATE- 11/08/68 SPACECRAFT WEIGHT IN ORBIT- 63.4 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 11/08/68 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 297.6 DAYS
APOAPSIS- .9905 AU RAD PERIAPSIS- .7542 AU RAD INCLINATION- .086509 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 11/08/68 ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 297.6 DAYS
APOAPSIS- .9905 AU RAD PERIAPSIS- .7542 AU RAD INCLINATION- .086509 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALL NASA-ARC MOFFETT FIELD, CA
PS - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 9 WAS THE FOURTH IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ALSO, A NEW CODING PROCESS WAS IMPLEMENTED FOR PIONEER 9. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES, ANOTHER WAS USED AT THE THREE LOWEST BIT RATES, AND THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE

TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS OF UP TO 15 HR, AS LIMITED BY THE DIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM NOVEMBER 8, 1968 TO JANUARY 15, 1969, 256 BPS FROM JANUARY 16, 1969 TO JANUARY 29, 1969, 64 BPS FROM JANUARY 30, 1969 TO MARCH 27, 1969, 16 BPS FROM MARCH 28, 1969 TO MAY 3, 1969, AND 8 BPS FROM MAY 3, 1969 AND THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. THE DATA COVERAGE AVERAGED CLOSE TO 100 PRCENT FOR THE FIRST 29 WEEKS AFTER LAUNCH. AFTER THIS, DATA COVERAGE DROPPED TO CLOSE TO 50 PERCENT UNTIL DECEMBER AND IT AVERAGED LESS THAN 30 PERCENT THROUGH JULY 1971. PIONEER 9 LEFT THE VICINITY OF THE EARTH PASSING THROUGH THE BOW SHOCK AT A LOCAL TIME OF 7 P.M. THE NEW CODING PROCESS INCREASED THE COMMUNICATIONS RANGE OF THE SATELLITE AT EACH BIT RATE. THE CELESTIAL MECHANICS EXPERIMENT WAS PUT INTO AN OPERATIONALLY OFF MODE IN FEBRUARY 1971.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- THREE-AXIS MAGNETOMETER NSSDC ID 68-100A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.P. SONETT NASA-ARC MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
A BOOM-MOUNTED, TRIAXIAL FLUXGATE MAGNETOMETER WAS USED TO STUDY THE INTERPLANETARY MAGNETIC FIELD AND ITS FLUCTUATIONS. THE SENSORS WERE ORTHOGONALLY MOUNTED WITH ONE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS. UPON COMMAND, A MOTOR INTERCHANGED A SENSOR IN THE SPIN PLANE WITH THE SENSOR ALONG THE SPIN AXIS, ENABLING INFLIGHT DETERMINATION OF ZERO LEVELS. EVERY 24 HR, THE INSTRUMENT WAS COMMANDED INTO A SELF-CALIBRATE SEQUENCE, AND THIS WAS OFTEN REPEATED AFTER THE SENSORS WERE FLIPPED. THE INSTRUMENT, WHICH HAD A DYNAMIC RANGE OF PLUS OR MINUS 200 GAMMAS WITH A RESOLUTION OF PLUS OR MINUS 0.2 GAMMA, WAS CAPABLE OF INFLIGHT DEMODULATION OF THE SIGNALS RECEIVED FROM THE TWO SENSORS IN THE SPIN PLANE. EACH MAGNETIC FIELD COMPONENT WAS DIGITIZED INTO A 10-BIT TELEMETRY WORD. NINE MAGNETIC FIELD COMPONENTS, COMPRISING THREE MAGNETIC FIELD VECTORS, WERE TRANSMITTED IN EACH SPACECRAFT TELEMETRY FRAME.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ELECTROSTATIC ANALYZER NSSDC ID 68-100A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 150 TO 15,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LOGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERO E/Q, OR BACKGROUND, STEP. IN OPERATION, THE ELECTRONS WERE MEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SPACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND BRACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - POLAR SCAN, AZIMUTHAL SCAN, AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 BPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE, ALL THREE COLLECTORS WERE OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE, THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE WAS USED AT EACH E/Q STEP FOLLOWED BY EITHER (1) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED, OR (2) FOR ELECTRONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MODE, ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEPS) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEPS). AT THE HIGH BIT RATES (512 AND 256 BPS) ONE SET OF ION MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64, 16, AND 8 BPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 28 SEC. AT 64 BPS, A COMPLETE SET OF MEASUREMENTS (SEVEN ION PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 BPS, IT TOOK 1610 SEC, AND, AT 8 BPS, IT TOOK 3220 SEC.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER NSSDC ID 68-100A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - T.A.	CROFT	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 4.6-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY

TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS FOR OTHER TIME PERIODS SEE 67-123A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 17, PP. 3325-3327, AND IN RADIO SCIENCE, VOL. 6,, PP. 55-63.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC DUST DETECTOR NSSDC ID 68-100A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - O.E. BERG NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE COSMIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S ORBIT, (3) DETERMINE THE GRADIENT, FLUX DENSITY, AND SPEED OF PARTICLES IN METEOR STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION WAS IDENTICAL TO THAT CARRIED ON PIONEER 8, CONSISTING ESSENTIALLY OF TWO THIN FILM-GRID DETECTORS (SEPARATED BY A DISTANCE OF 5 CM) THAT PRODUCED AN ELECTRICAL SIGNAL WHEN THE FILM WAS PENETRATED BY A MICROMETEOROID. EACH FILM HAD A SENSITIVE AREA OF 100 SQ CM AND WAS COMPOSED OF 16 SEGMENTS THAT PROVIDED BOTH THE DIRECTION AND THE TIME-OF-FLIGHT NEEDED FOR THE METEOROID TO TRAVERSE THE 5-CM DISTANCE BETWEEN THE FRONT FILM AND REAR FILM SENSOR. THE COMBINED RESULTS OF THE PIONEER 8 AND 9 COSMIC DUST EXPERIMENTS LENT STRONG SUPPORT TO THE HYPOTHESIS THAT THE BULK OF METEOROID DUST IS OF COMETARY ORIGIN.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY NSSDC ID 68-100A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K.G. MCCRACKEN U OF ADELAIDE ADELAIDE, AUSTRALIA

OI - U.R. RAO U OF TEXAS DALLAS, TEXAS
OI - W.C. BARTLEY U OF TEXAS DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SOLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCIDENCE PLASTIC SCINTILLATOR AND HAD A CONICAL APERTURE WITH A 38.2-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SOLID-STATE DETECTOR SUCH THAT EACH OF THE FIRST THREE DETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE OF 23-DEG HALF-ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW THAT PLANE, RESPECTIVELY. TWO CONCURRENT MODES OF COUNTING WERE EMPLOYED. IN THE FIRST MODE, COUNTS WERE ACCUMULATED IN EIGHT SEPARATE 45-DEG INTERVALS DURING THE SPACECRAFT SPIN, WHILE, IN THE SECOND, SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5 MEV/NUCLEON AND 19.7 TO 63.0 MEV/NUCLEON (NO SPECIES DISCRIMINATION) WHILE EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 3.3 TO 3.6 MEV AND 3.6 TO 6.7 MEV. IN THE SECOND MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5 AND 40 MEV/NUCLEON (INTERVAL LOWER LIMITS AT 4.5, 7.0, 9.6, 13, 21, AND 28 MEV/NUCLEON), WHILE EACH OF THE SOLID-STATE TELESCOPES SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 1 TO 6, 1 TO 5, 1 TO 3, AND 4 TO 6 MEV AND ALPHA PARTICLES IN THE ENERGY RANGE 4 TO 8 MEV. DURING EACH 224-BIT MAIN TELEMETRY FRAME, TWO FIRST-MODE 9-BIT ACCUMULATORS AND ONE SECOND-MODE 9-BIT ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF SOME OF THE ELECTRONICS WAS PERFORMED DAILY. SEE BUKATA ET AL., IEEE TRANS. NUC. SCI., NS-17, PP. 18-24, 1970, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC-RAY TELESCOPE NSSDC ID 68-100A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W.R. WEBBER U OF NEW HAMPSHIRE DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES, PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.31 AND 5.1 MEV, PROTONS IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 2.2 AND 42 MEV, AND ALPHA PARTICLES IN THOSE CONTIGUOUS ENERGY INTERVALS BETWEEN 5.8 AND 42 MEV/NUCLEON. A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE

TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. AT THE PRESENT LOW TELEMETRY BIT RATES, THE DATA IS RATHER SPARSE.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- PLASMA WAVE DETECTOR NSSDC ID 68-100A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - I.M.	GREEN	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - G.M.	CROOK	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - R.W.	FREDERICKS	TRW SYSTEMS GROUP	REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

ELECTROSTATIC AND ELECTROMAGNETIC PLASMA WAVES WERE MEASURED IN THE SOLAR WIND NEAR 1 AU USING AN UNBALANCED ELECTRIC DIPOLE ANTENNA. THE 423-MHZ STANFORD UNIVERSITY ANTENNA, WHICH SERVED AS THE SENSOR, WAS CAPACITIVELY COUPLED TO THREE TELEMETRY CHANNELS. CHANNEL 1 WAS A 15-PERCENT BANDPASS FILTER CENTERED AT 400 HZ. CHANNEL 2 WAS A 15-PERCENT BANDPASS FILTER CENTERED AT 30 KHZ. THESE CHANNELS WERE EACH SAMPLED 64 TIMES PER TELEMETRY SEQUENCE. CHANNEL 3 WAS A BROADBAND 100-HZ TO 100-KHZ CHANNEL. THE BROADBAND CHANNEL WAS FED INTO A COUNT RATE METER THAT MEASURED THE NUMBER OF POSITIVE GOING PULSES PER UNIT TIME HAVING AMPLITUDES LARGE ENOUGH TO CROSS THE PRESENT TRIGGER LEVEL. THE TRIGGER LEVEL WAS VARIED THROUGH EIGHT STEPS EIGHT TIMES PER TELEMETRY SEQUENCE. THE TRIGGER LEVELS, TOGETHER WITH THE COUNT RATE AT EACH LEVEL, GAVE A MEASURE OF THE BROADBAND POWER SPECTRUM. THE TELEMETRY SEQUENCE WAS REPEATED OVER TIME INTERVALS FROM 7 MIN 28 SEC TO 472 MIN 52 SEC, WITH MOST OF THE DATA OBTAINED AT 59 MIN 44 SEC PER TELEMETRY SEQUENCE DURING THE FIRST YEAR OF ACQUISITION. THIS IMPLIES THAT ONE 8-STEP PULSE HEIGHT ANALYSIS AND EIGHT 400-HZ AND 30-KHZ MEASUREMENTS WERE MADE EVERY 7 MIN 28 SEC.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/19/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- ESSA 8 NSSDC ID 68-114A
ALTERNATE NAMES- PL-691A, TOS-F, 03615

LAUNCH DATE- 12/15/68 SPACECRAFT WEIGHT IN ORBIT- 132. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES ESSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 12/16/68 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 114.7 MIN
APOAPSIS- 1473.00 KM ALT PERIAPSIS- 1410.00 KM ALT INCLINATION- 101.90 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 114.60 MIN
APOAPSIS- 1462.50 KM ALT PERIAPSIS- 1411.88 KM ALT INCLINATION- 101.642 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.W. JONES NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ESSA 8 WAS A SUN-SYNCHRONOUS OPERATIONAL METEOROLOGICAL SATELLITE DESIGNED TO PROVIDE REAL-TIME EARTH CLOUDCOVER TV PICTURES TO PROPERLY EQUIP GROUND RECEIVING STATIONS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE SATELLITE HAD ESSENTIALLY THE SAME CONFIGURATION AS THAT OF A TIROS SPACECRAFT, I.E., AN 18-SIDED RIGHT PRISM, 107 CM ACROSS OPPOSITE CORNERS AND 56 CM HIGH, WITH A REINFORCED BASEPLATE CARRYING MOST OF THE SUBSYSTEMS AND A COVER ASSEMBLY (HAT). ELECTRICAL POWER WAS PROVIDED BY APPROXIMATELY 10,000 1- BY 2-CM SOLAR CELLS THAT WERE MOUNTED ON THE COVER ASSEMBLY AND BY 21 NICKEL-CADMIUM BATTERIES. TWO REDUNDANT WIDE-ANGLE AUTOMATIC PICTURE TRANSMISSION (APT) CAMERAS WERE MOUNTED ON OPPOSITE SIDES OF THE SPACECRAFT WITH THEIR OPTICAL AXES PERPENDICULAR TO THE SPIN AXIS. PROJECTING DOWNWARD FROM THE BASEPLATE WERE A PAIR OF CROSSED-DIPOLE COMMAND RECEPTION ANTENNAS. A MONOPOLE TELEMETRY (136.500 MHZ) AND TRACKING (136.770 MHZ) ANTENNA EXTENDED OUTWARD FROM THE TOP OF THE COVER ASSEMBLY. THE SATELLITE SPIN RATE WAS CONTROLLED BY MEANS OF A MAGNETIC ATTITUDE SPIN COIL (MASC), WITH THE SPIN AXIS MAINTAINED NORMAL TO THE ORBITAL PLANE (CARTWHEEL ORBIT MODE) TO WITHIN PLUS OR MINUS 1 DEG. THE MASC WAS A CURRENT-CARRYING COIL MOUNTED IN THE COVER ASSEMBLY. THE MAGNETIC FIELD INDUCED BY THE CURRENT INTERACTED WITH THE EARTH'S MAGNETIC FIELD TO PROVIDE THE TORQUE NECESSARY TO MAINTAIN A DESIRED SPIN RATE OF 10.9 RPM.

ON 12/15/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM NSSDC ID 68-114A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION
THE ESSA 8 AUTOMATIC PICTURE TRANSMISSION (APT) SUBSYSTEM WAS A CAMERA AND TRANSMITTER COMBINATION DESIGNED TO TRANSMIT REAL-TIME, DAYLIGHT, SLOW-SCAN TELEVISION PICTURES OF CLOUDCOVER TO ANY PROPERLY EQUIPPED GROUND RECEIVING STATIONS. THE CAMERA SYSTEM CONSISTED OF TWO REDUNDANT APT CAMERAS WITH 2.54-CM-DIAM VIDICONS. EACH CAMERA HAD A 108-DEG WIDE-ANGLE F/1.8 OBJECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM. THE CAMERAS WERE MOUNTED 180 DEG APART ON THE SIDE OF THE SPACECRAFT, WITH THEIR OPTICAL AXES PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THE CAMERAS WERE PROGRAMMED TO TAKE FOUR OR EIGHT APT PICTURES PER ORBIT. THE ACTUAL PICTURE TAKING REQUIRED 8 SEC AND THE TRANSMISSION 200 SEC. EARTH-CLOUD IMAGES WERE RETAINED ON THE PHOTOSENSITIVE SURFACE OF THE VIDICON AND WERE READ OUT AT FOUR LINES PER SECOND TO PRODUCE AN 800-LINE PICTURE. TWO 5-W TV

TRANSMITTERS (137.5 MHZ) RELAYED THE PICTURES TO LOCAL APT STATIONS WITHIN COMMUNICATION RANGE. THE FACEPLATE OF THE VIDICON HAD RETICLE MARKS THAT APPEARED ON THE PICTURE FORMAT TO AID IN RELATING THE PICTURE TO ITS GEOGRAPHICAL POSITION ON THE EARTH'S SURFACE. AT NOMINAL SATELLITE ATTITUDE AND ALTITUDE (APPROXIMATELY 1450 KM), A PICTURE COVERED A 3100- BY 3100-KM SQUARE WITH A HORIZONTAL RESOLUTION OF ABOUT 4 KM AT NADIR. THERE WAS A 30 PERCENT OVERLAP EETWEEN PICTURES ALONG THE TRACK TO ENSURE COMPLETE COVERAGE. A SHIFT IN CAMERA NUMBER 2 VIDICON SCANNING OCCURRED IN THE SPRING OF 1969, AND ITS OPERATION HAS BEEN LIMITED SINCE THAT TIME. IDENTICAL EXPERIMENTS WERE FLOWN ON ESSA 2, 4, AND 6. APT DATA ARE PRIMARILY INTENDED FOR OPERATIONAL USE WITHIN THE LOCAL APT ACQUISITION STATION. HOWEVER, COPIES OF PICTURES TAKEN OVER THE UNITED STATES ARE MAINTAINED ON FILE AT NOAA-NESS, SUITLAND, MARYLAND.

ON 12/15/68, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/00/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- ISIS 1 NSSDC ID 69-009A
ALTERNATE NAMES- ISIS-A, 03669

LAUNCH DATE- 01/30/69 SPACECRAFT WEIGHT IN ORBIT- 389. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
CANADA CRC
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
EPOCH DATE- 01/29/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 128.35 MIN
APOAPSIS- 3524. KM ALT PERIAPSIS- 561. KM ALT INCLINATION- 88.4174 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 128.21 MIN
APOAPSIS- 3514.80 KM ALT PERIAPSIS- 574.20 KM ALT INCLINATION- 88.429 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	J.E. JACKSON	NASA-GSFC	GREENBELT, MD
PM -	J.H. WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO
PS -	J.H. WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
PS -	J.E. JACKSON	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ISIS 1 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH SWEEP FREQUENCY AND FIXED FREQUENCY IONOSONDES, A VLF RECEIVER, ENERGETIC AND SOFT PARTICLE DETECTORS, AN ION MASS SPECTROMETER, AN ELECTROSTATIC PROBE, AN ELECTROSTATIC ANALYZER, A BEACON TRANSMITTER, AND A COSMIC NOISE EXPERIMENT. THE SOUNDER USED TWO LONG DIPOLE ANTENNAS (76.9 M AND 20.2 M LONG, RESPECTIVELY). THE SATELLITE WAS SPIN STABILIZED AT ABOUT 2.9 RPM AFTER ANTENNA DEPLOYMENT. SOME CONTROL COULD BE EXERCISED OVER THE SPIN RATE AND ATTITUDE BY USING MAGNETICALLY-INDUCED TORQUES TO CHANGE THE SPIN RATE AND

TO PRECESS THE SPIN AXIS. A TAPE RECORDER WITH 1-HR CAPACITY WAS INCLUDED ON THE SATELLITE. THE SATELLITE COULD BE PROGRAMMED TO TAKE RECORDED OBSERVATIONS FOR FOUR DIFFERENT TIME PERIODS FOR EACH FULL RECORDING PERIOD. THE RECORDER WAS DUMPED ONLY AT OTTAWA. FOR NON-TAPE-RECORDED OBSERVATIONS, DATA FOR THE SATELLITE AND SUBSATELLITE REGIONS COULD BE OBSERVED AND TELEMETERED WHEN THE SPACECRAFT WAS IN THE LINE OF SIGHT OF TELEMETRY STATIONS. THE SELECTED TELEMETRY STATIONS WERE IN AREAS THAT PROVIDED PRIMARY DATA COVERAGE NEAR THE 80-DEG W MERIDIAN, PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. NO TAPE-RECORDED DATA WERE AVAILABLE AFTER JANUARY 30, 1970, BECAUSE OF FAILURE OF THE RECORDER. THE ION MASS SPECTROMETER FAILED ABOUT 3 DAYS AFTER LAUNCH. INITIALLY, 6 TO 9 HOURS OF OBSERVATIONS WERE MADE DAILY, BUT BY THE SPRING OF 1973, ONLY 4 TO 5 HOURS OF OBSERVATIONS PER DAY WERE BEING MADE. THE DECREASE IN OBSERVATION TIME WAS DUE TO A COMBINATION OF FUNDING AND POWER LIMITATIONS, AND SCHEDULING.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER NSSDC ID 69-009A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H. WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - G.E.K. LOCKWOOD	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - G.L. NELMS	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - J.E. JACKSON	NASA-GSFC	GREENBELT, MD
OI - J.W. KING	RSRS	SLOUGH, BUCKS, ENGLAND
OI - J. TURNER	DEPARTMENT OF INTERIOR	SYDNEY, AUSTRALIA
OI - M. SYLVAIN	CNRS	ST MAUR, FRANCE
OI - O. HOLT	AURORAL OBS	TROMSO, NORWAY
OI - Y. OGATA	RRL	TOKYO, JAPAN
OI - R. RAGHAVARAO	PHYSICAL RESEARCH LAB	AHMEDABAD, INDIA

EXPERIMENT BRIEF DESCRIPTION

THE ISIS 1 IONOSONDE WAS A RADIO TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND A RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.1 AND 20 MHZ WAS SAMPLED ONCE EVERY 19 OR 29 SEC, AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO SOUNDED FOR A PERIOD OF 3 TO 5 SEC DURING THIS 19- OR 29-SEC PERIOD. IN ADDITION TO THE SWEEP AND FIXED FREQUENCY MODES OF OPERATION, A MIXED MODE WAS POSSIBLE WHERE THE TRANSMITTER FREQUENCY WAS FIXED AT 0.82 MHZ WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL HEIGHT (DELAY TIME) TRACES WERE NORMALLY OBSERVED DUE TO GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NON-VERTICAL PROPAGATION, ETC. VIRTUAL HEIGHT AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM SHOWING VIRTUAL HEIGHT AS A FUNCTION OF FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- FIXED FREQUENCY SOUNDER NSSDC ID 69-009A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.	CALVERT	NOAA	BOULDER, CO
OI - R.B.	NORTON	NOAA-ERL	BOULDER, CO
OI - J.M.	WARNOCK	NOAA	BOULDER, CO
OI - G.L.	NELMS	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - G.E.K.	LOCKWOOD	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - J.H.	WHITTEKER	COMM RESEARCH CENTRE	OTTAWA ONTARIO,CANADA
OI - C.E.	PETRIE	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLY-BACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 19 OR 29 SEC. ONE OF SIX FREQUENCIES (0.25, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE, INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY, AND A SPECIAL MIXED MODE WITH TRANSMISSION AT THE FIXED FREQUENCY OF 0.82 MHZ AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST YEAR AFTER LAUNCH.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- VLF RECEIVER NSSDC ID 69-009A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.E.	BARRINGTON	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VLF EXPERIMENT WAS A LOW-FREQUENCY, BROADBAND RECEIVER THAT SENSED SIGNALS RECEIVED BY THE 79-M DIPOLE (SPLIT MONOPOLE) ANTENNA, BETWEEN .05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING FREQUENCIES BELOW 5 MHZ ON THE IONOSONDE. THE RECEIVER HAD A WIDE DYNAMIC RANGE (80 DB) THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL SYSTEM. THIS VLF EXPERIMENT INCLUDED AN OPTIONAL-USE ONBOARD EXCITER THAT OPERATED OVER A FREQUENCY CYCLE FROM ZERO TO .3 TO ZERO TO ELEVEN TO ZERO KHZ OVER A 3.5-SEC "FRAME" PERIOD. THE TRANSMISSION AT .3 KHZ OCCURRED FOR ABOUT 2 SEC, THE NON-LINEAR SWEEP TO 11 KHZ REQUIRED 0.9 SEC, TRANSMISSION AT 11 KHZ FOR ABOUT 0.3 SEC, AND THE NON-LINEAR SWEEP BACK TO ZERO TOOK ABOUT 0.3 SEC. THE FRAMES SEQUENCED THROUGH FOUR STEPS WHERE THE TRANSMISSIONS WERE ATTENUATED BY ZERO, 20, 20, THEN 40 DB, THUS REQUIRING 14 SEC FOR ONE COMPLETE CYCLE OF EXCITER OPERATION. THE EXCITER TRANSMITTED ON THE SHORT ANTENNAS AND THE

RECEIVER SENSED THE SIGNALS COUPLED BETWEEN THE TWO ANTENNAS BY THE AMBIENT PLASMA, PLUS ANY NOISE SIGNALS WHICH WERE EXCITED IN THE PLASMA. EXCITER OPERATION PERMITTED THE CONTROLLED STUDY OF ION RESONANCES IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE. THIS VLF EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08 MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE-RECORDER CHANNELS DURING THE TIME THE TAPE RECORDER OPERATED (TO JANUARY 1970). TAPE-RECORDED (AND BACK-UP REAL TIME) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY. FURTHER DETAILS CAN BE FOUND IN THE 'ISIS A TECHNICAL PLAN.'

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS NSSDC ID 69-009A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - I.B. MCDIARMID NATIONAL RSCH COUNCIL OTTAWA, ONTARIO, CANADA
OI - J.R. BURROWS NATIONAL RSCH COUNCIL OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE FIRST SET, COMPRISING FOUR GEIGER COUNTERS, MEASURED ELECTRONS GREATER THAN 20 AND 40 KEV AND PROTONS GREATER THAN 300 AND 500 KEV PARALLEL TO AND PERPENDICULAR TO THE SATELLITE SPIN AXIS. ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO THE SPIN AXIS. THE SECOND SET CONSISTED OF SOLID-STATE SILICON JUNCTION DETECTORS. THESE RESPONDED TO ELECTRONS GREATER THAN 25 AND 140 KEV, ELECTRONS IN THE RANGE 200 TO 770 KEV, AND PROTONS GREATER THAN 200 AND 400 KEV. THE THIRD SET CONSISTED OF 5 SILICON JUNCTION DETECTORS WHICH RESPONDED TO PROTONS BETWEEN 0.15 AND 30 MEV. THE FOURTH SET CONSISTED OF CESIUM IODIDE SCINTILLATION-PHOTOMULTIPLIER SYSTEMS. EACH SYSTEM OPERATED IN TWO MODES, AND RESPONDED TO ELECTRONS GREATER THAN 8, 40, AND 60 KEV AND PROTONS GREATER THAN 50 KEV AND IN THE RANGE 50 TO 70 KEV.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE NSSDC ID 69-009A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.H. BRACE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS

CURRENT-VOLTAGE PROFILE. THE ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 48.3 CM FROM THE SC, ALONG THE SPIN AXIS, AND WAS CENTERED AMONG THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNDISTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE THAT WAS FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE OUTER (0.24-CM DIAM AND 23-CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 23 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED FROM THE SAWTOOTH VOLTAGE (-2 TO PLUS 10V) APPLIED TO THE COLLECTOR. THIS CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM SQ, AND TEMPERATURES FROM ABOUT 400 TO 50,000 DEG K.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPHERICAL ELECTROSTATIC ANALYZER NSSDC ID 69-009A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.C. SAGALYN AFCRL BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THE SPHERICAL ELECTROSTATIC ANALYZER (SEA) EXPERIMENT WAS TO OBTAIN, BY DIRECT IN SITU MEASUREMENTS, A DESCRIPTION OF THE TEMPORAL AND SPATIAL VARIATIONS IN THE CONCENTRATIONS AND TEMPERATURES OF THE CHARGED PARTICLES, THROUGH THE ALTITUDE RANGE COVERED BY THE ISIS 1 SPACECRAFT. SPECIFICALLY, THE INSTRUMENTATION WAS DESIGNED TO MEASURE, 1 - THE ABUNDANCE OF THE THERMAL ION SPECIES THAT HAD CONCENTRATIONS FROM 10 IONS TO 6 TIMES 10 TO THE SIXTH IONS PER CC, USING A LOGARITHMIC DC AMPLIFIER INPUT CIRCUIT, 2 - THE KINETIC TEMPERATURES OF THERMAL IONS IN THE RANGE 700 TO 4000 DEG K, 3 - THE FLUX AND ENERGY SPECTRUM OF PROTONS IN THE RANGE 0-2 KEV, AND 4 - THE SPACECRAFT POTENTIAL WITH RESPECT TO THE UNDISTURBED AMBIENT PLASMA. THE SENSOR WAS COMPOSED OF CONCENTRIC SPHERICAL MESHED GRIDS WHICH ENCLOSED AN INNER COLLECTOR. THE GRID ELECTRODES WERE MADE OF TUNGSTEN MESH AND HAD A TRANSPARENCY OF 80 TO 90 PERCENT. THE SENSOR ASSEMBLY WAS MOUNTED ON A BOOM WHICH WAS DEPLOYED AFTER THE SOUNDER EXPERIMENT ANTENNA WAS EXTENDED.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RADIO BEACON NSSDC ID 69-009A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - P.A. FORSYTH WESTERN ONTARIO U LONDON, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DEVISED TO STUDY THE IONOSPHERIC IRREGULARITIES GIVING SPECIAL ATTENTION TO THE DISTURBED IONOSPHERIC CONDITIONS. BEACON TRANSMITTERS ABOARD THE SATELLITE RADIATED POLARIZED RADIO EMISSIONS ON COMMAND, AT 136.41 AND 137.95 MHZ. THE SIGNAL POLARIZATION, THE AMPLITUDE OF THE SIGNAL, THE RELATIVE PHASE OF THE SIGNAL, AND THE INCIDENT DIRECTION OF THE SIGNAL WERE OBSERVED FROM GROUND STATIONS. COINCIDENT OBSERVATIONS WERE MADE AT STATIONS ABOUT 100 WAVELENGTHS APART. FROM KNOWN SPACECRAFT POSITION INFORMATION AND THESE OBSERVATIONS, IONOSPHERIC IRREGULARITIES COULD BE ALMOST COMPLETELY DESCRIBED IN TERMS OF HEIGHT, HORIZONTAL SIZE AND SHAPE, ELECTRON PEAK CONCENTRATION, AND RADIAL DISTRIBUTION OF ELECTRONS. AN IMPORTANT PART OF THESE DESCRIPTIONS WAS TO ORIGINATE FROM THE COMPUTED VALUES OF TOTAL ELECTRON CONTENT (TEC) OBTAINED PRIMARILY FROM THE POLARIZATION AND PHASE OBSERVATIONS. THE BEACON HAS BEEN OPERABLE SINCE LAUNCH, BUT IT HAS BEEN IMPRACTICAL TO OBTAIN TEC MEASUREMENTS DUE TO POOR CHARACTERISTICS OF THE BEACON ANTENNA RADIATION PATTERN. USEFUL DATA HAVE BEEN OBTAINED FROM THE INCIDENT DIRECTION, PHASE, AND AMPLITUDE MEASUREMENTS. REFERENCE 'ISIS TECHNICAL PLAN,' PP. 84, 85 FOR FURTHER DETAILS.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC RADIO NOISE NSSDC ID 69-009A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T.R. HARTZ COMM RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT USED THE SWEEP-FREQUENCY IONOSONDE RECEIVER AUTOMATIC GAIN CONTROL VOLTAGE TO MEASURE GALACTIC AND SOLAR RADIO NOISE LEVELS. THE RECEIVER SWEPT FROM 0.1 TO 20 MHZ. THE DYNAMIC RANGE WAS 50 DB, AND THE BANDWIDTH WAS 55 KHZ. THE ANTENNAS USED WERE 18.75-M AND 73.15-M DIPOLES.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 01/30/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- OVS-6 NSSDC ID 69-046B
ALTERNATE NAMES- ERS 26, 03951

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT IN ORBIT- 1 0.44 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 05/24/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3115.2 MIN
APOAPSIS- 111636. KM ALT PERIAPSIS- 16923. KM ALT INCLINATION- 32.86 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 06/25/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3115.5 MIN
APOAPSIS- 121165. KM ALT PERIAPSIS- 7378.69 KM ALT INCLINATION- 27.434 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.H. REYNOLDS AFCRL BEDFORD, MA
PS - K. YATES AFCRL BEDFORD, MA

SPACECRAFT BRIEF DESCRIPTION
THE SATELLITE HAS A OCTAGONAL CONFIGURATION, IS SPIN-STABILIZED, AND WAS PLACED IN A MODERATELY ELLIPTICAL EARTH ORBIT (ECCENTRICITY = 0.670) BY A TITAN 3C ON MAY 23, 1969. THE PURPOSE OF THE SATELLITE IS TO MONITOR X RAY, ELECTRON, AND PROTON RADIATION ASSOCIATED WITH SOLAR ACTIVITY IN ORDER TO DEVELOP DATA HANDLING TECHNIQUES IN NEAR REAL-TIME FOR USE BY THE AIR WEATHER SERVICE FORECAST CENTER IN FORECASTING SOLAR FLARES.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GEIGER-MUELLER TUBE, SOLAR X-RAY DETECTOR, 2 TO 12 A NSSDC ID 69-046B-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
TWO IDENTICAL GEIGER-MUELLER TUBES (EON 6213) WERE MOUNTED IN MUTUALLY ORTHOGONAL POSITIONS AT 45 DEG AND 135 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. THESE DETECTORS, WHICH HAVE MICA WINDOWS, MEASURED THE SOLAR X-RAY FLUX IN THE 2- TO 12-A BAND. THIS EXPERIMENT HAD AN END-OF-LIFE TIMER SET TO TERMINATE OPERATION IN MID 1970. HOWEVER THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SODIUM IODIDE SCINTILLATOR, GAMMA-RAY DETECTOR, 19 TO 1175 KEV NSSDC ID 69-046B-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WAS TO MONITOR SOLAR RADIATION FLUX IN FOUR BANDS RANGING FROM HARD X RAYS TO HARD GAMMA RAYS. A DETECTOR CONSISTING OF A SODIUM IODIDE CRYSTAL PHOTOMULITPLIER (DOPED WITH THALLIUM) WAS USED TO MEASURE SOLAR ELECTROMAGNETIC RADIATION IN THE 19- TO 76-KEV, 76- TO 232-KEV, 232- TO 1175-KEV, AND GREATER THAN 1175 KEV BANDS. THE SODIUM IODIDE CRYSTAL IS 0.5 IN. IN DIAMETER AND 0.5 IN. LONG, AND WAS CONTAINED IN A HERMETICALLY--SEALED ALUMINUM CAN WITH WALLS 0.010 IN. THICK. THE THICKNESS OF THE WALLS DETERMINED THE LOWER LIMIT OF THE DETECTOR'S SENSITIVITY. THE DETECTOR HAD AN AUTOMATIC END-OF-LIFE TIMER SET TO TERMINATE OPERATION IN MID-1970. HOWEVER, THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PROTON ALPHA PARTICLE TELESCOPE NSSDC ID 69-046B-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
THIS TELESCOPE CONSISTS OF TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS. THE INSTRUMENT LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. PROTONS IN THE ENERGY RANGES 6.3-8, 8-17, 17-40, AND 40-100 MEV AND ALPHA PARTICLES IN THE ENERGY RANGES 20-32, 32-68, AND 68-100 MEV ARE MEASURED SEPARATELY. THE SATELLITE ROTATES A SIGNIFICANT AMOUNT DURING EACH COUNTING INTERVAL.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 08/12/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- LOW-ENERGY ELECTRON DETECTOR NSSDC ID 69-046B-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. YATES AFCRL BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
A PLASTIC SCINTILLATOR DETECTOR MEASURES THE OMNIDIRECTIONAL FLUXES OF ELECTRONS WITH ENERGIES GREATER THAN 40 KEV. THE DETECTOR HAS WORKED WELL FROM LAUNCH TO THE PRESENT (SEPTEMBER 1973).

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- VELA 5A NSSDC ID 69-046D
ALTERNATE NAMES- VELA 9 (TRW), 03954, VELA 5A (USAF)

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT IN ORBIT- 259.01 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6720. MIN
APOAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION- 32.3 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6720. MIN
APOAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION- 32.3 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN USAF, SAMSO SAN BERNARDINO, CA
PS - J.H. COON LOS ALAMOS SCI LAB LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION
VELA 5A WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE FIFTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 5A, AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES, HAD BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRON DETECTOR NSSDC ID 69-046D-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY NSSDC ID 69-046D-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	KLEBESADEL	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - I.B.	STRONG	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - R.A.	OLSON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.2 TO 1.0 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH, COUPLED WITH THE ISOTROPIC RESPONSE, IS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 150 COUNTS/SEC.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- VELA 5B NSSDC ID 69-046E
ALTERNATE NAMES- VELA 10 (TRW), 03955, VELA 5B (USAF)

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT IN ORBIT- 259.01 KG

LAUNCH SITE- VANDENEERG AFB, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6720. MIN
APOAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION- 32.8 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 05/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6720. MIN
APOAPSIS- 112000. KM ALT PERIAPSIS- 111000. KM ALT INCLINATION- 32.8 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	UNKNOWN	USAF, SAMSO	SAN BERNARDINO, CA
PS - J.H.	COON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION
VELA 5B WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 5B, AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES, HAD BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A NSSDC ID 69-046E-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.H.	CHAMBERS	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.C.	FULLER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - W.E.	KUNZ	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAMBERS HAD A 1- TO 8-A WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND A 1- TO 16-A AND A 44- TO 60-A RANGE, RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE BETWEEN THE

LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORDED NEARLY 4-PI STERADIAN COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A, AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES NSSDC ID 69-046E-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLID-STATE DE/DX VS E PARTICLE DETECTOR.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON DETECTORS NSSDC ID 69-046E-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAY IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND EXPERIMENT NSSDC ID 69-046E-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - H.E.	FELTHAUSER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RESISTANCE CAPACITOR (RC) TIME CONSTANTS. PARTICLES IN A 6-DEG BY 100-DEG FAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DURING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE DETECTOR UNIT WAS USED TO STUDY MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 KV AND 8.3 KV. THE OTHER DETECTOR UNIT, WHICH FAILED, WAS DESIGNED TO STUDY SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 18.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC RAYS NSSDC ID 69-046E-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.P.	CONNER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - W.D.	EVANS	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - R.D.	BELIAN	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE COSMIC X-RAY DETECTOR WAS A LARGE-AREA (26 CM SQUARED) SODIUM IODIDE SCINTILLATOR WITH A 5-MIL BERYLLIUM WINDOW. THE EXPERIMENT WAS DESIGNED TO PROVIDE MEASUREMENTS OF THE LOCATION, INTENSITY, AND INTENSITY VARIATIONS OF NONSOLAR X-RAY SOURCES OVER A LONG PERIOD OF TIME. THE DETECTOR WAS SENSITIVE TO X-RAY PHOTONS IN TWO ENERGY INTERVALS - (3 TO 6 KEV AND 3 TO 12 KEV), AND WAS SUFFICIENTLY SENSITIVE TO MONITOR FROM SIX TO TWELVE GALACTIC X-RAY SOURCES. ANY ONE SOURCE WAS VIEWED FOR APPROXIMATELY 1 HR, AND EVERY 2 DAYS EACH SOURCE WAS BACK IN VIEW. THREE MODES OF READOUT WERE AVAILABLE - (1) THE REAL TIME NORMAL MODE, IN WHICH COUNTS FROM EACH ENERGY CHANNEL WERE TRANSMITTED EVERY SEC, (2) THE HIGH RESOLUTION MODE, IN WHICH ONLY THE 3- TO 12-KEV CHANNEL WAS TRANSMITTED EIGHT TIMES PER SEC, (3) THE STORE MODE, IN WHICH ONLY THE 3- TO 12-KEV CHANNEL WAS STORED.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRON DETECTOR NSSDC ID 69-046E-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - S.J. BAME LOS ALAMOS SCI LAB LOS ALAMOS, NM
OI - J.R. ASBRIDGE LOS ALAMOS SCI LAB LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/23/69, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- ATS 5 NSSDC ID 69-069A
ALTERNATE NAMES- PL-6928, ATS-E, GGSE, 04068

LAUNCH DATE- 08/12/69 SPACECRAFT WEIGHT IN ORBIT- 821. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- ATLAS-AGEN

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 08/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1463. MIN
APOAPSIS- 36894.0 KM ALT PERIAPSIS- 35760.0 KM ALT INCLINATION- 2.6 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 08/23/69 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1463. MIN
APOAPSIS- 36894.0 KM ALT PERIAPSIS- 35760.0 KM ALT INCLINATION- 2.6 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCE NASA-GSFC GREENBELT, MD
PS - T.L. AGGSON NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ATS 5 WAS AN EQUATORIAL-ORBITING, SYNCHRONOUS-ALTITUDE TECHNOLOGY SATELLITE INTENDED TO TEST VARIOUS COMMUNICATIONS AND EARTH OBSERVATIONAL SYSTEMS. ALSO INCLUDED ON BOARD WERE PARTICLE, ELECTRIC FIELD, AND MAGNETIC

FIELD EXPERIMENTS. BECAUSE OF A MALFUNCTION, THE INTENDED GRAVITY GRADIENT STABILIZATION MECHANISM COULD NOT BE DEPLOYED, AND ATS 5 WAS STABILIZED IN A SPINNING MODE ABOUT SPACECRAFT Z AXIS AT APPROXIMATELY 71 RPM. ALL EXPERIMENTS WHICH DEPENDED ON THE PLANNED GRAVITY GRADIENT STABILIZATION WERE ADVERSELY AFFECTED TO VARYING DEGREES, AND THE MISSION WAS DECLARED A FAILURE. HOWEVER, SOME OF THE SCIENCE EXPERIMENTS, INCLUDING THE MAGNETIC FIELD MONITOR AND THE PARTICLE EXPERIMENTS, RETURNED USABLE DATA DURING THE OPERATIONAL LIFETIME OF THE MISSION. ATS 5 WAS POSITIONED AT ABOUT 105 DEG W LONGITUDE OVER THE PACIFIC OCEAN. DATA WERE RECORDED ABOUT 60 PERCENT OF THE TIME THROUGH MOST OF THE SPACECRAFT'S OPERATIONAL LIFETIME, WHICH EXTENDED TO JUNE 1, 1973. AFTER WHICH THE ACQUISITION RATE DECREASED FURTHER.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR — NSSDC ID 69-069A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.E. MCILWAIN — U OF CALIFORNIA, SD — SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION

THREE PLASTIC SCINTILLATOR DETECTORS, EACH WITH A 2-PI SOLID ANGLE FIELD OF VIEW, MEASURED ELECTRONS IN 12 INTERVALS IN THE ENERGY RANGE 0.5 TO 5 MEV. SOLAR COSMIC RAYS WITH ENERGIES GREATER THAN 12, 16, AND 24 MEV WERE ALSO MEASURED. THE DETECTORS HAVE FUNCTIONED NORMALLY FROM LAUNCH TO AUGUST 1972 AFTER WHICH TIME THE DATA ACQUISITION WAS LIMITED TO SELECTED TIMES. THE SPACECRAFT SPIN DID NOT DEGRADE THE EXPERIMENT DATA.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 08/00/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE DETECTOR — NSSDC ID 69-069A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - F.S. MOZER — U OF CALIFORNIA, BERK — BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF THREE ESSENTIALLY IDENTICAL SCINTILLATION PHOTOMULTIPLIER DETECTORS, EACH INTENDED TO MEASURE (SEPARATELY) ELECTRONS AND PROTONS IN THREE ENERGY WINDOWS CENTERED RESPECTIVELY AT 40, 75, AND 120 KEV AND 60,120, AND 165 KEV. TWO DETECTORS, LOOKING IN OPPOSITE DIRECTIONS, WERE TILTED BY 12 DEG FROM THE SATELLITE Z AXIS AND ONE WAS ORIENTED PERPENDICULAR TO THIS CONFIGURATION. OVER MOST OF ITS DATA COLLECTING LIFETIME, THE SATELLITE WAS SPINNING ABOUT ITS Z AXIS, WITH A SPIN PERIOD OF 0.78 SEC. DUE TO AN UNPLANNED SPACECRAFT SPIN SOON AFTER LAUNCH, A SHUTTER SYSTEM WAS ACTIVATED THAT RENDERED THE PERPENDICULAR DETECTOR INEFFECTIVE. THEREFORE, MEASUREMENTS WERE MADE ONLY IN DIRECTIONS APPROXIMATELY PARALLEL AND ANTIPARALLEL TO THE LOCAL MAGNETIC FIELD. THE SPECIES ANALYSIS WAS PERFORMED BY A THREE-CHANNEL PULSE-HEIGHT ANALYZER, AND PARTICLE COUNTS WERE TELEMETERED IN BOTH ANALOG AND DIGITAL MODES. THE INTEGRATION TIME FOR EACH CHANNEL WAS 0.01 SEC, WHILE THE READOUT RATE FOR ANY ONE CHANNEL VARIED FROM

0.2 TO 5.12 SEC. DEPENDING ON A COMMANDABLE READOUT MODE. FOR FURTHER INFORMATION CONSULT -- "DEVELOPMENT OF A DOUBLE-LAYERED SCINTILLATOR FOR SEPARATING AND DETECTING LOW-ENERGY PROTONS AND ELECTRONS," BY F. S. MOZER, F. H. BOGOTT, AND C. W. BATES, JR., IEEE TRANS. ON NUCL. SCI., NS-15 (3), 144, 1965.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR — NSSDC ID 69-069A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.E.	MCILWAIN	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - R.W.	FILLIUS	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - S.	DEFOREST	U OF CALIFORNIA, SD	SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS DETECTOR MEASURED ELECTRONS AND PROTONS IN 62 LOGARITHMICALLY EQUISPACED INTERVALS IN THE ENERGY RANGE 50 EV TO 50 KEV. FOUR CURVED-PLATE ELECTROSTATIC ANALYZERS AND CHANNELTRON MULTIPLIERS WERE USED. TWO APERTURES WITH 5 X 8 DEG VIEW ANGLES LOOKED PARALLEL TO, AND PERPENDICULAR TO, THE SPACECRAFT SPIN AXIS, RESPECTIVELY. THE DEFLECTION VOLTAGE WAS PROGRAMMED FOR EITHER A SCAN MODE (ONE STEP PER FRAME) OR A PEAK TRACKING MODE. IN THE SCAN MODE, A COMPLETE SEQUENCE (62 STEPS) WAS OBTAINED IN 20.5 SEC.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 08/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RADIO BEACON — NSSDC ID 69-069A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.V.	DAROSA	STANFORD U	STANFORD, CA
OI - O.K.	GARRIOTT	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF PHASE-COHERENT RADIO FREQUENCIES CONTINUOUSLY TRANSMITTED AT 137.350 AND 412.050 MHZ (3RD HARMONIC). THE TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH WAS CALCULATED BY ANALYSIS OF THE FARADAY ROTATION ANGLE MEASUREMENTS ON THE LOWER FREQUENCY, OR ANALYSIS OF DIFFERENTIAL DOPPLER FREQUENCY RECORDINGS OF BOTH FREQUENCIES. IONOSPHERIC IRREGULARITIES AND SCINTILLATION WAS ALSO OBSERVED.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID 69-069A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - M.	SUGIURA	NASA-GSFC	GREENBELT, MD
OI - R.A.	LANGEL	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO STUDY THE PROCESSES TAKING PLACE ON THE AURORAL MAGNETIC SHELLS. IT WAS ALSO INTENDED TO PROVIDE CORRELATIVE DATA FOR THE OTHER EXPERIMENTS ON THE SATELLITE. THE EXPERIMENT WAS PART OF THE MAGNETIC STABILIZATION SYSTEM THAT WAS THE BACKUP FOR THE GRAVITY-GRADIENT STABILIZATION SYSTEM. THE SENSOR SYSTEM CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER. THE SYSTEM MEASURED THE MAGNETIC FIELD ALONG THREE AXES BY COMBINING A FINE RANGE (PLUS AND MINUS 25 GAMMAS) AND A COARSE RANGE OF 32 INCREMENTS (32.8 GAMMAS EACH) TO GIVE THE TOTAL RANGE OF PLUS AND MINUS 500 GAMMAS. THE FINE AND COARSE READINGS WERE SAMPLED ON THE PFM TELEMETRY AT 5.12-SEC INTERVALS. THE FINE READINGS ONLY WERE RECORDED ON THE PCM TELEMETRY AT 2.57-SEC INVERVALS. THE PCM COARSE READINGS WERE SUBCOMMUTATED AT 95-SEC INTERVALS. A 10-GAMMA CALIBRATION PULSE WAS INITIATED TWICE A DAY FOR 5.6 MIN. THE FAST SPIN RATE OF THE SATELLITE, THE SLOW SAMPLE RATE OF THE DATA, AND THE RESULTING ALIASING PROBLEMS DEGRADED THE DATA IN THE SPIN PLANE. THE MAGNETOMETER ITSELF HAD OPERATED SATISFACTORILY SINCE LAUNCH AND HAD ABOUT A 50 PERCENT COVERAGE UP TO THE TIME WHEN THE SPACECRAFT WAS TURNED OFF.

ON 06/01/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- APOLLO 12 LM/ALSEP NSSDC ID 69-099C
ALTERNATE NAMES- 04246, ALSEP 12, LEM 12, APOLLO 12C

LAUNCH DATE- 11/14/69 SPACECRAFT WEIGHT IN ORBIT- 4379. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES NASA-OMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING. WHEN THE ASCENT STAGE FUNCTIONED AS A

SINGLE SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). INCLUDED IN THE DESCENT STAGE WERE THE SIX APOLLO LUNAR SCIENTIFIC EXPERIMENT PACKAGE (ALSEP) EXPERIMENTS AND THE LUNAR SURFACE EXPERIMENT. THE ALSEP EXPERIMENTS INCLUDED (1) THE PASSIVE SEISMOGRAPH, WHICH WAS DESIGNED TO MEASURE SEISMIC ACTIVITY AND PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR, (2) THE SUPRATHERMAL ION DETECTOR, DESIGNED TO MEASURE THE FLUX COMPOSITION, ENERGY, AND VELOCITY OF LOW-ENERGY POSITIVE IONS, (3) THE COLD CATHODE ION GAUGE, DESIGNED TO MEASURE THE ATMOSPHERE AND ANY VARIATIONS WITH TIME OR SOLAR ACTIVITY SUCH ATMOSPHERE MAY HAVE, (4) THE CHARGED PARTICLE LUNAR ENVIRONMENT, DESIGNED TO MEASURE PARTICLE ENERGIES OF SOLAR PROTONS AND ELECTRONS THAT REACH THE LUNAR SURFACE AND TO PROVIDE DATA ON ENERGY DISTRIBUTION OF THESE SOLAR PARTICLES, (5) THE LUNAR SURFACE MAGNETOMETER (LSM) DESIGNED TO MEASURE THE MAGNETIC FIELD AT THE LUNAR SURFACE, AND (6) THE SOLAR WIND SPECTROMETER, WHICH MEASURED THE STRENGTH, VELOCITY, AND DIRECTIONS OF THE ELECTRONS AND PROTONS THAT EMANATE FROM THE SUN AND REACH THE LUNAR SURFACE.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND SPECTROMETER NSSDC ID 69-099C-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.W.	SNYDER	NASA-JPL	PASADENA, CA
OI - D.R.	CLAY	NASA-JPL	PASADENA, CA
OI - M.M.	NEUGEBAUER	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR WIND SPECTROMETER WAS PART OF THE ALSEP PACKAGE LEFT ON THE LUNAR SURFACE BY APOLLO 12. IT CONSISTED OF SEVEN MODULATED FARADAY CUPS OPENED TOWARD DIFFERENT, BUT SLIGHTLY OVERLAPPING, PORTIONS OF THE LUNAR SKY. THE INSTRUMENT WAS USED TO OBSERVE THE DIRECTIONAL INTENSITIES OF THE ELECTRON (6-1330 EV) AND POSITIVE ION (18-9780 EV) COMPONENTS OF THE SOLAR WIND AND MAGNETOTAIL PLASMA THAT STRIKE THE SURFACE OF THE MOON. THE SOLAR WIND SPECTROMETER OPERATED WELL FROM TURN-ON UNTIL NOVEMBER 5, 1971, WHEN TROUBLE WAS ENCOUNTERED IN TWO OF THE SPECTRAL ENERGY LEVELS.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/05/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC NSSDC ID 69-099C-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.V.	LATHAM	U OF TEXAS	GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP PACKAGE. IT WAS LOCATED AND DEPLOYED 310 FT FROM THE LM IN THE VICINITY OF SURVEYOR III. THE SEISMOGRAPH EXPERIMENT MEASURED SEISMIC ACTIVITY OF THE MOON AND OBTAINED INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE DETECTED SURFACE TILT PRODUCED BY

TIDAL DEFORMATIONS MOONQUAKES, AND METEORITE IMPACTS. IT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE A SENSOR ASSEMBLY, LEVELING STOOL, THERMAL SHROUD, AND RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION WHICH TRANSMITTED THE DATA BACK TO EARTH.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR NSSDC ID 69-099C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.W. FREEMAN RICE U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, WHICH WAS PART OF THE ALSEP PACKAGE, STUDIED THE IONIC ENVIRONMENT OF THE MOON BY DETECTING FREE STREAMING AND THERMALIZED SOLAR WIND IONS AND THOSE IONS WHICH RESULT FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE. A LOW-ENERGY CURVED PLATE ANALYZER, WITH A VELOCITY FILTER OF CROSSED ELECTRIC AND MAGNETIC FIELDS, DETERMINED THE PARTICLE FLUX IN SELECTED INTERVALS OVER THE RANGE 0.2 TO 48.6 EV PER UNIT CHARGE, ALLOWING SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU. ANOTHER ANALYZER WITHOUT A VELOCITY FILTER DETECTED HIGHER-ENERGY PARTICLES, AS IN THE SOLAR WIND, IN SELECTED ENERGY INTERVALS BETWEEN 10 AND 3500 EV. DUE TO THE ORIENTATION OF THE INSTRUMENT, THIS EXPERIMENT, EXCEPT IN THE SHEATH AND TAIL, DID NOT MAKE DIRECT SOLAR WIND MEASUREMENTS. HOWEVER, IT DID SEE UPSTREAMING PARTICLES, ETC., FROM THE SHOCK. HIGH-VOLTAGE POWER SUPPLY ARCING- CAUSED SOME LOSS OF DATA. AFTER MARCH 18, 1970, THE INSTRUMENT WAS NOT OPERATED WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C.

ON 11/19/69, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/18/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- NIMBUS 4 NSSDC ID 70-025A
ALTERNATE NAMES- NIMBUS-D, PL-701E, 04362

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT IN ORBIT- 585. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- THORAD-AGE

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS

EPOCH DATE- 05/04/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 107.1 MIN
APOAPSIS- 1097.00 KM ALT PERIAPSIS- 1090.00 KM ALT INCLINATION- 99.9007 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 107.12 MIN
APOAPSIS- 1099.26 KM ALT PERIAPSIS- 1087.52 KM ALT INCLINATION- 99.845 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - H.	PRESS	NASA-GSFC	GREENBELT, MD
PS - W.P.	NORDBERG	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

NIMBUS 4, THE FOURTH IN A SERIES OF SECOND-GENERATION METEOROLOGICAL R AND D SATELLITES, WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A RING-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) THE CONTROL HOUSING UNIT, WHICH WAS CONNECTED TO THE SENSOR MOUNT BY A TRUSS STRUCTURE, SHAPED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS 4 WAS NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M ACROSS WITH SOLAR PADDLES EXTENDED. THE TORUS-SHAPED SENSOR MOUNT, WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS RING PROVIDED A MOUNTING SPACE FOR SENSORS AND TELEMETRY ANTENNAS. AN H-FRAME STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER EXPERIMENTS AND TAPE RECORDERS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS LOCATED ON TOP OF THE SPACECRAFT, WERE SUN SENSORS, HORIZON SCANNERS, GAS NOZZLES FOR ATTITUDE CONTROL, AND A COMMAND ANTENNA. USE OF AN ADVANCED ATTITUDE CONTROL SUBSYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG FOR ALL THREE AXES (PITCH, ROLL, AND YAW). PRIMARY EXPERIMENTS CONSISTED OF (1) AN IMAGE DISSECTOR CAMERA SYSTEM (IDCS) FOR PROVIDING DAYTIME CLOUDCOVER PICTURES BOTH IN REAL-TIME AND RECORDED MODES, (2) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAYTIME AND NIGHTTIME SURFACE AND CLOUDTOP TEMPERATURES AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (3) AN INFRARED INTERFEROMETER SPECTROMETER (IRIS) FOR MEASURING THE EMISSION SPECTRA OF THE EARTH/ATMOSPHERE SYSTEM, (4) A SATELLITE INFRARED SPECTROMETER (SIRS) FOR DETERMINING THE VERTICAL PROFILES OF TEMPERATURE AND WATER VAPOR IN THE ATMOSPHERE, (5) A MONITOR OF ULTRAVIOLET SOLAR ENERGY (MUSE) FOR DETECTING SOLAR UV RADIATION, (6) A BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER FOR MONITORING THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE, (7) A FILTER WEDGE SPECTROMETER (FWS) FOR ACCURATE MEASUREMENT OF IR RADIANCE AS A FUNCTION OF WAVELENGTH FROM THE EARTH/ATMOSPHERE SYSTEM, (8) A SELECTIVE CHOPPER RADIOMETER (SCR) FOR DETERMINING THE TEMPERATURES OF SIX SUCCESSIVE 10-KM LAYERS IN THE ATMOSPHERE FROM ABSORPTION MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND, AND (9) AN INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) FOR LOCATING, INTERROGATING, RECORDING, AND RETRANSMITTING METEOROLOGICAL AND GEOPHYSICAL DATA FROM REMOTE COLLECTION STATIONS. THE SPACECRAFT OPERATION WAS A SUCCESS, AND IT PERFORMED NORMALLY UNTIL APRIL 8, 1971, WHEN THE YAW GYRO FAILED, CAUSING THE SPACECRAFT TO FACE BACKWARDS IN ORBIT. IT WAS SUCCESSFULLY TURNED AROUND ON MAY 12, 1971. YAW PROBLEMS CONTINUED TO AFFECT THE SPACECRAFT THEREAFTER.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR UV MONITOR NSSDC ID 70-025A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.F.	HEATH	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 MONITOR OF ULTRAVIOLET SOLAR ENERGY (MUSE) EXPERIMENT WAS DESIGNED (1) TO LOOK FOR TEMPORAL VARIATIONS IN THE SOLAR UV FLUX IN FIVE BANDS FROM 1150 TO 3300 A, (2) TO MEASURE THE SOLAR FLUX IN THESE REGIONS, AND (3) TO MEASURE THE ATMOSPHERIC ATTENUATION AT THESE WAVELENGTHS AS THE SENSORS ON BOARD VIEWED THE SETTING SUN AFTER THE SPACECRAFT HAD CROSSED THE TERMINATOR IN THE NORTHERN HEMISPHERE. THE SENSORS HAD THEIR MAXIMUM RESPONSES AT 1216 A (PLUS A 1350- TO 1600-A CONTINUUM), 1800 A, 2100 A, 2800 A, AND 2600 A (INCLUDING A 2600- TO 3300-A INTERVAL). THE 1216-A, 1800-A, AND 2600-A SENSORS WERE IDENTICAL TO THOSE CARRIED ON NIMBUS 3, WHILE THE 2100-A AND 2800-A SENSORS, UTILIZING INTERFERENCE FILTERS, WERE NEW AND REPLACED THE TWO THAT MALFUNCTIONED ON NIMBUS 3. THE MUSE INSTRUMENT, WHICH CONSISTED OF FIVE VACUUM PHOTODIODES HOUSED IN AN ELECTRONICS PACKAGE AND A SENSOR PACKAGE, WAS MOUNTED IN THE REAR OF THE NIMBUS SPACECRAFT. ALL SENSORS EXCEPT THE 1216-A PHOTODIODE HAD SEMITRANSPARENT PHOTOCATHODES THAT WERE DEPOSITED ON AN ALUMINUM OXIDE WINDOW. THE 1216-A SENSOR HAD A SOLID TUNGSTEN CATHODE. THE SPECTRAL REGIONS OF THE SUN TO WHICH THREE OF THE SENSORS RESPONDED (1216 A, 1800 A, AND 2600 A) WERE DETERMINED BY FILTER TRANSMITTANCE ON THE SHORT WAVELENGTH SIDE, WHILE THE LONG WAVELENGTH CUTOFFS WERE PRODUCED BY THE VARYING DEGREES OF OPACITY OF THE PHOTOCATHODE MATERIALS. THE SHORTWAVE CUTOFFS FOR THE 2100-A AND 2800-A SENSORS, HOWEVER, WERE OBTAINED BY THE INTERFERENCE FILTERS, WHILE THE CESIUM TELLURIDE PHOTOCATHODE PROVIDED THE LONGWAVE CUTOFF. THE APPROPRIATE BANDS OF UV FLUX ENTERED THE PHOTODIODES AND PRODUCED A CURRENT THAT WAS MEASURED BY AN ELECTROMETER AND DIGITIZED BY THE NIMBUS VERSATILE INFORMATION PROCESSOR (VIP) SYSTEM. THE VIP DATA WERE STORED ON MAGNETIC TAPE AND TRANSMITTED ON PLAYBACK TO THE DATA ACQUISITION FACILITY. THE INSTRUMENT COULD OPERATE IN EITHER THE AUTOMATIC OR MANUAL MODE. IN THE AUTOMATIC MODE, THE INSTRUMENT HAD A BASIC 48-SEC CYCLE AND AN ANALOG-TO-DIGITAL CONVERSION RATE OF TWO SAMPLES PER SEC. IN THE MANUAL MODE, THE INSTRUMENT LOCKED ON A SELECTED SENSOR AND REMAINED THERE (TWO SAMPLES/SEC) UNTIL THE INSTRUMENT WAS COMMANDED BACK INTO THE AUTOMATIC MODE. THE FIELD OF VIEW OF THE SENSORS WAS ABOUT 90 DEG, WITH THE CENTER OF THE FIELD OF VIEW PARALLEL TO THE SPACECRAFT VELOCITY VECTOR. SOLAR ACQUISITION, THEREFORE, BEGAN AT 45 DEG PRIOR TO THE EARTH DAY/NIGHT TERMINATOR AND COMPLETELY CEASED AT THE SATELLITE DAY/NIGHT TRANSITION. THE INSTRUMENT HAD ONLY AN IN-FLIGHT ELECTRICAL CALIBRATION SEQUENCE, BECAUSE THERE ARE NO KNOWN SUITABLE UV SOURCES THAT CAN PROVIDE AN IN-FLIGHT OPTICAL CALIBRATION.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER — NSSDC ID 70-025A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.F.	HEATH	NASA-GSFC	GREENBELT, MD
OI - J.V.	DAVE	NATL CNTR ATMOS RSCH	BOULDER, CO
OI - A.J.	KRUEGER	NASA-GSFC	GREENBELT, MD
OI - C.L.	MATEER	NATL CNTR ATMOS RSCH	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER EXPERIMENT WAS DESIGNED TO MONITOR THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE BY MEASURING THE INTENSITY OF ULTRAVIOLET RADIATION BACKSCATTERED BY THE EARTH/ATMOSPHERE SYSTEM DURING DAY AND NIGHT IN THE 2500- TO 3400-A SPECTRAL BAND. THE PRIMARY INSTRUMENTATION CONSISTED OF A DOUBLE MONOCHROMATOR CONTAINING ALL REFLECTIVE OPTICS AND A PHOTOMULTIPLIER DETECTOR. THE DOUBLE MONOCHROMATOR WAS COMPOSED OF TWO FASTIE-EBERT-TYPE MONOCHROMATORS IN TANDEM. EACH MONOCHROMATOR HAD A 64- BY 64-MM GRATING WITH 2400 LINES PER MM. LIGHT FROM A 0.05-STER SOLID ANGLE (SUBTENDING APPROXIMATELY A 222-KM-SQUARE AREA ON THE EARTH'S SURFACE FROM A SATELLITE HEIGHT OF APPROXIMATELY 1100 KM) ENTERED THE NADIR-POINTING INSTRUMENT THROUGH A DEPOLARIZING FILTER. A MOTOR-DRIVEN CAM STEP ROTATED THE GRATINGS TO MONITOR THE INTENSITY OF 12 OZONE ABSORPTION WAVELENGTHS. THE DETECTOR WAS A PHOTOMULTIPLIER TUBE. FOR BACKGROUND READINGS, A FILTER PHOTOMETER MEASURED THE REFLECTED ULTRAVIOLET RADIATION IN AN OZONE FREE ABSORPTION AREA NEAR 3600 A. SIGNALS FROM BOTH UNITS WERE READ BY SEPARATE RANGE-SWITCHING ELECTROMETERS WITH SEVEN RANGES. THE BUV EXPERIMENT CYCLE REQUIRED 6144 SEC. EACH CYCLE, IN TURN, WAS DIVIDED INTO 192 BUV FRAMES OF 32-SEC DURATION. CALIBRATION BY ONBOARD LIGHT SOURCES WAS PERFORMED IN 26 OF THE 192 FRAMES. THE OTHER FRAMES WERE USED FOR EXPERIMENTAL DATA. DURING EACH OF THESE DATA FRAMES, THE MONOCHROMATOR MEASURED THE INTENSITY OF THE UV RADIATION IN EACH OF THE 12 WAVELENGTH BANDS WHILE THE PHOTOMETER MEASURED THE UV INTENSITY IN A SINGLE WAVELENGTH BAND. THE DWELL TIME AT EACH WAVELENGTH WAS 1.8 SEC. AND, DURING THIS INTERVAL, FOUR ANALOG UV INTENSITY MEASUREMENTS WERE TAKEN AT 400-MSEC INTERVALS IN ADDITION TO AN INTEGRATED PULSE COUNT MEASUREMENT OF THE UV INTENSITY AND ENERGETIC PARTICLE FLUX. ONCE EACH ORBIT, THE FIELD OF VIEW WAS CHANGED TO MONITOR THE SUN OR MOON DIRECTLY. THE MEASUREMENT RANGE OF THE SIGNAL CURRENT WAS FROM 0.2 TO 3000 MICROAMPS. THE VERTICAL DISTRIBUTION OF OZONE WAS OBTAINED BY MATHEMATICAL INVERSION TECHNIQUES. FOR A COMPLETE DESCRIPTION OF THE BUV EXPERIMENT, SEE SECTION 7 IN "THE NIMBUS IV USER'S GUIDE."

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) NSSDC ID 70-025A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.E. COTE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) EXPERIMENT WAS DESIGNED TO COLLECT AND RETRANSMIT METEOROLOGICAL, GEOPHYSICAL, AND OTHER EXPERIMENTAL DATA FROM REMOTE UNMANNED DATA COLLECTION STATIONS (PLATFORMS) DEPLOYED ON A GLOBAL SCALE. THE IRLS COULD ALSO DETERMINE THE LOCATION AND TRACK THE MOVEMENT OF SUCH PLATFORMS AS BALLOONS, OCEAN BUOYS, AND SHIPS TO WITHIN AN ACCURACY OF 2 KM. THE IRLS CONSISTED OF (1) A 466-MHZ RECEIVER, (2) A 401.5-MHZ TRANSMITTER, (3) DECODING AND CODING CIRCUITS, (4) A RANGE DETECTOR, AND (5) A 100-KB SATELLITE DATA MEMORY CAPABLE OF STORING DATA OBTAINED DURING EACH ORBIT FOR UP TO 370 DIFFERENT INTERROGATIONS. ON EACH ORBIT PASS, WHEN THE SATELLITE

WAS WITHIN RANGE OF AN ACQUISITION AND COMMAND STATION, THE SATELLITE COMMAND MEMORY WAS PROGRAMMED TO COMMUNICATE WITH SELECTED PLATFORMS DURING THE COMING ORBIT. THE SATELLITE STORED BOTH THE ADDRESS (NUMBER) OF EACH PLATFORM AND THE DESIRED TIME THAT EACH SHOULD BE CONTACTED. AT THE APPROPRIATE TIME IN ORBIT, THE SATELLITE INTERROGATED EACH PLATFORM, MEASURED THE SATELLITE TO PLATFORM DISTANCE BY DETERMINING THE ROUND TRIP PROPAGATION TIME OF THE RF SIGNAL, RECEIVED THE ANALOG DATA FROM THE PLATFORM, CONVERTED IT TO DIGITAL FORM, AND STORED IT. UPON RETURN TO THE LOCALE OF THE GROUND STATION, THE STATION COMMANDED THE SATELLITE TO TRANSMIT THE STORED DATA AND TO ACCEPT NEW COMMANDS FOR THE NEXT ORBIT. THE EXPERIMENT WAS INITIALLY A SUCCESS -- HOWEVER, OWING TO SPACECRAFT YAW PROBLEMS, THE AMOUNT OF USEFUL DATA PRODUCED AFTER APRIL 1971 WAS EXTREMELY LIMITED. A LISTING OF IRLS TRACKING DATA FROM CONSTANT-LEVEL BALLOONS (30 AND 50 MB) APPEARS IN THE "NIMBUS 4 DATA CATALOG," VOLUME 4. COPIES OF COMPUTER OUTPUTS FROM INDIVIDUAL PLATFORM EXPERIMENTS ARE RETAINED AT THE NIMBUS/ATS DATA UTILIZATION CENTER, NASA-GSFC, GREENBELT, MD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SELECTIVE CHOPPER RADIOMETER (SCR) NSSDC ID 70-025A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.T.	HOUGHTON	OXFORD U	OXFORD, ENGLAND
OI - S.D.	SMITH	HERIOT-WATT U	EDINBURGH, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 4 SELECTIVE CHOPPER RADIOMETER (SCR) OBSERVED THE EMITTED INFRARED RADIATION IN THE 15-MICRON ABSORPTION BAND OF CARBON DIOXIDE. FROM THESE MEASUREMENTS THE TEMPERATURE OF SIX SUCCESSIVE 10-KM LAYERS OF THE ATMOSPHERE WERE DETERMINED FROM EARTH OR CLOUDTOP LEVEL TO 60-KM HEIGHT. HEIGHT RESOLUTION WAS OBTAINED BY A COMBINATION OF OPTICAL MULTI-LAYER FILTERS AND SELECTIVE ABSORPTION OF RADIATION USING CARBON DIOXIDE-FILLED CELLS WITHIN THE EXPERIMENT. THE SCR HAD SIX CHANNELS, WHICH WERE ARRANGED IN THREE UNITS OF TWO. THE FOUR LOWER CHANNELS WERE CALLED SINGLE CELL CHANNELS. THE OPTICS OF EACH CHANNEL CONSISTED OF A CANTILEVER-MOUNTED BLADE SHUTTER THAT OSCILLATED AT 10 HZ AND SUCCESSIVELY CHOPPED THE FIELD OF VIEW BETWEEN EARTH AND SPACE. THE CHOPPED RADIATION WAS THEN PASSED THROUGH A 10-CM PATH LENGTH OF CARBON DIOXIDE, THE PRESSURE BEING SET FOR EACH CHANNEL TO DEFINE THE VIEWING DEPTH OF THE ATMOSPHERE. BEHIND THE CARBON DIOXIDE PATH WAS A NARROW-BAND FILTER, THE CENTERS OF WHICH WERE DIFFERENT FOR EACH CHANNEL, AND A LIGHT PIPE WHICH CONVERGED THE RADIATION ON A THERMISTOR BOLOMETER DETECTOR. TO OBTAIN ADEQUATE HEIGHT RESOLUTION IN THE UPPER LAYERS OF THE ATMOSPHERE, THE UPPER TWO CHANNELS OPERATED ON A SLIGHTLY DIFFERENT PRINCIPLE AND WERE KNOWN AS DOUBLE CELL CHANNELS. THE TECHNIQUE CONSISTED OF SWITCHING THE RADIATION BETWEEN TWO HALF-CELLS, SEMICIRCULAR IN SHAPE AND OF 1-CM PATH LENGTH, CONTAINING DIFFERENT PRESSURES OF CARBON DIOXIDE. A MOVABLE 45-DEG MIRROR WAS USED IN PLACE OF THE OSCILLATING SHUTTER USED IN THE LOWER FOUR CHANNELS. DURING ONE HALF-PERIOD, EARTH RADIATION PASSED THROUGH ONE HALF-CELL AND SPACE RADIATION THROUGH THE OTHER. THE SITUATION WAS REVERSED DURING THE OTHER HALF-PERIOD. THE RADIATION THEN PASSED THROUGH A LIGHT PIPE ONTO A THERMISTOR BOLOMETER DETECTOR. INFLIGHT CALIBRATION WAS CARRIED OUT BY VIEWING OF AN INTERNAL REFERENCE BLACKBODY OF KNOWN TEMPERATURE PRIOR TO THE VIEW OF SPACE. THE OUTPUT OF EACH CHANNEL WAS

SAMPLED ONCE EVERY SECOND. FOR A COMPLETE DESCRIPTION OF THE SCR, SEE SECTION 9 IN 'THE NIMBUS IV USER'S GUIDE.' THE CHANNEL 1 TEMPERATURE MONITORING SYSTEM FAILED ON JUNE 15, 1970, THEREBY REDUCING THE ACCURACY OF THE SCR DATA.

ON 04/08/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 06/15/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- VELA 6A NSSDC ID 70-027A
ALTERNATE NAMES- PL-7028, VELA 11 (TRW), 04366, VELA 6A (USAF)

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT IN ORBIT- 259.01 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3

FUNDING AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 04/09/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6729. MIN
APOAPSIS- 112160. KM ALT PERIAPSIS- 111210. KM ALT INCLINATION- 32.41 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 04/17/71 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6701.1 MIN
APOAPSIS- KM ALT PERIAPSIS- 111139. KM ALT INCLINATION- 33.4673 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	UNKNOWN	USAF, SAMSO	SAN BERNARDINO, CA
PS - J.H.	COON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION

VELA 6A WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 6A WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. ROTATION RATES OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 6A AND 6B, PLUS THE TWO ACTIVE VELAS STILL IN ORBIT (VELA 5A AND B), COMPLETED THE OBJECTIVES OF THE VELA PROGRAM.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A NSSDC ID 70-027A-02

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - W.H.	CHAMBERS	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.C.	FULLER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - W.E.	KUNZ	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAMBERS HAD A 1- TO 8-A WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND A 1- TO 16-A AND 44- TO 60-A RANGE, RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE BETWEEN THE LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORDED NEARLY 4-PI STER COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A, AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES NSSDC ID 70-027A-03

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLID-STATE DE/DX VS E PARTICLE DETECTOR.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON DETECTORS NSSDC ID 70-027A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND EXPERIMENT NSSDC ID 70-027A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - H.E.	FELTHAUSER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. PARTICLES IN A 6- BY 100-DEG FAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DURING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE ANALYZER MULTIPLIER UNIT STUDIED SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 18.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV. THE OTHER UNIT STUDIED MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 AND 8.3 KV.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/12/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- NEUTRON DETECTOR NSSDC ID 70-027A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, N.M.
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY NSSDC ID 70-027A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	KLEBESADEL	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - I.B.	STRONG	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - R.A.	OLSON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINOUS TEMPORAL COVERAGE WHICH, COUPLED WITH THE ISOTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- VELA 6B NSSDC ID 70-027B

ALTERNATE NAMES- PL-702C, VELA 12 (TRW), 04368, VELA 6B (USAF)

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT IN ORBIT- 259.01 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3

FUNDING AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 04/11/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6745. MIN
APOAPSIS- 112160. KM ALT PERIAPSIS- 111500. KM ALT INCLINATION- 32.52 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 04/18/71 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 6698.2 MIN
APOAPSIS- KM ALT PERIAPSIS- 111073. KM ALT INCLINATION- 33.3150 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	UNKNOWN	USAF, SAMSO	SAN BERNARDINO, CA
PS - J.H.	COON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION
VELA 6B WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 6B WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 6A AND 6B, PLUS THE TWO ACTIVE VELAS STILL IN ORBIT (VELA 5A AND B), COMPLETED THE OBJECTIVES OF THE VELA PROGRAM.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO NSSDC ID 70-027B-02
8 A, 1 TO 16 A, 44 TO 60 A

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.H.	CHAMBERS	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.C.	FULLER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - W.E.	KUNZ	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE

SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAMBERS HAD A 1- TO 8-A WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND 1- TO 16-A AND 44- TO 60-A RANGE, RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE BETWEEN THE LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORDED NEARLY 4-PI STER COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A, AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES NSSDC ID 70-027B-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, N.M.
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLID-STATE DE/DX VS E PARTICLE DETECTOR.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON DETECTORS NSSDC ID 70-027B-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.	SINGER	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRON DETECTOR NSSDC ID 70-027B-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY NSSDC ID 70-027B-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	KLEBESADEL	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - I.B.	STRONG	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - R.A.	OLSON	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH, COUPLED WITH THE ISOTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/08/70, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 42 NSSDC ID 70-107A
ALTERNATE NAMES- SAS 1, SAS-A, CHUBU 1, PL-701C, 04797

LAUNCH DATE- 12/12/70 SPACECRAFT WEIGHT IN ORBIT- 142. KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
EPOCH DATE- 12/12/70 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.7 MIN
APOAPSIS- 572.000 KM ALT PERIAPSIS- 531.000 KM ALT INCLINATION- 3.04 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/06/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.072 MIN
APOAPSIS- 538.14 KM ALT PERIAPSIS- 505.96 KM ALT INCLINATION- 3.036 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M.R. TOWNSEND NASA-GSFC GREENBELT, MD
PS - C.E. FICHTEL NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
EXPLORER 42 WAS THE FIRST OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WERE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV, AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSION OF EXPLORER 42 WAS TO DEVELOP A CATALOG OF CELESTIAL X-RAY SOURCES BY SYSTEMATIC SCANNING OF THE CELESTIAL SPHERE IN THE ENERGY RANGE FROM 1 TO 20 KEV. THE SPACECRAFT WAS LAUNCHED DECEMBER 12, 1970 FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA, AFRICA, INTO A NEAR CIRCULAR EQUATORIAL ORBIT. THE ORBITING SPACECRAFT WAS IN THE SHAPE OF A CYLINDER APPROXIMATELY 56 CM IN DIAM AND 116 CM IN LENGTH. FOUR SOLAR PADDLES WERE USED TO RECHARGE A 6-AMP-HR EIGHT-CELL NICKEL-CADMIUM BATTERY AND TO PROVIDE POWER TO THE SPACECRAFT AND EXPERIMENT. THE SPACECRAFT WAS SPIN STABILIZED, AND A MAGNETICALLY TORQUED COMMANDABLE CONTROL SYSTEM WAS USED TO POINT THE SPIN AXIS OF THE SPACECRAFT TO ANY POINT OF THE SKY. NORMAL OPERATION OF THE SPACECRAFT STARTED ON DECEMBER 18, 1970. DATA WERE STORED ON A ONE-ORBIT STORAGE TAPE RECORDER AND TELEMETERED DURING A 3.4-MIN PLAYBACK CYCLE. A 1000-BPS PCM/PM SYSTEM WAS USED. THE TAPE RECORDER FAILED ON JANUARY 23, 1971. ONLY REAL-TIME DATA FROM BACKUP GROUND STATIONS WERE AVAILABLE AFTER JANUARY 23, 1971. THE STAR SENSOR FAILED IN NOVEMBER 1971. THE SPACECRAFT BATTERY FAILED IN EARLY APRIL 1973. SINCE THAT TIME THE SPACECRAFT HAS OPERATED ON SOLAR POWER ONLY AND HAS PRODUCED TWO TO THREE USABLE FRAMES OF DATA PER DAY.

ON 01/23/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY NSSDC ID 70-107A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.	GIACCONI	HARVARD COLLEGE OBS	CAMBRIDGE, MA
OI - E.M.	KELLOGG	HARVARD COLLEGE OBS	CAMERIDGE, MA
OI - H.	GURSKY	HARVARD COLLEGE OBS	CAMBRIDGE, MA
OI - H.	TANANBAUM	HARVARD COLLEGE OBS	CAMERIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WERE TO PERFORM AN ALL-SKY SURVEY TO DETECT AND LOCATE STELLAR X-RAY SOURCES IN THE ENERGY RANGE FROM 1- TO 20-KEV, WITH LOCATION ACCURACIES OF ONE MIN OF ARC FOR THE STRONGER SOURCES, AND TO STUDY SOURCE SPECTRA AND TEMPORAL VARIATIONS. THE INSTRUMENT HAD TWO NEARLY IDENTICAL SIDES. EACH SIDE CONSISTED OF AN X-RAY DETECTION SYSTEM COMPOSED OF A COLLIMATOR, PROPORTIONAL COUNTERS, ASSOCIATED ELECTRONICS, AND AN ASPECT SENSING SYSTEM. THE HIGH SPATIAL RESOLUTION SIDE HAD A VIEWING ANGLE OF 0.5- BY 5-DEG FULL-WIDTH HALF-MAXIMUM (FWHM), AND A DETECTION RANGE OF 1 TO 20 KEV. THE HIGH SENSITIVITY SIDE HAD A 5- BY 5-DEG FWHM COLLIMATOR AND A DETECTION RANGE OF 1 TO 10 KEV. SIX GAS-FILLED PROPORTIONAL COUNTERS WERE LOCATED BEHIND EACH COLLIMATOR. NORMAL OPERATION OF THE EXPERIMENT STARTED ON DECEMBER 18, 1970 AND CONTINUED UNTIL JANUARY 23, 1971 WHEN THE SPACECRAFT RECORDER FAILED. REAL-TIME DATA WERE COLLECTED AFTER THAT DATE. THIS PROVIDED DATA RECOVERY DURING 60 PERCENT OF EACH ORBIT. ONLY TWO OR THREE USABLE FRAMES OF DATA PER DAY WERE OBTAINED AFTER THE BATTERY FAILED IN APRIL 1973.

ON 01/23/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- APOLLO 14 LM/ALSEP NSSDC ID 71-008C
ALTERNATE NAMES- ALSEP 14, LEM 14, 04905, APOLLO 14C

LAUNCH DATE- 01/31/71 SPACECRAFT WEIGHT IN ORBIT- 124.2 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES NASA-OMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.	PETRONE	NASA HEADQUARTERS	WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 14 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE LUNAR HIGHLANDS (3 DEG 39 MIN 1 SEC S LATITUDE, 17 DEG 27 MIN 55 SEC W LONGITUDE). THE NUCLEAR POWERED ALSEP WAS DEPLOYED AT THE LANDING SITE, AND INCLUDED EXPERIMENTS TO

STUDY THE SEISMIC WAVES, MAGNETIC FIELDS, SOLAR WIND COMPOSITION AND INTERACTION WITH THE MOON, LUNAR ATMOSPHERE, IONIC ENVIRONMENT, HIGH-ENERGY RADIATION DAMAGE TO SOLAR CELLS, LUNAR MOTION, AND THE LUNAR SOIL.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC NSSDC ID 71-008C-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.V.	LATHAM	U OF TEXAS	GALVESTON, TX
OI - W.M.	EWING	COLUMBIA U	NEW YORK, NY
OI - F.	PRESS	MIT	CAMBRIDGE, MA
OI - G.	SUTTON	U OF HAWAII	HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP. IT WAS LOCATED AND DEPLOYED 98 M FROM THE LM. THIS EXPERIMENT WAS DESIGNED TO MEASURE SEISMIC ACTIVITY OF THE MOON AND TO OBTAIN INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE WAS ALSO DESIGNED TO DETECT SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS, MOONQUAKES, AND METEORITE IMPACTS. THE EXPERIMENT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE THE SENSOR ASSEMBLY, THE LEVELING STOOL, THE THERMAL SHROUD, AND THE RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION, WHICH TRANSMITTED THE DATA BACK TO EARTH. INFORMATION ABOUT THE INTERIOR TO DEPTHS OF APPROXIMATELY 100 KM HAVE BEEN OBTAINED FROM THIS SEISMOMETER AND FROM THE APOLLO 11 MISSION SEISMOMETER LEFT ON THE MOON AT TRANQUILITY BASE.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ACTIVE SEISMIC NSSDC ID 71-008C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.	KOVACH	STANFORD U	STANFORD, CA
OI - J.S.	WATKINS	U OF NORTH CARCLINA	CHAPEL HILL, NC

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO GENERATE AND MONITOR SEISMIC WAVES IN THE MOON NEAR THE SURFACE IN ORDER TO STUDY THE INTERNAL STRUCTURE TO A DEPTH OF 460 M. THE SEISMIC ENERGY SOURCE USED WAS THE THUMPER DEVICE, WHICH CONTAINED 21 SMALL EXPLOSIVE CHARGES. THE MORTAR PACKAGE CONTAINING FOUR HIGH-EXPLOSIVE GRENADES WAS PLANTED, BUT IT'S DETONATION FROM EARTH WAS POSTPONED UNTIL THE OTHER EXPERIMENTS WERE COMPLETED TO AVOID DAMAGING THEM. THE THUMPER DEVICE PROVIDED DATA THAT INDICATED THAT TWO P-WAVE VELOCITIES WERE MEASURED AT THE FRA MAURO SITE. THE NEAR SURFACE HAS A SEISMIC WAVE VELOCITY OF 104 M/SEC, AND A SUBLAYER STARTING AT A DEPTH OF 8.5 M HAS A VELOCITY OF 299 M/SEC. ESTIMATES OF THE THICKNESS OF THIS SUBSTRATUM RANGE FROM 38 TO 76 M, WHICH IS PROBABLY INDICATIVE OF THE DEPTH OF THE FRA MAURO

FORMATION. THE EQUIPMENT CONSISTED OF A STAFF WITH THE CHARGE INITIATORS MOUNTED ON THE LOWER END OF ITS BASE, A CABLE CONNECTING THE STAFF (THUMPER) TO THE CENTRAL STATION, GEOPHONES (MINIATURE SEISMOMETERS) FOR RECORDING THE WAVES, AND A THREE-CHANNEL AMPLIFIER WITH LOG COMPRESSOR FOR TELEMETERING THE EARTH.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR NSSDC ID 71-008C-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.W. FREEMAN RICE U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND THE FREE-STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FROM THE DATA OBTAINED, FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE CAN BE DETERMINED. A CURVED PLATE ANALYZER AND AN E CROSS B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV, ENABLING SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU. A SEPARATE CURVED PLATE ANALYZER COUNTED SOLAR WIND PROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. DUE TO THE ORIENTATION OF THESE DIRECTIONAL INSTRUMENTS, SOLAR WIND IONS WERE NOT OBSERVED DIRECTLY EXCEPT IN THE TAILWARD SHEATH. HOWEVER, IONS FROM THE BOW SHOCK WERE OBSERVED. ON APRIL 5, 1971 SOME ENGINEERING DATA WAS LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG-TO-DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20, 1971 WHEN ARCING IN THE HIGH-VOLTAGE POWER SUPPLY LIMITED OPERATION NEAR LUNAR NOON. AFTER DECEMBER 16, 1971 OPERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 85 DEG C. ALL DATA TAKEN AFTER MARCH 29, 1972 WAS TAKEN IN AN ANOMALOUS STANDBY MODE, AND DATA COVERAGE WAS VERY POOR.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/29/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT NSSDC ID 71-008C-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - F.S. JOHNSON U OF TEXAS DALLAS, TX
OI - D.E. EVANS NASA-JSC HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT DETERMINED PRESSURES FROM 10 TO THE -6 POWER TO 10 TO THE -12 POWER TORR OF THE AMBIENT LUNAR ATMOSPHERE. THE RESULTS OF THIS EXPERIMENT, COMBINED WITH THOSE OF THE SUPRATHERMAL ION DETECTOR, WERE USED TO MEASURE THE DENSITY AND PRESSURE OF THE LUNAR NEUTRAL

ATMOSPHERE. ON APRIL 5, 1971 SOME ENGINEERING DATA WAS LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG TO DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20, 1971 WHEN ARCING OCCURRED IN THE HIGH-VOLTAGE POWER SUPPLY, LIMITING OPERATION NEAR LUNAR NOON. AFTER DECEMBER 20, 1971 OPERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 85 DEG C. ALL DATA TAKEN AFTER MARCH 29, 1972 WAS TAKEN IN AN ANOMALOUS STANDBY MODE, WHERE DATA COVERAGE WAS VERY POOR.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/29/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE LUNAR ENVIRONMENT NSSDC ID 71-008C-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - B.J.	O'BRIEN	DEPT OF ENVIRON PROT	PERTH, AUSTRALIA
OI - D.L.	REASONER	RICE U	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM OF LOW-ENERGY CHARGED PARTICLES STRIKING THE LUNAR SURFACE. THE MAIN PART OF THE INSTRUMENTATION CONSISTED OF TWO ELECTROSTATIC ANALYZERS. ONE OF THESE POINTED TOWARD LOCAL LUNAR VERTICAL, AND THE OTHER TO A POINT 60 DEG FROM VERTICAL TOWARD LUNAR WEST. AS A FIRST APPROXIMATION, BOTH DETECTORS COULD BE CONSIDERED TO POINT IN THE ECLIPTIC PLANE. EACH ANALYZER CONSISTED OF A SET OF DIRECTION-DEFINING SLITS, DEFLECTION PLATES, FIVE SMALL-APERTURE, C-SHAPED CHANNEL ELECTRON MULTIPLIERS, AND ONE LARGER APERTURE CHANNEL ELECTRON MULTIPLIER. FOR A GIVEN APPLIED DEFLECTION VOLTAGE, THE FIVE MULTIPLIERS WERE ARRANGED SO AS TO COUNT PARTICLES OF ONE POLARITY WITH DIFFERING ENERGIES, WHILE THE LARGER APERTURE MULTIPLIER MADE A WIDE-BAND MEASUREMENT OF PARTICLES OF THE OPPOSITE POLARITY. DURING EACH 19.2-SEC INTERVAL IN THE AUTOMATIC MODE OF EXPERIMENT OPERATION, DEFLECTION VOLTAGES OF ZERO VOLTS (TWICE) AND PLUS AND MINUS 35, 350, AND 3500 VOLTS WERE APPLIED TO THE DEFLECTION PLATES OF BOTH ANALYZERS FOR 2.4 SEC EACH VOLTAGE. THE LITTLE-USED MANUAL MODE PERMITTED THE CONTINUOUS APPLICATION OF A SINGLE DEFLECTION VOLTAGE, THUS INCREASING TEMPORAL RESOLUTION FOR PARTICLES IN A LIMITED PORTION OF THE SPECTRUM. USEFUL DATA OBTAINED DURING EACH 19.2-SEC INTERVAL (AUTOMATIC MODE) WERE, FOR EACH ANALYZER, 1.2-SEC ACCUMULATED COUNTS OF ELECTRONS IN 18 ENERGY WINDOWS BETWEEN 40 EV AND 20 KEV, AND IONS IN 12 ENERGY WINDOWS BETWEEN 0.17 AND 20 KEV. THE EXPERIMENT WORKED NORMALLY FROM DEPLOYMENT (FEB. 5, 1971) UNTIL APRIL 8, 1971 WHEN THE ANALYZER POINTING AWAY FROM LUNAR VERTICAL FAILED. THE OTHER ANALYZER CONTINUED TO FUNCTION NORMALLY UNTIL JUNE 6, 1971, WHEN A PARTIAL FAILURE OCCURRED. OPERATION OF THIS ANALYZER WAS INTERMITTENT FOR THE REST OF 1971. DURING MOST OF 1972, OPERATION WAS CONTINUOUS DURING LUNAR NIGHT AND INTERMITTENT DURING LUNAR DAY. FROM DECEMBER 1972 TO FEBRUARY 1973 OPERATION WAS CONTINUOUS AT WHICH TIME THE HIGH VOLTAGE PROBLEMS OCCURRED AGAIN.

ON 02/05/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 02/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 43 NSSDC ID 71-019A
ALTERNATE NAMES- IMP-I. IMP 6. 05043

LAUNCH DATE- 03/13/71 SPACECRAFT WEIGHT IN ORBIT- 278. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 03/17/71 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 5956. MIN
APOAPSIS- 204577. KM ALT PERIAPSIS- 353.000 KM ALT INCLINATION- 28.80 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/05/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 5974.5 MIN
APOAPSIS- 195513. KM ALT PERIAPSIS- 9864.88 KM ALT INCLINATION- 37.714 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - P. BUTLER NASA-GSFC GREENBELT, MD
PS - F.B. MCDONALD NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
IMP-I (EYE) CONTINUED THE STUDY, BEGUN BY EARLIER IMPS, OF THE INTERPLANETARY AND OUTER MAGNETOSPHERIC REGIONS BY MEASURING ENERGETIC PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. A RADIO ASTRONOMY EXPERIMENT WAS ALSO INCLUDED IN THE SPACECRAFT PAYLOAD. THE 16-SIDED SPACECRAFT WAS 182.12 CM HIGH BY 125.64 CM IN DIAMETER. THE SPACECRAFT SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE, AND ITS SPIN RATE WAS 5 RPM. THE INITIAL APOGEE POINT LAY NEAR THE EARTH-SUN LINE. THE SOLAR-CELL AND CHEMICAL-BATTERY-POWERED SPACECRAFT CARRIED TWO TRANSMITTERS. ONE CONTINUOUSLY TRANSMITTED PCM ENCODER DATA AT A 1600-BPS INFORMATION BIT RATE. THE SECOND TRANSMITTER WAS USED FOR TRANSMISSION OF VLF DATA AND FOR RANGING INFORMATION. THREE ORTHOGONAL PAIRS OF DIPOLE ANTENNAS WERE USED FOR THE ELECTRIC FIELDS EXPERIMENTS, AND ONE OF THESE PAIRS WAS ALSO USED FOR THE RADIO ASTRONOMY EXPERIMENT. THE MEMBERS OF THE ANTENNA PAIR ALONG THE SPACECRAFT SPIN AXIS EXTENDED 2.9 M. THE MEMBERS OF THE PAIR USED IN BOTH THE ELECTRIC FIELD AND RADIO ASTRONOMY EXPERIMENTS EXTENDED 45.5 M, AND THE MEMBERS OF THE THIRD PAIR WERE SLIGHTLY UNBALANCED, EXTENDING 24.4 AND 27.6 M, RESPECTIVELY. ALL FOUR ELEMENTS PERPENDICULAR TO THE SPIN AXIS WERE TO HAVE EXTENDED 45.5 M.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF MAGNETIC FIELDS NSSDC ID 71-019A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - N.F. NESS NASA-GSFC GREENBELT, MD
OI - J.B. SEEK NASA-GSFC GREENBELT, MD
OI - D.H. FAIRFIELD NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE ACCURATELY THE VECTOR MAGNETIC FIELD IN THE INTERPLANETARY MEDIUM AND IN THE EARTH'S MAGNETOSPHERE, MAGNETOTAIL, AND MAGNETOSHEATH. THE DETECTOR WAS A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER WITH FOUR RANGES -- MINUS TO PLUS 16, 48, 144, AND 432 GAMMAS, RESPECTIVELY. CORRESPONDING SENSITIVITIES WERE PLUS OR MINUS 0.06, 0.19, 0.56, AND 1.69 GAMMAS, RESPECTIVELY. AUTOMATIC RANGE SELECTION CAPABILITY WAS INCLUDED. A FLIPPING MECHANISM PERMITTED INFLIGHT CALIBRATION OF THE THREE SENSOR ZERO LEVELS. THE VECTOR SAMPLING RATE WAS 12.5 SAMPLES PER SECOND.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC FIELDS NSSDC ID 71-019A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

TWO DIPOLE ANTENNAS WERE MOUNTED ORTHOGONALLY IN THE SPIN PLANE OF THE SPACECRAFT WHILE A THIRD DIPOLE ANTENNA WAS MOUNTED ALONG THE SPACECRAFT SPIN AXIS. ANTENNA ELEMENT LENGTHS WERE -X, 27.6 M, +X, 24.4 M, -Y AND +Y, 45.5 M, -Z AND +Z (SPIN AXIS), 2.9 M. ELECTROMETERS MEASURED THE ANALOG POTENTIAL DIFFERENCE BETWEEN THE ELEMENTS IN EACH PAIR OF ANTENNAS SIMULTANEOUSLY EVERY 5.12 SEC. THE POTENTIAL DIFFERENCES WERE SAMPLED DIGITALLY THROUGH A 14-BIT ANALOG/DIGITAL CONVERTER EVERY .64 SEC. DC SENSITIVITY WAS 100 MICROVOLTS PER METER.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/20/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE -- IONA NSSDC ID 71-019A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THREE ORTHOGONAL SEARCH COILS AND THE THREE ORTHOGONAL NEARLY BALANCED DIPOLES USED IN THE DC ELECTRIC FIELD EXPERIMENT (71-019A-02) GAINED SIMULTANEOUS E AND B FIELD DATA IN 16 LOGARITHMICALLY EQUISPACED NARROW CHANNELS FROM 20 HZ TO 200 KHZ. THE SPECTRAL FREQUENCY RESOLUTION WAS ABOUT 30 PERCENT. EACH E-B CHANNEL WAS SAMPLED EVERY 5.12 SEC. A SHORT BACK-UP

DIPOLE ANTENNA (ABOUT 1 M TIP TO TIP) WAS ALSO USED TO DETECT VERY SHORT WAVELENGTH PLASMA PHENOMENA. ANALOG B OR E DATA FROM 0 TO 30 KHZ IN THREE SEGMENTS WERE ALSO TELEMETERED ON THE SPECIAL PURPOSE A-W ANALOG CHANNEL. THIS EXPERIMENT WAS DESIGNED TO BE USED IN CONJUNCTION WITH THE LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA).

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/14/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS NSSDC ID 71-019A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.A. FRANK U OF IOWA IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO CONDUCT COMPREHENSIVE OBSERVATIONS OF THE DIFFERENTIAL ENERGY SPECTRA, THE ANGULAR DISTRIBUTION, AND SPATIAL DISTRIBUTIONS AND TEMPORAL VARIATIONS OF ELECTRONS AND PROTONS OVER THE GEOCENTRIC RADIAL DISTANCE RANGE 1.03 TO 30 EARTH RADII. TWO ARRAYS OF THE CURVED-PLATE CYLINDRICAL ELECTROSTATIC ANALYZERS AND CONTINUOUS CHANNEL MULTIPLIERS WERE USED FOR THIS PURPOSE. ONE ANALYZER, THE LEPEDEA (LOW ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER), WAS TO MEASURE THE ENERGY SPECTRA AND ANGULAR DISTRIBUTION OF PROTONS AND ELECTRONS SEPARATELY IN THE ENERGY RANGE 24 EV TO 80 KEV (16 ENERGY INTERVALS FOR PROTONS AND ELECTRONS SEPARATELY). THE OTHER ANALYZER, THE LEPEDEA (LOW ENERGY PROTON DIFFERENTIAL ENERGY ANALYZER) WAS TO MEASURE THE ENERGY SPECTRA AND ANGULAR DISTRIBUTION OF PROTONS IN THE ENERGY RANGE 1.7 TO 550 EV (EIGHT ENERGY INTERVALS). THE ANALYZERS WERE MOUNTED PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AN EON TYPE 213 GM COUNTER, WHOSE COLLIMATED FIELD OF VIEW OF 15 DEG HALF ANGLE WAS ORIENTED APPROXIMATELY PARALLEL TO THAT OF THE LEPEDEA, WAS USED TO MEASURE THE INTENSITY OF ELECTRONS OF ENERGIES GREATER THAN 45 KEV AND PROTONS OF ENERGIES GREATER THAN 500 KEV AND TO PROVIDE BACKGROUND MEASUREMENTS FOR THE LEPEDEA.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS NSSDC ID 71-019A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K.A. ANDERSON U OF CALIFORNIA, BERK BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WAS USED TO STUDY THE ACCELERATION OF ELECTRONS AT THE SUN AND THEIR EJECTION INTO INTERPLANETARY SPACE, CONSISTED OF FOUR DETECTORS. TWO OF THESE WERE GM TUBES WITH VIEWING DIRECTIONS OF 170 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. ONE TUBE RESPONDED TO ELECTRONS WITH ENERGIES GREATER THAN 20 KEV THAT WERE BACKSCATTERED OFF A GOLD FOIL.

THE 20-KEV ELECTRON DATA WERE ACCUMULATED AND READ OUT EVERY 10.24 SEC. THE OTHER GM TUBE DIRECTLY OBSERVED ELECTRONS AND PROTONS WITH ENERGIES GREATER THAN 18 AND 250 KEV, RESPECTIVELY. THIS DATA WAS ACCUMULATED AND READ OUT EVERY 5.12 SEC. THE THIRD DETECTOR, A TELESCOPE CONSISTING OF THREE SEMICONDUCTORS, HAD A VIEWING DIRECTION OF 170 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. THIS DETECTOR RESPONDED TO ELECTRONS AND PROTONS IN THE ENERGY INTERVALS 18 TO 450 KEV AND 0.04 TO 2 MEV, RESPECTIVELY. ELECTRON DATA FROM THIS DETECTOR WERE ACCUMULATED IN FOUR CONTIGUOUS LOGARITHMICALLY EQUISPACED ENERGY CHANNELS FOR 5.12 SEC AND READ OUT AT THE END OF EACH TIME INTERVAL. IN ADDITION, A 64-CHANNEL PULSE HEIGHT ANALYSIS WAS PERFORMED ON THE DETECTOR COUNTS, AND THIS INFORMATION WAS TELEMETERED EVERY 163.84 SEC. PROTON DATA FROM THIS DETECTOR WAS ACCUMULATED AND READ OUT EVERY 20.48 SEC. THE FOURTH DETECTOR CONSISTED OF TWO SEMICONDUCTORS WITH A VIEWING DIRECTION PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THIS DETECTOR RESPONDED TO ELECTRONS WITH ENERGIES BETWEEN 47 AND 350 KEV THAT WERE BACKSCATTERED OFF A GOLD FOIL. COUNTS OF 47- TO 350-KEV ELECTRONS AND 80- TO 350-KEV ELECTRONS WERE ACCUMULATED IN EACH OF 16 AND FOUR EQUIANGULAR SECTORS, RESPECTIVELY, DURING SUCCESSIVE 20.48-SEC INTERVALS, AND THEY WERE READ OUT AT THE END OF EACH INTERVAL.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MONITORING OF SOLAR PROTONS NSSDC ID 71-019A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - D.S.	BEALL	APPLIED PHYSICS LAB	SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR PROTON MONITORING EXPERIMENT CONSISTED OF FIVE SEPARATE DETECTORS EACH USING ONE OR MORE SOLID-STATE DETECTOR ELEMENTS. THREE DETECTORS, EACH WITH A 2 PI STER FIELD OF VIEW AND A 20.48-SEC ACCUMULATION TIME, MEASURED PROTONS WITH ENERGIES GREATER THAN 10, 30, AND 60 MEV. RESULTANT HOURLY AVERAGED FLUXES ARE BEING PUBLISHED ON A RAPID BASIS IN SOLAR-GEOPHYSICAL DATA. THE FOURTH DETECTOR MEASURED DIRECTIONAL FLUXES OF PROTONS IN THE ENERGY INTERVALS 0.2 TO 0.5, 0.5 TO 2.0, AND 2.0 TO 7.5 MEV AND DIRECTIONAL FLUXES OF ALPHA PARTICLES IN THE ENERGY INTERVAL 8 TO 20 MEV. THE FIFTH DETECTOR MEASURED DIRECTIONAL FLUXES OF ELECTRONS ABOVE 10 KEV. FOR THE LAST TWO DETECTORS, COUNTS WERE OBTAINED IN 45-DEG SECTORS AS THE SPACECRAFT SPUN. ONBOARD CALIBRATION CAPABILITY FOR THE FIRST FOUR DETECTORS WAS INCLUDED.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/14/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR AND GALACTIC COSMIC-RAY STUDIES NSSDC ID 71-019A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - D.E.	HAGGE	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT WAS DESIGNED TO MEASURE ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 26. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF FOUR ESSENTIALLY IDENTICAL SOLID-STATE TELESCOPES. TWO WERE PERPENDICULAR AND TWO WERE PARALLEL TO THE SPACECRAFT SPIN AXIS. BECAUSE THE TELESCOPES DIFFERED IN THEIR ABSORBING THICKNESSES, SOME DISCRIMINATION BETWEEN ELECTRONS AND PROTONS WAS POSSIBLE. EACH DETECTOR RESPONDED TO PARTICLES BETWEEN ABOUT 50 KEV AND 2 MEV. A SEVEN-LEVEL INTEGRAL ANALYZER WAS INCLUDED FOR SPECTRAL INFORMATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DE/DX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED Z = 1 TO 16 NUCLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4-MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE OBTAINED AS COUNTS IN THE DE/DX, BUT NOT IN THE E, SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT ACTED AS A DE/DX VS E DETECTOR. ABOVE 80 MEV, IT ACTED AS A BIDIRECTIONAL TRIPLE DE/DX VS E DETECTOR. BY USE OF A COMBINATION OF PULSE HEIGHT ANALYSIS AND GAIN SWITCHING, THE OUTPUT OF EACH SENSOR OF THE SECOND AND THIRD DETECTOR SYSTEMS WAS SORTED INTO ONE OF 1000 AND 1200 ENERGY CHANNELS, RESPECTIVELY. FLUX DIRECTIONALITY INFORMATION WAS OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR INTO EIGHT ANGULAR SECTORS. THE SECOND DETECTOR SYSTEM PERFORMED NORMALLY FROM LAUNCH UNTIL OCTOBER 14, 1971 (APOGEE SHADOW), AFTER WHICH PROBLEMS WERE ENCOUNTERED. ESSENTIALLY NO DATA WERE OBTAINED FROM THIS TELESCOPE AFTER NOVEMBER 1971.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/14/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS NSSDC ID 71-019A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - M.G.	MUNOZ	U OF CHICAGO	CHICAGO, IL
OI - S.	VERMA	U OF CHICAGO	CHICAGO, IL
OI - J.	HSIEH	U OF CHICAGO	CHICAGO, IL
OI - G.M.	MASON	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRA OF NUCLEI OVER A WIDE DYNAMIC RANGE OF FLUXES (AT LEAST 100,000). EMPHASIS HAS BEEN PLACED ON HIGH CHARGE RESOLUTION EXTENDING FROM Z = 1 TO Z = 30, AND HIGH ISOTOPIC RESOLUTION FOR H, HE, AND LI. THE EXPERIMENT IS ALSO DESIGNED TO MEASURE ELECTRONS OF ENERGIES GREATER THAN 2 MEV. THE INSTRUMENTATION

INCLUDED TWO PARTICLE TELESCOPES (A COMPOSITION TELESCOPE WAS COMPOSED OF FOUR SOLID-STATE DETECTORS AND A CERENKOV COUNTER, AND THE LOW-ENERGY TELESCOPE WAS COMPOSED OF FIVE SOLID-STATE AND TWO SCINTILLATION DETECTORS). BOTH TELESCOPES WERE TO BE CALIBRATED PERIODICALLY IN FLIGHT BY PROGRAMMED PULSE GENERATORS. THE OUTPUTS OF SENSORS D1, D4 AND THE CERENKOV COUNTER OF THE COMPOSITION TELESCOPE WERE PULSE HEIGHT ANALYZED BY THREE 512-CHANNEL PULSE HEIGHT ANALYZERS, AND THE OUTPUT OF D2 WAS ANALYZED BY A 1024-CHANNEL PULSE HEIGHT ANALYZER. USE OF THE VARIOUS COUNT RATE MODES PROVIDED A DIFFERENTIAL ENERGY SPECTRUM (THREE INTERVALS) OF NUCLEI UP TO ABOUT Z = 30 IN THE ENERGY RANGE FROM 0.5 TO 1200 MEV/NUCLEON. THE CERENKOV COUNTER ALLOWED MEASUREMENT OF NUCLEI FROM 1.2 TO ABOUT 2 BEV/NUCLEON BEFORE SATURATING. SIMILARLY, THE OUTPUTS OF SENSORS D1, D2, AND D5 OF THE LOW-ENERGY TELESCOPE WERE PULSE HEIGHT ANALYZED USING TWO 256-CHANNEL ANALYZERS. SENSORS D1 AND D5 SHARED ONE ANALYZER, I.E., WHEN AN EVENT HAD SUFFICIENT ENERGY TO TRIGGER D5, THE ANALYZER WAS AUTOMATICALLY SWITCHED FROM D1 TO D5. THE DIFFERENTIAL ENERGY SPECTRUM (TWO INTERVALS) OF NUCLEI UP TO ABOUT Z = 30 WAS OBTAINABLE FROM ABOUT 0.5 TO ABOUT 800 MEV/NUCLEON. THE ELECTRON CURRENT DETECTOR (ECD) AND THE FISSION CELL CARRIED OUT MEASUREMENTS IN THE EARTH'S RADIATION BELTS. THE ECD DETECTED EXTREMELY HIGH INTENSITIES (GREATER THAN 1,000,000 PARTICLES/CM SQ-SEC) OF ELECTRONS OF ENERGIES GREATER THAN 2 MEV BY MEASURING THE CURRENT GENERATED IN A SOLID-STATE DETECTOR BY THE IONIZATION LOSS OF LARGE NUMBERS OF ELECTRONS. THE FISSION CELL WAS DESIGNED TO DETECT PROTON FLUXES (ENERGIES GREATER THAN 50 MEV) BY SANDWICHING A THIN FOIL OF TH232 BETWEEN TWO SOLID-STATE DETECTORS WHICH RESPONDED ONLY TO LARGE PULSES LEFT BY SLOW MOVING FRAGMENTS FROM PROTON INDUCED FISSION OF THE THORIUM. THE COMPOSITION TELESCOPE FAILED WITHIN A DAY AFTER LAUNCH DURING THE PRE-SPINUP PERIOD OF THE SPACECRAFT, APPARENTLY DUE TO CONTINUOUS DIRECT EXPOSURE TO THE SUN. THE D6 DETECTOR OF THE LOW-ENERGY TELESCOPE WAS NOISY IN AUGUST, 1971.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA NSSDC ID 71-019A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO EXTEND DESCRIPTIONS OF THE PARTICLE (ELECTRON AND POSITIVE ION) POPULATIONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. ENERGY SPECTRAL ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. THE ANALYZER HAD FOUR COMMANDABLE MODES. THE FIRST MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND PROTONS AND ALPHA PARTICLES. DURING EIGHT SPACECRAFT REVOLUTIONS, 32-LEVEL ENERGY SPECTRA WERE OBTAINED IN EIGHT ANGULAR RANGES CENTERED ON THE SUN. THE ENERGY LEVELS EXTENDED FROM 100 EV TO 8 KEV. THE SECOND MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND HEAVY IONS. THIS CYCLE WAS THE SAME AS THE FIRST EXCEPT THAT THE ENERGY PER CHARGE LEVELS WERE LIMITED TO 500 V TO 8 KV, AND THE EFFICIENCY OF COUNTING HEAVY IONS WAS INCREASED RELATIVE TO PROTONS AND ALPHA PARTICLES. THE THIRD MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND MAGNETOSHEATH POSITIVE IONS. THIS WAS A

COMBINATION CYCLE IN WHICH ELECTRON AND POSITIVE ION SPECTRAL SWEEPS WERE ALTERNATED. DURING A CYCLE OF NINE SPACECRAFT REVOLUTIONS, EIGHT ELECTRON SPECTRA AND EIGHT POSITIVE ION SPECTRA WERE OBTAINED. THE COMBINED DATA FOR ELECTRONS IN THIS MODE CONSISTED OF 16-LEVEL ENERGY SPECTRA TAKEN IN 32 EVENLY SPACED ANGULAR RANGES. THE SPECTRA EXTENDED FROM 4 TO 1000 EV. THE DATA FOR POSITIVE IONS CONSISTED OF 32-LEVEL SPECTRA TAKEN IN THE SAME 32 ANGULAR RANGES. THE ENERGY PER CHARGE SPECTRA EXTENDED FROM 100 V TO 8 KV. THE FOURTH MODE WAS DESIGNED FOR MAGNETOTAIL ELECTRONS AND POSITIVE IONS. ELECTRONS AND POSITIVE IONS WERE STUDIED WITH 16-LEVEL SPECTRA IN 32 EVENLY SPACED ANGULAR RANGES FOR BOTH ELECTRONS AND POSITIVE IONS. THE ENERGY PER CHARGE RANGES WERE 6 V TO 24 KV FOR ELECTRONS AND 45 V TO 34 KV FOR POSITIVE IONS.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/15/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE NSSDC ID 71-019A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE POLARIZATION, DIRECTION OF PROPAGATION, POINTING FLUX, AND DIRECTION OF THE WAVE NORMAL SURFACE FOR PLASMA WAVES. THE TIME-AVERAGED CORRELATION AT ONE CHANNEL FREQUENCY FROM ANY COMBINATION OF THE SIX ANTENNA ELEMENTS (THREE EACH ORTHOGONAL E AND B) COULD BE SIMULTANEOUSLY CALCULATED BY SIX ONBOARD ANALOG COMPUTERS. THERE WERE 64 LOGARITHMICALLY EQUISPACED FREQUENCY CHANNELS CENTERED FROM 23 HZ TO 200 KHZ WITH A 15 PERCENT BANDWIDTH AT 3 DB. AVERAGING TIME WAS 2.5 SEC AT THE HIGH BIT RATE. THE COMBINATIONS OF ELEMENTS AND THE SEQUENCE OF FREQUENCIES TO BE MEASURED WERE CONTROLLED EITHER BY AN ONBOARD COMPUTER OR FROM THE GROUND.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INTERPLANETARY LONG-WAVELENGTH RADIO ASTRONOMY EXPERIMENT NSSDC ID 71-019A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.T.	HADDOCK	U OF MICHIGAN	ANN ARBOR, MI
OI - W.C.	ERICKSON	U OF MARYLAND	COLLEGE PARK, MD
OI - R.G.	STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO STUDY THE SPECTRA OF THE GALAXY, THE SUN, AND JUPITER WITH HIGH FLUX RESOLUTION (ABOUT 1 PERCENT). A RADIOMETER, OPERATING IN EITHER A STEPPING MODE (EIGHT FREQUENCIES) OR AT A SINGLE FREQUENCY, WAS CONNECTED TO A 300-FT DIPOLE ANTENNA, WHICH WAS ALSO USED IN THE ELECTRIC FIELD EXPERIMENTS. THE FREQUENCY RANGE COVERED WAS 0.05 TO 3.5 MHZ.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE NSSDC ID 71-019A-16

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD
OI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION
AC ELECTRIC FIELD INTENSITY IN 12 NARROW CHANNELS WAS MEASURED FROM 0.1 TO 100 HZ. THE EXPERIMENT HAD AN OPTIMUM NOISE THRESHOLD OF 10 MICROVOLTS PER METER. EACH CHANNEL WAS SAMPLED ONCE EVERY 5.12 SEC AT THE HIGH BIT RATE. THE ANTENNAS USED IN THE DC FIELD EXPERIMENT (71-019A-02) WERE ALSO UTILIZED IN THIS EXPERIMENT.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/13/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- ISIS 2 NSSDC ID 71-024A
ALTERNATE NAMES- ISIS-B, PL-701F, 05104

LAUNCH DATE- 04/01/71 SPACECRAFT WEIGHT IN ORBIT- 248.6 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

CANADA	CRC
UNITED STATES	NASA-OSS

INITIAL ORBIT PARAMETERS
EPOCH DATE- 04/01/71 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 113.61 MIN
APOAPSIS- 1429. KM ALT PERIAPSIS- 1367. KM ALT INCLINATION- 88.1564 DEG

RECENT ORBIT PARAMETERS

EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 113.55 MIN
APOAPSIS- 1424.39 KM ALT PERIAPSIS- 1354.33 KM ALT INCLINATION- 88.181 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.E.	JACKSON	NASA-GSFC	GREENBELT, MD
PS - J.E.	JACKSON	NASA-GSFC	GREENBELT, MD
PS - J.H.	WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA

SPACECRAFT BRIEF DESCRIPTION

ISIS 2 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SWEEP FREQUENCY AND A FIXED FREQUENCY IONOSONDE, A VLF RECEIVER, ENERGETIC AND SOFT PARTICLE DETECTORS, AN ION MASS SPECTROMETER, AN ELECTROSTATIC PROBE, A RETARDING POTENTIAL ANALYZER, A BEACON TRANSMITTER, A COSMIC NOISE EXPERIMENT, AND TWO PHOTOMETERS. THE SOUNDER USED TWO LONG CROSSED-DIPOLE ANTENNAS (78.9 M AND 20.2 M LONG, RESPECTIVELY) FOR THE SOUNDING, VLF, AND COSMIC NOISE EXPERIMENTS. THE SPACECRAFT WAS NOMINALLY SPIN STABILIZED WITH SPIN AXIS IN THE ORBIT PLANE, TO ABOUT 2 RPM AFTER ANTENNA DEPLOYMENT. A CARTWHEEL MODE WITH THE AXIS PERPENDICULAR TO THE ORBIT PLANE WAS MADE AVAILABLE OCCASIONALLY FOR PERIODS OF A FEW MONTHS, IN ORDER TO PROVIDE RAM AND WAKE DATA, FOR SOME EXPERIMENTS, EACH SPIN PERIOD RATHER THAN EACH ORBIT PERIOD. ATTITUDE AND SPIN INFORMATION WAS OBTAINED FROM A THREE-AXIS MAGNETOMETER AND A SUN SENSOR. CONTROL OF ATTITUDE AND SPIN WAS POSSIBLE BY MEANS OF MAGNETIC TORQUING. THE EXPERIMENT PACKAGE ALSO INCLUDED A PROGRAMMABLE TAPE RECORDER WITH A 1-HR CAPACITY. FOR NON-RECORDED OBSERVATIONS, DATA FROM SATELLITE AND SUBSATELLITE LOCATIONS WERE TELEMETERED WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF A TELEMETRY STATION. TELEMETRY STATIONS ARE LOCATED SO THAT PRIMARY DATA COVERAGE IS NEAR THE 80-DEG W MERIDIAN AND NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, FRANCE, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. INITIAL OPERATION OF ALL EXPERIMENTS WAS NOMINAL. THE TAPE RECORDERS FAILED ON FEBRUARY 4, 1972 BUT REAL-TIME OBSERVATIONS WERE ROUTINELY TELEMETERED TO GROUND STATIONS.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER NSSDC ID 71-024A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - G.E.K.	LOCKWOOD	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - G.L.	NELMS	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA
OI - J.	TURNER	DEPARTMENT OF INTERIOR	SYDNEY, AUSTRALIA
OI - M.	SYLVAIN	CNES	ST MAUR, FRANCE
OI - O.	HOLT	AURORAL OBS	TROMSO, NORWAY
OI - Y.	OGATA	RRL	TOKYO, JAPAN
OI - R.	RAGHAVARAO	PHYSICAL RESEARCH LAB	AHMEDABAD, INDIA

EXPERIMENT BRIEF DESCRIPTION

THE ISIS 2 IONOSONDE WAS A RADIO TRANSMITTER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN .1 AND 20 MHZ WERE SAMPLED EVERY 14 OR 21 SEC, AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO USED FOR SOUNDING FOR A FEW SECONDS DURING EACH 14- OR 21-SEC PERIOD. IN ADDITION TO THE SWEEP- AND FIXED-FREQUENCY MODES OF OPERATION, A MIXED MODE WAS AVAILABLE IN WHICH THE TRANSMITTER FREQUENCY WAS FIXED AT ONE OF SIX POSSIBLE FREQUENCIES WHILE THE RECEIVER SWEPT. SEVERAL VIRTUAL RANGE (DELAY TIME) TRACES RESULTING FROM

GROUND REFLECTIONS, PLASMA RESONANCES, BIREFRINGENCE OF THE IONOSPHERE, NON-VERTICAL PROPAGATION, ETC., WERE NORMALLY OBSERVED. VIRTUAL RANGE AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM (GRAPH) SHOWING VIRTUAL RANGE AS A FUNCTION OF RADIO FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY PROFILES. INITIAL OPERATION OF THIS EXPERIMENT WAS NORMAL AND BOTH REAL TIME AND TAPE RECORDED DATA WERE TAKEN UNTIL FEBRUARY 4, 1972 WHEN THE RECORDERS FAILED.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- FIXED FREQUENCY SOUNDER NSSDC ID 71-024A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W. CALVERT	NOAA	BOULDER, CO	
OI - R.B. NORTON	NOAA	BOULDER, CO	
OI - G.L. NELMS	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA	
OI - C.E. PETRIE	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA	
OI - G.E.K. LOCKWOOD	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA	
OI - J.H. WHITTEKER	COMM RESEARCH CENTRE	OTTAWA, ONTARIO, CANADA	
OI - S.M. WARNOCK	NOAA	BOULDER, CO	

EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLY-BACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 14 OR 21 SEC. ONE OF SIX FREQUENCIES (0.12, 0.48, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER, AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY AND A SPECIAL MIXED MODE WITH TRANSMISSION AT A SELECTED ONE OF THE SIX FIXED FREQUENCIES AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST YEAR AFTER LAUNCH.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- VLF RECEIVER NSSDC ID 71-024A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.E. BARRINGTON COMM RESEARCH CENTRE OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VERY LOW-FREQUENCY (VLF) EXPERIMENT WAS A LOW-FREQUENCY (LF) BROADBAND RECEIVER THAT OBSERVED SIGNALS FROM THE 79-M LONG DIPOLE (SPLIT MONOPOLE) ANTENNA BETWEEN .05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING SIGNALS BELOW 5 MHZ ON THE IONOSONDE. THE VLF RECEIVER HAD A WIDE DYNAMIC RANGE THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL (AGC) SYSTEM. THIS VLF EXPERIMENT INCLUDED AN ONBOARD EXCITER THAT SWEPT AT A NONLINEAR RATE FROM 50 TO ZERO HZ, THEN TO 9500 HZ, OVER A PERIOD OF 1.0 SEC. THIS PERMITTED THE CONTROLLED STUDY OF ION RESONANCES STIMULATED BY THE EXCITER, IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE. THE EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.08-MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE RECORDER CHANNELS FOR THE FIRST YR WHEN THE SPACECRAFT TAPE RECORDER WAS OPERATING. TAPE RECORDED (AND BACKUP REAL-TIME CAPABILITY) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS NSSDC ID 71-024A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - I.B. MCDIARMID NATIONAL RSCH COUNCIL OTTAWA, ONTARIO, CANADA
OI - J.R. BURROWS NATIONAL RSCH COUNCIL OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE FIRST, MADE UP OF FOUR GEIGER COUNTERS, MEASURED ELECTRONS GREATER THAN 20 AND 40 KEV AND PROTONS GREATER THAN 300 AND 500 KEV PARALLEL TO AND PERPENDICULAR TO THE SATELLITE SPIN AXIS. ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO THE SPIN AXIS. THE SECOND SET CONSISTED OF TWO SOLID-STATE SILICON JUNCTION DETECTORS. THESE HAD THRESHOLDS OF 80, 100, 120, AND 200 KEV FOR ELECTRONS AND 200 AND 400 KEV FOR PROTONS. THE THIRD SET CONSISTED OF FOUR SILICON JUNCTION DETECTORS WHICH MEASURED PROTONS IN THE ENERGY RANGE 0.15 TO 55 MEV. THE FOURTH SET WAS COMPOSED OF TWO CESIUM IODIDE SCINTILLATION-PHOTOMULTIPLIER SYSTEMS, EACH OPERATED IN TWO DIFFERENT MODES. THE SYSTEM RESPONDED TO ELECTRONS GREATER THAN 3, 40, AND 60 KEV AND PROTONS GREATER THAN 20 AND 50 KEV.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 03/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOFT-PARTICLE SPECTROMETER NSSDC ID 71-024A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - W.J. HEIKKILA U OF TEXAS DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION
THE SOFT PARTICLE SPECTROMETER (WHICH WAS BASICALLY AN ELECTROSTATIC ANALYZER) WAS USED TO STUDY THE DIRECTIONAL INTENSITY AND DIFFERENTIAL ENERGY SPECTRA OF PROTONS AND ELECTRONS TO OBTAIN A GREATER UNDERSTANDING OF AURORAS, GEOMAGNETIC DISTURBANCES, AND VARIOUS IONOSPHERIC FEATURES. DIFFERENTIAL ENERGY SPECTRA WERE OBTAINED IN THE ENERGY RANGE 10 EV TO 10 KEV WITH A 20 PERCENT ENERGY RESOLUTION. THE VOLTAGE SWEEP PROGRAM OF THE ANALYZER WAS FLEXIBLE.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 03/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ION MASS SPECTROMETER NSSDC ID 71-024A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - J.H. HOFFMAN U OF TEXAS DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION
THIS MAGNETIC ION MASS SPECTROMETER EXPERIMENT WAS FLOWN TO MEASURE THE DISTRIBUTION OF THE CONCENTRATIONS OF THE ION SPECIES AS A FUNCTION OF TIME AND POSITION, WITH PARTICULAR INTEREST FOCUSED ON THE SOLAR WIND PARTICLES. THE INSTRUMENT HAD TWO ION DETECTOR SYSTEMS, AND MASS SCANNING THROUGH THE RANGE FROM 1 TO 64 AMU WAS ACCOMPLISHED IN TWO SECTIONS -- 1 TO 8 AMU AND 8 TO 64 AMU. TWO ION BEAMS EMERGED FROM THE MAGNETIC SECTOR OF THE INSTRUMENT AND WERE SIMULTANEOUSLY DETECTED BY ELECTRON MULTIPLIERS AND LOG ELECTROMETER AMPLIFIERS. A CIRCUIT FOLLOWING EACH AMPLIFIER DETECTED THE PEAK AMPLITUDE OF THE ION CURRENT. THIS PEAK VALUE, RATHER THAN THE ENTIRE MASS SPECTRUM, WAS TRANSMITTED IN ORDER TO REDUCE THE REQUIRED TELEMETRY BANDWIDTH. IN THIS MODE OF OPERATION, THE COMPLETE MASS RANGE WAS SCANNED IN 1 SEC. A BACKUP MODE WAS PROVIDED WHICH PRODUCED AN ANALOG OUTPUT WITH A SWEEP PERIOD OF 8 SEC. THIS EXPERIMENT OPERATED NOMINALLY AFTER LAUNCH WITH MOST OF THE DATA OBTAINED IN THE PEAK MODE. FOR ABOUT 2 MIN PER PASS OVER OTTAWA, CANADA, THE EXPERIMENT OPERATED IN THE ANALOG MODE. INFLIGHT CALIBRATION WAS ACHIEVED BY COMPARING ION CONCENTRATION MEASUREMENTS AT APPROPRIATE ALTITUDES, I.E., WHERE A SINGLE ION SPECIES PREDOMINATED, WITH ELECTRON DATA FROM THE SOUNDER ON BOARD. OTHER COMPARISONS WERE MADE BETWEEN THE SPECTROMETER OUTPUT AND MEASUREMENTS OBTAINED FROM OTHER RELATED EXPERIMENTS ON BLARC.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE NSSDC ID 71-024A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.H.	BRACE	NASA-GSFC	GREENBELT, MD
OI - J.A.	FINDLAY	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW TO THE PROBE FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE, ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 46.3 CM FROM THE SC, ALONG THE SPIN AXIS, AND WAS CENTERED BETWEEN THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNPERTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE, WHICH WERE FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE OUTER (0.24 CM IN DIAM AND 23 CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 2.3 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED THAT CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM SQ, AND IN TEMPERATURE VALUES FROM 400 TO 50,000 DEG K.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER NSSDC ID 71-024A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.J.R.	MAIER	NASA-GSFC	GREENBELT, MD.
OI - E.J.	SMIDDY	AFCRL	GREENBELT, MD
OI - B.E.	TROY, JR.	NASA-GSFC	GREENBELT, MD
OI - J.L.	DONLEY	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED ION AND/OR ELECTRON CURRENT IN ORDER TO STUDY HEAT TRANSFER PROCESSES WHICH ARE IMPORTANT IN THE DYNAMICS OF THE IONOSPHERE. THIS RETARDING POTENTIAL ANALYZER CONSISTED OF THREE GRIDS (APERTURE GRID, RETARDING GRID AND A SUPPRESSOR GRID) WHICH PROVIDED A VOLT-AMPERE CURVE RELATING SWEEP VOLTAGE ON THE RETARDING GRID TO CURRENT FLOW TO THE COLLECTOR. ANALYSIS OF THE CURVES COULD PROVIDE ION/ELECTRON TEMPERATURES AND DENSITIES.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- RADIO BEACON NSSDC ID 71-024A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)
PI - P.A. FORSYTH WESTERN ONTARIO U LONDON. ONTARIO. CANADA
OI - C. LYON WESTERN ONTARIO U LONDON. ONTARIO. CANADA

EXPERIMENT BRIEF DESCRIPTION
A CW TRANSMITTER (137 TO 138 MHZ BAND) RADIATING ABOUT 100 MW AND OPERATING IN CONJUNCTION WITH TRACKING BEACON (136 TO 137 MHZ BAND) PROVIDED FACILITIES FOR OBSERVING SCINTILLATIONS FROM IRREGULARITIES. DETERMINING MAGNITUDES AND POSITIONS. AND EVALUATING ELECTRON CONTENT BETWEEN GROUND OBSERVER AND SATELLITE. INTERFERENCE DIFFICULTIES WITH OTHER SPACECRAFT OPERATIONS PREVENTED NOMINAL ELECTRON CONTENT DATA FROM BEING OBTAINED. HOWEVER SOME LIMITED AMOUNT OF USEFUL SCINTILLATION DATA WAS OBSERVED.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 04/23/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC RADIO NOISE NSSDC ID 71-024A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)
PI - T.R. HARTZ COMM RESEARCH CENTRE OTTAWA. ONTARIO. CANADA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT USED THE SWEEP FREQUENCY IONOSONDE RECEIVER AUTOMATIC GAIN CONTROL (AGC) VOLTAGES TO MEASURE GALACTIC AND SOLAR RADIO NOISE LEVELS. THE RECEIVER SWEPT FROM 0.1 TO 20 MHZ. THE DYNAMIC RANGE WAS 50 DB. AND THE BANDWIDTH WAS 55 KHZ. THE ANTENNAS USED WERE 20.2-M AND 78.9-M DIPOLES.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- 3914- TO 5577-A PHOTOMETER NSSDC ID 71-024A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)
PI - C.D. ANGER U OF CALGARY EDMONTON. ALBERTA. CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS DUAL WAVELENGTH SCANNING AURORAL PHOTOMETER WAS DESIGNED TO MAP THE DISTRIBUTION OF AURORAL EMISSIONS AT 5577 AND 3914 A OVER THE PORTION OF THE DARK EARTH VISIBLE TO THE SPACECRAFT. A COMBINATION OF INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND ROTATIONAL MOTIONS OF THE SPACECRAFT PERMITTED THE SENSOR TO SYSTEMATICALLY SCAN ACROSS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW INCIDENT RADIATION TO BE ACCEPTED FROM TWO DIRECTIONS 180 DEG APART AND THEN TO FOCUS THIS LIGHT AT A COMMON POINT ON THE SINGLE IMAGE DISSECTOR PHOTOMETER TUBE. FOR EACH DIRECTION, THE LIGHT PASSED THROUGH ITS OWN LENS, INTERFERENCE FILTER, AND MIRROR. ONE FILTER OPERATED IN THE RANGE 5581 PLUS OR MINUS 9 A (AT THE HALF-MAXIMUM POINTS), AND THE OTHER FILTER OPERATED AT 3915 PLUS OR MINUS 13 A. ONLY ONE OF THE TWO OPTICAL SYSTEMS POINTED AT THE EARTH AT ANY ONE TIME, WHILE THE OTHER FACED INTO SPACE. WHEN THE SPACECRAFT SPIN AXIS WAS ORIENTED TO LIE IN THE ORBITAL PLANE, EACH ROTATION OF THE SPACECRAFT RESULTED IN AN EARTH SCAN 5 DEG WIDE. THIS WIDTH SIZE WAS CHOSEN TO INSURE OVERLAP WITH THE PREVIOUS SCAN. THE IMAGE DISSECTOR REPETITIVELY SCANNED AT A HIGH SPEED ACROSS THE NARROW DIMENSION OF EACH 5-DEG BAND AND DIVIDED IT INTO SEPARATELY RESOLVED REGIONS 0.4 DEG BY 0.4 DEG. SIMILAR STRIPS WERE SCANNED AT EACH OF THE TWO WAVELENGTHS, BUT AT TIMES THAT DIFFERED BY HALF THE ROTATION PERIOD OF ABOUT 10 SEC. A CALIBRATION LIGHT SOURCE FOR EACH WAVELENGTH WAS BUILT INTO THE OPTICAL ASSEMBLY, AND A CALIBRATE CYCLE WAS INITIATED AUTOMATICALLY WHENEVER A 'POWER ON' COMMAND WAS GIVEN. TO MINIMIZE THE PROBLEMS ARISING FROM SOLAR ILLUMINATION OF THE OPTICS AND THE DIRECT VIEWING OF THE SUNLIT EARTH, A SUNLIGHT PROTECTION SYSTEM WAS INCLUDED. THE ELECTRONIC PORTION OF THE INSTRUMENT CONSISTED OF MODULES THAT AMPLIFIED AND COUNTED OUTPUT PULSES FROM THE IMAGE DISSECTOR TUBE AND CONVERTED THESE INTO A HIGH-RATE PULSE CODE MODULATED OUTPUT AND A LOW-RATE ANALOG OUTPUT. THE DATA WILL BE REPRODUCED DIRECTLY IN THE FORM OF SEPARATE PICTURES REPRESENTING EMISSIONS AT EACH WAVELENGTH, WHICH WILL BE USED TO STUDY THE LARGE-SCALE DISTRIBUTION AND MORPHOLOGY OF AURORAS AND TO COMPARE WITH OTHER MEASUREMENTS FROM THIS AND OTHER SPACECRAFT AND FROM GROUND-BASED INSTRUMENTS. COMPLETE DETAILS ABOUT THE EXPERIMENT CAN BE FOUND IN THE REPORT 'THE ISIS-2 SCANNING AURORAL PHOTOMETER,' C. D. ANGER, T. FANCOTT, J. MCNALLY, AND H. S. KERR, APPLIED OPTICS, VOL 12, NO. 8, PP. 1753-1766, AUGUST (1973).

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- 6300-A PHOTOMETER NSSDC ID 71-024A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.G. SHEPHERD YORK U TORONTO, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

A TWO-CHANNEL PHOTOMETER WAS USED TO MEASURE DIRECTLY AND TO MAP THE INTENSITY OF THE ATOMIC OXYGEN RED LINE AT 6300 A IN DAY, TWILIGHT, AND NIGHT AIRGLOW AND AURORA. EACH CHANNEL HAD ITS OWN OPTICAL INPUT, AND THE TWO INPUTS WERE MOUNTED AT THE SAME END OF THE SPACECRAFT, SEPARATED BY 180 DEG, WITH THEIR AXES AT 90 DEG TO THE SPACECRAFT'S SPIN AXIS. ONE OPTICAL INPUT WAS CHARACTERIZED BY A SPECTRAL BANDWIDTH OF 12 A CENTERED AROUND THE 6300 A LINE OF ATOMIC OXYGEN, AND THE OTHER INPUT WAS USED FOR WHITE LIGHT MEASUREMENTS. THE SPINNING SATELLITE CAUSED THE PHOTOMETER TO ALTERNATELY

VIEW THE EARTH AND THEN THE SKY, I.E., WHEN ONE SENSOR VIEWED THE EARTH, THE OTHER SENSOR SAW THE SKY. BOTH SENSORS HAD A 2.5-DEG CIRCULAR FIELD OF VIEW. WITH THE USE OF A BEAM COMBINER ARRANGEMENT, THE SAME PHOTOMULTIPLIER ACCEPTED THE TWO INPUTS. THE DYNAMIC RANGE OF INTENSITY MEASUREMENTS WAS FROM ABOUT 10 R TO MORE THAN ONE MEGARALEIGH. SUNLIGHT COULD ENTER THE OPTICAL SYSTEMS DIRECTLY IN ADDITION TO EARTH-REFLECTED LIGHT. THE INSTRUMENT BAFFLE WAS ILLUMINATED BY THE SUN ONLY FOR THE OFF-AXIS ANGLES LESS THAN 47 DEG. OUTSIDE THIS LIMIT, THE DATA WERE NOT DEGRADED BY SUNLIGHT, PERMITTING NORMAL OPERATION IN THE REGION OF THE ORBIT WHERE THE SPACECRAFT WAS IN SUNLIGHT BUT THE PORTION OF THE EARTH BENEATH IT WAS DARK. AN EXTERNAL LIGHT SOURCE "SAW" THE FILTER ONLY WHEN IT WAS 7.5 DEG OR LESS OFF AXIS. IN THE RANGE 7.5 TO 47 DEG, GOOD DATA WERE STILL OBTAINED WHEN THE SUNLIT EARTH WAS THE ORIGIN OF THE CONTAMINATION. TO GIVE ACCURATE LOW LIGHT LEVEL READINGS, AS WELL AS COVER THE FULL DYNAMIC RANGE, AND TO PRESENT THE MEASUREMENTS IN A FORM COMPATIBLE WITH ENCODING AS AN 8-BIT BINARY WORD FOR TELEMETRY, A HYBRID LINEAR-LOG AMPLIFIER SYSTEM WAS USED. THE ELECTRONIC SYSTEM PULSE COUNTED AT LOW LIGHT LEVELS AND AMPLIFIED ON A LOG SCALE FOR HIGHER LIGHT LEVELS. IT WAS COMPOSED OF A PREAMP, TWO SIGNAL PROCESSING CHANNELS (LINEAR AND LOGARITHMIC), AND AN OUTPUT COMMUTATOR TO SELECT BETWEEN THEM AS WELL AS TO INTERFACE THEM TO THE SPACECRAFT SYSTEM. ALSO PROVIDED WERE CALIBRATION AND PROTECTION CIRCUITRY TO OPERATE THE CALIBRATE LAMPS AND TO PROTECT THE PHOTOTUBE FROM THE EFFECTS OF EXPOSURE TO HIGH LIGHT LEVELS. TO PERFORM THE DATA ANALYSIS, IT WAS NECESSARY, AMONG OTHER OPERATIONS, TO EVALUATE DIFFERENT GEOMETRICAL SITUATIONS, AND TO LOCATE THE ON-EARTH LIMB CROSSING OF THE 12 A BANDPASS PHOTOMETER SO THAT THE DATA COULD BE ORGANIZED INTO SPIN MAPS.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/04/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 44 NSSDC ID 71-058A
ALTERNATE NAMES- SOLRAD 10, SOLAR EXPLORER-C, SE-C, SOLRAD-C, PL-703A

LAUNCH DATE- 07/08/71 SPACECRAFT WEIGHT IN ORBIT- 118. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 07/09/71 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.23 MIN
APOAPSIS- 632.000 KM ALT PERIAPSIS- 433.000 KM ALT INCLINATION- 58.06 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 01/28/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.027 MIN
APOAPSIS- KM ALT PERIAPSIS- 435. KM ALT INCLINATION- 51.0465 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC
PM - E.W. PETERKIN NAVAL RESEARCH LAB WASHINGTON, DC

PS - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

SOLRAD 10, A SPIN-STABILIZED SATELLITE, WAS ONE IN A SERIES OF SPACECRAFT DESIGNED TO PROVIDE CONTINUOUS COVERAGE OF WAVELENGTH AND INTENSITY CHANGES IN SOLAR RADIATION IN THE UV, SOFT, AND HARD X-RAY REGIONS. (THE FIRST SPACECRAFT IN THIS SERIES, SR-1, WAS LAUNCHED IN 1960.) SOLRAD 10 ALSO MAPPED THE CELESTIAL SPHERE USING A HIGH-SENSITIVITY X-RAY DETECTOR. THE SPACECRAFT WAS A 12-SIDED CYLINDER THAT MEASURED 76 CM IN DIAMETER AND 58 CM IN HEIGHT. FOUR SYMMETRICALLY PLACED 17.8- BY 53.3-CM SOLAR CELL PANELS, HINGED AT THE CENTER SECTION OF THE STRUCTURE, SERVED AS THE ELEMENTS OF A TURNSTILE ANTENNA SYSTEM. EIGHTEEN SOLAR SENSORS WERE MOUNTED POINTING PARALLEL TO THE SPIN AXIS OF THE SATELLITE, WHICH POINTED DIRECTLY AT THE SOLAR DISK. THE PLANE OF ROTATION SHIFTED ABOUT 1 DEG/DAY SO THAT A STELLAR DETECTOR MOUNTED TO POINT RADIALLY OUTWARD FROM THE AXIS SCANNED THE CELESTIAL SPHERE. THE EXPERIMENTS WERE TURNED ON AT 1430 UT ON JULY 9, 1971. DATA FROM ALL DETECTORS WERE STORED IN A 54-KBS CORE MEMORY AND TELEMETERED ON COMMAND TO THE NRL TRACKING STATION AT BLOSSOM PT., MD. THE FIRST CORE DUMP WAS OBTAINED AT 2100 UT ON JULY 9, 1971. DATA WERE ALSO TRANSMITTED IN REAL TIME AT 137.710 MHZ. THE CORE MEMORY FAILED IN JULY, 1973. ONLY REAL-TIME DATA WERE TAKEN AFTER THAT TIME.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR RADIATION DETECTORS NSSDC ID 71-058A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MONITOR THE SOLAR X-RAY FLUX IN EIGHT BANDS AND THE SOLAR UV FLUX IN FIVE BANDS AS PART OF A LONG-TERM PROJECT TO OBSERVE SOLAR X-RAY AND UV ACTIVITY WITH SETS OF STANDARDIZED SENSORS OVER AN ENTIRE SOLAR CYCLE. THE X-RAY BANDS OBSERVED WERE 0.08 TO 0.8 A, 0.1 TO 1.6 A, 0.5 TO 3 A, 1 TO 5 A, 1 TO 8 A, 8 TO 16 A, 1 TO 20 A, AND 44 TO 60 A. ALL THE DETECTORS FOR THESE BANDS, WITH THE EXCEPTION OF THAT FOR THE 0.08- TO 0.8-A BAND, WERE ION CHAMBERS FITTED WITH A VARIETY OF WINDOW MATERIAL (BERYLLIUM, ALUMINUM, AND MYLAR) OF VARIOUS THICKNESSES AND FILLED WITH SEVERAL DIFFERENT GASES (KRYPTON, ARGON, NITROGEN, CARBON TETRACHLORIDE, AND XENON) AT VARIOUS PRESSURES. THE 0.08- TO 0.8-A BAND HAD AS A DETECTOR A CESIUM IODIDE (NA) SCINTILLATING CRYSTAL SURROUNDED BY A PLASTIC SCINTILLATING MATERIAL VIEWED BY A SINGLE PHOTOMULTIPLIER. THIS DETECTOR WAS DESIGNED TO COLLECT DATA ON THE VERY-HIGH-ENERGY SOLAR X-RAY EMISSION OBSERVED ONLY DURING SOLAR FLARES. THE UV BANDS OBSERVED WERE 170 TO 500 A, 170 TO 700 A, 1080 TO 1350 A, 1225 TO 1350 A, AND 1450 TO 1600 A. THE TWO SHORTER WAVELENGTH BANDS HAD LITHIUM FLUORIDE, PHOTOSENSITIVE SURFACES PROTECTED BY ALUMINUM, ALUMINUM OXIDE, AND CARBON WINDOWS FOR DETECTORS WHILE THE REMAINING BANDS HAD ION CHAMBERS WITH WINDOWS COMPOSED OF LITHIUM FLUORIDE, CALCIUM FLUORIDE, OR SILICON DIOXIDE, AND VARIOUS GAS FILTERS (NITRIC OXIDE OR TRIETHYLAMINE B). SOME OF THE SOLAR DETECTORS WERE PROTECTED FROM CHARGED PARTICLES BY CONE-SHAPED ALUMINUM COLLIMATORS. THE DATA WERE TRANSMITTED OVER TWO TELEMETRY SYSTEMS IN ONE OF THREE FORMS -- STORED DATA, REAL-TIME DIGITAL (PCM) DATA, AND REAL-TIME ANALOG DATA. TELEMETRY SYSTEM 1 (TM 1) USED A PAM/PCM/FM/PM TRANSMITTER THAT OPERATED AT 137.710 MHZ WITH A RADIATED POWER OF 250 MW. UNDER NORMAL OPERATING CONDITIONS, TM 1 CONTINUOUSLY TRANSMITTED ANALOG AND PCM REAL-TIME DATA.

ALTHOUGH THE REAL-TIME DIGITAL PCM WAS THE PRIMARY REAL-TIME TRANSMISSION FORMAT. TELEMETRY SYSTEM 2 (TM 2) USED A PCM/PM TRANSMITTER THAT OPERATED AT 136.380 MHZ WITH A RADIATED POWER OF 250 MW. TM 2 TRANSMITTED STORED DATA (UP TO ONE DATA SAMPLE PER MINUTE FOR 14.25 HR) ON COMMAND.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY NSSDC ID 71-058A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MAP THE X-RAY SKY IN THE 0.5- TO 15-A REGION. THE DETECTOR, MOUNTED ON THE SIDE OF THE SPACECRAFT, WAS A LARGE-AREA PROPORTIONAL COUNTER MOUNTED TO POINT RADIALLY OUTWARD FROM THE SPIN AXIS, WHICH POINTED CONTINUALLY TOWARD THE SUN. THE DETECTOR WINDOW WAS MADE OF 1/8-MIL-THICK MYLAR WITH AN EFFECTIVE AREA OF 100 SQ CM. THE GAS FILLER WAS A MIXTURE OF 0.45 ARGON, 0.45 XERON, AND 0.10 CARBON DIOXIDE MAINTAINED AT 4 LB/SQ CM. A COLLIMATOR LIMITED THE FIELD OF VIEW TO 8 DEG (FULL-WIDTH AT HALF-MAXIMUM) IN A PLANE CONTAINING THE SPIN AXIS AND 1 DEG (FWHM) IN THE PLANE PERPENDICULAR TO THE SPIN AXIS. CHARGED PARTICLE INFORMATION WAS PROVIDED BY PROPORTIONAL COUNTERS MOUNTED ON THREE SIDES OF THE X-RAY DETECTOR. ASPECT INFORMATION WAS PROVIDED BY A BLUE-SENSITIVE PHOTOMULTIPLIER CAPABLE OF DETECTING ALL FOURTH-MAGNITUDE AND NOT FIFTH-MAGNITUDE STARS. THE RESOLUTION OF THE ASPECT SYSTEM AND THE ACCURACY WITH WHICH THE EXPERIMENT COULD LOCATE X-RAY SOURCES WAS BETTER THAN PLUS OR MINUS 0.25 DEG. THE DETECTOR WAS CONNECTED TO A 400-CHANNEL PULSE TIME ANALYZER WHICH WAS SYNCHRONIZED WITH THE SPIN PERIOD TO GIVE A 2-DEG SPATIAL RESOLUTION IN THE SPIN DIRECTION. THE WHOLE CELESTIAL SPHERE WAS SURVEYED EVERY SIX MONTHS.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 07/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- APOLLO 15 LM/ALSEP NSSDC ID 71-063C
ALTERNATE NAMES- APOLLO 15C, ALSEP 15, LEM 15, ROVER 15, 05366

LAUNCH DATE- 07/26/71 SPACECRAFT WEIGHT IN ORBIT- 12700. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY

UNITED STATES NASA-CMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R. PETRONE NASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE APOLLO 15 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE MOON AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE NORTH CENTRAL PART OF THE MOON (26 DEG 4 MIN 56 SEC N LATITUDE, 3 DEG 39 MIN 30 SEC E LONGITUDE), AT THE FOOT OF THE APENNINE MOUNTAIN RANGE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING THE EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR POWERED ALSEP CONTAINED SEISMIC, MAGNETIC FIELDS, LUNAR ATMOSPHERE COMPOSITION, ION COMPOSITION, LUNAR DUST, SOLAR WIND COMPOSITION, HEAT LOSS, AND SOLAR CELL RADIATION DAMAGE EXPERIMENTS.

ON 07/30/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC NSSDC ID 71-063C-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.V. LATHAM U OF TEXAS GALVESTON, TX
OI - W.M. EWING COLUMBIA U NEW YORK, NY
OI - F. PRESS MIT CAMBRIDGE, MA
OI - G. SUTTON U OF HAWAII HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION
THE PASSIVE SEISMIC EXPERIMENT (PSE), PART OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), MEASURED SEISMIC SIGNALS FROM BOTH EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE MEASUREMENTS OBTAINED HAVE BEEN USED TO DETERMINE THE INTERNAL STRUCTURE OF THE MOON, THE RATE OF ENERGY RELEASE, AND THE NUMBERS AND MASSES OF METEOROIDS IMPACTING THE LUNAR SURFACE. THE LUNAR SURFACE IMPACTS OF THE SPENT S-IVB AND LM ASCENT STAGES WERE USED AS EXTERNAL CALIBRATION SOURCES FOR THE SEISMOMETERS. THE KNOWN MASS AND VELOCITY OF THESE STAGES AT SURFACE IMPACT AND THE LUNAR IMPACT POINT COORDINATES ENABLED THE COMPUTATION OF ENERGY GENERATED AT IMPACT AND THE POINT OF ENERGY APPLICATION. (THE CALIBRATION CHARACTERISTICS WERE DETERMINED BY MEASURING SEISMOMETER RESPONSE TO THESE ENERGY SOURCES.) THE EXPERIMENT, WHICH WAS DEPLOYED 110 M WEST OF THE LM, CONSISTED OF TWO SEISMIC ASSEMBLIES -- A LONG PERIOD (LP) SEISMOMETER (TRIAXIAL, ORTHOGONAL) WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80-DB DYNAMIC RANGE) AND A SHORT PERIOD (SP) SEISMOMETER (UNIAXIAL, VERTICAL MOTION) WITH A SEISMIC FREQUENCY FROM 0.05 TO 20 HZ (80-DB DYNAMIC RANGE). THE MINIMUM DETECTABLE SIGNAL OF THE PSE SEISMOMETERS WAS 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE SEISMOMETERS WERE HOUSED IN A DRUM-SHAPED ENCLOSURE ROUNDED IN THE BOTTOM. THIS ENCLOSURE RESTED ON A SUPPORT STRUCTURE (STOOL) AND WAS COVERED BY A THERMAL SHROUD AFTER DEPLOYMENT OF THE EXPERIMENT. THE SEISMOMETERS WERE OPERATING NORMALLY AS OF AUGUST 1972. THE APOLLO 15 SEISMOMETER WAS PART OF A TRIANGULAR NETWORK OF SEISMOMETERS THAT INCLUDED THE APOLLO 12 AND 14 SEISMOMETERS. (THE APOLLO 11 SEISMOMETER CEASED FUNCTIONING ABOUT 2 MONTHS AFTER DEPLOYMENT ON JULY 20, 1969). FOUR MAJOR DISCOVERIES HAVE RESULTED FROM THE SEISMOMETER EXPERIMENTS -- (1) THE EXISTENCE OF A CRUST

AND MANTLE. (2) DEPTH OF FOCUS OF CYCLIC MOON QUAKES AT 800 KM. (3) SWARMS OF NON-CYCLIC MOONQUAKES. AND (4) EFFICIENT SCATTERING OF ENERGY IN A NEAR-SOURCE REGION.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/31/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR NSSDC ID 71-063C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)
PI - J.W. FREEMAN RICE U HOUSTON. TX

EXPERIMENT BRIEF DESCRIPTION
THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND FROM THE FREE STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FLUX. NUMBER DENSITY. VELOCITY. AND ENERGY PER UNIT CHARGE WERE DETERMINED FROM THE DATA OBTAINED. A CURVED PLATE ANALYZER AND E CROSS B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV. SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU WAS POSSIBLE. A SEPARATE CURVED PLATE ANALYZER COUNTED SOLAR WIND PROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. OPERATION WAS NORMAL UNTIL LUNAR NOON ON DECEMBER 16. 1971. WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C. OPERATION WAS CURTAILED DUE TO POWER SUPPLY ARCING. DATA FROM OTHER PERIODS OF OPERATION WERE NORMAL.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/16/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HEAT FLOW NSSDC ID 71-063C-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)
PI - M.G. LANGSETH LAMONT-DOHERTY GEO OBS PALISADES. NY
OI - S. CLARK YALE U NEW HAVEN. CT

EXPERIMENT BRIEF DESCRIPTION
THE HEAT FLOW EXPERIMENT (HFE). WHICH WAS PART OF THE ALSEP. WAS DESIGNED TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. THE EXPERIMENT DETECTED LUNAR TEMPERATURES OF THE FOLLOWING TYPES AND RANGES. WITH CORRESPONDING ACCURACIES NOTED IN PARENTHESES -- HIGH-SENSITIVITY MEASUREMENTS OF PLUS OR MINUS 2 DEG C (0.003 DEG C) TEMPERATURE DIFFERENCE. LOW-SENSITIVITY MEASUREMENTS OF PLUS OR MINUS 20 DEG C (0.03 DEG C) TEMPERATURE DIFFERENCE. PROBE AMBIENT TEMPERATURES FROM 200 DEG K TO 250 DEG K (0.1 DEG K). THERMOCOUPLE REFERENCE TEMPERATURE FROM -20 DEG C TO -60 DEG C (0.1 DEG C). AND PROBE CABLE AMBIENT TEMPERATURES FROM 90 DEG K TO 250 DEG K (0.3 DEG K). THE INSTRUMENTATION CONSISTED OF TWO 1.2-M PROBES THAT WERE INSERTED INTO THE LUNAR SURFACE. A SPECIAL TOOL FOR PROBE INSERTION. AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE CENTRAL

STATION. TO ENABLE PLACEMENT OF THE PROBES INTO THE LUNAR SURFACE, TWO 3-M HOLES WERE DRILLED IN THE SURFACE BY ASTRONAUT SCOTT USING THE APOLLO LUNAR SURFACE DRILL (ALSD). THE ALSD WAS EQUIPPED WITH CORE STEM CAPS AND RETAINERS, CORE STEMS, CORE BITS, A BORE BIT/DRILL ADAPTER, A TREADLE, AND A BORE STEM/CORE STEM WRENCH. THE BORE STEM ASSEMBLIES USED IN DRILLING REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT COLLAPSE OF THE HOLE WALLS DURING INSERTION OF THE PROBES. PRELIMINARY RESULTS OF THE EXPERIMENT INDICATE A LUNAR HEAT FLOW OF 3.3 TIMES 10 TO THE MINUS 6 W/CM SQ, WHICH IS ONE-HALF THAT OF THE EARTH. THE RATE OF TEMPERATURE INCREASE AS A FUNCTION OF DEPTH IS 1.75 DEG K PER M. TEMPERATURE MEASUREMENTS WERE ALSO OBTAINED DURING LUNAR NIGHT AND DURING A TOTAL ECLIPSE ON AUGUST 6, 1971.

ON 07/30/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/31/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT NSSDC ID 71-063C-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.S.	JOHNSON	U OF TEXAS	DALLAS, TX
OI - D.E.	EVANS	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT MEASURED THE DENSITY OF NEUTRAL ATOMS AND DETERMINED PRESSURES OF THE AMBIENT LUNAR ATMOSPHERE FROM 10 TO THE -6 POWER TO 10 TO THE -12 POWER TORR. THE DATA OBTAINED COMPLEMENTED MEASUREMENTS MADE BY THE ALSEP SUPRATHERMAL ION DETECTOR. DATA WERE NORMAL UNTIL DECEMBER 12, 1971 WHEN A POWER SUPPLY ARCING CURTAILED OPERATION WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C. OTHER DATA WERE USABLE.

ON 07/30/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/16/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- LUNAR DUST DETECTOR NSSDC ID 71-063C-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.R.	BATES	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE FUNCTION OF THE ALSEP LUNAR DUST DETECTOR EXPERIMENT WAS TO SEPARATE AND MEASURE HIGH-ENERGY RADIATION DAMAGE TO THREE SOLAR CELLS, TO MEASURE REDUCED SOLAR CELL OUTPUT DUE TO DUST ACCUMULATION, AND TO MEASURE REFLECTED INFRARED ENERGY AND TEMPERATURES FOR USE IN COMPUTING LUNAR SURFACE TEMPERATURES. THE DUST DETECTOR HAD TWO COMPONENTS -- SENSOR PACKAGE MOUNTED TO THE TOP OF THE CENTRAL STATION SUN SHIELD, AND A PRINTED CIRCUIT BOARD LOCATED WITHIN THE CENTRAL STATION THAT INTERFACED WITH THE POWER DISTRIBUTION UNIT OF THE ALSEP DATA SUBSYSTEM. THE EXPERIMENT WAS SIMILAR TO THAT DEPLOYED ON APOLLO 12 AND 14.

ON 07/30/71. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/31/71. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- OSO 7 NSSDC ID 71-083A
ALTERNATE NAMES- OSO-H. 05491

LAUNCH DATE- 09/29/71 SPACECRAFT WEIGHT IN ORBIT- 635. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 10/02/71 OREIT TYPE- GEOCENTRIC ORBIT PERICD- 93.40 MIN
APOAPSIS- 571.000 KM ALT PERIAPSIS- 323.000 KM ALT INCLINATION- 33.13 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/04/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 91.769 MIN
APOAPSIS- 424.71 KM ALT PERIAPSIS- 297.88 KM ALT INCLINATION- 33.127 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)
PM - R.H. PICHARD NASA-GSFC GREENBELT. MD
PS - S.P. MARAN NASA-GSFC GREENBELT. MD

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THE OSO SATELLITE SERIES WERE TC PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SOLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT AND X-RAY AND GAMMA RADIATION. THE OSO 7 PLATFORM CONSISTED OF A SAIL SECTION. WHICH POINTED TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN. AND A WHEEL SECTION. WHICH SPUN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND CARRIED FOUR EXPERIMENTS. ATTITUDE ADJUSTMENT WAS PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. A POINTING CONTROL PERMITTED THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN A 40- BY 40-ARC-MIN RASTER PATTERN. IN ADDITION. THE POINTED SECTION COULD BE COMMANDED TO SELECT AND SCAN ANY 7.5- BY 7-ARC-MIN REGION NEAR THE SOLAR DISK. DATA WERE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY PCM/PM TELEMETRY. A COMMAND SYSTEM PROVIDED FOR AT LEAST 155 GROUND-BASED COMMANDS. REAL TIME DATA HAS ONLY BEEN RECEIVED SINCE MAY 1973. WHEN THE SECOND TAPE RECORDER FAILED.

ON 05/18/73. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- X-RAY AND EUV SPECTROHELIOGRAPH (2 TC 40C A) NSSDC ID 71-083A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.M.	NEUPERT	NASA-GSFC	GREENBELT, MD
OI - J.H.	UNDERWOOD	NASA-GSFC	GREENBELT, MD
OI - R.D.	CHAPMAN	NASA-GSFC	GREENBELT, MD
OI - R.V.	THOMAS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO DETERMINE THE DISTRIBUTION OF MATTER AND TEMPERATURE IN THE CORONA ABOVE SOLAR ACTIVE REGIONS AND DETERMINE HOW THIS MATTER CHANGES DURING SOLAR FLARES. FOUR DISTINCT INSTRUMENTS WERE USED. THE FIRST WAS A GRAZING-INCIDENCE SPECTROMETER WITH A SPECTRAL RESOLUTION OF 1.0 A, USED TO COVER THE RANGE 170 TO 400 A. THE VARIOUS DISCRETE WAVELENGTHS WERE DETECTED BY THREE BENDIX ELECTRON MULTIPLIERS MOUNTED ON A MOVING CARRIAGE. SECOND, A LONG X-RAY SPECTROHELIOGRAPH WITH A BANDPASS OF 2 A WAS USED TO COVER THE RANGE 8 TO 15 A. THE THIRD INSTRUMENT WAS A SHORT X-RAY SPECTROHELIOGRAPH, USED TO COVER THE RANGE 1.7 TO 2.5 A. BOTH SPECTROHELIOGRAPHS USED THE BALANCED FILTER METHOD. FOURTH, A POLARIMETER USING THE SCATTERING TECHNIQUE WAS USED TO COVER THE 20 TO 40 KEV RANGE. THE SPATIAL RESOLUTION OF THE EUV SPECTROHELIOGRAPH WAS 10 X 20 ARC SECONDS. THE SPATIAL RESOLUTION OF X-RAY SPECTROHELIOGRAPHS WAS 20 X 20 ARC SECONDS. THE SHORT EUV DETECTOR FAILED IN MARCH 1972. THE MEDIUM EUV DETECTOR SENSITIVITY STARTED DROPPING DURING OCTOBER 1972, AND BY MARCH 1973 WAS 60 PERCENT OF THE ORIGINAL VALUE. THE LONG EUV DETECTOR DEGRADED TO THE POINT THAT IT NO LONGER PRODUCED USEFUL SCIENTIFIC DATA AS OF MAY 1973. ONLY REAL-TIME DATA WERE OBTAINED AFTER MAY 18, 1973 WHEN THE SPACECRAFT TAPE RECORDER FAILED.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- WHITE-LIGHT CORONOGRAPH AND EXTREME ULTRAVIOLET CORONOGRAPH — NSSDC ID 71-083A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.	TOUSEY	NAVAL RESEARCH LAB	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED (1) TO STUDY THE MORPHOLOGY OF THE CORONA IN WHITE LIGHT AND THE EXTREME UV IN RELATION TO ACTIVE PHENOMENA, SUCH AS PLAGES AND FLARES IN THE LOWER SOLAR ATMOSPHERE, AND (2) TO CORRELATE THE WHITE LIGHT CORONA WITH THE EXTREME UV CORONA AND WITH SOLAR AND INTERPLANETARY MAGNETIC FIELDS. THE INSTRUMENTATION WAS LOCATED WITHIN THE POINTED SECTION OF THE SPACECRAFT AND CONSISTED OF (1) A WHITE LIGHT CORONAGRAPH FOR USE IN THE POINTED MODE TO RECORD THE OUTER CORONA OF THE SUN FROM APPROXIMATELY 3 TO 10 SOLAR RADII IN THE VISIBLE BAND OF 3900 TO 6500 A AND (2) AN EXTREME UV CORONAGRAPH FOR USE IN THE RASTER MODE TO RECORD THE UPPER CHROMOSPHERE AND LOWER CORONA FULLY TO TWO SOLAR RADII AND PARTIALLY TO FIVE SOLAR RADII IN THE BAND FROM 170 TO 550 A. THE WHITE LIGHT INSTRUMENT WAS A MODIFIED LYOT CORONAGRAPH THAT ARTIFICIALLY ECLIPSED THE SUN WITH A SPAR-MOUNTED EXTERNAL OCCULTING DISC ASSEMBLY MOUNTED APPROXIMATELY 76 CM IN FRONT OF THE INSTRUMENT. THE FAINT OUTER CORONA COULD THEN BE OBSERVED AGAINST THE BLACK SKY OF SPACE. THE IMAGE WAS STORED IN A SEC VIDICON TUBE WITH 256 PICTURE ELEMENTS AND AN ANGULAR RESOLUTION OF 1.25 ARC-MIN. THE EXTREME UV CORONAGRAPH REQUIRED NO OCCULATION DEVICE SINCE THE

SOLAR DISC WAS NOT AN OVERWHELMING SOURCE OF EXTREME UV RADIATION. THERE WERE FOUR OPEN-TO-VACUUM CHANNEL PHOTOMULTIPLIER DETECTORS IN THE IMAGE PLANE BEHIND THE APERTURE PLATE. THE SUN-CENTERED APERTURE DETECTOR HAD A SPATIAL RESOLUTION OF 20 ARC-SEC. THE REMAINING APERTURE DETECTOR COMBINATIONS WERE OFFSET, EXCLUDING THE DISC, AND HAD A RESOLUTION OF 60 ARC-SEC. IN A LARGE RASTER MODE, THE SCANNED AREAS OVERLAPPED. THE EXPERIMENT OPERATED NORMALLY UNTIL MARCH 1972, WHEN IT BECAME PARTIALLY OPERABLE. THE EXTREME UV CORONAGRAPH DEGRADED UNTIL IT BECAME USELESS IN SEPTEMBER 1973.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 09/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC X-RAY EXPERIMENT NSSDC ID 71-083A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.E.	PETERSON	U OF CALIFORNIA, SD	LA JOLLA, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENT MEASURED INTENSITY, POSITION, AND SPECTRUM OF COSMIC X-RAY SOURCES IN THE 10- TO 300-KEV RANGE. THE BASIC DETECTOR WAS A LARGE SODIUM IODIDE SCINTILLATION CRYSTAL WITH AN ANTICOINCIDENCE SHIELD COLLIMATOR WHICH PROVIDED APPROXIMATELY A 3-DEG HALF-ANGLE FIELD OF VIEW. EACH EVENT WAS ANALYZED WITH A 128-CHANNEL PULSE-HEIGHT ANALYZER. THE WHOLE CELESTIAL SPHERE WAS SURVEYED EVERY 6 MONTHS.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- COSMIC X-RAY SOURCES IN THE RANGE 1.5 TO 9 A NSSDC ID 71-083A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	CLARK	MIT	CAMBRIDGE, MA
OI - H.V.D.	ERADT	MIT	CAMBRIDGE, MA
OI - W.H.G.	LEWIN	MIT	CAMBRIDGE, MA
OI - H.W.	SCHNOPPER	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO SURVEY THE ENTIRE SKY FOR COSMIC X-RAY SOURCES IN THE ENERGY RANGE 1 TO 60 KEV WITH AN ANGULAR RESOLUTION OF ABOUT 1 DEG, AND PERFORM SPECTRAL ANALYSIS IN 5 BROAD BANDS. EACH PORTION OF THE SKY WAS VIEWED SEVERAL TIMES DURING EACH YEAR OF OPERATION. TWO MULTICOMPARTMENTED PROPORTIONAL COUNTERS EQUIPPED WITH HONEYCOMB COLLIMATORS (3.5 SQ DEG SOLID ANGLE) WERE MOUNTED IN ONE SEGMENT OF THE CSO WHEEL SECTION, WITH THE CENTERS OF THEIR FIELDS-OF-VIEW ORIENTED 15 DEG ABOVE AND 15 DEG BELOW THE SPACECRAFT EQUATOR. X RAYS WERE DETECTED IN ONE OR ANOTHER OF FOUR COMPARTMENTS DEPENDING UPON THEIR ENERGY. LOW-ENERGY PHOTONS WERE STOPPED IN THE FIRST COMPARTMENT. HIGHER-ENERGY PHOTONS PENETRATED TO THE

SECOND COMPARTMENT. PHOTONS OF EVEN HIGHER ENERGIES PENETRATED THROUGH THE FIRST AND SECOND COMPARTMENTS TO THE THIRD AND FOURTH COMPARTMENTS. THE ENERGY BANDS WERE LOGARITHMICALLY EQUISPACED. A SEPARATE SINGLE COMPARTMENT COUNTER WITH A THIN ALUMINUM WINDOW DETECTED PHOTONS BETWEEN 1.0 AND 1.5 KEV. COUNTS FROM EACH COMPARTMENT WERE STORED IN ONE OF 256 ACCUMULATORS CORRESPONDING TO A DIVISION OF THE SPACECRAFT SPIN INTO 256 SECTORS. IN-FLIGHT CALIBRATION WAS PROVIDED BY PERIODIC EXPOSURE TO A RADIOACTIVE SOURCE. ACCURATE ASPECT INFORMATION WAS PROVIDED BY A STAR SENSOR.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- HARD SOLAR X-RAY MONITORING NSSDC ID 71-083A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.E. PETERSON U OF CALIFORNIA, SD LA JOLLA, CA

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT MEASURED HARD SOLAR X-RAY BURSTS IN THE ENERGY RANGE 2 TO 300 KEV. THE DETECTOR WAS A LARGE SODIUM IODIDE SCINTILLATION CRYSTAL WITH AN ANTICOINCIDENCE COLLIMATOR-SHIELD HAVING A FAN-SHAPED APERTURE OF ABOUT 0.1 STER. X-RAY EVENTS WERE PULSE-HEIGHT ANALYZED INTO 10 LOGARITHMICALLY EQUISPACED CHANNELS WITH A TIME RESOLUTION WHICH WAS EQUAL TO THE SPIN PERIOD (APPROXIMATELY 2 SEC).

ON 05/18/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 09/29/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 45 NSSDC ID 71-096A
ALTERNATE NAMES- SSS-A, S-CUBED A, CESSB

LAUNCH DATE- 11/15/71 SPACECRAFT WEIGHT IN ORBIT- 48. KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 09/06/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 438.06 MIN
APOAPSIS- 25175.8 KM ALT PERIAPSIS- 281.29 KM ALT INCLINATION- 3.539 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/06/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 438.06 MIN

APOAPSIS- 25175.6 KM ALT PERIAPSIS- 261.25 KM ALT INCLINATION- 3.539 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - G.W.	LONGANECKER	NASA-GSFC	GREENBELT, MD
PS - R.A.	HOFFMAN	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

EXPLORER 45 WEIGHED APPROXIMATELY 100 LB. IT WAS DESIGNED TO PERFORM A VARIETY OF MISSIONS WITHIN THE MAGNETOSPHERE. EXPLORER 45 WAS DESIGNED TO INVESTIGATE THE PARTICLE FLUXES, ELECTRIC FIELDS, AND MAGNETIC FIELDS OF THE MAGNETOSPHERE. ITS OBJECTIVES WERE TO STUDY THE RING CURRENT AND DEVELOPMENT OF THE MAIN PHASE MAGNETIC STORM, THE ACCELERATION OF CHARGED PARTICLES WITHIN THE MAGNETOSPHERE, AND THE TIME VARIATIONS OF THE CHARGED PARTICLE POPULATION. EXPLORER 45 HAD THE CAPABILITY FOR COMPLETE INFLIGHT CONTROL OF THE DATA FORMAT THROUGH THE USE OF AN ONBOARD SET OF STORED PROGRAM INSTRUCTIONS. THESE INSTRUCTIONS GOVERNED THE COLLECTION OF DATA AND WERE REPROGRAMMABLE VIA GROUND COMMAND. THE ANTENNA SYSTEM CONSISTED OF FOUR DIPOLE ANTENNAS. THE TRANSMITTER HAD TWO DIFFERENT MODES--A HIGH-POWER MODE (14,080 BPS, FOR USE WHEN THE DATA WERE BEING TRANSMITTED FROM THE TAPE RECORDER) AND A LOW-POWER MODE (440 BPS, FOR USE WHEN THE DATA WERE BEING TRANSMITTED IN REAL TIME). THE BIT RATE INTO THE TAPE RECORDER WAS 440 BPS. THE TAPE RECORDER HAD A CAPACITY OF 6.8 HR, COVERING MOST OF THE PLANNED 7-HR ORBIT. THE SATELLITE POWER SYSTEM CONSISTED OF A RECHARGEABLE BATTERY AND AN ARRAY OF SOLAR CELLS. THE SPIN RATE WAS TO BE 4 RPM, AND THE SPIN AXIS WAS TO LIE IN THE PLANE OF THE ORBIT. THE INITIAL LOCAL TIME OF APOGEE WAS TO BE TOWARD THE MIDNIGHT MERIDIAN.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHANNEL ELECTRON MULTIPLIERS WITH ELECTROSTATIC ANALYZERS NSSDC ID 71-096A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HOFFMAN	NASA-GSFC	GREENBELT, MD.
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - J.F.	ARENS	NASA-GSFC	STANFORD, CA
OI - L.R.	DAVIS	NASA-GSFC	GREENBELT, MD
OI - D.S.	EVANS	NOAA	GREENBELT, MD
OI - A.	KONRAD I	NASA-JSC	HOUSTON, TX
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - J.M.	WILLIAMSON	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED CYLINDRICAL CURVED-PLATE ELECTROSTATIC ANALYZERS IN CONJUNCTION WITH CHANNEL ELECTRON MULTIPLIERS TO STUDY PROTON AND ELECTRON DIRECTIONAL INTENSITIES IN 8 OR 16 CONTIGUOUS ENERGY INTERVALS IN THE ENERGY RANGE 800 EV-25 KEV. UNDER NORMAL OPERATION, THE VOLTAGE STEPS WERE SYNCHRONIZED TO EITHER THE HALF ROLL OR FULL ROLL OF THE SATELLITE. DUAL DETECTOR SYSTEMS WERE USED TO EXTEND THE DYNAMIC RANGE OF THE INSTRUMENT. A COMPLETE SET OF MEASUREMENTS WAS OBTAINED EVERY 64 SEC. THIS PERIOD WAS REPROGRAMMABLE. THERE WERE TWO ELECTROSTATIC ANALYZERS WHICH LOOKED ALONG THE SPIN AXIS. BOTH WERE CAPABLE OF MEASURING PROTONS OR ELECTRONS AS SELECTED BY GROUND COMMAND. ONE MEASURED PARTICLES AT 2 KEV, THE OTHER AT 5 KEV.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ZINC SULFIDE THIN-FILM SCINTILLATOR NSSDC ID 71-096A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T.A. FRITZ NOAA BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF TWO SOLID-STATE DETECTORS FOR MEASURING PROTONS AND ALPHAS OVER THE RANGE 25-872 KEV. ONE TELESCOPE COVERED THE RANGE 25-300 KEV, THE OTHER 300-872 MEV.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLID-STATE DETECTORS NSSDC ID 71-096A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
ELECTRON INTENSITIES IN THE RANGES 35 TO 70 KEV, 70 TO 140 KEV, 140 TO 250 KEV, AND 250 TO 400 KEV WERE MONITORED BY FOUR 300-MICRON, 0.25-SQ CM SURFACE BARRIER DETECTORS.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER NSSDC ID 71-096A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.J. CAHILL, JR. U OF MINNESOTA MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF TWO PERPENDICULAR SEARCH COIL MAGNETOMETERS, EACH MOUNTED ON A 61-CM RADIAL BOOM. THE PLANE OF ONE MAGNETOMETER WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, AND THE PLANE OF THE OTHER WAS PARALLEL TO THE SPACECRAFT SPIN AXIS. THIS SYSTEM MEASURED MAGNETIC FLUCTUATIONS BETWEEN 1 AND 3000 HZ. THE SEARCH COIL OUTPUTS WERE ROUTED TO SETS OF FILTERS, EACH OF WHICH WAS NOMINALLY SAMPLED ONCE EACH SEC. THE EXPERIMENT FUNCTIONED NORMALLY UNTIL THE LATTER PART OF MARCH 1973 WHEN A SWITCH IN THE SPACECRAFT ANALOG MULTIPLEXER (WHICH EFFECTS ANALOG TO

DIGITAL CONVERSION) BEGAN TO FAIL. AFTER THIS TIME, THE ONLY RELIABLE DATA WERE ANALOG BROAD-BAND DATA.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- AC ELECTRIC FIELD MEASUREMENT NSSDC ID 71-096A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - N.C.	MAYNARD	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ELECTRIC FIELD ANTENNA CONSISTED OF TWO 5-1/2-IN.-DIAM METAL SPHERES MOUNTED ON THE ENDS OF TWO BOOMS WITH A 16-FT TIP-TO-TIP SEPARATION. DETERMINATION OF THE POTENTIAL DIFFERENCE BETWEEN THE SPHERES YIELDED ELECTRIC FIELDS WITH A SENSITIVITY OF 0.1 MILLIVOLT/METER. SIXTEEN NARROW BAND FILTERS COVERED THE FREQUENCY RANGE 20 HZ TO 200 KHZ. THE SAME ANTENNA WAS USED IN EXPERIMENT -CE.

ON 11/15/71, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 05/01/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- HEOS 2 NSSDC ID 72-005A
ALTERNATE NAMES- HEOS-A2, 05814

LAUNCH DATE- 01/31/72 SPACECRAFT WEIGHT IN ORBIT- 117.2 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- THOR-DELTA

FUNDING AGENCY

INTERNATIONAL	ESRO

INITIAL ORBIT PARAMETERS
EPOCH DATE- 01/31/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 7835. MIN
APOAPSIS- 248161. KM ALT PERIAPSIS- 439.000 KM ALT INCLINATION- 90.17 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 08/19/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 7510.3 MIN
APOAPSIS- 236429. KM ALT PERIAPSIS- 4905.32 KM ALT INCLINATION- 87.903 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PS - B.G.	TAYLOR	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION

HEOS 2 WAS A SPIN-STABILIZED SPACECRAFT WITH A HIGHLY ECCENTRIC ORBIT WHOSE APOGEE OCCURRED AT HIGH LATITUDE. ITS PRIMARY SCIENTIFIC MISSION WAS THE INVESTIGATION OF INTERPLANETARY SPACE AND THE HIGH-LATITUDE MAGNETOSPHERE AND ITS BOUNDARY IN THE REGION AROUND THE NORTHERN NEUTRAL POINT. HEOS 2 PROVIDED NEW DATA ON THE SOURCES AND ACCELERATION MECHANISMS OF PARTICLES WHICH ARE FOUND IN THE TRAPPED RADIATION BELTS AND IN THE POLAR PRECIPITATION REGIONS AND AURORAL ZONES. IT MONITORED SOLAR ACTIVITY AND COSMIC RADIATION. THE SATELLITE CARRIED A MAGNETOMETER AND PARTICLE DETECTORS WHICH COVERED A BROAD RANGE FROM THERMAL TO COSMIC-RAY ENERGIES. THE SATELLITE HAD THREE ANTENNAS TO STUDY ELF WAVES AND CARRIED A SENSITIVE MICROMETEORITE DETECTOR.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER NSSDC ID 72-005A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.	ELLIOTT	IMPERIAL COLLEGE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

A THREE-AXIS FLUXGATE MAGNETOMETER WAS USED TO MEASURE MAGNETIC FIELDS OF UP TO PLUS OR MINUS 16 GAMMAS WITH A DIGITAL RESOLUTION OF PLUS OR MINUS 0.125 GAMMA, AND FROM PLUS OR MINUS 16 GAMMAS TO PLUS OR MINUS 150 GAMMAS WITH A PLUS OR MINUS 1-GAMMA RESOLUTION. CONTINUOUS FIELD SAMPLING OCCURRED AT A RATE OF ONE VECTOR PER 32 SEC. FASTER ADDITIONAL RATES ARE AVAILABLE IN A LIMITED DUTY CYCLE WHEN CORE BUFFER STORAGE IS USED. RMS NOISE MEASURMENTS FOR ONE FIELD COMPONENT IN A FREQUENCY BAND FROM 1 TO 5 HZ WERE ALSO MADE. THE INSTRUMENT WAS SIMILAR TO THAT USED FOR EXPERIMENT 68-109A-02 CARRIED ON HEOS-A1.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV) NSSDC ID 72-005A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PIZZELLA	U OF ROME	ROME, ITALY
OI - A.M.	BONETTI	U OF FLORENCE	FLORENCE, ITALY

EXPERIMENT BRIEF DESCRIPTION

THE DETECTOR OBSERVED ELECTRON AND PROTON DIRECTIONAL AND DIFFERENTIAL INTENSITIES IN SIX ENERGY LEVELS BETWEEN 29 EV AND 50 KEV. A SPECTRUM WAS OBTAINED IN 2.4 MIN. AN ELECTROSTATIC ANALYZER, TWO CHANNEL MULTIPLIERS, AND TWO FARADAY CUPS PERMITTED DETERMINATION OF THE BULK VELOCITY VECTOR OF THE PLASMA.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR VLF OBSERVATION NSSDC ID 72-005A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B. PETERS DANISH INST SPACE RSCH COPENHAGEN, DENMARK

EXPERIMENT BRIEF DESCRIPTION
RADIATION AT 5 DISCRETE LOGARITHMICALLY EQUISPACED INTERVALS BETWEEN 20 AND 500 HZ WAS MEASURED USING A 1.5-SQ-M LOOP AND TWO SPHERICAL WIRE CAGE ANTENNAS. THE DYNAMIC RANGE WAS APPROXIMATELY 50 DB. THE EXPERIMENT OBJECTIVES WERE TO MEASURE VLF RADIATION IN THE SOLAR WIND AND MAGNETOSPHERE.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PARTICLE COUNTER TELESCOPE NSSDC ID 72-005A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.E. PAGE EUR SPACE TECH CENTER NOORDWIJK, HOLLAND.

EXPERIMENT BRIEF DESCRIPTION
A TWO-ELEMENT SOLID-STATE DETECTOR TELESCOPE AND ANTICOINCIDENCE GUARD SCINTILLATOR WAS USED TO IDENTIFY UNAMBIGUOUSLY AND TO DETERMINE THE ENERGIES OF ELECTRONS, PROTONS, AND ALPHA PARTICLES IN THE RANGES 0.45 TO 3.2 MEV, 6.2 TO 33 MEV, AND 26 TO 132 MEV, RESPECTIVELY. OTHER ENERGY RANGES COULD ALSO BE MEASURED BUT WITH LESS CERTAIN IDENTIFICATION. THE GEOMETRIC FACTOR OF THE INSTRUMENT WAS 1 CM SQ STER. RATES OF 0.01 TO 10,000 PARTICLES PER SEC COULD BE MEASURED. A SPECTRUM WAS OBTAINED IN 2 MIN. INFORMATION WAS ALSO OBTAINED ON THE ANGULAR DISTRIBUTIONS OF THE FLUXES.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72. THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE. THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HIGH-ENERGY ELECTRONS NSSDC ID 72-005A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.O. DILWORTH U OF MILAN MILAN, ITALY
OI - J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THE FLUX AND ENERGY OF ELECTRONS IN THE RANGE 10 MEV TO 600 MEV WERE MEASURED USING A FOUR-ELEMENT TELESCOPE CONSISTING OF A GAS CERENKOV DETECTOR, A SOLID-STATE DETECTOR, A LEAD-GLASS CERENKOV DETECTOR, AND A CAF SCINTILLATOR. THE TELESCOPE HAD A GEOMETRIC FACTOR OF APPROXIMATELY 0.4 CM SQ STER AND WAS TO DETECT AND ANALYZE ONE EVENT APPROXIMATELY EVERY 2 MIN. PULSE HEIGHT ANALYSIS WAS PERFORMED ON THE OUTPUTS FROM THE GLASS CERENKOV AND SCINTILLATOR DETECTORS. THE INSTRUMENT WAS SIMILAR TO THAT USED FOR EXPERIMENT 68-109A-07 ON HEOS-A1.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR WIND MEASUREMENTS (230 EV-16 KEV) NSSDC ID 72-005A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H.R. ROSENBAUER M.PLANCK INST.GARCHING GARCHING, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

A QUADISPHERICAL ELECTROSTATIC ANALYZER WITH 11 CHANNEL MULTIPLIERS WAS USED TO STUDY THE VELOCITY DISTRIBUTION FUNCTION OF THE POSITIVE SOLAR WIND IONS. ENERGY PER UNIT CHARGE WAS MEASURED IN 28 CHANNELS SPREAD LOGARITHMICALLY BETWEEN 230 EV AND 16 KEV. A COMPLETE SPECTRUM WAS DETERMINED EVERY 4 MIN. DETAILED INFORMATION ON THE DIRECTION OF INCIDENT PARTICLES WAS OBTAINED WITH 11 CHANNELS IN ELEVATION AND 18 CHANNELS IN AZIMUTH. A SECOND SENSOR WAS USED FOR MEASUREMENTS WITHIN THE MAGNETOSPHERE. MEASUREMENTS WERE PERFORMED IN 13 ENERGY CHANNELS COVERING THE RANGE 100 EV TO 50 KEV FOR BOTH PROTONS AND ELECTRONS. ANGULAR MEASUREMENTS WERE ALSO PERFORMED.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MICROMETEOROID DETECTOR NSSDC ID 72-005A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. FECHTIG M.PLANCK INST.HEIDELBG HEIDELBERG, WEST GERMANY
OI - W. GENTNER M.PLANCK INST.HEIDELBG HEIDELBERG, FORGN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE FLUX, MASS, AND VELOCITY OF MICROMETEOROIDS AS A FUNCTION OF EARTH DISTANCE. THE INSTRUMENTATION CONSISTED OF AN ION COLLECTOR CENTERED IN A HEMISPHERICAL CONTAINER THAT WAS LOCATED IN THE OCTAGONAL-TUBE CENTER STRUCTURE OF THE SPACECRAFT. DUST PARTICLES IMPACTING ON THE HEMISPHERE CREATED SECONDARY IONS ON THE COLLECTOR. COMBINATIONS OF GRIDS HAVING VOLTAGES BETWEEN -100 V AND +300 V WERE LOCATED IN FRONT OF THE DETECTOR TO COUNTERACT ANY EFFECTS DUE TO SOLAR WIND CHARGED PARTICLES. DATA WERE OBTAINED FROM BOTH THE INTERPLANETARY REGION AND THE HIGH-LATITUDE PORTION OF THE MAGNETOSPHERE (400 TO 245,000

KM). THE EXPERIMENT WAS DESIGNED TO OPERATE FOR AT LEAST 1 YR.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/31/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- PIONEER 10 NSSDC ID 72-012A
ALTERNATE NAMES- PIONEER-F, PL-723D, C5660

LAUNCH DATE- 03/03/72 SPACECRAFT WEIGHT IN ORBIT- 231. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

RECENT ORBIT PARAMETERS
EPOCH DATE- 03/06/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 89.5 MIN
APOAPSIS- 316. KM ALT PERIAPSIS- 210. KM ALT INCLINATION- 65. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALL NASA-ARC MOFFETT FIELD, CA
PS - J.H. WOLFE NASA-ARC MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
PIONEER 10 WAS THE FIRST OF TWO 231-KG, SPIN-STABILIZED, EARTH-POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM, THE ASTEROID BELT, AND THE NEAR-JUPITER ENVIRONMENT. THIS JUPITER FLYBY SPACECRAFT WAS POWERED BY A RADIOISOTOPE THERMOELECTRIC GENERATOR AND A BATTERY. THE SATELLITE INSTRUMENTATION WAS TO STUDY THE INTERPLANETARY AND POSSIBLE JOVIAN MAGNETIC FIELDS, THE SOLAR WIND AND POSSIBLE JOVIAN BOW SHOCK AND MAGNETOPAUSE BOUNDARIES, SOLAR AND GALACTIC COSMIC RAYS, INTERPLANETARY CHARGED PARTICLES AND POSSIBLE JOVIAN TRAPPED RADIATION, JOVIAN THERMAL ENERGY FLUX, ZODIACAL LIGHT, ASTEROIDS AND METEOROIDS, AND INTERPLANETARY AND JOVIAN ULTRAVIOLET RADIATION. AN S-BAND OCCULTATION EXPERIMENT AND A JUPITER IMAGING AND PHOTOPOLARIZATION EXPERIMENT WERE PERFORMED. THE SPACECRAFT WAS EXPECTED TO REACH JUPITER BETWEEN 600 AND 750 DAYS AFTER LAUNCH. AFTER FLYBY, IT WAS TO HAVE A TRAJECTORY OF ESCAPE FROM THE SOLAR SYSTEM. THE CELESTIAL MECHANICS, THERMOPILE RADIOMETERS, AND S-BAND OCCULTATION EXPERIMENTS WERE IN AN OPERATIONAL OFF MODE AS OF MARCH 15, 1973. THE SPACECRAFT APPARENTLY SUFFERED NO ILL EFFECTS IN PASSING THROUGH THE ASTEROID BELT.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MAGNETIC FIELDS NSSDC ID 72-012A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.J.	SMITH	NASA-JPL	PASADENA, CA
OI - D.S.	COLBURN	NASA-ARC	MOFFETT FIELD, CA
OI - P.	DYAL	NASA-ARC	MOFFETT FIELD, CA
OI - C.P.	SONETT	NASA-ARC	MOFFETT FIELD, CA
OI - P.J.	COLEMAN, JR.	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - L.	DAVIS	CAL TECH	PASADENA, CA
OI - D.E.	JONES	BRIGHAM YOUNG U	PROVO, UT

EXPERIMENT BRIEF DESCRIPTION

THE MAGNETOMETER ON PIONEER 10 WAS A TRIAXIAL HELIUM MAGNETOMETER WITH SEVEN DYNAMIC RANGES, FROM PLUS OR MINUS 2.5 GAMMAS TO PLUS OR MINUS 10 GAUSS. THE LINEARITY WAS 0.1 PERCENT, AND THE NOISE THRESHOLD WAS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY WAS 0.5 PERCENT OF FULL SCALE RANGE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION NSSDC ID 72-012A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - J.J.	O'CALLAGHER	U OF MARYLAND	COLLEGE PARK, MD
OI - A.	TUZZOLINO	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE CHARGE COMPOSITION USING THREE TYPES OF DETECTORS - (1) A SEVEN-ELEMENT SOLID-STATE DETECTOR TELESCOPE, (2) A HIGH ENERGY ELECTRON DETECTOR (EGG), AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (450 KEV TO 150 MEV), ELECTRONS (200 KEV TO 30 MEV), AND PARTICLES FROM HE (Z = 2) TO O (Z = 16) (8 TO 150 MEV/NUCLEON). THE SECOND DETECTOR WAS TO MEASURE BREMSSTRAHLUNG RADIATION FROM ELECTRONS AND ELECTRONS DIRECTLY (E.GT. 9 MEV) AND IS DESIGNED TO EXCLUDE PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE DETECTOR SAMPLE TIME WAS TO BE SYNCHRONIZED WITH THE SPACECRAFT SPIN AND SHOULD BE 1/8 SPACECRAFT ROTATION OR ABOUT 1-1/2 SEC.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ASTEROID/METEOROID ASTRONOMY NSSDC ID 72-012A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.K.	SOBERMAN	GENERAL ELECTRIC CO	VALLEY FORGE, PA
OI - H.A.	ZOOK	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT SEARCHED FOR PARTICLES WITH MASSES LARGER THAN ABOUT ONE MICROGRAM BY OBSERVING THE SOLAR LIGHT THEY REFLECTED AND SCATTERED. FOUR INDEPENDENT TELESCOPIC SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WERE USED, WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE PARTICLES BEING USED TO DETERMINE THE RANGE AND VELOCITIES OF THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS WERE COMPOSED OF 8-IN. RITCHEY-CRETAIN TELESCOPES WITH A 10-IN. FOCAL LENGTH AND A 0.2-RAD FIELD OF VIEW.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- METEOROID DETECTORS NSSDC ID 72-012A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.H.	KINARD	NASA-LARC	HAMPTON, VA
OI - R.E.	TURNER	NASA-MSFC	HUNTSVILLE, AL
OI - J.M.	ALVAREZ	NASA-LARC	LANGLEY FIELD, VA
OI - D.H.	HUMES	NASA-LARC	LANGLEY FIELD, VA
OI - R.L.	O'NEAL	NASA-LARC	LANGLEY FIELD, VA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE NUMBER OF METEOROID IMPACTS ON THE PIONEER 10 SPACECRAFT BY MEANS OF 12 PANELS, EACH CONTAINING 18 PRESSURIZED CELLS, MOUNTED ON THE BACK OF THE ANTENNA DISK. THE TOTAL EXPOSED AREA WAS 0.465 M SQ. EACH PANEL OF GAS-FILLED CELLS CONSISTED OF A 1-MIL-THICK AND A 2-MIL-THICK SHEET OF STAINLESS STEEL WELDED TOGETHER IN SUCH A WAY THAT MANY SMALL POCKETS OF GAS WERE LEFT BETWEEN THEM. WHENEVER A POCKET WAS PUNCTURED, THE GAS ESCAPED AND A COLD CATHODE DEVICE DETECTED THE LOSS. THE RATE OF PRESSURE LOSS INDICATED THE SIZE OF THE HOLE MADE, AND THUS THE PARTICLE'S MASS AND INCIDENT ENERGY COULD BE DETERMINED. THE COMBINATION OF THESE DATA WITH TRAJECTORY DATA PROVIDED AN INDICATION OF THE SPATIAL DENSITY OF THE PARTICLES. THE 1-MIL-THICK SIDE OF THE GAS PANEL WAS EXPOSED TO THE INTERPLANETARY MEDIUM, AND PENETRATIONS OF THE CELLS FROM THAT SIDE INDICATED ENCOUNTERS WITH PARTICLES HAVING MASSES OF 1 NANOGRAM OR MORE. SOME 300 TO 400 HITS WERE EXPECTED BY THE TIME THE SPACECRAFT COMPLETED ITS 200-DAY JOURNEY THROUGH THE ASTEROID BELT. AFTER PIONEER 10 ENTERED THE ASTEROID BELT BETWEEN MARS AND JUPITER ON JULY 1, 1972, THE METEOROID EXPERIMENT DETECTED UNUSUALLY LARGE NUMBERS OF METEOROIDS AND DUST PARTICLES.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION NSSDC ID 72-012A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	FILLIUS	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - C.E.	MCILWAIN	U OF CALIFORNIA, SD	SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR DETECTORS. A CERENKOV COUNTER MEASURED ELECTRONS ABOVE 3, 7, AND 10 MEV. A SOLID-STATE ELECTRON SCATTER DETECTOR USED THREE DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND 3 MEV. A DC SCINTILLATOR DETECTOR MEASURED THE SUM OF 25- TO 250-KEV ELECTRONS AND 800-KEV TO 250-MEV PROTONS. A SECOND SOLID-STATE DETECTOR SEPARATELY MEASURED OMNIDIRECTIONAL 60- TO 250-MEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST THREE DETECTORS LOOKED PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. EACH DETECTOR HAD A 30 DEG HALF-ANGLE APERATURE, AND EACH MADE EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD. WHILE THIS EXPERIMENT IS PRIMARILY DESIGNED FOR ENCOUNTER, DATA WERE OBTAINED AT A LOW RATE IN INTERPLANETARY SPACE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY NSSDC ID 72-012A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.L.	JUDGE	USC	LOS ANGELES, CA
OI - R.W.	CARLSON	USC	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, CONSISTING OF A BROADBAND PHOTOMETER SENSITIVE BETWEEN 200 AND 800 A, OBSERVED EVIDENCE OF HELIUM, WHICH IN TURN INDICATED INTERACTIONS BETWEEN CHARGED PARTICLES AND NEUTRAL HYDROGEN. DURING THE CRUISE PHASE OF THE MISSION, THIS EXPERIMENT WAS USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC TRANSITION REGION IN THE SOLAR WIND. DURING THE JOVIAN ENCOUNTER, THIS EXPERIMENT WAS USED TO LOOK FOR EVIDENCE OF AN AURORAL OVAL ON THE JOVIAN DAYSIDE, TO FIND THE RATIO OF HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE, AND TO FIND THE TEMPERATURE OF THE OUTER PORTION OF THE JOVIAN ATMOSPHERE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IMAGING PHOTO POLARIMETER NSSDC ID 72-012A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.	GEHRELS	U OF ARIZONA	TUCSON, AZ
OI - J.L.	WEINBERG	DUDLEY OBS	ALBANY, NY
OI - D.L.	COFFEEN	U OF ARIZONA	TUCSON, AZ
OI - J.	HAMEEN-ANTILLA	U OF ARIZONA	TUCSON, AZ
OI - C.E.	KENKNIGHT	U OF ARIZONA	TUCSON, AZ

OI - R.F. HUMMER SANTA BARBARA RSCH CEN SANTA BARBARA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A POINTABLE 1-IN. MAKSUTOV TELESCOPE EQUIPPED WITH TWO COLOR DETECTORS (RED, 5800 TO 7000 A, AND BLUE, 3900 TO 4900 A) AND A POLARIZATION MEASURING CAPABILITY. THE FIELD OF VIEW COULD BE SELECTED FOR ZODIACAL LIGHT STUDIES (32 X 40 MILLIRAD), PHOTOPOLARIMETRY (8 X 8 OR 12 X 12 MILLIRAD), OR IMAGING (0.5 X 0.5 MILLIRAD). DURING THE CRUISE PORTION OF THE MISSION THIS EXPERIMENT WAS USED TO OBSERVE ZODIACAL LIGHT TO ASSESS THE QUANTITY AND DISTRIBUTION OF PARTICULATE MATTER IN INTERPLANETARY SPACE. UPON APPROACHING JUPITER, THIS EXPERIMENT WAS USED FOR PHOTOMETRIC AND POLARIZATION STUDIES OF JUPITER AND ONE OR MORE OF ITS SATELLITES. DURING JOVIAN ENCOUNTER, THE EXPERIMENT WOULD TAKE ADVANTAGE OF THE SPACECRAFT SPIN IN ORDER TO MAKE TWO COLOR IMAGES OF JUPITER WITH A RESOLUTION OF 200 KM ON THE JOVIAN SURFACE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED RADIOMETERS NSSDC ID 72-012A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	MUNCH	CAL TECH	PASADENA, CA
OI - G.	NEUGEBAUER	CAL TECH	PASADENA, CA
OI - S.C.	CHASE, JR.	SANTA BARBARA RSCH CEN	GOLETA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE IRRADIANCE OF JUPITER'S ATMOSPHERE AND SURFACE IN TWO RANGES OF THERMAL (IR) WAVELENGTHS -- 14 TO 25 MICRONS AND 19 TO 56 MICRONS. THESE MEASUREMENTS PROVIDED DATA ON THE NET THERMAL ENERGY FLUX OF JUPITER AND ITS DEVIATION FROM A BLACKBODY SPECTRUM. IN ADDITION, DETAILED INFORMATION WAS PROVIDED ON THE ATMOSPHERIC THERMAL STRUCTURE AND CHEMICAL COMPOSITION OF THE PLANET. THE INSTRUMENTATION FOR THIS EXPERIMENT WAS SIMILAR TO THAT CARRIED ON THE MARINER MARS 1969 FLIGHTS BUT HAD HIGHER RESOLUTION. IT WAS A TWO-CHANNEL IR RADIOMETER EMPLOYING A PAIR OF 88-CHANNEL, THIN-FILM BIMETALLIC THERMOCOUPLES, ILLUMINATED THROUGH APPROPRIATE OPTICS BY A 7.62-CM REFLECTING CASSEGRAIN TELESCOPE WITH A 1-DEG BY 0.3-DEG FIELD OF VIEW. ANALYSIS OF THE DATA WAS TO HELP RESOLVE -- (1) WHETHER JUPITER IS RADIATING A SIGNIFICANT AMOUNT OF INTERNAL ENERGY, (2) THE EXISTENCE OF A FROZEN METHANE POLAR CAP, (3) THE BRIGHTNESS TEMPERATURE ON THE DARK HEMISPHERE, AND (4) THE EXISTENCE OF THERMAL DISCONTINUITIES IN THE ATMOSPHERE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME ZERO.

EXPERIMENT NAME- CELESTIAL MECHANICS NSSDC ID 72-012A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.D.	ANDERSON	NASA-JPL	PASADENA, CA.
OI - G.W.	NULL	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WAS USED TO MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES, THE HELIOCENTRIC ORBIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF THE SUN, JUPITER, AND THE GALILEAN SATELLITES.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- S-BAND OCCULTATION NSSDC ID 72-012A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.J.	KLIORE	NASA-JPL	PASADENA, CA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - D.L.	CAIN	NASA-JPL	PASADENA, CA
OI - B.L.	SEIDEL	NASA-GISS	NEW YORK, NY
OI - S.I.	RASOOL	NASA HEADQUARTERS	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED RADIO REFRACTION EFFECTS ON THE SPACECRAFT'S S BAND RADIO SIGNAL TO DETERMINE THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN ATMOSPHERE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT NSSDC ID 72-012A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE PARTICLES IN THE VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A THREE-ELEMENT GEIGER TUBE TELESCOPE, (2) A THREE-ELEMENT TRIANGULAR ARRAY OF DETECTORS, AND (3) A LOW-ENERGY GEIGER TUBE DETECTOR. THE FIRST DETECTOR IS TO MEASURE ELECTRONS (E.GT. 2 MEV) AND PROTONS (E.GT. 10 MEV). THE SECOND IS TO MEASURE ELECTRONS (E.GT. 10 MEV), AND THE THIRD IS ALSO TO MEASURE ELECTRONS (E.GT. 50 KEV). THE DETECTOR SAMPLE TIME IS TO BE SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND WOULD DEPEND UPON THE TELEMETRY BIT RATE,, I.E., THE SAMPLE TIME MAY RANGE FROM 3/32 SEC TO 12 SEC.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC-RAY SPECTRA NSSDC ID 72-012A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA
OI - W.R.	WEBBER	U OF NEW HAMPSHIRE	DURHAM, NH
OI - E.C.	ROELOF	U OF NEW HAMPSHIRE	DURHAM, NH
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF THREE MULTIELEMENT SOLID-STATE TELESCOPES, ALL LOOKING NORMAL TO THE SPACECRAFT SPIN AXIS. THE HIGH-ENERGY TELESCOPE (HET) CONSISTED OF FIVE COLINEAR SENSORS AND MEASURED STOPPING PARTICLES (Z = 1 TO 8) IN THE ENERGY RANGE 20 TO 50 MEV/NUCLEON AND PENETRATING PARTICLES IN THE RANGE 50 TO 800 MEV/NUCLEON. CHARGE RESOLUTION FOR PENETRATING PARTICLES WAS POSSIBLE UP TO 200 MEV/NUCLEON. THE FIRST LOW-ENERGY TELESCOPE (LET-I) HAD FOUR ELEMENTS AND MEASURED STOPPING Z = 1 TO 8 PARTICLES IN THE ENERGY RANGE 3 TO 32 MEV/NUCLEON. THE SECOND LOW-ENERGY TELESCOPE (LET-II) HAD THREE ELEMENTS AND MEASURED STOPPING ELECTRONS BETWEEN 50 AND 1000 KEV AND STOPPING PROTONS BETWEEN 50 KEV AND 20 MEV. FOR EACH TELESCOPE, COUNT RATES WERE OBTAINED FOR EACH OF SEVERAL SENSOR COINCIDENCE-ANTICOINCIDENCE MODES. SOME OF THE RATES FROM EACH TELESCOPE WERE SECTORED INTO EIGHT OCTANTS IN THE SPACECRAFT SPIN PLANE. IN ADDITION, THREE-SENSOR PULSE HEIGHT ANALYSIS, WITH PRIORITY SCHEMES FAVORING THE ANALYSIS OF HEAVIER PARTICLES, WAS ASSOCIATED WITH EACH TELESCOPE.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/02/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA EXPERIMENT NSSDC ID 72-012A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	WOLFE	NASA-ARC	MOFFETT FIELD, CA
OI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA
OI - R.	LUST	M.PLANCK INST.,GARCHING	GARCHING, W. GERMANY
OI - D.S.	INTRILIGATOR	USC	LOS ANGELES, CA
OI - D.D.	MCKIBBIN	NASA-ARC	MOFFETT FIELD, CA
OI - V.T.	ZAVIENTSEFF	NASA-ARC	MOFFETT FIELD, CA
OI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - H.R.	COLLARD	NASA-ARC	MOFFETT FIELD, CA
OI - W.C.	FELDMAN	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS WERE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTRONS. THE DETECTORS WERE USED TO OBSERVE A POSSIBLE JOVIAN BOW SHOCK, MAGNETOSHEATH, AND MAGNETOPAUSE. THE INSTRUMENTS STUDIED POSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 100 V AND 18 KV, AND ELECTRONS IN 16 STEPS BETWEEN 100 V AND 18 KV.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 03/03/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- TD 1A NSSDC ID 72-014A
ALTERNATE NAMES- PL-721E, TD 1, 05879

LAUNCH DATE- 03/12/72 SPACECRAFT WEIGHT IN ORBIT- 472. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- TA DELTA

FUNDING AGENCY
INTERNATIONAL ESRO

INITIAL ORBIT PARAMETERS
EPOCH DATE- 03/12/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.291 MIN
APOAPSIS- 541.9 KM ALT PERIAPSIS- 523.43 KM ALT INCLINATION- 97.555 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/05/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.141 MIN
APOAPSIS- 535.90 KM ALT PERIAPSIS- 525.15 KM ALT INCLINATION- 97.569 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THE TD-1 SPACECRAFT WAS ESSENTIALLY COMPOSED OF TWO BOXES. THE UPPER BOX CONTAINED THE EXPERIMENTS AND THE LOWER BOX CONTAINED THE SPACECRAFT EQUIPMENT. THE EXPERIMENT COMPARTMENT WAS BUILT AROUND THE TWO LARGE TELESCOPES (26 AND 30 CM IN DIAM) AND THE SPARK CHAMBER. THE SPACECRAFT WAS SOLAR POWERED, AND DURING THE SUNLIT PHASE OF ITS ORBIT WAS ATTITUDE CONTROLLED TO ABOUT 1 MIN OF ARC. ONE AXIS WAS POINTED TO WITHIN ONE ARC-MIN OF THE SUN, AND ANOTHER AXIS LAY WITHIN 0.5 DEG OF THE PLANE OF THE SUN, EARTH, AND SPACECRAFT (I.E., THE SPACECRAFT Z AXIS ALWAYS POINTED TOWARDS THE EARTH). BOTH TAPE RECORDERS FAILED WITHIN TWO MONTHS OF LAUNCH, CAUSING DATA RECOVERY TO DROP FROM 95 PERCENT TO LESS THAN 25 PERCENT. IN OCTOBER 1972, THE SPACECRAFT WAS PLACED IN HIBERNATION FOR ABOUT FOUR MONTHS SINCE IT COULD NOT WITHSTAND, FOR ANY LENGTH, PERIODS OF SPACECRAFT NIGHT WHILE IN ACTIVE USE. IN FEBRUARY 1973 THE SPACECRAFT WAS SUCCESSFULLY REACTIVATED AND REAL-TIME TELEMETRY COVERAGE WAS INCREASED TO ABOUT 70 PERCENT. THE COSMIC X-RAY SPECTROMETER EXPERIMENT (S-77) CAUSED ABNORMAL READOUTS IN THE HOUSEKEEPING TELEMETRY CHANNELS, AND HENCE WAS NOT OPERATED UNTIL JULY, 1973.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- STELLAR UV RADIATION EXPERIMENT NSSDC ID 72-014A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L.N. HOUZIAUX U OF MONS LIEGE, BELGIUM

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A 1.4-M TELESCOPE WITH A SPECTROMETER BOX ATTACHED TO IT. AN OFF-AXIS PARABOLOID MIRROR (F/3.5, DIAM 275 MM) REFLECTED STARLIGHT ONTO A SYSTEM OF TWO SLITS SITUATED IN THE PRIME FOCAL PLANE. ONE OF THE TWO SLITS FED THE STELLAR LIGHT INTO A SINGLE PHOTOMETRIC CHANNEL WITH A FILTER LIMITING THE PASSBAND TO 400 A CENTERED AT 2750 A. THE OTHER SLIT WAS MUCH WIDER (11.9 X 17 ARC-MIN), AND LED INTO THE THREE-CHANNEL GRATING SPECTROMETER. ONCE PER ORBIT, THE TELESCOPE, ALIGNED ALONG THE Z AXIS, SCANNED A GREAT CIRCLE OF THE SKY. BECAUSE OF THIS MOTION ACROSS THE SKY, THE PRIMARY IMAGE OF A CERTAIN STAR ENTERING THE TELESCOPE'S FIELD OF VIEW MOVED ACROSS THE PHOTOMETER AND SPECTROPHOTOMETER SLOTS. WHILE THE STAR IMAGE TRAVERSED THE WIDE SPECTROPHOTOMETER SLOT, ITS CORRESPONDING SPECTRUM MOVED IN THE FOCAL PLANE OF THE SPECTROGRAPH ACROSS THE THREE EXIT SLITS, BEHIND WHICH THERE WERE THREE PULSE-COUNTING PHOTOMULTIPLIERS. BY EMPLOYING THE SCANNING MOTION OF THE SATELLITE, A SPECTRUM SCANNING ACTION WAS ACHIEVED WITHOUT THE NEED FOR MOVING PARTS. THE THREE EXIT SLITS OF THE SPECTROPHOTOMETER WERE FIXED AT THE FOLLOWING WAVELENGTHS -- 1350 TO 1760 A, 1760 TO 2160 A AND 2150 TO 2550 A. THE WAVELENGTH REGION FROM 1350 TO 2550 A WAS FULLY COVERED BY THE THREE CHANNELS IN 3.3 SEC, YIELDING A TOTAL OF ABOUT 60 DATA POINTS. IN EACH CHANNEL THE SPECTRUM WAS SCANNED AT 19.4-A INTERVALS. THE EFFECTIVE PASSBAND DURING EACH INTEGRATION INTERVAL HAVING A FULL-WIDTH HALF-MAXIMUM OF 35 TO 40 A. JUST BEFORE THE TELESCOPE WAS INTEGRATED INTO THE SATELLITE, THE INSTRUMENT WAS EXTENSIVELY CALIBRATED IN ORDER TO ACHIEVE AN ABSOLUTE PHOTOMETRIC ACCURACY BETWEEN 10 AND 20 PERCENT. A RELATIVE PHOTOMETRIC ACCURACY WITHIN 10 PERCENT AND A WAVELENGTH CALIBRATION ACCURATE TO A FEW ANGSTROMS. THIS EXPERIMENT WAS TO DETECT 20,000 STARS, OF WHICH 6000 SHOULD HAVE GIVEN USEFUL UV SPECTRA. IT WAS ABLE TO MEASURE STARS OF MAGNITUDE 10.5. TWO MAJOR OBJECTIVES WERE THE STUDY OF INTERSTELLAR EXTINCTION AND THE PREPARATION OF A UV STAR CATALOG.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- UV STELLAR SPECTROMETER NSSDC ID 72-014A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A CASSEGRAIN TELESCOPE (PRIMARY MIRROR 26 CM IN DIAM) AND A GRATING SPECTROMETER WHICH OPERATED IN THREE PASSBANDS (2260 TO 2155 A, 2455 TO 2590 A, AND 2775 TO 2865 A). WHEN A STAR OF SUFFICIENT BRIGHTNESS APPEARED IN THE TELESCOPE, THE TELESCOPE LOCKED ONTO IT WITH A SELF-CONTAINED GUIDANCE SYSTEM AND THEN SCANNED THREE 100-A PASSBANDS IN 0.5 A INCREMENTS WITH AN OVERALL ACCURACY OF 1 A AND SPECTRAL

RESOLUTION OF 1.8 A.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPECTROMETRY OF PRIMARY CHARGED PARTICLES NSSDC ID 72-014A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT MEASURED THE CHARGE SPECTRUM OF PRIMARY COSMIC RAYS BY USING A CHARGED PARTICLE TELESCOPE AND COINCIDENCE TECHNIQUES. THE TELESCOPE WAS MOUNTED ALONG THE MAIN AXIS OF THE SATELLITE, WHICH WAS ALWAYS POINTED TOWARD THE CENTER OF THE SUN.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SPECTROMETRY OF EXTRATERRESTRIAL X RAYS NSSDC ID 72-014A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT BRIEF DESCRIPTION
A 100-SQ-CM PROPORTIONAL COUNTER WAS USED TO MEASURE THE SPECTRA OF COSMIC X-RAY SOURCES IN 10 CHANNELS BETWEEN 3 AND 30 KEV. THE PROPORTIONAL COUNTER WAS LOCATED BEHIND A CROSSED PAIR OF SLOT COLLIMATORS WHICH TOGETHER YIELDED A 5- BY 1- DEG FIELD OF VIEW. THE PROPORTIONAL COUNTER HAD A 0.5-MM BERYLLIUM WINDOW AND A XENON FILLER GAS. IT WAS CONSTRUCTED IN TWO PARTS, WHICH WERE THEN ANTICOINCIDENCED TO REMOVE THE BACKGROUND DUE TO COSMIC-RAY PARTICLES. DUE TO OPERATIONAL DIFFICULTIES, THIS EXPERIMENT WAS TURNED OFF SOON AFTER IT WAS TURNED ON, AND WAS NOT TURNED ON AGAIN UNTIL JULY 2, 1973.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 07/02/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR GAMMA RAYS IN THE 50- TO 500-MEV ENERGY RANGE NSSDC ID 72-014A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G. OCCHIALINI U OF MILAN MILAN, ITALY

EXPERIMENT BRIEF DESCRIPTION
A COMBINATION OF SCINTILLATORS AND PHOTOMULTIPLIERS WERE USED TO DETECT SOLAR GAMMA RAYS (PHOTON ENERGY .LT. 50 AND .GT. 500 MEV) WHILE DISCRIMINATING AGAINST CHARGED PARTICLES. A DIRECTIONAL ACCURACY OF A FEW DEG WAS ACHIEVED. THE EFFECTIVE AREA OF 100 SQ CM ALLOWED A BACKGROUND OF 10 TO THE -5 PHOTONS/SQ CM-SEC TO BE OBTAINED WHILE THE DYNAMIC RANGE ALLOWED FLUXES UP TO 10 TO THE -2 TO BE MEASURED DURING SOLAR FLARES.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID 72-014A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C. DE JAGER UTRECHT U UTRECHT, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT OBSERVED HARD X RAYS EMITTED BY THE SUN, DIVIDING PULSES OBTAINED FROM A CESIUM IODIDE (CSI) CRYSTAL INTO 12 LOGARITHMICALLY EQUISPACED ENERGY INTERVALS BETWEEN 20 AND 900 KEV. THE EXPERIMENT TOOK ADVANTAGE OF THE CONTINUOUS SUN POINTING. A TIME RESOLUTION OF 1.2 SEC WAS ACHIEVED FOR THE FOUR CHANNELS BETWEEN 20 AND 90 KEV. THE RESOLUTION WAS 4.8 SEC FOR THE OTHER CHANNELS.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- GAMMA-RAY MEASUREMENT NSSDC ID 72-014A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J. LABEYRIE CEN GIF-SUR-YVETTE, FRANCE

EXPERIMENT BRIEF DESCRIPTION
AN OPTICAL SPARK CHAMBER WITH COUNTERS AND A VIDICON SYSTEM WAS USED TO MEASURE GAMMA RAYS IN THE 70- TO 300-MEV ENERGY RANGE. THE SENSITIVE AREA OF THE DETECTOR WAS 200 SQ CM, AND THE EFFICIENCY FOR GAMMA RAYS WAS 16 PERCENT. ALL OF THE SKY WAS SCANNED IN 6 MONTHS WITH A SENSITIVITY CAPABLE OF DETECTING A FLUX OF GREATER THAN 10 TO THE -6 PHOTONS/SQ CM-SEC.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 02/14/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- APOLLO 16 LM/ALSEP NSSDC ID 72-031C
ALTERNATE NAMES- ALSEP 16, LEM 16, ROVER 16, 06005, APOLLO 16C

LAUNCH DATE- 04/16/72 SPACECRAFT WEIGHT IN ORBIT- 16400. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES NASA-OMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 16 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE DESCARTES HIGHLAND REGION JUST NORTH OF THE CRATER DOLLAND AT 8 DEG 59 MIN 55 SEC S LATITUDE, AND 15 DEG 31 MIN 12 SEC E LONGITUDE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING EXTRA VEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR POWERED ALSEP PACKAGE CONTAINED SEISMIC, MAGNETIC FIELD, HEAT FLOW, LUNAR SOIL COMPOSITION, SOLAR WIND, AND COSMIC-RAY EXPERIMENTS.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PASSIVE SEISMIC NSSDC ID 72-031C-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.V. LATHAM U OF TEXAS GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PASSIVE SEISMIC EXPERIMENT (PSE) (S-031), WHICH WAS PART OF THE ALSEP, WAS TO MEASURE SEISMIC SIGNALS FROM ALL EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE DATA FROM THIS EXPERIMENT WILL BE USED TO DETERMINE THE INTERNAL LUNAR STRUCTURE, RATE OF ENERGY RELEASE, AND NUMBERS AND MASSES OF IMPACTING METEORS. THIS EXPERIMENT USED THE DATA FROM EXPERIMENTS ON THE IMPACTS OF THE S-IV B AND LM ASCENT STAGES AS EXTERNAL CALIBRATION SOURCES. THE INSTRUMENT PACKAGE REPRESENTED THE FOURTH ACTIVE INSTRUMENT AVAILABLE IN THE LUNAR SEISMIC NETWORK AND WILL ENABLE SCIENTISTS TO LOCATE REGIONS OF SEISMIC ACTIVITY MORE PRECISELY . THE INSTRUMENT PACKAGE WAS COMPOSED OF TWO ASSEMBLIES -- (1) A LONG-PERIOD, TRIAXIAL, ORTHOGONAL SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80 DB) DYNAMICAL RANGE AND (2) A SHORT-PERIOD, UNIAXIAL, VERTICAL MOTION SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.05 TO 20 HZ (80-DB) DYNAMICAL RANGE AND THE MINIMUM DETECTABLE SIGNALS ON 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE INSTRUMENT PACKAGE WAS CABLE-CONNECTED TO THE CENTRAL ALSEP POWER STATION WHICH WAS DEPLOYED BY THE ASTRONAUTS.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ACTIVE SEISMIC NSSDC ID 72-031C-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.L. KOVACH STANFORD U STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE ACTIVE SEISMIC EXPERIMENT (ASE) (S-033) WAS TO ACQUIRE DATA TO DETERMINE THE PHYSICAL PROPERTIES OF THE LUNAR SURFACE AND SUBSURFACE MATERIALS. BOTH NATURAL AND ARTIFICIALLY PRODUCED SEISMIC WAVES WERE MONITORED. THE ARTIFICIAL WAVES WERE PRODUCED BY SHOTGUN-LIKE CHARGES FIRED BY A 'THUMPER' DEVICE AND EXPLOSIVE GRENADE CHARGES FIRED FROM A MORTAR BOX ASSEMBLY BY AN ASTRONAUT. THE EQUIPMENT CONSISTED OF A THUMPER/GEOPHONE ASSEMBLY, A MORTAR PACKAGE ASSEMBLY, INTERCONNECTING CABLES, AND AN ELECTRONICS ASSEMBLY HOUSED IN THE CENTRAL STATION. THE ASE GENERATED AND MONITORED SEISMIC WAVES IN THE RANGE 3 TO 250 HZ WITH A FREQUENCY RESPONSE OF PLUS OR MINUS 3 DB IN THE FREQUENCY RANGE OF 3 TO 100 HZ. NATURAL SEISMIC WAVES WERE ALSO MONITORED WITHIN THIS RANGE WHILE THE ALSEP STATION WAS OPERATING IN THE ASE MODE. THE DATA-GATHERING INTERVAL WAS SMALL BECAUSE THE CENTRAL STATION OPERATED IN THE ASE MODE ON THE AVERAGE OF ONLY 30 MIN/WEEK. THE THUMPER CONTAINED 21 STANDARD INITIATORS MOUNTED PERPENDICULAR TO ITS BASE PLATE, WHICH WAS SELECTED AND FIXED BY AN ASTRONAUT. THE THUMPER WAS CABLE-CONNECTED TO THE CENTRAL STATION AND WAS FIRED AT INTERVALS OF 5 M. THUMPER FIRINGS BEYOND APPROXIMATELY 40 M PRODUCED WEAK SIGNALS. ONE P-WAVE VELOCITY OF 114 M/SEC WAS MEASURED. THE GEOPHONES WERE ELECTROMAGNETIC LISTENING DEVICES THAT WERE CABLE-CONNECTED TO THE CENTRAL STATION, WHERE THEY WERE AMPLIFIED, DIGITIZED, AND TRANSMITTED TO EARTH. THEY WERE PLACED AT DISTANCES OF 3, 43, AND 93 M FROM THE CENTRAL STATION. THE MORTAR BOX GRENADES WERE ROCKET-LAUNCHED BY EARTH COMMAND. THEY IMPACTED AT RANGES OF APPROXIMATELY 150, 300, AND 900 M FROM THE DEPLOYED MORTAR BOX ASSEMBLY. THE DECISION NOT TO LAUNCH GRENADE NO. 1 (1500 M) WAS MADE BECAUSE THE LAUNCH ASSEMBLY PITCH-ANGLE SENSOR WENT OFF-SCALE HIGH, MAKING THE PITCH POSITION OF THE ASSEMBLY UNCERTAIN.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/21/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- ERTS 1 NSSDC ID 72-058A
ALTERNATE NAMES- EARTH RES. TECH SAT.-A, PL-724A, ERTS-A, 06126

LAUNCH DATE- 07/23/72 SPACECRAFT WEIGHT IN ORBIT- 816. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 07/23/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 103.2 MIN
APOAPSIS- 912.000 KM ALT PERIAPSIS- 912.000 KM ALT INCLINATION- 99.125 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/05/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 103.15 MIN
APOAPSIS- 914.37 KM ALT PERIAPSIS- 900.80 KM ALT INCLINATION- 99.062 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - S.	WEILAND	NASA-GSFC	GREENBELT, MD
PS - W.P.	NORDBERG	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS) 1 WAS A MODIFIED VERSION OF THE NIMBUS 4 METEOROLOGICAL SATELLITE. THE NEAR-POLAR ORBITING SPACECRAFT WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GEOLOGY AND MINERAL RESOURCES, HYDROLOGY AND WATER RESOURCES, GEOGRAPHY, CARTOGRAPHY, ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES, AND METEOROLOGICAL PHENOMENA. TO ACCOMPLISH THESE OBJECTIVES, THE SPACECRAFT WAS EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A THREE-CAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADIOMETRIC IMAGES OF THE EARTH AND (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE, INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS 1 CARRIED TWO WIDE-BAND VIDEO TAPE RECORDERS (WBVTR) CAPABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS INCLUDED A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM, OPERATING AT 2287.5 AND 137.86 MHZ, FOR SPACECRAFT HOUSEKEEPING, ATTITUDE, AND SENSOR PERFORMANCE DATA. VIDEO DATA FROM THE THREE-CAMERA RBV SYSTEM WAS TRANSMITTED IN BOTH REAL-TIME AND TAPE RECORDER MODES AT 2265.5 MHZ, WHILE INFORMATION FROM THE MSS WAS CONSTRAINED TO A 20-MHZ RF BANDWIDTH AT 2229.5 MHZ. THE RBV WAS TURNED OFF 2 WEEKS AFTER LAUNCH WHEN AN EXCESSIVE POWER DRAIN WAS OBSERVED IN THE SPACECRAFT ELECTRICAL SYSTEM. ONE WBVTR IS ALSO INOPERABLE.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- RETURN BEAM VIDICON (RBV) CAMERA SYSTEM NSSDC ID 72-058A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - O.	WEINSTEIN	NASA-GSFC	GREENBELT, MD
OI - T.M.	RAGLAND	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ERTS 1 RETURN BEAM VIDICON (RBV) CAMERA SYSTEM CONTAINED THREE INDEPENDENT CAMERAS COVERING THE THREE SPECTRAL BANDS FROM BLUE-GREEN (0.47 TO 0.575 MICRON) THROUGH YELLOW-RED (0.56 TO 0.68 MICRON) TO NEAR INFRARED (0.69 TO 0.83 MICRON). WHILE DESIGNED PRIMARILY TO OBTAIN INFORMATION FOR EARTH RESOURCE TYPE STUDIES, THE RBV CAMERA SYSTEM WAS ALSO USED TO CONDUCT METEOROLOGICAL STUDIES, I.E., TO INVESTIGATE ATMOSPHERIC ATTENUATION AND TO OBSERVE MESOSCALE PHENOMENA, WINTER MONSOON CLOUDS (JAPAN), SNOW COVER, ETC. THE THREE EARTH-ORIENTED CAMERAS WERE MOUNTED TO A COMMON BASE, WHICH WAS STRUCTURALLY ISOLATED FROM THE SPACECRAFT TO MAINTAIN ACCURATE ALIGNMENT. EACH CAMERA CONTAINED AN OPTICAL LENS, A 2.08-CM RETURN BEAM VIDICON, A THERMOELECTRIC COOLER, DEFLECTION AND FOCUS COILS, A MECHANICAL SHUTTER, ERASE LAMPS, AND SENSOR ELECTRONICS. THE CAMERAS WERE SIMILAR EXCEPT FOR THE SPECTRAL FILTERS CONTAINED IN THE LENS ASSEMBLIES THAT PROVIDED SEPARATE SPECTRAL VIEWING REGIONS. THE VIEWED GROUND SCENE, 185 BY 185 KM IN AREA, WAS STORED ON THE PHOTOSENSITIVE SURFACE OF THE CAMERA TUBE, AND, AFTER SHUTTERING, THE IMAGE WAS SCANNED BY AN ELECTRON BEAM TO PRODUCE A VIDEO SIGNAL OUTPUT. EACH CAMERA WAS READ OUT SEQUENTIALLY, REQUIRING ABOUT 3.5 SEC FOR EACH OF THE SPECTRAL IMAGES. THE CAMERAS WERE RESHUTTERED EVERY 25 SEC TO PRODUCE OVERLAPPING IMAGES ALONG THE DIRECTION OF SPACECRAFT MOTION. VIDEO DATA FROM THE RBV WERE TRANSMITTED (2265.5 MHZ) IN BOTH REAL-TIME AND TAPE RECORDER MODES. FROM A NOMINAL SPACECRAFT ALTITUDE OF 900 KM, THE RBV HAD A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT ARE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD., AND ARE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED PERSONS MAY OBTAIN DATA FROM THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, S.D. THE RBV PERFORMED NORMALLY AFTER LAUNCH BUT WAS PLACED OPERATIONALLY OFF ON AUGUST 6, 1972, WHEN AN EXCESSIVE POWER DRAIN OCCURRED IN THE SPACECRAFT ELECTRICAL SYSTEM.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS) NSSDC ID 72-058A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE ERTS 1 MULTISPECTRAL SCANNER (MSS) WAS DESIGNED TO PROVIDE REPETITIVE DAYTIME ACQUISITION OF HIGH-RESOLUTION, MULTISPECTRAL DATA OF THE EARTH'S SURFACE ON A GLOBAL BASIS AND TO DEMONSTRATE THAT REMOTE SENSING FROM SPACE IS A FEASIBLE AND PRACTICAL APPROACH TO EFFICIENT MANAGEMENT OF THE EARTH'S RESOURCES. IN ADDITION TO OBTAINING DATA FOR USE IN EARTH RESOURCE TYPE STUDIES, THE MSS SYSTEM WAS USED TO CONDUCT OCEANOGRAPHIC AND METEOROLOGICAL STUDIES, I.E., TO MAP SEA-ICE FIELDS, LOCATE AND TRACK MAJOR OCEAN CURRENTS, MONITOR BOTH AIR AND WATER POLLUTION, DETERMINE SNOW COVER, INVESTIGATE SEVERE STORM ENVIRONMENTS, ETC. THE MSS CONSISTED OF A 22.86-CM DOUBLE REFLECTOR-TYPE TELESCOPE, SCANNING MIRROR, FILTERS, DETECTORS, AND ASSOCIATED ELECTRONICS. THE SCANNER OPERATED IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1, 0.5 TO 0.6 MICRON, BAND 2, 0.6 TO 0.7 MICRON, BAND 3, 0.7 TO 0.8 MICRON, AND BAND 4, 0.8 TO 1.1 MICRONS. INCOMING RADIATION WAS COLLECTED BY THE SCANNING MIRROR, WHICH OSCILLATED 2.89 DEG TO EITHER SIDE

OF NADIR AND SCANNED CROSS-TRACK SWATHS 185 KM WIDE. THE ALONG-TRACK SCAN WAS PRODUCED BY THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCED AT THE IMAGE PLANE OF THE TELESCOPE WAS RELAYED BY USE OF FIBER OPTIC BUNDLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WAS ACCOMPLISHED. OPTICAL FILTERS WERE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX DETECTORS WERE EMPLOYED IN EACH OF THE FOUR SPECTRAL BANDS -- BANDS 1 THROUGH 3 USED PHOTOMULTIPLIER TUBES AS DETECTORS, AND BAND 4 USED SILICON PHOTODIODES. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM PROCESSED THE SCANNER'S 24 CHANNELS OF VIDEO DATA. THE DATA WERE TIME-MULTIPLEXED AND THEN CONVERTED TO A PULSE CODE MODULATED (PCM) SIGNAL BY AN A/D CONVERTER. THE DATA WERE THEN TRANSMITTED (2229.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR, IN THE CASE OF REMOTE AREAS, STORED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK THE NEXT TIME THE SPACECRAFT CAME WITHIN COMMUNICATION RANGE OF AN ACQUISITION STATION. DATA FROM THIS EXPERIMENT ARE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD., AND ARE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS MAY OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, S.D.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- DATA COLLECTION SYSTEM (DCS) NSSDC ID 72-058A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE ERTS 1 DATA COLLECTION SYSTEM (DCS) WAS TO PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WAS COMPOSED OF OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP'S), (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS, WHICH INCLUDED REMOTE RECEIVING SITES AND THE GROUND DATA HANDLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS PROVIDED A CONTINUAL FLOW OF INFORMATION TO BE USED FOR MANAGEMENT OF WILDLIFE, MARINE, AGRICULTURE, WATER, AND FORESTRY RESOURCES AND TO LEAD TO IMPROVED WEATHER FORECASTS, POLLUTION CONTROL, AND EARTHQUAKE PREDICTION AND WARNING. THE ENVIRONMENTAL SENSORS MOUNTED ON A DCP WERE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REQUIREMENTS. FROM A NOMINAL ORBIT OF APPROXIMATELY 900 KM, THE SPACECRAFT WAS CAPABLE OF ACQUIRING DATA FROM DCP'S WITHIN A RADIUS OF AROUND 3100 KM FROM THE SUBSATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST ONCE EVERY 12 HR. THE DCPS' TRANSMITTER FREQUENCY WAS 401.55 MHZ. LACKING INTERROGATION CAPABILITIES, THE DCS EQUIPMENT IN THE SPACECRAFT WAS ESSENTIALLY A RECEIVER. THE DATA WERE SIMPLY RECEIVED AND RETRANSMITTED (AT 2287.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WAS NO SIGNAL MULTIPLEXING OR DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WAS DESIGNED TO ACCOMMODATE UP TO 1000 DCP'S DEPLOYED THROUGHOUT THE CONTINENTAL UNITED STATES. HOWEVER, THE DCS INITIALLY CONSISTED OF A PILOT GROUP OF ONLY SIX DCP'S, WITH USER AGENCIES PROCURING, INSTRUMENTING, AND DEVELOPING ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FROM THIS EXPERIMENT ARE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 07/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 46 NSSDC ID 72-061A
ALTERNATE NAMES- METEC, MTS, 06142, METEOROID TECHNOLOGY SAT

LAUNCH DATE- 08/13/72 SPACECRAFT WEIGHT IN ORBIT- 200. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OAST

INITIAL ORBIT PARAMETERS
EPOCH DATE- 09/04/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 97.65 MIN
APOAPSIS- 811. KM ALT PERIAPSIS- 492. KM ALT INCLINATION- 37.7 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/10/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 97.593 MIN
APOAPSIS- 792.50 KM ALT PERIAPSIS- 494.48 KM ALT INCLINATION- 37.691 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.V. WOERNER NASA-LARC HAMPTON,VA.
PS - W.H. KINARD NASA-LARC HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THE METEOROID TECHNOLOGY SATELLITE WERE TO MEASURE THE METEOROID PENETRATION RATES IN A BUMPER-PROTECTED TARGET, AND TO OBTAIN DATA ON METEOROID VELOCITY AND FLUX DISTRIBUTION. THE CENTRAL HUB OF THE SATELLITE WAS 320 CM LONG AND CARRIED THE VELOCITY AND IMPACT EXPERIMENTS. BUMPER TARGETS EXTENDED FROM THE SATELLITE, GIVING IT AN OVERALL WIDTH OF 701.5 CM. THE SPACECRAFT WAS SPIN STABILIZED AT 3 RPM, AND SHOULD HAVE OPERATED FOR A MINIMUM OF ONE YR. HOWEVER, TWO OF THE FOUR PRIMARY EXPERIMENT BUMPER PANELS FAILED TO DEPLOY, CAUSING THE SPACECRAFT TO REVOLVE ABOUT AN AXIS DIFFERENT THAN THAT PLANNED. THIS ORIENTATION CAUSED THE TELEMETRY SYSTEM BATTERY TO OVERHEAT, AND NECESSITATED THE TURNOFF OF BOTH SECONDARY EXPERIMENTS (EXPERIMENTS -02 AND -03) WITHIN TWO WEEKS AFTER LAUNCH.

ON 08/27/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- METEOROID PENETRATION NSSDC ID 72-061A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W.H. KINARD NASA-LARC HAMPTON, VA

OI - D.H. HUMES NASA-LARC HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT WAS TO MEASURE THE METEOROID PENETRATION RATES OF A BUMPER-PROTECTED TARGET. PENETRATIONS WERE MEASURED, USING TWELVE 2-MIL STAINLESS-STEEL PRESSURE CELLS LOCATED BEHIND 1-MIL STAINLESS-STEEL BUMPERS. THESE 12 CELLS WERE MOUNTED ON FOUR BUMPER PANELS WHICH EXTENDED OUT FROM THE CYLINDRICAL SPACECRAFT BODY. DUE TO A MALFUNCTION, ONLY TWO OF THE FOUR BUMPER PANELS DEPLOYED.

ON 08/27/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 08/27/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- OAO 3 NSSDC ID 72-065A
ALTERNATE NAMES- PL-7010, OAO-C, COPERNICUS, 06163

LAUNCH DATE- 08/21/72 SPACECRAFT WEIGHT IN ORBIT- 2150. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 08/21/72 OREIT TYPE- GEOCENTRIC ORBIT PERIOD- 99.7 MIN
APOAPSIS- 751.000 KM ALT PERIAPSIS- 735.000 KM ALT INCLINATION- 35.012 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/05/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 99.709 MIN
APOAPSIS- 749.15 KM ALT PERIAPSIS- 740.10 KM ALT INCLINATION- 35.011 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. PURCELL NASA-GSFC GREENBELT, MD
PS - J.E. KUPPERIAN, JR. NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
OAO-C CONTINUED THE MISSION OF THE OAO PROGRAM TO OBSERVE THE CELESTIAL SPHERE FROM ABOVE THE EARTH'S ATMOSPHERE. A SPECTROMETER MEASURED HIGH-RESOLUTION SPECTRA OF THE STARS, GALAXIES, PLANETS, NEBULAE, THE SUN, ETC., IN THE ULTRAVIOLET REGION OF THE SPECTRUM. THREE SMALL X-RAY TELESCOPES STUDIED X-RAY RADIATION IN THREE PASSBANDS BETWEEN 3 AND 60 A. THE OAO-C SPACECRAFT WAS A GROUND-CONTROLLABLE SPACECRAFT THAT WAS PLACED IN A LOW-ALTITUDE EARTH ORBIT. THE SPACECRAFT SHAPE WAS THAT OF AN OCTAGONAL CYLINDER WITH EXTENDABLE SOLAR PANELS. THE SILICON SOLAR CELL ARRAY SUPPLIED 30 W AND 50 W PEAK POWER. DATA WAS TRANSMITTED IN BOTH REAL TIME AND DELAYED TIME.

ON 08/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HIGH-RESOLUTION TELESCOPES NSSDC ID 72-065A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.	SPITZER	PRINCETON U	PRINCETON, NJ
OI - J.	ROGERSON, JR.	PRINCETON U	PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVE OF THIS EXPERIMENT WAS TO MAKE QUANTITATIVE OBSERVATIONS OF THE INTERSTELLAR ABSORPTION LINES IN THE SPECTRAL REGION 1000 TO 3300 A. THE SECONDARY OBJECTIVE WAS TO OBSERVE THE ULTRAVIOLET SPECTRA OF SELECTED BRIGHTER STARS IN DETAIL. THE PRIME OPTICAL SYSTEM WAS AN 80-CM DIAM CASSEGRAIN TELESCOPE WITH A 16-M FOCAL LENGTH (F/20). THIS TELESCOPE WAS COUPLED TO A PASCHEN-RUNGE SPECTROMETER CAPABLE OF 0.1-A RESOLUTION IN FIRST ORDER AND 0.05-A RESOLUTION IN SECOND ORDER. THE PHOTONS WERE DETECTED BY FOUR EMR PHOTOTUBES, EACH EQUIPPED WITH ITS OWN EXIT SLIT, AND MOVABLE IN PAIRS ALONG THE ROWLAND CIRCLE. A GUIDANCE ERROR SENSOR ATTACHED TO THE PRIME OPTICS CONTROLLED THE SPACECRAFT ATTITUDE TO WITHIN 0.1 ARC-SEC. THIS GUIDANCE SYSTEM LOCKED ONTO A STAR AS WEAK AS 7TH MAGNITUDE. THE OVERALL SYSTEM COULD MAKE USEFUL MEASUREMENTS ON O- AND B-TYPE STARS OF 7TH MAGNITUDE.

ON 08/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 08/21/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- STELLAR PHOTOMETRY NSSDC ID 72-065A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F.	BOYD	U COLLEGE, LONDON	LONDON, ENGLAND
OI - E.A.	STEWARDSON	U COLLEGE, LONDON	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THREE TELESCOPES AND A COLLIMATED PROPORTIONAL COUNTER TO OBSERVE COSMIC X-RAY SOURCES BETWEEN 1 AND 70 A. BETWEEN 1 AND 3 ANGSTROMS A PROPORTIONAL COUNTER LOCATED BEHIND A COLLIMATOR WAS USED IN CONJUNCTION WITH PULSE-SHAPE DISCRIMINATION TO REJECT BACKGROUND COUNTS. FROM 3 TO 9 A AND 6 TO 18 A, PROPORTIONAL COUNTERS LOCATED AT THE FOCUS OF TWO GRAZING-INCIDENCE REFLECTING TELESCOPES (5.5 SQ CM AND 12 SQ CM, RESPECTIVELY) WERE USED, WITH AN ANTICOINCIDENCE SCINTILLATOR ALSO EMPLOYED TO REJECT BACKGROUND COSMIC RAY COUNTS. AN OPEN CHANNEL MULTIPLIER LOCATED AT THE FOCUS OF A GRAZING INCIDENCE TELESCOPE (23 SQ CM) WAS USED TO OBSERVE BETWEEN 20 AND 70 A. DATA FROM THIS EXPERIMENT WAS USED TO DETERMINE THE INTERSTELLAR ABSORPTION OF SOFT X RAYS. THE 3- TO 9-A AND 6- TO 18-A DETECTORS FAILED IN JUNE 1973. THE 20- TO 70-A DETECTOR APPEARS TO BE QUITE NOISY.

ON 08/21/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 47 NSSDC ID 72-073A
ALTERNATE NAMES- PL-713A, IMP-H, IMP 7, 06197

LAUNCH DATE- 09/23/72 SPACECRAFT WEIGHT IN ORBIT- 390. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 09/25/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 7365. MIN
APOAPSIS- 235639. KM ALT PERIAPSIS- 201599. KM ALT INCLINATION- 28.6 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 08/23/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 17602. MIN
APOAPSIS- 233231. KM ALT PERIAPSIS- 202306. KM ALT INCLINATION- 8.566 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - P.	BUTLER	NASA-GSFC	GREENBELT, MD
PS - N.F.	NESS	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
IMP-H CONTINUED THE STUDY BEGUN BY EARLIER IMP SPACECRAFT OF THE INTERPLANETARY AND MAGNETOTAIL REGIONS FROM A NEARLY CIRCULAR ORBIT NEAR 37 EARTH RADII. THIS 16-SIDED DRUM-SHAPED SPACECRAFT WAS 157 CM HIGH AND 135 CM IN DIAM. IT WAS DESIGNED TO MEASURE ENERGETIC PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. THE SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE, AND THE SPIN PERIOD WAS 1.3 SEC. THE SPACECRAFT WAS POWERED BY SOLAR CELLS AND A CHEMICAL BATTERY. SCIENTIFIC DATA WERE TELEMETERED TO EARTH AT 1600 BPS (WITH A SECONDARY 400-BPS RATE AVAILABLE).

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA NSSDC ID 72-073A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI - A.J.	LAZARUS	MIT	CAMBRIDGE, MA
OI - J.H.	SINSACK	MIT	CAMBRIDGE, MA
OI - E.F.	LYON	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
A MODULATED SPLIT-COLLECTOR FARADAY CUP WHICH WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, TRANSITION REGION, AND MAGNETOTAIL. ELECTRONS WERE STUDIED IN EIGHT LOGARITHMICALLY EQUISPACED CHANNELS BETWEEN 17 EV AND 7 KEV. POSITIVE IONS WERE STUDIED IN EIGHT CHANNELS BETWEEN 50 EV AND 7 KEV. A SPECTRUM WAS OBTAINED EVERY EIGHT SPACECRAFT REVOLUTIONS.

ANGULAR INFORMATION WAS OBTAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-DEG REVOLUTION OF THE SATELLITE OR IN 15 ANGULAR SEGMENTS CENTERED MORE CLOSELY ABOUT THE SPACECRAFT SUN LINE.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV — NSSDC ID 72-073A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD
OI - C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI - D.K.	HOVESTADT	M.PLANCK INST.GARCHING	GARCHING, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES ASSOCIATED WITH SOLAR ACTIVITY. THE DETECTORS USED WERE (1) AN ELECTROSTATIC ANALYZER (TO SELECT PARTICLES OF THE DESIGNATED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICOINCIDENCE SHIELDING AND (2) A PARTICLE TELESCOPE CONSISTING OF A SILICON SURFACE BARRIER DETECTOR AND A FLAT TWO-CHAMBER PROPORTIONAL COUNTER ENCLOSED IN AN ANTICOINCIDENCE SCINTILLATOR CUP. THE EXPERIMENT MEASURED PARTICLE ENERGIES FROM 0.1 TO 2 MEV PER CHARGE IN 12 BANDS AND UNIQUELY IDENTIFIED POSITRONS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES OF Z FROM 1 TO 8 (NO CHARGE RESOLUTION FOR Z GREATER THAN 8). TWO 1000-CHANNEL PULSE HEIGHT ANALYZERS, ONE FOR EACH ELEMENT OF THE TELESCOPE, WERE INCLUDED IN THE EXPERIMENT PAYLOAD. THE TELESCOPE FAILED ON NOVEMBER 25, 1972 WHEN THE WINDOW ON THE PROPORTIONAL COUNTER WEAKENED AND BURST DUE TO EXPOSURE TO UV RADIATION.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/25/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS — NSSDC ID 72-073A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 R(E) TO FURTHER UNDERSTAND GEOMAGNETIC STORMS, AURORA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPHERIC PHENOMENA. THE DETECTOR WAS A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPEDEA - LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 10 ENERGY INTERVALS BETWEEN 5 EV AND 50 KEV. IT HAD AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG IN FOUR DIRECTIONS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THE DETECTOR WAS OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING

GOOD ANGULAR RESOLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY BAND) ONCE EACH 272 SEC, AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIRE ENERGY RANGE IN FOUR DIRECTIONS WAS MEASURED EVERY 68 SEC.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS NSSDC ID 72-073A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.C.	ARMSTRONG	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WERE (1) TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW, (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNETOPAUSE, AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION CONSISTED OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLID-STATE DETECTORS AND A MAGNETIC FIELD TO DEFLECT ELECTRONS. TWO SIDE-MOUNTED DETECTORS WERE USED TO DETECT THE ELECTRONS DEFLECTED BY THE MAGNET. TWO ADDITIONAL SOLID-STATE DETECTORS WERE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV) PARTICLES, ALPHA PARTICLES, AND CHARGED PARTICLES OF Z GREATER THAN 2. THE EXPERIMENT WAS DESIGNED TO MEASURE (1) PROTON FLUXES FROM 30 KEV TO GREATER THAN 8.6 MEV IN SIX RANGES, (2) ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV, (4) ALPHA PARTICLES GREATER THAN 0.5 MEV, GREATER THAN 1.6 MEV, 2.2 TO 8.8 MEV, AND 8.8 TO 35 MEV, AND (5) CHARGED PARTICLES OF Z GREATER THAN 2 AT E GREATER THAN 5 MEV.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/26/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES NSSDC ID 72-073A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.C.	STONE	CAL TECH	PASADENA, CA
OI - R.E.	VOGT	CAL TECH	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT STUDIED (VIA DIFFERENTIAL ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES, ACCELERATION PROCESSES OF SOLAR PARTICLES, STORAGE IN THE INTERPLANETARY MEDIUM, AND SOLAR MODULATION OF PARTICLES IN THE INTERPLANETARY MEDIUM. THE DETECTOR USED WAS A MULTI-ELEMENT, TOTALLY DEPLETED SOLID-STATE TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND WAS

OPERATED IN ANY OF THREE MODES -- (1) THE ENERGY RANGE MODE, (2) THE ELECTRON MODE (150 KEV TO 2.8 MEV), AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40 MEV/NUCLEON). THE DETECTOR HAD AN ANGULAR RESOLUTION OF PLUS TO MINUS 22 DEG.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT — NSSDC ID 72-073A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - M.G.	MUNOZ	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT INCREASED THE UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE SUN. THE DETECTOR POINTED ALONG THE SPACECRAFT SPIN AXIS. IT WAS A WINDOWLESS DE/DX VS E TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND OPERATED IN EITHER OF TWO MODES -- (1) THE HIGH Z - LOW E MODE HAVING AN ENERGY RANGE 0.5 TO 50 MEV/NUCLEON AND A CHARGE RANGE Z 5 TO 50 AND (2) THE LOW Z MODE, HAVING AN ENERGY RANGE 6 TO 1200 MEV/NUCLEON (ISOTOPES - HYDROGEN, DEUTERIUM, TRITIUM, HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR ELECTRONS WAS PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE OF THE DETECTOR WAS 50-DEG FULL ANGLE.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS — NSSDC ID 72-073A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.M.	KRIMIGIS	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - T.P.	ARMSTRONG	U OF KANSAS	LAWRENCE, KS
OI - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THREE SOLID-STATE DETECTORS IN AN ANTICOINCIDENCE PLASTIC SCINTILLATOR OBSERVED ELECTRONS BETWEEN 0.2 AND 2.5 MEV, PROTONS BETWEEN 0.3 AND 500 MEV, ALPHA PARTICLES BETWEEN 2.0 AND 200 MEV, HEAVY PARTICLES WITH ATOMIC NUMBERS RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 8 MEV, HEAVY PARTICLES WITH Z VALUES RANGING BETWEEN 6 AND 8 WITH ENERGIES GREATER THAN 32 MEV, AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON, ALL WITH DYNAMIC RANGES OF 1 TO ONE MILLION (PER SQUARE CM-SEC-STER). FIVE THIN WINDOW GEIGER-MUELLER TUBES OBSERVED ELECTRONS OF ENERGY GREATER THAN 15 KEV, PROTONS OF ENERGY GREATER THAN 250 KEV, AND X RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A. ALL WITH A DYNAMIC RANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY OF SOLAR ORIGIN WERE

STUDIED, BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT PERMITTED COSMIC RAYS AND MAGNETOTAIL PARTICLES TO BE OBSERVED.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/26/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR- AND COSMIC-RAY PARTICLES NSSDC ID 72-073A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - D.E.	FAGGE	NASA-JSC	HOUSTON, TX
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT MEASURED ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTION OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF A PAIR OF SOLID-STATE TELESCOPES WHICH MEASURED INTEGRAL FLUXES ABOVE 150, 350, AND 700 KEV AND OF PROTONS ABOVE 0.5, .15, .70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV. EXCEPT FOR THE .05 MEV PROTON MODE, ALL COUNTING MODES HAD UNIQUE SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DE/DX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED NUCLEI FROM 1 TO 16 AMU WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE OBTAINED AS COUNTS IN THE DE/DX, BUT NOT IN THE E, SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT CSI SCINTILLATOR TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND NUCLEI FROM 1 TO 30 AMU IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT ACTED AS A DE/DX DETECTOR. ABOVE 80 MEV, IT ACTED AS A BIDIRECTIONAL TRIPLE DE/DX DETECTOR. FLUX DIRECTIONALITY INFORMATION WAS OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR SYSTEM INTO EIGHT ANGULAR SECTORS.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/26/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA NSSDC ID 72-073A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. IONS AS HEAVY AS OXYGEN WERE RESOLVED WHEN THE SOLAR WIND TEMPERATURE WAS LOW. ENERGY ANALYSIS WAS ACCOMPLISHED BY

CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND FROM 200 EV TO 2 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOTAIL, POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WERE STUDIED.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA WAVE EXPERIMENT NSSDC ID 72-073A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - G.M.	CROOK	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - I.M.	GREEN	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - R.W.	FREDERICKS	TRW SYSTEMS GROUP	REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

ELECTRIC FIELD COMPONENTS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS AND THE MAGNETIC FIELD COMPONENT PARALLEL TO THAT AXIS WERE MEASURED BY AN ELECTRIC DIPOLE ANTENNA AND A SEARCH COIL MAGNETOMETER. BOTH SENSORS WERE MOUNTED ON A 3.05-M BOOM. DATA WAS OBTAINED IN EIGHT FREQUENCY CHANNELS FROM 10 HZ TO 100 KHZ IN EITHER THE NORMAL MODE OR THE SNAPSHOT MODE. TWO CHANNELS, CENTERED AT 67 AND 600 HZ, HAD 10-DB FALL-OFF POINTS OF 17 AND 150 HZ, AND 270 AND 810 HZ, RESPECTIVELY. THE REMAINING SIX CHANNELS WERE NARROW-BANDWIDTH CHANNELS CENTERED AT 1.3, 2.3, 5.4, 10.5, 30, AND 70 KHZ. IN THE NORMAL MODE, THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERIOD (COMPARABLE TO THE SPACECRAFT SPIN PERIOD). DURING THE NEXT PERIOD, THE SEARCH COIL WAS SAMPLED MANY TIMES IN THE SAME FREQUENCY CHANNEL. NEXT, THE ANTENNA WAS SAMPLED IN THE NEXT FREQUENCY CHANNEL, FOLLOWED BY THE SEARCH COIL IN THAT CHANNEL. THE FREQUENCY CHANNELS WERE INCREMENTED, AND THE SAMPLED SENSORS WERE ALTERNATED UNTIL A FULL SET OF DATA WAS OBTAINED IN 16 MEASUREMENT PERIODS (APPROXIMATELY 20 SEC). IN THE SNAPSHOT MODE, ONLY ELECTRIC FIELD DATA WERE TRANSMITTED, AS FOLLOWS. THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERIOD. IN THE NEXT PERIOD, THE ANTENNA WAS SAMPLED IN TWO SEQUENCES OF EIGHT FREQUENCY CHANNELS. THIS TWO-PERIOD MEASUREMENT WAS EXECUTED EIGHT TIMES, EACH TIME INCREMENTING THE FREQUENCY CHANNEL STUDIED IN EVERY OTHER PERIOD BY ONE. THUS, A FULL SET OF DATA AGAIN REQUIRED 16 MEASUREMENT PERIODS. IN ADDITION, AN ANALOG MODE, SAMPLING THE ANTENNA AND SEARCH COIL FROM 10 TO 100 HZ, WAS USED IN CONJUNCTION WITH THE SPECIAL PURPOSE ANALOG TELEMETRY TEST TO BE CONDUCTED. UNFORTUNATELY THIS NEW TELEMETRY SYSTEM DID NOT WORK WELL, AND LITTLE IF ANY USABLE DATA WERE OBTAINED IN THIS MODE OF OPERATION. FOR THE DIGITAL MODES, THE ELECTRIC AND MAGNETIC THRESHOLDS WERE SET BY INTERFERENCE CAUSED BY THE SOLAR CELL ARRAYS. THIS INTERFERENCE WAS DUE TO THE ASYMMETRIC SHEATH RELATED TO THE NON-CONDUCTING SATELLITE SURFACE AND THE SIX-SIDED GEOMETRY OF THE SPACECRAFT PANELS. IT IS EXPECTED THAT THESE INTERFERENCE PROBLEMS

WILL ADVERSELY AFFECT MOST AMBIENT FIELD MEASUREMENTS.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/24/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- SOLAR WIND ION COMPOSITION NSSDC ID 72-073A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K.W. OGILVIE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
AN ELECTROSTATIC ANALYZER AND WEIN-TYPE VELOCITY SELECTOR WERE USED TO GAIN EXPLORATORY DATA ON HEAVY ION COMPOSITION IN THE SOLAR WIND. THE BULK VELOCITIES OF 4HE++, 4HE+, 3HE++, AND O (ISOTOPES INDISTINGUISHABLE) IONS IN ALL IONIZATION STATES WERE SEPARATELY STUDIED. DURING 30 SUCCESSIVE SPACECRAFT SPIN PERIODS, IONS OF A GIVEN SPECIES WERE STUDIED IN 30 LOGARITHMICALLY EQUISPACED BULK VELOCITY CHANNELS FROM 200 TO 600 KM/SEC. A COMPLETE SET OF MEASUREMENTS REQUIRED ABOUT 10 MIN AND CONSISTD OF THIRTY 1-STEP SEQUENCES FOR 4 HE++ IONS AND FIVE 30-STEP SEQUENCES FOR EACH OF THE OTHER THREE SPECIES.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 09/24/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS NSSDC ID 72-073A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T.L. CLINE NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT STUDIED GALACTIC AND SOLAR ELECTRONS AND POSITRONS IN THE KINETIC ENERGY RANGE 50 KEV TO 2 MEV. INFORMATION ON PROTONS BETWEEN 0.5 AND 4.0 MEV WAS ALSO OBTAINED. A COLLIMATED STILBENE CRYSTAL SCINTILLATOR LOOKING PERPENDICULAR TO THE SPACECRAFT SPIN AXIS SERVED AS THE PRINCIPAL DETECTOR. A SIMILAR, FULLY SHIELDED CRYSTAL SERVED TO DETERMINE THE CONTRIBUTION TO THE PRINCIPAL DETECTOR COUNT RATE OF ELECTRONS AND PROTONS GENERATED WITHIN THE PRINCIPAL DETECTOR BY GAMMA RAYS AND NEUTRONS, RESPECTIVELY. A FULLY SHIELDED CSI CRYSTAL SERVED AS A GAMMA-RAY SPECTROMETER AND WAS USED IN COINCIDENCE WITH THE PRINCIPAL DETECTOR TO DISTINGUISH ELECTRONS FROM POSITRONS. COUNT RATES FROM EACH DETECTOR OBTAINED IN EIGHT ANGULAR SECTORS PER REVOLUTION WERE TELEMETERED. IN ADDITION, THE AMPLITUDE AND SHAPE OF THE PULSE GENERATED IN THE PRINCIPAL DETECTOR BY THE FIRST STOPPING PARTICLE IN EACH APPROPRIATE TELEMETRY FRAME WILL BE STUDIED. PULSE AMPLITUDE AND SHAPE WERE TO YIELD ENERGY (10 PERCENT RESOLUTION) AND PARTICLE SPECIES INFORMATION.

ON 09/23/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME

NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/13/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- NOAA 2 NSSDC ID 72-082A
ALTERNATE NAMES- PL-701J, ITOS-D, 06235

LAUNCH DATE- 10/15/72 SPACECRAFT WEIGHT IN ORBIT- 409. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

INITIAL ORBIT PARAMETERS
EPOCH DATE- 10/15/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 114.9 MIN
APOAPSIS- 1453.57 KM ALT PERIAPSIS- 1446.18 KM ALT INCLINATION- 101.768 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 114.90 MIN
APOAPSIS- 1453.73 KM ALT PERIAPSIS- 1446.37 KM ALT INCLINATION- 101.722 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENT NASA-GSFC GREENBELT, MD.
PS - I.L. GOLDBERG NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
NOAA 2 WAS THE FIRST IN A SERIES OF RECONFIGURED ITOS-M SATELLITES LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS SYSTEM. NOAA 2 WAS NOT EQUIPPED WITH CONVENTIONAL TV CAMERAS BUT INSTEAD WAS THE FIRST OPERATIONAL WEATHER SATELLITE TO RELY SOLELY UPON RADIOMETRIC IMAGING TO OBTAIN CLOUDCOVER DATA. THE PRIMARY OBJECTIVE OF NOAA 2 WAS TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT REAL-TIME CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WAS ALSO CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA FOR SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE RECORDER MODE. A SECONDARY OBJECTIVE WAS TO OBTAIN GLOBAL SOLAR PROTON FLUX DATA ON A REAL-TIME DAILY BASIS. THE PRIMARY SENSORS CONSISTED OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WERE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT MEASURED 1 BY 1 BY 1.2 M. THE SATELLITE WAS EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WERE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT WAS ACHIEVED. EACH PANEL MEASURED OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WAS COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE NOAA 2 DYNAMICS AND ATTITUDE CONTROL SYSTEM MAINTAINED DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WAS MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT PROVIDED THE DESIRED EARTH-LOOKING ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WERE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF

THE MOMENTUM FLYWHEEL.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOLAR PROTON MONITOR NSSDC ID 72-082A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.C. BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION
THREE SOLID STATE DETECTORS MONITORED THE OMNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID STATE DETECTORS EACH MEASURED DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS), PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP REGION, WHICH IS OF THE GREATEST INTEREST, THE TELESCOPES VIEWED PARALLEL TO, AND PERPENDICULAR TO, THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR MEASURED DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR LOOKED IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SCANNING RADIOMETER (SR) NSSDC ID 72-082A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION
THE NOAA 2 SCANNING RADIOMETER (SR) SUBSYSTEM CONSISTED OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR, AND TWO SR RECORDERS. THIS SUBSYSTEM PERMITTED THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND, THE SEA, OR CLOUD TOPS VIEWED BY THE RADIOMETER. THE RADIOMETER MEASURED REFLECTED RADIATION FROM THE EARTH ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON BAND DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR DID NOT TAKE A PICTURE BUT INSTEAD FORMED AN IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR SCANNED THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH, EACH ROTATION OF THE MIRROR PROVIDED ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WAS PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) COULD BE STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA COULD BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL WAS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WAS FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN WAS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. AT A NOMINAL SPACECRAFT ALTITUDE OF 1460 KM, THE RADIOMETER HAD A GROUND RESOLUTION OF BETTER THAN 4 KM AT NADIR. THE

RADIOMETER WAS CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF 4 AND 1 DEG K, RESPECTIVELY. DATA FROM THIS EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS, SUITLAND, MD. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F, AND -G.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR) NSSDC ID 72-082A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 2 VERY HIGH-RESOLUTION RADIOMETER (VHRR) EXPERIMENT WAS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT COULD ALSO BE PROGRAMMED TO RECORD UP TO 5 MIN OF DATA FOR REMOTE AREAS WHEN NO CDA STATIONS WERE WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSED. THE EXPERIMENT INCLUDED TWO SCANNING RADIOMETERS, A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR OPERATED SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NADIR). ONE VHRR CHANNEL MEASURED REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE OF 0.6 TO 0.7 MICRON. THIS PROVIDED MORE CONTRAST BETWEEN THE EARTH AND CLOUDS THAN THE SR BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL MEASURED INFRARED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION PERMITTED BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR FORMED AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR EXCEPT THAT BOTH RADIOMETERS OPERATED SIMULTANEOUSLY. AS THE SATELLITE PROCEEDED IN ITS ORBIT, THE 400-RPM REVOLVING MIRRORS SCANNED THE EARTH'S SURFACE 180 DEG OUT OF PHASE (ONE MIRROR AT A TIME) AND PERPENDICULAR TO THE ORBIT PATH. THE VISIBLE AND INFRARED DATA WERE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WAS REPEATED 400 TIMES PER MINUTE, (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILED, THE SYSTEM WAS STILL CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RADIATION USING ONLY THE REMAINING RADIOMETER. DATA FROM THIS EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS, SUITLAND, MD. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F, AND -G.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIOMETER NSSDC ID 72-082A-04

(VTPR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 2 VERTICAL PROFILE TEMPERATURE RADIOMETER (VTPR) SENSED THE RADIANCE ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 15.0, 14.8, 14.4, 14.1, 13.8, AND 13.4 MICRONS. THE ATMOSPHERIC GROSS WATER VAPOR CONTENT WAS DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WERE ALSO TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUD TOP TEMPERATURES. THE VTPR CONSISTED OF AN OPTICAL SYSTEM, A DETECTOR AND ASSOCIATED ELECTRONICS, AND A SCANNING MIRROR. THE SCANNING MIRROR LOOKED AT THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH, AS EACH AREA WAS SCANNED, THE OPTICAL SYSTEM COLLECTED, FILTERED, AND DETECTED THE RADIATION FROM THE EARTH INTO THE EIGHT SPECTRAL INTERVALS. THE FIELD OF VIEW CONTRIBUTING TO ONE PROFILE WAS APPROXIMATELY 50 KM SQ AT THE GROUND. THE RADIOMETER OPERATED CONTINUOUSLY, TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WERE RECORDED THROUGHOUT THE ORBIT AND PLAYED BACK ON COMMAND WHEN THE SATELLITE WAS WITHIN COMMUNICATION RANGE OF A COMMAND AND ACQUISITION STATION. GROUND PERSONNEL USED THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. DATA FROM THIS EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS, SUITLAND, MD. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F, AND -G. AS OF DECEMBER 1972, THE RADIOMETER CONTINUES TO FUNCTION NORMALLY.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 10/15/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- ESRO 4
ALTERNATE NAMES- PL-724C, 06285 NSSDC ID 72-092A

LAUNCH DATE- 11/22/72 SPACECRAFT WEIGHT IN ORBIT- 32. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
INTERNATIONAL ESRO

INITIAL ORBIT PARAMETERS
EPOCH DATE- 11/22/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 98.873 MIN
APOAPSIS- 1169.99 KM ALT PERIAPSIS- 239.54 KM ALT INCLINATION- 91.106 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95.282 MIN
APOAPSIS- 833.66 KM ALT PERIAPSIS- 230.83 KM ALT INCLINATION- 91.083 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

THE ESRO 4 SPACECRAFT WAS DESIGNED TO INVESTIGATE NEUTRAL PARTICLE AND ION CONCENTRATIONS IN THE IONOSPHERE AND NEAR MAGNETOSPHERE, TO DETECT AURORAL PARTICLES, AND TO MONITOR SOLAR PARTICLES IN ORDER TO DISCOVER THE MECHANISM BY WHICH THEY PENETRATE AND DIFFUSE IN THE MAGNETOSPHERE. THE SPACECRAFT WAS LAUNCHED INTO A POLAR ORBIT WITH A NODAL REGRESSION RATE NEAR ZERO, THUS PROVIDING A COMPLETE SCAN ON LOCAL TIME IN 1 YEAR, TO PROVIDE AN ALTITUDE SCAN OVER THE WHOLE GLOBE, THE PERIGEE PRECESSED AT A RATE OF -3.5 DEG/DAY. THE SPACECRAFT WAS CYLINDRICAL IN SHAPE (SIMILAR IN CONSTRUCTION TO ESRO 2), WAS SPIN STABILIZED, AND USED A PCM/PM TELEMETRY MODE TRANSMITTED IN THREE FORMS -- REAL-TIME TELEMETRY AT 64 BPS, TAPE RECORDER PLAYBACK, AND HIGH-SPEED TELEMETRY AT 10,240 BPS.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- POSITIVE ION SPECTROMETER NSSDC ID 72-092A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F. BOYD U COLLEGE, LONDON LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVE OF THIS EXPERIMENT, DESIGNATED AS EXPERIMENT S45 IN ESRO PROJECT DOCUMENTS, WAS TO MEASURE THE DENSITY AND TEMPERATURE OF ELECTRONS AND IONS IN THE VICINITY OF THE SPACECRAFT, AND TO IDENTIFY THE PROMINENT ION SPECIES PRESENT. THREE SPHERICAL PROBES OF DIFFERENT SIZES WERE FLOWN TO OBTAIN THE DESIRED MEASUREMENTS. THE LARGEST ONE WAS 190 MM IN DIAMETER, FUNCTIONED AS AN ION MASS SPECTROMETER, AND WAS SURROUNDED BY A SPHERICAL GRID 200 MM IN DIAMETER WHICH WAS MAINTAINED AT A NEGATIVE POTENTIAL TO REPEL ELECTRONS. APPLICATION OF A SUITABLE VOLTAGE SWEEP TO THE PROBE ALLOWED SPECIES IDENTIFICATIONS TO BE MADE AND THEIR DENSITIES TO BE MEASURED. ONE CYCLE OF MASS SCAN WAS MADE EVERY 4.8 SEC. THIS SENSOR WAS MOUNTED ON A RADIAL BOOM, APPROXIMATELY 1300 MM FROM THE SPACECRAFT'S SKIN, IN ORDER THAT IT HAVE A 360-DEG "LOOK ANGLE," AND THAT IT SAMPLE THE IONOSPHERE OUTSIDE THE SATELLITE'S CHARGE SHEATH. TO KEEP THIS ION MASS SENSOR FROM CROSSING THE SATELLITE'S WAKE, THE SATELLITE'S ATTITUDE HAD TO BE SUCH THAT THE VELOCITY VECTOR WAS KEPT INSIDE A CONE OF APPROXIMATELY 55 DEG HALF-ANGLE AROUND THE SPIN AXIS. THE SMALL ELECTRON COLLECTING PROBE, 10 MM IN DIAMETER, WAS VOLTAGE SWEPT TO PROVIDE ELECTRON TEMPERATURE AND DENSITY DATA. IN ADDITION, THIS LANGMUIR PROBE WAS MOUNTED RELATIVELY CLOSE TO THE MAIN PROBE, I.E., APPROXIMATELY 300 MM AWAY FROM IT, SO THAT THE SPACECRAFT POTENTIAL IT MEASURED COULD BE DIRECTLY APPLIED TO THE ION SPECTROMETER, WITHOUT BEING AFFECTED BY INDUCED FIELDS. IT WAS NOT MOUNTED CLOSE ENOUGH TO CAUSE MUTUAL INTERFERENCE. THE THIRD PROBE, 90 MM IN DIAMETER, WAS MOUNTED ON AN AXIAL BOOM PROTRUDING FROM THE SEPARATION PLANE OF THE SATELLITE (I.E., THE REAR) FOR APPROXIMATELY 350 MM, AND WAS FLOWN TO MONITOR TOTAL ION DENSITY. THE MEASUREMENTS FROM THIS SENSOR WERE ALSO USED TO BETTER INTERPRET AND EVENTUALLY CORRECT THE MEASUREMENTS MADE WITH THE MAIN PROBE. THIS EXPERIMENT REQUIRED A MINIMUM OF 5000 SQ CM OF CONDUCTING AREA ON THE SATELLITE SKIN, TO BE PROVIDED PRIMARILY BY TWO ADDITIONAL SPHERES ON THE END OF BOOMS, TO MAINTAIN THE SATELLITE AT REASONABLE POTENTIAL FOR THIS EXPERIMENT. THE POSITIVE SIDE OF THE SOLAR CELLS WAS GROUNDED.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE CATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NEUTRAL MASS SPECTOMETER NSSDC ID 72-092A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - U. VON ZAHN U OF BONN BONN, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO STUDY THE SPATIAL AND TEMPORAL VARIATIONS OF THE COMPOSITION AND MASS DENSITY OF THE NEUTRAL ATMOSPHERE IN THE ALTITUDE RANGE FROM ABOUT 300 TO 700 KM. TWO ELECTRONICS BOXES AND THE MASS SPECTROMETER COMPLETED THE EXPERIMENT HARDWARE. THE ANALYZER, A MONOPOLE, CONTAINED -- (1) AN ION SOURCE WHERE NEUTRAL PARTICLES WERE IONIZED BY A THERMALLY GENERATED AND MAGNETICALLY FOCUSED ELECTRON BEAM, (2) THE RADIO FREQUENCY (RF) ANALYZING FIELD WHERE THE MASS SCANNING WAS ACHIEVED BY SUITABLE CHANGES IN THE RF AMPLITUDES, (3) A TOTAL ION CURRENT MONITOR THAT MEASURED THE TOTAL DENSITY OF PARTICLES INSIDE THE ION SOURCE, AND (4) ION AND ELECTRON COLLECTORS AND AN ELECTRON MULTIPLIER. IT WAS ORIENTED IN THE SPACECRAFT TO INSURE THAT THE ION SOURCE -- (1) HAD A FIELD OF VIEW OF 180 DEG AND (2) WAS ABOVE ANY OTHER PART OF THE SATELLITE SURFACE, TO MINIMIZE THE NUMBER OF CONTAMINANT PARTICLES (E.G., THOSE DUE TO OUTGASSING PROCESSES) ENTERING THE SOURCE. LAUNCHED SEALED UNDER VACUUM, THE ANALYZER WAS EXPOSED TO THE AMBIENT ATMOSPHERE IN ORBIT WHEN THE ION SOURCE PROTECTIVE CAP WAS EJECTED BY MEANS OF A PYROTECHNIC SYSTEM. THE MASS RANGE COVERED EXTENDED FROM 1 TO 44 AMU AND WAS SELECTED TO INSURE THAT THE CONCENTRATIONS OF THE PRINCIPAL ATMOSPHERIC CONSTITUENTS WERE DETERMINED. SPECIFICALLY, THE MEASURED SPECIES WERE -- ATOMIC HYDROGEN (1), HELIUM (4), ATOMIC OXYGEN (16), MOLECULAR NITROGEN (28), AND ARGON (40). IN ADDITION, BACKGROUND GASES WERE EVALUATED AND THREE CALIBRATION STEPS AT 5.5-AMU INTERVALS WERE INCLUDED. IT WAS POSSIBLE TO CORRECT UNFORESEEN OUTPUT DRIFTS BY COMMAND. PRIOR TO LAUNCH, THE SPACECRAFT SURFACES IN THE REGION OF THIS EXPERIMENT PACKAGE WERE SEALED TO MINIMIZE OUTGASSING. THE NEUTRAL COMPOSITION AND DENSITY DATA WERE CORRELATED WITH MEASUREMENTS OBTAINED FROM THE POSITIVE ION EXPERIMENT (72-092A-01).

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- AURORAL PARTICLE SPECTROMETER NSSDC ID 72-092A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B.K.G. HULTQUIST KIRUNA GEOPHYSICAL OBS KIRUNA, SWEDEN

EXPERIMENT BRIEF DESCRIPTION

PRECIPITATION OF LOW-ENERGY PARTICLES AND THE MECHANISM OF THIS PRECIPITATION WAS INVESTIGATED BY MONITORING PITCH ANGLE DISTRIBUTIONS FOR PARTICLES IN VARIOUS ENERGY RANGES AND WAS CORRELATED WITH GROUND-BASED OBSERVATIONS. THE MAJOR PART OF THE EQUIPMENT WAS SWITCHED ON ONLY IN THE VICINITY OF NORTHERN SWEDEN, WHERE DATA WAS TRANSMITTED AT THE RATE OF

10,240 BPS FOR ABOUT 5 MIN. MOST OF THE MEASUREMENTS WERE MADE BY BANKS OF CHANNEL MULTIPLIERS MOUNTED TO LOOK RADIALLY AND SET TO DETECT PROTONS AND ELECTRONS MOSTLY IN THE 0.15- TO 15-KEV ENERGY RANGE, BUT ONE OF THE INSTRUMENTS WAS SET TO COUNT ELECTRONS BETWEEN 0.1 AND 0.3 KEV. IN ADDITION, SOME CHANNEL MULTIPLIERS WERE MOUNTED TO LOOK AXIALLY. THERE WERE ALSO TWO GEIGER COUNTERS MONITORING ELECTRONS WITH ENERGIES GREATER THAN 40 KEV TOGETHER WITH THREE SOLID-STATE DETECTORS TO COUNT PROTONS AND ELECTRONS IN THE 50- TO 150-KEV RANGE.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER — NSSDC ID 72-092A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C. DE JAGER — U OF UTRECHT — UTRECHT, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THE ENTRY OF SOLAR PROTONS AND ALPHA PARTICLES MAINLY OVER THE POLAR CAPS WERE STUDIED USING TWO SOLID-STATE DETECTOR TELESCOPES. THE FIRST OF THESE USED TWO SURFACE BARRIER DETECTORS AND DETECTED PROTONS IN THE ENERGY RANGES BETWEEN 2.5 AND 20 MEV, TOGETHER WITH ALPHA PARTICLES IN THE CORRESPONDING RANGES. THIS TELESCOPE HAD A GEOMETRIC FACTOR OF ABOUT 0.55 CM SQ STER. THE VIEWING HALF-ANGLE WAS ABOUT 40 DEG. THE SECOND TELESCOPE ANALYZED PROTONS IN THREE RANGES BETWEEN 20 AND 160 MEV AND ALPHA PARTICLES IN THE CORRESPONDING RANGES. TWO SOLID-STATE DETECTORS WERE USED FOR THE ANALYSIS, WITH A THIRD AS AN ANTICOINCIDENCE SHIELD. THE GEOMETRIC FACTOR FOR THIS TELESCOPE WAS ABOUT 1.1 CM SQ STER, AND THE VIEWING HALF-ANGLE WAS ABOUT 40 DEG. THE CENTER OF THE VIEWING DIRECTION OF THESE TWO TELESCOPES WAS TILTED AT 25 DEG TO THE SPIN AXIS OF THE SPACECRAFT IN AN ATTEMPT TO MINIMIZE THE EFFECT ON COUNTING RATES OF THE VARYING ANGLE BETWEEN THE SPIN AXIS AND THE MAGNETIC VECTOR. IT WAS INTENDED THAT THIS EXPERIMENT CONCENTRATE ON THE SOUTHERN POLAR CAP WHILE EXPERIMENT 72-092A-05 CARRIED OUT AN INVESTIGATION MOSTLY OVER THE NORTHERN POLAR CAP. THE INSTRUMENTS BEING TURNED ON ALTERNATELY BY AN AUTOMATIC SWITCH.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER — NSSDC ID 72-092A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R. LUST — M.PLANCK INST.GARCHING — GARCHING, GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT HAD THE SAME SCIENTIFIC OBJECTIVE AS EXPERIMENT 72-092A-04, I.E., TO STUDY THE ENTRY OF SOLAR PROTONS AND ALPHA PARTICLES OVER THE POLAR CAP REGIONS. THE DATA FROM THE TWO EXPERIMENTS WERE

CORRELATED. TWO TELESCOPES WERE USED BUT WITH A SLIGHTLY DIFFERENT TECHNIQUE THAN FOR ESRO-4-C5. THE RANGE FROM ABOUT 0.2 TO 8 MEV FOR PROTONS AND 2.5 TO 24 MEV FOR ALPHA PARTICLES WAS INVESTIGATED WITH THE AID OF TWO SILICON SURFACE BARRIER DETECTORS MOUNTED BELOW A TANTALUM COLLIMATOR THAT HAD A HALF-ANGLE OF ABOUT 22 DEG. THE GEOMETRIC FACTOR OF THIS TELESCOPE WAS ABOUT 0.9 CM SQ STER. A MAGNET OF 1.2 KGAUSS WAS USED TO PREVENT THE ENTRY OF LOW-ENERGY ELECTRONS. THE SECOND TELESCOPE CONSISTED OF A STACK OF TWO SOLID-STATE DETECTORS MOUNTED ABOVE A CESIUM IODIDE SCINTILLATOR. LIGHT FROM THE CESIUM IODIDE WAS COLLECTED BY TWO LIGHT-SENSITIVE DIODES. THE WHOLE ASSEMBLY WAS SURROUNDED BY A PLASTIC SCINTILLATOR THAT WAS VIEWED BY A PHOTOTUBE. SETTING THE CONE OF SENSITIVITY TO A HALF-ANGLE OF 30 DEG. THE GOEMETRIC FACTOR WAS APPROXIMATELY 1.5 CM SQ STER. COVERING ENERGY RANGES OF 8 TO 80 MEV FOR PROTONS AND 24 TO 360 MEV FOR ALPHA PARTICLES.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 11/22/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- APOLLO 17 LM/ALSEP NSSDC ID 72-096C
ALTERNATE NAMES- APOLLO 17C, 06307, LEM 17, ROVER 17, ALSEP 17

LAUNCH DATE- 12/07/72 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OMSF

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R. PETRONE NASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE APOLLO 17 LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED BY THE ASTRONAUTS IN THE NORTHEASTERN PORTION OF THE MOON (LATITUDE 20 DEG 10 MIN N, LONGITUDE 30 DEG 48 MIN E) ON THE SOUTHEASTERN RIM OF MARE SERENITATIS IN A DARK DEPOSIT BETWEEN MASS UNITS OF THE SOUTHWESTERN TAURUS MOUNTAINS SOUTH OF LITTROW CRATER. THE ALSEP EXPERIMENTS WERE POWERED BY A NUCLEAR POWER SOURCE AND INCLUDED PASSIVE LUNAR SOIL MECHANICS OBSERVATIONS, STUDY OF THE ATMOSPHERIC AND IONIC ENVIRONMENT OF THE MOON, HEAT LOSS FROM THE LUNAR INTERIOR, FAR UV SPECTROMETER, IR SCANNING RADIOMETER, LUNAR SOUNDER, TRAVERSE GRAVIMETER, LUNAR EJECTA AND METEORITES, LUNAR SEISMIC PROFILING, SURFACE ELECTRICAL PROPERTIES, AND LUNAR SURFACE GRAVITOMETER.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- HEAT FLOW NSSDC ID 72-096C-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - M.G. LANGSETH LAMONT-DOHERTY GEO OBS PALISADES, NY

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE HEAT FLOW EXPERIMENT (S-037) WAS TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. SPECIFIC OBJECTIVES WERE (1) MEASUREMENT OF THE SUBSURFACE VERTICAL TEMPERATURE GRADIENTS IN THE LUNAR SURFACE LAYER AS A FUNCTION OF TIME, (2) MEASUREMENT OF THE ABSOLUTE TEMPERATURE OF THE LUNAR SUBSURFACE AS A FUNCTION OF TIME, (3) DETERMINATION OF THE THERMAL CONDUCTIVITY OF THE LUNAR SUBSURFACE MATERIAL, AND (4) MEASUREMENT OF THE BRIGHTNESS TEMPERATURE OF THE LOCAL LUNAR SURFACE. MEASUREMENTS TAKEN OF THE HEAT FLUX THROUGH THE UPPER 2.4 M OF THE SURFACE WILL PROVIDE DATA ON THE LUNAR SOIL THERMAL CONDUCTIVITY, WILL CONTRIBUTE TO THE RESOLUTION OF ISSUES CONCERNING LUNAR INTERNAL HEATING PROCESSES, AND WILL ESTABLISH LIMITS OF CONSTRAINT ON THE INTERIOR TEMPERATURE AND COMPOSITION OF THE MOON. THE EXPERIMENT CONSISTED OF TWO PROBES, EACH ABOUT 1.2 M IN LENGTH, A SPECIAL TOOL FOR PROBE INSERTION, RADIATION SHIELDS FOR EACH PROBE, AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE ALSEP CONTROL STATION. TWO HOLES WERE DRILLED IN THE LUNAR SURFACE ABOUT 10 M APART. THE BORE SYSTEMS REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT WALL COLLAPSE. ONE PROBE WAS INSERTED INTO EACH HOLE, AND THE DEPTH OF THE PROBE WAS RECORDED.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- LUNAR EJECTA AND METEORITES NSSDC ID 72-096C-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.E. BERG NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE APOLLO 17 LUNAR EJECTA AND METEORITE EXPERIMENT MEASURED THE FREQUENCY WITH WHICH THE MOON IS IMPACTED BY PRIMARY COSMIC DUST PARTICLES AND THE EFFECT OF THE LUNAR EJECTA EMANATING FROM THE SITES OF METEORITE IMPACTS ON THE LUNAR SURFACE. THE EXPERIMENT HAD THE FOLLOWING SPECIFIC OBJECTIVES -(1) TO DETERMINE THE BACKGROUND AND LONG-TERM VARIATIONS OF COSMIC DUST INFLUX RATES IN CISLUNAR SPACE, (2) TO DETERMINE THE EXTENT AND NATURE OF LUNAR EJECTA PRODUCED BY METEORITE IMPACTS ON THE LUNAR SURFACE, (3) TO DETERMINE THE RELATIVE CONTRIBUTION OF COMETS AND ASTEROIDS TO THE EARTH'S METEOROID ENSEMBLE, (4) TO STUDY POSSIBLE CORRELATIONS BETWEEN THE ASSOCIATED EJECTA EVENTS AND THE TIMES OF THE EARTH'S CROSSING OF COMETARY ORBITAL PLANES AND METEOR STREAMS, (5) TO DETERMINE THE EXTENT OF THE CONTRIBUTION OF INTERSTELLAR PARTICLES TOWARD THE MAINTENANCE OF THE ZODIACAL CLOUD AS THE SOLAR SYSTEM PASSES THROUGH GALACTIC SPACE, AND (6) TO INVESTIGATE THE EXISTENCE OF AN EFFECT CALLED 'EARTH FOCUSING OF DUST PARTICLES.' THE EQUIPMENT FOR THIS EXPERIMENT, WHICH WAS PART OF THE APOLLO 17 ALSEP, INCLUDED ONE DEPLOYABLE UNIT WITH DETECTOR PLATES, ALSEP CENTRAL STATION ELECTRONICS, AND THE CABLE AND ASTROMATE CONNECTOR FOR MATING THE EXTERNAL UNIT WITH THE CENTRAL STATION. THE EXTERNAL UNIT COMPONENTS OR SENSORS CONSISTED OF SUPPRESSOR AND COLLECTOR PLATES, IMPACT PLATES, FILM FRAMES, AND MICROPHONES. THE SENSOR HAD A FIELD OF VIEW OF PLUS OR MINUS 60

DEG AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 26 DEG. IT MEASURED PARTICLE IMPACTS IN AN ENERGY RANGE OF 1 TO 1000 ERGS WITH A PRIMARY FREQUENCY OF MEASUREMENT OF 10 TO THE -4 POWER IMPACTS/SQ M/SEC. THE EXTERNAL UNIT WAS ERECTED AND DEPLOYED ON THE LUNAR SURFACE ABOUT 8 M SOUTH OF THE ALSEP CENTRAL STATION. THE UNIT WAS ALIGNED TO PLUS OR MINUS 5 DEG OF THE SCAN-SHADOW LINE AND LEVELED TO PLUS OR MINUS 5 DEG. A COVER PROVIDED TO SHIELD THE DETECTOR PLATES FROM DIRT PARTICLES PRODUCED DURING LUNAR MODULE ASCENT LIFTOFF WAS JETTISONED BY EARTH COMMAND AT A SUITABLE TIME AFTER LIFTOFF.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- LUNAR SEISMIC PROFILING EXPERIMENT NSSDC ID 72-096C-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.L. KOVACH STANFORD U STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR SEISMIC PROFILING EXPERIMENT (S-203) WAS TO ACQUIRE DATA ON THE PHYSICAL PROPERTIES OF THE LUNAR NEAR-SURFACE MATERIALS. SPECIFIC OBJECTIVES INCLUDED MEASURING THE LUNAR SEISMIC SIGNALS PRODUCED BY DETONATION OF EXPLOSIVE CHARGES ON THE SURFACE, MONITORING NATURAL SEISMIC ACTIVITY RESULTING FROM MOON QUAKES OR METEORITE IMPACTS, RECORDING THE SEISMIC SIGNALS RESULTING FROM THE ASCENT OF THE LM, AND RECORDING THE SEISMIC SIGNALS RESULTING FROM THE IMPACT OF THE SPENT LM ASCENT STAGE. THIS EXPERIMENT YIELDED DETAILED INFORMATION ON LUNAR GEOLOGIC CHARACTERISTICS TO DEPTHS OF 3 KM. THE EQUIPMENT CONSISTED OF FOUR GEOPHONES, MARKER FLAGS, A GEOPHONE MODULE WITH A MARKER FLAG, AN ELECTRONICS PACKAGE IN THE ALSEP CENTRAL STATION, A TRANSMITTER, AN ANTENNA, AND EIGHT EXPLOSIVE PACKAGES. THE EXPLOSIVE PACKAGE MAJOR COMPONENTS WERE A RECEIVING ANTENNA, A RECEIVER, AN EXPLOSIVE TRAIN, A SIGNAL PROCESSOR, AND A FIRING PULSE GENERATOR. THE CREW DEPLOYED THE GEOPHONES AND THE GEOPHONE MODULE MARKED WITH FLAGS AND THEN PHOTOGRAPHED THEM DURING EVA 1. THE ANTENNAS AND ELECTRONICS PACKAGE WERE ALSO DEPLOYED AND CONNECTED TO THE ALSEP CENTRAL STATION. THE EXPLOSIVE PACKAGES WERE DEPLOYED AT DESIGNATED SITES DURING THE LUNAR TRAVERSES.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION NSSDC ID 72-096C-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.H. HOFFMAN U OF TEXAS DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE LUNAR ATMOSPHERIC COMPOSITION EXPERIMENT INCLUDED (1) OBTAINING DATA TO IDENTIFY THE GASES IN THE NATIVE LUNAR

ATMOSPHERE AT THE LUNAR SURFACE AND DETERMINING THEIR CONCENTRATIONS. (2) OBTAINING DATA TO DETERMINE THE VARIATIONS IN THESE GAS CONCENTRATIONS OVER TWO OR MORE LUNATIONS. AND (3) OBTAINING DATA ON SHORT-TERM TRANSIENT CHANGES IN THE LUNAR ATMOSPHERIC COMPOSITION. THE LUNAR SURFACE MASS SPECTROMETER UNIT INCLUDED A MINIATURE ANALYZER THAT SIMULTANEOUSLY SCANNED THE MASS RANGES (EXPRESSED IN ATOMIC MASS UNITS (AMU)) 1 TO 4, 12 TO 48, AND 27 TO 110. THE REMAINING COMPONENTS OF THE MASS SPECTROMETER UNIT WERE THE ELECTRONICS, HEATERS, DEPLOYABLE DUST COVER, AND A RIBBON CABLE CONNECTOR TO THE ALSEP CENTRAL STATION. A CREWMAN TRANSFERRED AND EMPLACED THE MASS SPECTROMETER UNIT ON THE LUNAR SURFACE APPROXIMATELY 15 M NORTHEAST OF THE ALSEP CENTRAL STATION, LEVEL TO IT TO WITHIN PLUS OR MINUS 15 DEG, AND MATED THE CABLE TO THE CENTRAL STATION.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/14/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME UNKNOWN.

EXPERIMENT NAME- LUNAR SURFACE GRAVIMETER NSSDC ID 72-096C-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J. WEBER U OF MARYLAND COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THE LUNAR SURFACE GRAVIMETER EXPERIMENT (S-207) WAS TO OBTAIN HIGHLY ACCURATE MEASUREMENTS OF THE LUNAR SURFACE GRAVITATIONAL ACCELERATION AND ITS TEMPORAL VARIATIONS AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES WERE DETERMINATION OF THE VALUE OF LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 1 PART IN 10 TO THE FIFTH POWER), DETERMINATION OF THE MAGNITUDE OF LUNAR SURFACE DEFORMATION DUE TO TIDAL FORCES, MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR NATURAL SEISMICITY, AND MONITORING OF FREE OSCILLATIONS OF THE MOON THAT MAY BE INDUCED BY GRAVITATIONAL RADIATION FROM COSMIC SOURCES. PRECISE MEASURES OF ACCELERATION DUE TO GRAVITY OVER A PERIOD OF SEVERAL MONTHS ESTABLISHED THE DEFORMATION DUE TO TIDAL FORCES AND CONTRIBUTED TO CONCLUSIONS ABOUT THE INTERNAL CONSTITUTION OF THE MOON. THE EQUIPMENT CONSISTED OF ELECTRONICS, SENSORS (SPRING MASS SUSPENSION CAPACITOR PLATES), A SUNSHIELD, AND A RIBBON CABLE TO THE CENTRAL STATION ELECTRONICS. THE CREW DEPLOYED THIS EXPERIMENT ABOUT 8 M W OF THE ALSEP CENTRAL STATION. THIS PROCEDURE CONSISTED OF LEVELING WITHIN PLUS OR MINUS 3 DEG, ALIGNMENT WITHIN PLUS OR MINUS 3 DEG USING THE SUNSHIELD SHADOW, AND MATING THE CABLE TO THE CENTRAL STATION.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/12/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- NIMBUS 6 NSSDC ID 72-097A

ALTERNATE NAMES- NIMBUS-E, PL-721B, 06305

LAUNCH DATE- 12/11/72 SPACECRAFT WEIGHT IN ORBIT- 681. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 12/11/72 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 107.16 MIN
APOAPSIS- 1101.27 KM ALT PERIAPSIS- 1089.62 KM ALT INCLINATION- 99.945 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 107.16 MIN
APOAPSIS- 1101.33 KM ALT PERIAPSIS- 1089.42 KM ALT INCLINATION- 99.933 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - S. WEILAND NASA-GSFC GREENBELT, MD.
PS - W.P. NORDBERG NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE NIMBUS 5 R AND D SATELLITE WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL AND GEOLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A HOLLOW RING-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HOUSING UNIT THAT WAS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS 5 WAS NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT, WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS PROVIDED MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS LOCATED ON TOP OF THE SPACECRAFT, WERE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM PERMITTED THE SPACECRAFT ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG IN ALL THREE AXES. PRIMARY EXPERIMENTS INCLUDED (1) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAY AND NIGHT SURFACE AND CLOUDTOP TEMPERATURES, AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (2) AN ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) FOR MAPPING THE THERMAL RADIATION FROM THE EARTH'S SURFACE AND ATMOSPHERE, (3) AN INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR) FOR OBTAINING VERTICAL PROFILES OF TEMPERATURE AND MOISTURE, (4) A NIMBUS-E MICROWAVE SPECTROMETER (NEMS) FOR DETERMINING TROPOSPHERIC TEMPERATURE PROFILES, ATMOSPHERIC WATER VAPOR ABUNDANCES, AND CLOUD LIQUID WATER CONTENTS, (5) A SELECTIVE CHOPPER RADIOMETER (SCR) FOR OBSERVING THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE, AND (6) A SURFACE COMPOSITION MAPPING RADIOMETER (SCMR) FOR MEASURING THE DIFFERENCES IN THE THERMAL EMISSION CHARACTERISTICS OF THE EARTH'S SURFACE. TRANSMISSION OF USEFUL DATA FROM THE SCMR WAS TERMINATED ON JANUARY 4, 1973, AND THE ITPR IS OPERATING IN A RESTRICTED MODE.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED TEMPERATURE PROFILE RADIOMETER NSSDC ID 72-097A-01

(ITPR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.L.	SMITH	NOAA-NESS	SUITLAND, MD
OI - D.Q.	WARK	NOAA-NESS	SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR) EXPERIMENT WAS DESIGNED TO TEST THE FEASIBILITY AND OPERATIONAL APPLICATIONS OF A REMOTE SOUNDING TECHNIQUE USING SIMULTANEOUS MEDIUM-RESOLUTION (32 KM) MEASUREMENTS IN NINE SPECTRAL INTERVALS. THE RADIOMETER SENSED SIX INTERVALS IN THE 15-MICRON CARBON DIOXIDE BAND, ONE INTERVAL IN THE WATER VAPOR ROTATIONAL BAND NEAR 20 MICRONS, AND TWO SPECTRAL INTERVALS IN THE ATMOSPHERIC WINDOW REGIONS NEAR 3.8 AND 11 MICRONS. THE ITPR VIEWED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES DISTRIBUTED SYMMETRICALLY ABOUT NADIR IN A PLANE NORMAL TO THE ORBITAL TRACK. FORTY-TWO GEOGRAPHICALLY INDEPENDENT SCAN SPOTS WERE TAKEN ALONG A SINGLE STRIP. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH, THE RADIOMETER OBSERVED 10 SUCH "42-SPOT" STRIPS TO FORM A 42 BY 10 MATRIX OF INDEPENDENT SCAN SPOTS. EACH MATRIX WAS PRODUCED IN 222 SEC WITH THE WHOLE SCANNING SEQUENCE REPEATED EVERY 240 SEC. THE MATRIX DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. MATRIX MEASUREMENTS TAKEN IN THE CARBON DIOXIDE AND WATER VAPOR ABSORPTION BANDS WERE USED TO CALCULATE TEMPERATURE PROFILES AND TOTAL WATER VAPOR CONTENT IN THE TROPOSPHERE AND LOWER STRATOSPHERE. THE TWO WINDOW MEASUREMENTS HELPED TO DETECT AND ELIMINATE CLOUD CONTAMINATION OF THE RADIANCES, THUS PERMITTING ACTUAL DETERMINATION OF PROFILES DOWN TO THE EARTH'S SURFACE IN ALL BUT COMPLETELY OVERCAST AREAS. THE RADIOMETER WAS INITIALLY SUCCESSFUL, BUT AFTER APPROXIMATELY 50 ORBITS THE SCAN MOTION BECAME ERRATIC. AS OF JANUARY 1973, THE RADIOMETER WAS OPERATING BUT WITH ONLY 40 PERCENT OF ITS NORMAL SCAN CYCLE.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 01/00/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- SELECTIVE CHOPPER RADIOMETER (SCR) NSSDC ID 72-097A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.T.	HOUGHTON	OXFORD U	OXFORD, ENGLAND
OI - S.D.	SMITH	HERIOT-WATT U	EDINBURGH, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 SELECTIVE CHOPPER RADIOMETER (SCR) WAS DESIGNED TO (1) OBSERVE THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE UP TO 50 KM IN ALTITUDE, (2) MAKE SUPPORTING OBSERVATIONS OF WATER VAPOR DISTRIBUTION, AND (3) DETERMINE THE DENSITY OF ICE PARTICLES IN CIRRUS CLOUDS. TO ACCOMPLISH THESE OBJECTIVES, THE SCR MEASURED EMITTED RADIATION IN 16 SPECTRAL INTERVALS SEPARATED INTO THE FOLLOWING FOUR GROUPS -- (1) FOUR CARBON DIOXIDE CHANNELS BETWEEN 13.8 AND 14.8 MICRONS, (2) AN IR WINDOW CHANNEL AT 11.1 MICRONS AND A WATER VAPOR CHANNEL AT 18.6 MICRONS, (3) TWO CHANNELS AT 49.5 AND 133.3 MICRONS, (4) CHANNELS AT 2.08, 2.55, 2.65, AND 3.5 MICRONS. FROM AN AVERAGE SATELLITE ALTITUDE OF 1100 KM, THE RADIOMETER VIEWED A 48-KM CIRCLE ON THE EARTH'S SURFACE WITH A GROUND RESOLUTION OF ABOUT 13 KM AT NADIR. THE REDUCED TEMPERATURE FIELDS HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C. A SIMILAR EXPERIMENT WAS FLOWN ON NIMBUS 4.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- NIMBUS-E MICROWAVE SPECTROMETER (NEMS) NSSDC ID 72-097A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.H.	STAELIN	MIT	CAMBRIDGE, MA
OI - F.T.	BARATH	NASA-JPL	PASADENA, CA
OI - N.E.	GAUT	ENVIRON RES + TECH INC	STAMFORD, CT
OI - W.P.	NORDBERG	NASA-GSFC	GREENBELT, MD
OI - P.	THADDEUS	NASA-GISS	NEW YORK, NY
OI - W.B.	LENOIR	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-E MICROWAVE SPECTROMETER (NEMS) WAS DESIGNED PRIMARILY TO DEMONSTRATE THE CAPABILITIES AND LIMITATIONS OF MICROWAVE SENSORS FOR MEASURING TROPOSPHERIC TEMPERATURE PROFILES, WATER VAPOR ABUNDANCES, CLOUD LIQUID WATER CONTENT, AND EARTH SURFACE TEMPERATURES. A SECONDARY PURPOSE WAS TO OBTAIN SUCH DATA FOR WEATHER PREDICTION PURPOSES. THE NEMS COULD CONTINUOUSLY MONITOR EMITTED THERMAL RADIATION AT WAVELENGTHS OF 11.1, 9.55, 5.58, 5.46, AND 5.10 MM. THE THREE CHANNELS NEAR THE 5-MM OXYGEN ABSORPTION BAND WERE USED PRIMARILY TO DETERMINE THE ATMOSPHERIC TEMPERATURE PROFILE. NEMS WOULD PROVIDE MEASUREMENTS FOR USE IN DERIVING TEMPERATURE PROFILES EVEN IN CLOUDCOVER CONDITIONS THAT NORMALLY RESTRICT THE USEFULNESS OF CONVENTIONAL IR DATA IN SUCH SITUATIONS. THE TWO WATER VAPOR CHANNELS NEAR 10 MM PERMITTED THE WATER VAPOR AND CLOUD LIQUID WATER CONTENT OVER OCEANS TO BE ESTIMATED AND ALSO YIELDED AN ESTIMATED TEMPERATURE ONCE THE SURFACE EMISSIVITY HAD BEEN CALIBRATED BY COMPARISON WITH DIRECT MEASUREMENTS. THE THREE OXYGEN CHANNELS SHARED A COMMON SIGNAL AND REFERENCE ANTENNA. BOTH WATER VAPOR CHANNELS HAD THEIR OWN SIGNAL AND REFERENCE ANTENNAS. FROM AN AVERAGE SATELLITE HEIGHT OF 1100 KM, THE NEMS VIEWED A 180-KM CIRCLE ON THE EARTH'S SURFACE. NEMS DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SOMEWHAT SIMILAR EXPERIMENT IS PLANNED FOR NIMBUS-F.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) NSSDC ID 72-097A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.T.	WILHEIT, JR.	NASA-GSFC	GREENBELT, MD
OI - P.	GLOERSEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVES OF THE NIMBUS-5 ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) WERE (1) TO DERIVE THE LIQUID WATER CONTENT OF CLOUDS FROM

BRIGHTNESS TEMPERATURES OVER OCEANS. (2) TO OBSERVE DIFFERENCES BETWEEN SEA ICE AND THE OPEN SEA OVER THE POLAR CAPS, AND (3) TO TEST THE FEASIBILITY OF INFERRING SURFACE COMPOSITION AND SOIL MOISTURE. TO ACCOMPLISH THESE OBJECTIVES, THE ESMR WAS CAPABLE OF CONTINUOUS GLOBAL MAPPING OF THE 1.55-CM (19.36 GHZ) RADIO THERMAL (MICROWAVE) RADIATION EMITTED BY THE EARTH/ATMOSPHERE SYSTEM AND COULD FUNCTION EVEN IN THE PRESENCE OF CLOUD CONDITIONS THAT BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. A 90- BY 90-CM RADIOMETER ANTENNA SYSTEM, DEPLOYED AFTER LAUNCH, SCANNED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES IN A PLANE PERPENDICULAR TO THE SPACECRAFT ORBITAL TRACK, PRODUCING A BRIGHTNESS TEMPERATURE MAP OF THE SURFACE OF THE EARTH AND ITS ATMOSPHERE. THE SCANNING PROCESS WAS CONTROLLED BY A COMPUTER ON BOARD AND CONSISTED OF 78 SYMMETRICALLY DISTRIBUTED INDEPENDENT SCAN SPOTS EXTENDING 50 DEG TO EITHER SIDE OF NADIR. ANGULAR SEPARATION OF THE SCAN SPOTS ALLOWED FOR AN 8.5 PERCENT OVERLAP BETWEEN VIEW POSITIONS. FROM A MEAN ORBITAL HEIGHT OF 1100 KM, THE RADIOMETER HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C WITH A SPATIAL RESOLUTION OF ABOUT 25 KM. THE ESMR DATA WERE STORED ON MAGNETIC TAPE FOR TRANSMISSION TO GROUND ACQUISITION STATIONS. A SIMILAR EXPERIMENT WILL BE FLOWN ON NIMBUS-F.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER NSSDC ID 72-097A-08
(THIR)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A.W. MCCULLOCH NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE NIMBUS 5 TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) WAS DESIGNED TO DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDOW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL MEASURED CLOUDTOP TEMPERATURES AND WAS CAPABLE OF PRODUCING CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE ORBIT. THE OTHER CHANNEL OPERATED PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSOR DATA FROM THESE TWO CHANNELS WAS PRIMARILY USED TO SUPPORT THE OTHER, MORE SOPHISTICATED METEOROLOGICAL EXPERIMENTS ON BOARD NIMBUS 5. THE INSTRUMENT CONSISTED OF A 12.7-CM CASSEGRAIN SYSTEM, A SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV, NO IMAGE WAS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WAS COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR ROTATED AT 48 RPM AND SCANNED IN A PLANE PERPENDICULAR TO THE SPACECRAFT VELOCITY. THE ENERGY WAS FOCUSED ON A DICHROMATIC BEAM SPLITTER, WHICH DIVIDED THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIR SENSOR TRANSFORMED THE RECEIVED RADIATION INTO AN ELECTRIC OUTPUT (VOLTAGES), WHICH WAS RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SIMILAR EXPERIMENT IS PLANNED FOR NIMBUS-F.

ON 01/04/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME PARTIAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 12/11/72, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- PIONEER 11 NSSDC ID 73-019A
ALTERNATE NAMES- PIONEER-G, PL-733C

LAUNCH DATE- 04/06/73 SPACECRAFT WEIGHT IN ORBIT- 231. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	C.F. HALL	NASA-ARC	MOFFETT FIELD, CA
PS -	J.H. WOLFE	NASA-ARC	MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 11 IS THE SECOND OF TWO 231-KG, SPIN-STABILIZED EARTH POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM, THE ASTEROID BELT AND THE NEAR-JUPITER ENVIRONMENT. THIS JUPITER FLY-BY SPACECRAFT IS POWERED BY A RADIOISOTOPE THERMOELECTRIC GENERATOR AND A BATTERY. THE SPACECRAFT INSTRUMENTATION WILL STUDY THE INTERPLANETARY AND POSSIBLE JOVIAN MAGNETIC FIELDS, THE SOLAR WIND AND POSSIBLE JOVIAN BOW SHOCK AND MAGNETOPAUSE BOUNDARIES, SOLAR AND GALACTIC COSMIC RAYS, INTERPLANETARY CHARGED PARTICLES AND POSSIBLE JOVIAN TRAPPED RADIATION, JOVIAN THERMAL ENERGY FLUX, ZODIACAL LIGHT, ASTEROIDS AND METEOROIDS, AND INTERPLANETARY AND JOVIAN ULTRAVIOLET RADIATION. AN S-BAND OCCULTATION EXPERIMENT AND A JUPITER IMAGING AND PHOTOPOLARIZATION EXPERIMENT WILL BE PERFORMED. THE SPACECRAFT WILL FLY BY JUPITER BETWEEN 600 AND 750 DAYS AFTER LAUNCH AND MAY, DEPENDING ON THE AMOUNT OF THRUSTER FUEL LEFT AFTER THE JUPITER ENCOUNTER, CONTINUE ON TO ENCOUNTER WITH SATURN APPROXIMATELY 7 YEARS AFTER LAUNCH.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- MAGNETIC FIELDS NSSDC ID 73-019A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	E.J. SMITH	NASA-JPL	PASADENA, CA
OI -	D.S. COLBURN	NASA-ARC	MOFFETT FIELD, CA
OI -	P. DYAL	NASA-ARC	MOFFETT FIELD, CA
OI -	C.P. SONETT	NASA-ARC	MOFFETT FIELD, CA
OI -	P.J. COLEMAN, JR.	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI -	L. DAVIS	CAL TECH	PASADENA, CA
OI -	D.E. JONES	BRIGHAM YOUNG U	PROVO, UT

EXPERIMENT BRIEF DESCRIPTION

THE MAGNETOMETER ON PIONEER 11 IS A TRIAXIAL HELIUM MAGNETOMETER WITH SEVEN DYNAMIC RANGES, FROM PLUS OR MINUS 2.5 GAMMA TO PLUS OR MINUS 10 GAUSS. THE LINEARITY IS 0.1 PERCENT, THE NOISE THRESHOLD IS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY IS 0.5 PERCENT OF FULL SCALE RANGE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION NSSDC ID 73-019A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - J.J.	O'GALLAGHER	U OF MARYLAND	COLLEGE PARK, MD
OI - A.	TUZZOLINO	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE CHARGE COMPOSITION USING THREE TYPES OF DETECTORS -- (1) A 7-ELEMENT SOLID-STATE DETECTOR TELESCOPE, (2) A HIGH-ENERGY ELECTRON DETECTOR (EGG), AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (450 KEV TO 150 MEV), ELECTRONS (200 KEV TO 30 MEV), AND PARTICLES FROM H(Z=2) TO O(Z=16) (6 TO 150 MEV/NUCLEON). THE SECOND DETECTOR WAS TO MEASURE BREMSSTRAHLUNG RADIATION FROM ELECTRONS AND ELECTRONS DIRECTLY (E.GT. 9 MEV) AND WAS DESIGNED TO EXCLUDE PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE DETECTOR SAMPLE TIME WAS TO BE SYNCHRONIZED WITH THE SPACECRAFT SPIN AND SHOULD BE .EQ. 1/8 OF A SPACECRAFT ROTATION OR ABOUT 1-1/2 SEC.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ASTEROID/METEOROID ASTRONOMY NSSDC ID 73-019A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.K.	SOBERMAN	GENERAL ELECTRIC CO	VALLEY FORGE, PA
OI - H.A.	ZOOK	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL SEARCH FOR PARTICLES WITH MASSES LARGER THAN ABOUT ONE MICROGRAM BY OBSERVING THE SOLAR LIGHT THE PARTICLES REFLECT AND SCATTER. FOUR INDEPENDENT TELESCOPIC SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WILL BE USED, WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE PARTICLES BEING USED TO DETERMINE THE RANGE AND VELOCITIES OF THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS ARE COMPOSED OF 8-IN. RITCHEY-CHRETIEN TELESCOPES WITH A 10-IN. FOCAL LENGTH AND A 0.2-RAD FIELD OF VIEW.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- METEOROID DETECTOR NSSDC ID 73-019A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W.H. KINARD NASA-LARC HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE PIONEER-G METEOROID DETECTION EXPERIMENT WILL ATTEMPT TO DETECT THE DISTRIBUTION IN INTERPLANETARY SPACE OF METEOROIDS TOO SMALL TO BE SEEN BY LIGHT SCATTERING TECHNIQUES. TWELVE PANELS, EACH CONTAINING 18 PRESSURIZED CELLS, ARE MOUNTED ON THE BACK OF THE SPACECRAFT ANTENNA DISH. THE PRESSURIZED CELLS CONSIST OF A 2-MIL-THICK STAINLESS STEEL OUTER LAYER WELDED TO A 1-MIL-THICK STAINLESS STEEL INNER LAYER WITH A LARGE NUMBER OF SMALL POCKETS OF GAS TRAPPED BETWEEN THEM. LOSS OF GAS PRESSURE FROM ANY OF THE CELLS WILL INDICATE A HIT, AND THE RATE OF GAS LOSS WILL INDICATE THE SIZE OF THE HOLE MADE. THUS THE MASS AND INCIDENT ENERGY OF THE METEOROID PARTICLE CAN BE OBTAINED AND, WHEN COMBINED WITH TRAJECTORY DATA, WILL ALLOW THE SPATIAL DENSITY OF THE METEOROIDS TO BE DETERMINED. THE PANELS WILL DETECT IMPACTS WITH PARTICLES HAVING A MASS OF GREATER THAN 10 TO THE -8 GM. THE PANELS WILL COVER 0.4€ M SQ OF EXPOSED AREA ON PIONEER-G. RESULTS FROM THIS EXPERIMENT WILL BE COMBINED WITH THOSE FROM A SIMILAR EXPERIMENT FLOWN ON PIONEER 10 TO DETERMINE THE RANGE IN MASS OF SMALL PARTICLES ON BOTH THE INNER AND OUTER BOUNDARIES AND WITHIN THE ASTEROID BELT.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION NSSDC ID 73-019A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.W. FILLIUS U OF CALIFORNIA, SD SAN DIEGO, CA
OI - C.E. MCILWAIN U OF CALIFORNIA, SD SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTS OF FOUR DETECTORS. A CERENKOV COUNTER WILL MEASURE ELECTRONS ABOVE 3, 7, AND 10 MEV. A SOLID-STATE ELECTRON SCATTER DETECTOR WILL USE THREE DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND 3 MEV. A DC SCINTILLATOR DETECTOR WILL MEASURE THE SUM OF 25- TO 250-KEV ELECTRONS AND 800-KEV TO 250-MEV PROTONS. A SECOND SOLID-STATE DETECTOR WILL MEASURE SEPARATELY OMNIDIRECTIONAL 60- TO 250-MEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST THREE DETECTORS LOOK PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. EACH DETECTOR HAS A 30-DEG HALF-ANGLE APERTURE, AND EACH MAKES EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD. WHILE THIS EXPERIMENT WAS DESIGNED PRIMARILY FOR ENCOUNTER, IT DOES OBTAIN DATA AT A LOW RATE IN INTERPLANETARY SPACE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY NSSDC ID 73-019A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.L.	JUDGE	USC	LOS ANGELES, CA
OI - R.W.	CARLSON	USC	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, A BROADBAND PHOTOMETER SENSITIVE BETWEEN 200 AND 800 A, OBSERVES EVIDENCE OF HELIUM, WHICH IN TURN INDICATES INTERACTIONS BETWEEN CHARGED PARTICLES AND NEUTRAL HYDROGEN. DURING THE CRUISE PHASE OF THE MISSION THIS EXPERIMENT WILL BE USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC TRANSITION REGION IN THE SOLAR WIND. DURING THE JOVIAN ENCOUNTER, THIS EXPERIMENT WILL BE USED TO LOOK FOR EVIDENCE OF AN AURORAL OVAL ON THE JOVIAN DAYSIDE, TO FIND THE RATIO OF HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE, AND TO FIND THE TEMPERATURE OF THE OUTER PORTION OF THE JOVIAN ATMOSPHERE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- IMAGING PHOTOPOLARIMETER NSSDC ID 73-019A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.	GEHRELS	U OF ARIZONA	TUCSON, AZ
OI - J.L.	WEINBERG	DUDLEY OBS	ALBANY, NY
OI - D.L.	COFFEEN	U OF ARIZONA	TUCSON, AZ
OI - J.	HAMEEN-ANTILLA	U OF ARIZONA	TUCSON, AZ
OI - C.E.	KENKNIGHT	U OF ARIZONA	TUCSON, AZ
OI - R.F.	HUMMER	SANTA BARBARA RSCH CEN	SANTA BARBARA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTS OF A POINTABLE 1-IN. MAKSUTOV TELESCOPE EQUIPPED WITH TWO COLOR DETECTORS (RED, 5800 TO 7000 A, AND BLUE, 3900 TO 4900 A) AND A POLARIZATION MEASURING CAPABILITY. THE FIELD OF VIEW CAN BE SELECTED FOR ZODIACAL LIGHT STUDIES (32 X 40 MILLIRAD), PHOTOPOLARIMETRY (8 X 8 OR 12 X 12 MILLIRAD), OR IMAGING (0.5 X 0.5 MILLIRAD). DURING THE CRUISE PORTION OF THE MISSION THIS EXPERIMENT WILL BE USED TO OBSERVE ZODIACAL LIGHT TO ASSESS THE QUANTITY AND DISTRIBUTION OF PARTICULATE MATTER IN INTERPLANETARY SPACE. UPON APPROACHING JUPITER, THIS EXPERIMENT WILL BE USED FOR PHOTOMETRIC AND POLARIZATION STUDIES OF JUPITER AND ONE OR MORE OF ITS SATELLITES. DURING JOVIAN ENCOUNTER, THE EXPERIMENT WOULD TAKE ADVANTAGE OF THE SPACECRAFT SPIN IN ORDER TO MAKE TWO COLOR IMAGES OF JUPITER WITH A RESOLUTION OF 200 KM ON THE JOVIAN SURFACE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- INFRARED RADIOMETER NSSDC ID 73-019A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G. MUNCH CAL TECH PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
THE PIONEER G INFRARED RADIOMETER EXPERIMENT WILL MEASURE THE JOVIAN THERMAL BALANCE, TEMPERATURE DISTRIBUTION IN THE OUTER ATMOSPHERE, GENERAL SURFACE COMPOSITION, INCLUDING THE OVERALL HYDROGEN-TO-HELIUM RATIO, AND DARK SIDE TEMPERATURE. THE INSTRUMENT WILL CONSIST OF A 7.62-CM (3-IN.) REFLECTING CASSEGRAIN TELESCOPE WITH A 1-DEG BY 3-DEG FIELD-OF-VIEW THAT ILLUMINATES A PAIR OF 88-CHANNEL, THIN-FILM BIMETALLIC THERMOPILES IN TWO BANDS OF THE IR SPECTRUM (14 TO 25 MICRONS AND 19 TO 56 MICRONS) TO MEASURE THE IRRADIANCE. THE TWO-CHANNEL RADIOMETER WILL BE SIMILAR TO THOSE FLOWN ON MARINER 6 AND 7, BUT WILL BE MORE ACCURATE AND WILL HAVE BETTER SPATIAL RESOLUTION.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME ZERO.

EXPERIMENT NAME- CELESTIAL MECHANICS NSSDC ID 73-019A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.D. ANDERSON NASA-JPL PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WILL BE USED TO MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES, THE HELIOCENTRIC ORBIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF THE SUN, JUPITER, AND THE GALILEAN SATELLITES.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- S-BAND OCCULTATION NSSDC ID 73-019A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.J.	KLIORE	NASA-JPL	PASADENA, CA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - D.L.	CAIN	NASA-JPL	PASADENA, CA
OI - B.L.	SEIDEL	NASA-GISS	NEW YORK, NY
OI - S.I.	RASOOL	NASA HEADQUARTERS	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL UTILIZE RADIO REFRACTION EFFECTS ON THE SPACECRAFT'S BAND RADIO SIGNAL TO DETERMINE THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN ATMOSPHERE.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT NSSDC ID 73-019A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE PARTICLES IN THE VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A THREE-ELEMENT GEIGER TUBE TELESCOPE, (2) A THREE-ELEMENT TRIANGULAR ARRAY OF DETECTORS, AND (3) A LOW-ENERGY GEIGER TUBE DETECTOR. THE FIRST DETECTOR WILL MEASURE ELECTRONS (E.GT. 2 MEV) AND PROTONS (E.GT. 10 MEV). THE SECOND WILL TO MEASURE ELECTRONS (E.GT. 10 MEV), AND THE THIRD WILL ALSO MEASURE ELECTRONS (E.GT. 50 KEV). THE DETECTOR SAMPLE TIME IS TO BE SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND WILL DEPEND UPON THE TELEMETRY BIT RATE, I.E., THE SAMPLE TIME MAY RANGE FROM 3/32 SEC TO 12 SEC.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- COSMIC-RAY SPECTRA NSSDC ID 73-019A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA
OI - W.R.	WEBBER	U OF NEW HAMPSHIRE	DURHAM, NH
OI - E.C.	ROELOF	U OF NEW HAMPSHIRE	DURHAM, NH
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTS OF THREE 3-ELEMENT TELESCOPES, ALL LOOKING NORMAL TO THE SPACECRAFT SPIN AXIS. A BI-DIRECTIONAL TELESCOPE WILL MEASURE 20- TO 800-MEV/NUCLEON PARTICLES WITH 5 TO 10 PERCENT ENERGY RESOLUTION. ANOTHER TELESCOPE WILL MEASURE 3- TO 22-MEV/NUCLEON PARTICLES WITH 5 PERCENT

RESOLUTION. THESE TWO TELESCOPES WILL MEASURE PARTICLES WITH Z VALUES BETWEEN 1 AND 8. THE THIRD TELESCOPE WILL MEASURE 50-KEV TO 1-MEV ELECTRONS AND 50-KEV TO 20-MEV PROTONS WITH 20 PERCENT RESOLUTION.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- PLASMA EXPERIMENT NSSDC ID 73-019A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	WOLFE	NASA-ARC	MOFFETT FIELD, CA
OI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA
OI - R.	LUST	M.PLANCK INST.GARCHING	MUNICH, W. GERMANY
OI - D.S.	INTRILIGATOR	USC	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS ARE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTRONS. THE DETECTORS ARE ALSO USED TO OBSERVE A POSSIBLE JOVIAN BOW SHOCK, MAGNETOSHEATH, AND MAGNETOPAUSE. THE INSTRUMENTS WILL STUDY POSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 100 V AND 18 KV, AND ELECTRONS IN 16 STEPS BETWEEN 100 V AND 18 KV.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- JOVIAN MAGNETIC FIELD NSSDC ID 73-019A-14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - M.H.	ACUNA	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS TRIAXIAL FLUXGATE MAGNETOMETER IS DESIGNED TO STUDY THE JOVIAN MAGNETIC FIELD. EACH SENSOR WILL OPERATE IN THE RANGE 0.01- TO 10-GAUSS, WITH 0.1 PERCENT DIGITIZATION ACCURACY. IT IS ANTICIPATED THAT ONE VECTOR MEASUREMENT WILL BE OBTAINED EACH 36 SEC.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 04/06/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME SUB-STANDARD.

****

SPACECRAFT COMMON NAME- SKYLAB NSSDC ID 73-027A
ALTERNATE NAMES-

LAUNCH DATE- 05/14/73 SPACECRAFT WEIGHT IN ORBIT- 90607. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 5

FUNDING AGENCY
UNITED STATES NASA-OMSF

INITIAL ORBIT PARAMETERS
EPOCH DATE- 05/14/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 93.4 MIN
APOAPSIS- 442. KM ALT PERIAPSIS- 434. KM ALT INCLINATION- 50.0 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 05/14/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 93.4 MIN
APOAPSIS- 442. KM ALT PERIAPSIS- 434. KM ALT INCLINATION- 50.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - O.G. SMITH NASA-JSC HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION
THE SKYLAB WAS A MANNED, ORBITING SPACECRAFT COMPOSED OF FIVE PARTS, THE APOLLO TELESCOPE MOUNT (ATM), THE MULTIPLE DOCKING ADAPTER (MDA), THE AIRLOCK MODULE (AM), THE INSTRUMENT UNIT (IU), AND THE ORBITAL WORKSHOP (OWS). THE SKYLAB WAS IN THE FORM OF A CYLINDER, WITH THE ATM BEING POSITIONED 90 DEG FROM THE LONGITUDINAL AXIS AFTER INSERTION INTO ORBIT. THE ATM WAS A SOLAR OBSERVATORY, AND PROVIDED ATTITUDE CONTROL AND EXPERIMENT POINTING FOR THE REST OF THE CLUSTER. IT WAS ATTACHED TO THE MDA AND AM AT ONE END OF THE OWS. THE RETRIEVAL AND INSTALLATION OF FILM USED IN THE ATM WAS ACCOMPLISHED BY ASTRONAUTS DURING EXTRAVEHICULAR ACTIVITY (EVA). THE MDA SERVED AS A DOCK FOR THE COMMAND AND SERVICE MODULES, WHICH SERVED AS PERSONNEL TAXIS TO THE SKYLAB. THE AM PROVIDED AN AIRLOCK BETWEEN THE MDA AND THE OWS, AS WELL AS CONTAINING CONTROLS AND INSTRUMENTATION. THE IU WAS USED ONLY DURING LAUNCH AND THE INITIAL PHASES OF OPERATION, AND PROVIDED GUIDANCE AND SEQUENCING FUNCTIONS FOR THE INITIAL DEPLOYMENT OF THE ATM, SOLAR ARRAYS, ETC. THE OWS WAS A MODIFIED SATURN 4B STAGE SUITABLE FOR LONG DURATION MANNED HABITATION IN ORBIT. IT CONTAINED PROVISIONS AND CREW QUARTERS NECESSARY TO SUPPORT THREE-MAN CREWS FOR PERIODS OF UP TO 56 DAYS EACH. ALL PARTS WERE ALSO CAPABLE OF UNMANNED, IN-ORBIT STORAGE, REACTIVATION AND REUSE.

ON 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

EXPERIMENT NAME- WHITE LIGHT CORONAGRAPH NSSDC ID 73-027A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R. MACQUEEN U OF COLORADO BOULDER, CO
OI - G. NEWKIRK, JR. U OF COLORADO BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, LOCATED IN THE ATM, USED AN EXTERNALLY OCCULTED CORONAGRAPH TO MONITOR, BETWEEN 4000 AND 6000 A, THE BRIGHTNESS, FORM, AND

POLARIZATION OF THE SOLAR CORONA AT RADIAL DISTANCES OF 1.5 TO 6.0 SOLAR RADII.

ON 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- X-RAY SPECTROGRAPHIC TELESCOPE NSSDC ID 73-027A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.	GIACCONI	HARVARD COLLEGE OBS	CAMBRIDGE, MA
OI - M.	ZOMBECK	AS+E	CAMERIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, LOCATED IN THE APOLLO TELESCOPE MOUNT, OBSERVED SOLAR X-RAY EMISSIONS IN THE 2- TO 10-A RANGE WITH HIGH SPATIAL, SPECTRAL (0.5 A), AND TEMPORAL RESOLUTION.

ON 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- UV SCANNING POLYCHROMATOR/SPECTROHELIOMETER NSSDC ID 73-027A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.	GOLDBERG	HARVARD COLLEGE OBS	CAMBRIDGE, MA
OI - E.M.	REEVES	HARVARD COLLEGE OBS	CAMERIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT, WHICH WAS LOCATED ON THE APOLLO TELESCOPE MOUNT, WAS TO OBTAIN EXTREME ULTRAVIOLET (EUV) OBSERVATIONS OF A VARIETY OF STRUCTURES IN THE SOLAR CHROMOSPHERE, CORONA, AND CHROMOSPHERIC-CORONAL TRANSITION LAYER. AN ULTRAVIOLET SCANNING POLYCHROMATOR SPECTROHELIOMETER OPERATED IN A SPECTRAL RANGE OF 296 TO 1350 A WITH A RESOLUTION OF 1.5 A. THE INSTRUMENT HAD THREE BASIC OBSERVING MODES. FIRST, A MIRROR RASTER SCANNING MODE WAS USED IN WHICH SPECTROHELIOGRAMS OF A 5.5- BY 5-ARC-MIN-SQ AREA WERE ACQUIRED IN UP TO SEVEN WAVELENGTHS SIMULTANEOUSLY. EACH SCAN TOOK APPROXIMATELY 5.5 MIN TO COMPLETE. SECOND, A MIRROR LINE SCANNING MODE ACQUIRED DATA FOR SEVEN WAVELENGTHS SIMULTANEOUSLY IN AN AREA 5 ARC-SEC BY 5.5 ARC-MIN. THIS TOOK APPROXIMATELY 5.5 SEC. THIRD, A GRATING WAVELENGTH SCANNING MODE WAS USED, IN WHICH THE SPECTRUM OF A 5- BY 5-ARC-SEC-SQ AREA WAS SCANNED IN 3.8 MIN. THE SCAN CONSISTED OF 5270 DATA POINTS. THE INSTRUMENT COULD BE OPERATED DURING MANNED, UNATTENDED, OR UNMANNED PERIODS OF THE SKYLAB MISSION. COUNT DATA WERE RECORDED AND THEN TRANSMITTED TO EARTH EVERY ORBIT.

ON 09/25/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME SUB-STANDARD.

ON 05/25/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

****

SPACECRAFT COMMON NAME- EXPLORER 49 NSSDC ID 73-039A
ALTERNATE NAMES- RADIO ASTRONOMY EXPLORER, PL-6938, RAE-B, 06686

LAUNCH DATE- 06/10/73 SPACECRAFT WEIGHT IN ORBIT- 250. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- LT DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

INITIAL ORBIT PARAMETERS
EPOCH DATE- 06/21/73 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 221.17 MIN
APOAPSIS- 1063.84 KM ALT PERIAPSIS- 1052.98 KM ALT INCLINATION- 38.721 DEG

RECENT ORBIT PARAMETERS
EPOCH DATE- 09/07/73 ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 221.91 MIN
APOAPSIS- 1070.25 KM ALT PERIAPSIS- 1059.07 KM ALT INCLINATION- 38.676 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.T. SHEA NASA-GSFC GREENBELT, MD
PS - R.G. STONE NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE RAE-B SPACECRAFT MEASURED WITH DIRECTIVITY THE INTENSITY OF CELESTIAL RADIO SOURCES AS A FUNCTION OF TIME, DIRECTION, AND FREQUENCY (0.03 TO 20 MHZ). THREE RAPID-BURST RECEIVERS, TWO RYLE-VONBERG RECEIVERS, AND AN IMPEDANCE PROBE CONNECTED TO TWO 750-FT-LONG 'V' ANTENNAS AND A 120-FT-LONG DIPOLE ANTENNA WERE USED. THE SPACECRAFT WAS IN A LUNAR ORBIT.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- STEP FREQUENCY RADIOMETERS NSSDC ID 73-039A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.G. STONE NASA-GSFC GREENBELT, MD
OI - R.R. WEBER NASA-GSFC GREENBELT, MD
OI - L. BROWN NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
TWO RYLE-VONBERG RADIOMETERS WERE EACH CONNECTED TO A 750-FT, ACUTE ANGLE 'V' ANTENNA. EACH RADIOMETER WAS SUCCESSIVELY TUNED TO NINE DIFFERENT FREQUENCIES IN THE BAND 0.03 TO 20 MHZ. PRECISE, AUTOMATIC, AND CONTINUOUS CALIBRATION WAS INHERENT IN THIS TYPE OF DESIGN.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- RAPID-BURST RECEIVERS NSSDC ID 73-039A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.G.	STONE	NASA-GSFC	GREENBELT, MD
CI - J.K.	ALEXANDER, JR.	NASA-GSFC	GREENBELT, MD
OI - J.	FAINBERG	NASA-GSFC	GREENBELT, MD
OI - J.F.	CLARK	NASA-GSFC	GREENBELT, MD
OI - H.	MALITSON	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

A 32-CHANNEL STEP FREQUENCY RADIOMETER WAS CONNECTED TO EACH ANTENNA (2 'V' ANTENNAE, 750-FT LONG, 1 DIPOLE, 120-FT LONG) AND MEASURED THE AMPLITUDES, RATES OF CHANGE OF FREQUENCY, AND DECAY TIMES OF SOLAR BURSTS AND OTHER RAPIDLY VARYING NOISE IN THE 0.025 TO 16 MHZ BAND. OPERATING IN TWO SENSITIVITY MODES, THESE RECEIVERS MEASURED SIGNALS UP TO 60 DB ABOVE THE COSMIC BACKGROUND LEVEL. THE 32 CHANNELS WERE CYCLED EVERY 1.28 SEC.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

EXPERIMENT NAME- CAPACITANCE PROBE NSSDC ID 73-039A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.G.	STONE	NASA-GSFC	GREENBELT, MD
OI - J.L.	DONLEY	NASA-GSFC	GREENBELT, MD
OI - J.E.	GUTHRIE	NASA-GSFC	GREENBELT, MD
OI - J.A.	KANE	NASA-GSFC	GREENBELT, MD
OI - R.C.	SOMERLOCK	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ANTENNA AND SPACECRAFT FUNCTIONED AS TWO CAPACITOR PLATES WITH THE AMBIENT PLASMA ACTING AS THE DIELECTRIC. FREQUENCY SHIFTS IN TWO COUPLED OSCILLATORS CONNECTED TO THE ANTENNA INDICATED CHANGES IN ANTENNA CAPACITANCE CAUSED BY VARIATIONS IN THE AMBIENT ELECTRON DENSITY.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED SPACECRAFT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE SPACECRAFT DATA ACQUISITION RATE BECAME STANDARD.

ON 06/10/73, THE DATE OF THE LAST IDENTIFIED EXPERIMENT STATUS CHANGE, THE STATUS BECAME NORMAL AND AT THAT TIME THE EXPERIMENT DATA ACQUISITION RATE BECAME STANDARD.

Planned Spacecraft and Experiments

SECTION 2 - DESCRIPTIONS OF PLANNED SPACECRAFT AND EXPERIMENTS

Section 2 contains descriptions of all planned space science spacecraft and experiments pertinent to this Report for which NSSDC has at least minimal documentation. This section is similar in format to Section 1. All descriptions included in this section are ordered alphabetically by NSSDC ID Code, which appears in the upper right-hand corner of the description.

The heading for each spacecraft description in this section includes a set of planned orbit parameters (orbit type, orbit period, apoapsis, periapsis, and inclination), a planned launch date, launch site, launch vehicle, spacecraft weight in orbit, spacecraft common and alternate names, funding country and agency, and spacecraft personnel (project manager and project scientist). The last reported status of the spacecraft project is given at the end of the spacecraft brief description and is repeated at the end of each experiment brief description. This status information is based on information received from the various spacecraft project offices and other sources. The spacecraft status is given as "APPROVED MISSION," or "PROPOSED MISSION." The header for an experiment entry indicates the experiment name and the name and address of each investigator associated with the experiment.

NATIONAL SPACE SCIENCE DATA CENTER
PLANNED SPACECRAFT AND EXPERIMENTS

SPACECRAFT COMMON NAME- AD-A NSSDC ID AD-A
ALTERNATE NAMES- DUAL AIR DENSITY EXPL-A, AD-A

PLANNED LAUNCH DATE- 05/00/75 SPACECRAFT WEIGHT IN ORBIT- 40. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 122. MIN
APOAPSIS- 1500. KM ALT PERIAPSIS- 400. KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.E. CANADY, JR. NASA-LARC HAMPTON, VA
PS - E.J. PRIOR NASA-LARC HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION
THE EXPERIMENT AD-A (DUAL AIR DENSITY EXPLORER A) WILL CONSIST OF A 76-CM-DIAM SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE UPPER THERMOSPHERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH THE SECOND SATELLITE IN THE SYSTEM, AD-B (DUAL AIR DENSITY EXPLORER B), USING A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE DRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 400 KM), AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN ONBOARD MASS SPECTROMETER. THE SATELLITE WILL BE EQUIPPED WITH A RADIO BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETERED IN REAL TIME.

ON 12/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY NSSDC ID AD-A -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.M. KEATING NASA-LARC HAMPTON, VA
OI - E.J. PRIOR NASA-LARC HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-A IS DESIGNED TO PROVIDE INDIRECT MEASUREMENTS OF UPPER THERMOSPHERIC DENSITY NEAR SATELLITE PERIGEE (APPROXIMATELY 400 KM). THE EXPERIMENT WILL HAVE NO UNIQUE ONBOARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE, SEASON, AND LOCAL SOLAR TIME.

ON 12/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION MASS SPECTROMETER NSSDC ID AD-A -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - K.	MAUERSBERGER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - E.J.	PRIOR	NASA-LARC	HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AD-A IS DESIGNED TO PERFORM COMPOSITION MEASUREMENTS IN THE UPPER THERMOSPHERE (APPROXIMATELY 400 KM). THE INSTRUMENT WILL BE A DOUBLE-FOCUSING MATTAUCH-HERZOG SPECTROMETER, AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NEON, AND ARGON. ALL DATA WILL BE TRANSMITTED IN REAL TIME.

ON 12/00/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- AD-B NSSDC ID AD-B
ALTERNATE NAMES- DUAL AIR DENSITY EXPL-B

PLANNED LAUNCH DATE- 05/00/75 SPACECRAFT WEIGHT IN ORBIT- 43. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 122. MIN
APOAPSIS- 1500. KM ALT PERIAPSIS- 400. KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.E.	CANADY, JR.	NASA-LARC	HAMPTON, VA
PS - E.J.	PRIOR	NASA-LARC	HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE EXPERIMENT AD-B (DUAL AIR DENSITY EXPLORER-B) WILL CONSIST OF A 3.66-M INFLATABLE SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE LOWER EXOSPHERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH AD-A (DUAL AIR DENSITY EXPLORER A), THE OTHER SATELLITE IN THE SYSTEM, BY A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE DRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 700 KM), AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN ONBOARD MASS SPECTROMETER. THE SATELLITE WILL BE EQUIPPED WITH A RADIO BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETERED IN REAL TIME.

ON 02/27/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY NSSDC ID AD-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.M.	KEATING	NASA-LARC	HAMPTON, VA

OI - E.J. PRIOR NASA-LARC HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-B IS DESIGNED TO PROVIDE INDIRECT MEASUREMENTS OF LOWER EXOSPHERIC DENSITY NEAR SATELLITE PERIGEE (APPROXIMATELY 700 KM). THE EXPERIMENT WILL HAVE NO UNIQUE ONBOARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE, SEASON, AND LOCAL SOLAR TIME.

ON 02/27/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION MASS SPECTROMETER NSSDC ID AD-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A.O.C. NIER U OF MINNESOTA MINNEAPOLIS, MN
OI - K. MAUERSBERGER U OF MINNESOTA MINNEAPOLIS, MN
OI - E.J. PRIOR NASA-LARC HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AC-B WILL PERFORM COMPOSITION MEASUREMENTS IN THE LOWER EXOSPHERE (APPROXIMATELY 700 KM). THE INSTRUMENT IS A DOUBLE-FOCUSING MATTAUCH-HERZOG SPECTROMETER AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NEON, AND ARGON. ALL DATA WILL BE TRANSMITTED IN REAL TIME.

ON 02/27/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- AE-C NSSDC ID AE-C
ALTERNATE NAMES- S 66, PL-721C, ATMOSPHERE EXPLORER-C

PLANNED LAUNCH DATE- 12/00/73 SPACECRAFT WEIGHT IN ORBIT- 660. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 129. MIN
APOAPSIS- 4256. KM ALT PERIAPSIS- 157. KM ALT INCLINATION- 68.1 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.W. GRIMES NASA-GSFC GREENBELT, MD
PS - N.W. SPENCER NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ONE OBJECTIVE OF AE-C WILL BE TO INVESTIGATE THE PHOTOCHEMICAL PROCESSES ACCOMPANYING THE ABSORPTION OF SOLAR UV RADIATION IN THE EARTH'S ATMOSPHERE BY MAKING CLOSELY COORDINATED MEASUREMENTS OF REACTING

CONSTITUENTS. THE MEASUREMENTS WILL BE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, AIRGLOW EMISSIONS, PARTICLE FLUXES, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE, THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ON-BOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SATELLITE IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF 'RADIO SCIENCE', VOL. 8, NO. 4, APRIL 1973.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION NSSDC ID AE-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.H.	BRACE	NASA-GSFC	GREENBELT, MD
OI - R.F.	THEIS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT MEASURES THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE CAN BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER OUTWARD FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG NSSDC ID AE-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.S.W.	CHAMPION	AFCRL	BEDFORD, MA
OI - F.A.	MARCOS	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE ALONG THE SPACECRAFT X AXIS, AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION.

THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER NSSDC ID AE-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.P.	DOERING	JOHNS HOPKINS U	BALTIMORE, MD
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.C.	ARMSTRONG	APPLIED PHYSICS LAB	SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION TEMPERATURE NSSDC ID AE-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - D.R.	ZUCCARO	SW CNTR AD STUDIES	DALLAS, TX
OI - S.	SANTINI	U OF TEXAS	DALLAS, TX.

EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPOLISHED IN 3 SEC. IN THE NONSPINNING MODE, AN ADDITIONAL 3-SEC "DUCT" MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER NSSDC ID AE-C -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.F.	HEATH	NASA-GSFC	GREENBELT, MD
OI - J.	OSANTOWSKI	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER C SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IONIZATION RATES FOR MOLECULAR NITROGEN AND ATOMIC OXYGEN. SECONDARY OBJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS, THREE PHOTODIODES, AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT ARE TRANSPARENT IN THE VICINITY OF THE PLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION, A CALIBRATION POSITION, AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS IS WED TO EACH OF THE DETECTORS, THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS, FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER NSSDC ID AE-C -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.E.	HINTEREGGER	AFCRL	BEDFORD, MA
OI - D.E.	BEDO	AFCRL	BEDFORD, MA
OI - L.A.	HALL	AFCRL	BEDFORD, MA
OI - C.W.	CHAGNON	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESOLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-C -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - F.J.	HEYDEN	MANILA OBS	THE PHILLIPINES
OI - K.	MAUERSBERGER	U OF MINNESOTA	MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 ATOMIC MASS UNITS (AMU). A DOUBLE-FOCUSING MATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100-MICROAMP BEAM OF 75-EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, FOR MOLECULAR NITROGEN GAS, APPROXIMATELY 10 TO THE -8 AMP OF RESOLVED MASS -28 IONS WILL APPEAR AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). ON COMMAND, THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV. AT THIS LOWER ENERGY, THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN, AND THEREFORE, IT WILL BE POSSIBLE TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH AND LOW-MASS ION COLLECTORS. A 50 PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, WILL INTERCEPT HALF THE BEAM. THIS GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER, AND THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE POSSIBLE AND WILL BE SELECTED BY GROUND COMMAND. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. THERE ARE EIGHT OF THESE 32-STEP PROGRAMS WHICH FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES, SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON, (2) MINOR CONSTITUENT PROGRAMS THAT OMIT MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE, (3) A LOW MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU, AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC, CORRESPONDING TO A SPATIAL RESOLUTION OF ABOUT 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER IS APPROXIMATELY 2.5 BY 10 TO THE -14 TO 4.8 BY 10 TO THE -9 AMP AND FOR THE MULTIPLIER THE UPPER LIMIT IS 3 BY 10 TO THE +6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C, -D, AND -E,' A. O. NIER ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP.271 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-C -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.T.	PELZ	NASA-GSFC	GREENBELT, MD
OI - C.A.	REBER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION, NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ON-BOARD EXPERIMENTS, NAMELY -- OPEN SOURCE SPECTROMETER (AE-C -07), SOLAR EUV SPECTROPHOTOMETER (AE-C -06), AND DENSITY-ACCELEROMETER (AE-C -02). THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE, A HYPERBOLIC ROD QUADRUPOLE ANALYZER, AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT-SENSITIVITY LIMITATIONS, ARE -- 250 KM FOR MOLECULAR OXYGEN, 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN, 700 KM FOR ATOMIC OXYGEN, AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTIONS WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU), ARE -- (A) GEOPHYSICAL - 1, 2, 4, TOTAL, 16, 28, 32, SELECTED, 40, (B) ANALYTICAL - 12, 14, 18, 20, 22, 30, 44, CALIBRATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED, SELECTED, . . . (ANY MASS 1 TO 44), (D) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16 AMU STEPS), (E) SWEEP ANALOG - 2, 3, 4, 5, . . . 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL FORMAT' THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN, HELIUM, OXYGEN, NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION WILL BE DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK, WHILE THE INSTRUMENT IS FACING FORWARD. USING 'NORMAL FORMAT', ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTROMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL ACCELERATE INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION, THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT, AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK ONE THOUSANDTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.01-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL DYNAMIC RANGE OF THE MEASUREMENTS IS GREATER THAN 10 TO THE SEVENTH POWER. THERE IS PROVISION FOR THE INSTRUMENT ORIFICE TO BE COVERED DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN, 'A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C, -D, -E,' D. T. PELZ ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 272 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION

NSSDC ID AE-C -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE, INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE, THE BAFFLE WILL BE MADE TO OSCILLATE IN THE STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE ORIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS IONIZED NITROGEN BEAM WILL BE DIRECTED FROM A QUADRUPOLE ANALYZER, TUNED TO PASS THOSE PARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE, THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD, NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ONCE PER SPIN PERIOD WITH BAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY, EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE, THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN, "THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT," N. W. SPENCER, ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC ION-MASS SPECTROMETER NSSDC ID AE-C -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	HOFFMAN	U OF TEXAS	DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

A MAGNETIC ION MASS SPECTROMETER WILL BE FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT ION SPECIES IN THE MASS RANGE FROM 1 TO 90 ATOMIC MASS UNITS (AMU). MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS, THE ENTRANCE APERTURE WILL FACE FORWARD WHEN THE SPACECRAFT IS IN THE DESPUN MODE. THE ELECTRIC AND MAGNETIC FIELDS WILL BE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WILL BE PLACED ALONG THE FOCAL PLANE IN APPROPRIATE PLACES TO SIMULTANEOUSLY COLLECT IONS IN THE MASS RATIOS 1 TO 4 TO 16 AMU. IONOSPHERIC IONS WILL BE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1050 TO -225 V. THE THREE MASS RANGES MEASURED SIMULTANEOUSLY WILL BE 1 TO 4, 4 TO 16, AND 16 TO 64 AMU. FOLLOWING EACH SLIT WILL BE AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER-AMPLIFIER

DETECTOR. THE DETECTOR OUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT, OR IT COULD BE FED TO A 'PEAK' CIRCUIT THAT WILL DETERMINE THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WILL BE TELEMETERED IN THE PRIMARY PEAKS MODE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WILL BE 1 SEC. OTHER MODES OF OPERATION WILL BE POSSIBLE. IN THE ANALOG SHORT MODE, THE THREE MASS RANGES WILL BE SWEPT IN 3 SEC, ALTERNATING WITH 1-SEC 'PEAKS' MODE SCANS. AN 8-SEC SWEEP TIME IS REQUIRED IN THE ANALOG LONG MODE, AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCAN. AN OPTION WILL EXIST IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMBERS IN THE RATIO 1 TO 4 TO 16 TO GIVE HIGH SPATIAL RESOLUTION. THIS MODE, WHICH WILL ALSO INCLUDE AN OCCASIONAL 1-SEC SWEEP OF THE MASS SPECTRUM IN THE PEAKS MODE, WILL BE MOST USEFUL IN THE DESPUN SATELLITE ORIENTATION. MORE EXPERIMENT DETAIL CAN BE FOUND IN 'THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER', J. H. HOFFMAN, ET AL., 'RADIO SCIENCE', VOL. 8, NO. 4, PP.315-322, (APRIL 1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BENNETT ION-MASS SPECTROMETER NSSDC ID AE-C -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.C.	BRINTON	NASA-GSFC	GREENBELT, MD
OI - L.R.	SCOTT	NASA-GSFC	GREENBELT, MD
OI - M.W.	PHARO	NASA-GSFC	GREENBELT, MD
OI - H.A.	TAYLOR, JR.	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO MEASURE, THROUGHOUT THE AE ORBIT, THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ION SPECIES IN THE MASS RANGE 1 TO 72 ATOMIC MASS UNITS (AMU), AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE MASS RANGES, WHICH ARE EXPRESSED IN AMU, CAN BE SELECTED BY GROUND COMMAND -- RANGE A - 4 TO 1, RANGE B - 18 TO 2, RANGE C - 72 TO 8. EACH RANGE WILL NORMALLY BE SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALONG ORBIT), BUT THE SCAN TIME PER RANGE CAN BE INCREASED TO 5.1 SECONDS BY COMMAND. NORMAL OPERATION WILL CONSIST IN SEQUENCE ABCABC (72 TO 1 AMU IN 4.8 SEC), BUT OTHER COMBINATIONS SUCH AS BCBC AND CCCC MAY BE USED. LABORATORY AND INFLIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND MASS DISCRIMINATION WILL PERMIT DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CONCENTRATIONS. CORRELATION OF THESE MEASURED DATA WITH THE RESULTS FROM COMPANION EXPERIMENTS, 'ELECTROSTATIC PROBE (AE-C -01)' AND 'RETARDING POTENTIAL ANALYZER (AE-C -04),' SHOULD PERMIT INDIVIDUAL ION CONCENTRATIONS TO BE DETERMINED WITH AN ACCURACY OF PLUS OR MINUS 10 PERCENT. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WILL BE -- GUARD RING AND ION-ANALYZER TUBE, COLLECTOR AND PREAMPLIFIER ASSEMBLY, VENT, AND MAIN ELECTRONICS HOUSING. THE GUARD RING WILL NORMALLY BE AT GROUND POTENTIAL, BUT IT CAN BE PLACED AT -6 V BY COMMAND IF DESIRABLE, E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNETT TUBE WITH 7 TO 5 CYCLE DRIFT SPACES WILL BE FLOWN AND WILL BE MODIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO BE OBTAINED DOWN TO 120-KM ALTITUDE. SPECIFICALLY, A VENT WILL BE PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-DISK ION-CURRENT COLLECTOR WILL BE REPLACED WITH A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PEAK-TO-PEAK R.F. VOLTAGE WILL VARY WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ, RANGE B - 5 MHZ, AND RANGE C - 2.5 MHZ. INTO THE VACUUM TIGHT ALUMINA-CERAMIC CYLINDRICAL ANALYZER TUBE A SERIES OF 16 PARALLEL TUNGSTEN-MESH GRIDS WILL BE BRAZED. THE BALANCE BETWEEN ION-CURRENT SENSITIVITY AND MASS-RESOLUTION IN A BENNETT

SPECTROMETER MAY BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES CAN BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH ONE OF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT OUTPUT WILL BE A COMPRESSED ION CURRENT SPECTRUM WHICH DISPLAYS THE FULL DYNAMIC RANGE OF THE AMPLIFIER SYSTEM ON A SINGLE TELEMETRY CHANNEL. ON-BOARD DATA PROCESSING WILL PROVIDE A READ-OUT OF PRIMARY EXPERIMENT DATA IN THE FORM OF TWO DIGITAL WORDS FOR EACH PEAK IN THE ION SPECTRUM. ONE EIGHT-BIT WORD WILL INDICATE PEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD WILL IDENTIFY SWEEP POSITION, I.E., SPECIES IDENTIFICATION. THE WORDS WILL BE READ OUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SECOND. INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS WILL DEPEND PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SPIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER 'THE BENNETT ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER -C AND -E,' H. C. BRINTON ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 323-332 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRONS NSSDC ID AE-C -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HOFFMAN	NASA-GSFC	GREENBELT, MD
OI - D.S.	EVANS	NOAA	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE, (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURORAL ZONE, AND (3) THE MAGNETOSPHERIC SUBSTORM PRECIPITATION. THE INSTRUMENT, WHICH WILL MEASURE ELECTRONS IN THE ENERGY RANGE 0.2 TO 25 KEV, WILL CONSIST OF DETECTORS, EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WILL BE TWO MODES OF OPERATION, THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE, THERE WILL BE GOOD ENERGY RESOLUTION, MODERATE TEMPORAL RESOLUTION, AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION IN THIS MODE WILL BE SIMULTANEOUS WITH THE PRIMARY AERONOMICAL AND IONOSPHERIC EXPERIMENTS WHEN THE SATELLITE IS EITHER IN THE SPINNING OR DESPUN MODES. THE DATA MODE WILL PROVIDE SUFFICIENT ENERGY, PITCH ANGLE, AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RADIATION ENCOUNTERED IN THE AURORAL AND TRANS-AURORAL REGIONS. DATA ACQUISITION WILL OCCUR ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD IS OFF, ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOGEE PERIODS IN THE DESPIN MODE THE DETECTORS WILL LOOK DOWN TOWARD THE EARTH ALONG FIELD LINES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NITRIC OXIDE AIRGLOW NSSDC ID AE-C -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.A.	BARTH	U OF COLORADO	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS ULTRAVIOLET NITRIC-OXIDE EXPERIMENT (UVNO) WILL CONSIST OF A TWO-CHANNEL FIXED-GRATING EBERT SPECTROMETER WHICH WILL MEASURE THE AIRGLOW

IN THE (1, 0) GAMMA BAND IN A 12-A REGION CENTERED AT 2150 A. THE OBSERVED INTENSITY WILL BE PRODUCED BY RESONANCE FLUORESCENCE OF SUNLIGHT BY THE NITRIC-OXIDE MOLECULES IN THE INSTRUMENT'S FIELD OF VIEW. THE INTENSITY PROFILES OBTAINED WILL YIELD ALTITUDE PROFILES OF NITRIC-OXIDE DENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WILL BE MEASURED ALONG THE TRACK OF THE SATELLITE AT ALL TIMES WHEN IT IS ON THE SUNLIT SIDE OF THE EARTH. THE REMOTE SENSING CHARACTER OF THE UVNO EXPERIMENT WILL PERMIT MEASUREMENTS OF NITRIC-OXIDE TO BE MADE AT ALTITUDES BOTH ABOVE AND BELOW SATELLITE PERIGEE. AS THE SPACECRAFT SPINS, THE SPECTROMETER, WHICH LOOKS OUTWARD THROUGH THE RIM OF THE SATELLITE, WILL REPEATEDLY HAVE ITS FIELD OF VIEW CARRIED DOWN THROUGH THE ATMOSPHERE ONTO THE EARTH'S LIMB, AND ALTITUDE PROFILES OF THE EMITTED AIRGLOW INTENSITY WILL BE OBTAINED. BELOW SOME ALTITUDE THE MEASURED SIGNAL AT 2150 A WILL BE CONTAMINATED BY RAYLEIGH SCATTERED SUNLIGHT. TO CORRECT FOR THIS CONTAMINATION, A SECOND CHANNEL WILL MEASURE ONLY SCATTERED LIGHT INTENSITY IN A 12-A REGION CENTERED AT 2190 A. THE TWO CHANNELS WILL BE OPTICALLY AND ELECTRICALLY INDEPENDENT. NITRIC-OXIDE AIRGLOW INTENSITY WILL BE DETERMINED BY TAKING THE DIFFERENCE BETWEEN THESE TWO MEASUREMENTS. FROM THE CORRECTED SIGNAL, NITRIC-OXIDE DENSITY PROFILES WILL BE OBTAINED BETWEEN APPROXIMATELY 80 KM AND 250 KM. THE SENSOR'S SPHERICAL FUSED QUARTZ TELESCOPE MIRROR WILL HAVE A 125-MM FOCAL LENGTH, AND WILL FOCUS INCIDENT LIGHT ON THE ENTRANCE SLIT OF THE SPECTROMETER. FROM THIS SLIT THE LIGHT WILL STRIKE ONE HALF OF THE EBERT MIRROR AND WILL BE COLLIMATED ONTO THE GRATING. THE 3600-LINES-PER-MM GRATING WILL RETURN IT COLLIMATED TO THE OTHER HALF OF THE EBERT MIRROR, AND THE LIGHT WILL BE FOCUSED ON TWO EXIT SLITS. THE SPECTROMETER FIELD OF VIEW IS ZERO DEG FIFTEEN MIN BY FOUR DEG THIRTY NINE MIN. IN NORMAL OPERATION EACH CHANNEL IS INTEGRATED FOR 20.8 MSEC AND IS READ OUT ALTERNATELY AT 10.4-MSEC INTERVALS. THE INSTRUMENT HAS LINEAR RESPONSE CHARACTERISTICS, AND THE OBSERVATION OF A 1-KR EMISSION RATE WILL PRODUCE, ON THE AVERAGE, 100 COUNTS PER INTEGRATION PERIOD IN THE 2150-A CHANNEL AND 50 COUNTS IN THE 2190-A CHANNEL. THE CAPABILITY EXISTS TO INHIBIT OPERATION OF THE 2190-A CHANNEL. WHEN THIS IS DONE, THE INTEGRATION TIME OF THE 2150-A CHANNEL IS HALVED AND THE ALTITUDE RESOLUTION OF THE NITRIC-OXIDE MEASUREMENT IS DOUBLED. THIS CAPABILITY WOULD BE USED WHEN IT IS DESIRED TO MEASURE THE NITRIC-OXIDE PROFILE WELL ABOVE THE RAYLEIGH SCATTERING LAYER IN THE ATMOSPHERE. THE DARK CURRENT CORRESPONDS TO ONE TO THREE COUNTS PER INTEGRATION PERIOD AND WILL NOT SIGNIFICANTLY AFFECT EXPERIMENT ACCURACY. THE INSTRUMENT IS PROTECTED AGAINST CONTAMINATION FROM INTERNAL SCATTERING OF OFF-AXIS UNDISPERSED LIGHT. THE CONTAMINATION IS NOT EXPECTED TO BE MUCH GREATER THAN 10 PERCENT OF THE AIRGLOW SIGNAL, AND IT CAN BE ACCURATELY SUBTRACTED OUT AFTER FLIGHT DATA FROM NEAR APOGEE HAS BEEN USED TO MEASURE THE INSTRUMENT'S SCATTERING FUNCTION. MORE EXPERIMENT DETAILS CAN BE FOUND IN, 'THE UV NITRIC-OXIDE EXPERIMENT FOR THE ATMOSPHERE EXPLORER', C. A. BARTH, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 379 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AIRGLOW PHOTOMETER NSSDC ID AE-C -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.B.	HAYS	U OF MICHIGAN	ANN ARBOR, MI
OI - G.G.	SHEPHERD	YORK U	TORONTO, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONTAIN A FILTER PHOTOMETER DESIGNED TO MONITOR VARIOUS AIRGLOW AND AURORAL FEATURES WHICH LIE IN THE SPECTRAL RANGE BETWEEN 3000 A AND 7500 A. THE PRIMARY INFORMATION OBTAINED FROM THIS EXPERIMENT WILL BE THE RATES OF EXCITATION OF THE ATOMIC AND MOLECULAR CONSTITUENTS OF

THE THERMOSPHERE. FOR THE AE-C MISSION, THE FOLLOWING SIX SPECIFIC LINES AND BANDS WERE CHOSEN FOR STUDY SINCE THEY PLAY AN IMPORTANT ROLE IN THE PHOTOCHEMICAL ENERGY BALANCE OF THE ATMOSPHERE -- 3371 A, 4278 A, 5200 A, 5577 A, 6300 A, AND 7319 TO 7330 A. TWO OPTICAL SYSTEMS WILL VIEW AT RIGHT ANGLES TO EACH OTHER. EACH ONE WILL EMPLOY A COMBINATION OF A SIMPLE OBJECTIVE LENS AND FIELD STOP TO DEFINE THE FIELD OF VIEW, AND EACH WILL CONTAIN A MULTISTAGE LIGHT BAFFLE. THE WIDE-ANGLE HIGH SENSITIVITY SYSTEM (DESIGNATED CHANNEL 2) WILL HAVE A FIELD OF VIEW OF 3 DEG HALF-ANGLE, AND WILL BE USED TO MEASURE THE NIGHTGLOW, DAYGLOW ABOVE THE SATELLITE, AND OTHER WEAK EMISSION FEATURES. THE LESS SENSITIVE SYSTEM (DESIGNATED CHANNEL 1) WILL HAVE A FIELD OF VIEW OF APPROXIMATELY 3/4 DEG HALF-ANGLE, AND WILL BE USED FOR DAYGLOW AND NIGHTGLOW HORIZON MEASUREMENTS AS WELL AS DISCRETE AURORAL FEATURES WHICH SHOW STRONG SPATIAL GRADIENTS. FOR CHANNEL 1 THE THRESHOLD WILL BE APPROXIMATELY 15 RAYLEIGHS, AND FOR CHANNEL 2 IT WILL BE 0.5 RAYLEIGH. BOTH OPTICAL CHANNELS WILL HAVE A DIAMETER OF 2.2 CM. THEY WILL SHARE A FILTER WHEEL THAT WILL CONTAIN 6 INTERFERENCE FILTERS AT THE WAVELENGTHS IDENTIFIED ABOVE, AND TWO OTHER POSITIONS. ONE WILL BE A DARK POSITION FOR NOISE MEASUREMENTS, AND THE OTHER WILL BE A CALIBRATE POSITION. THE DYNAMIC RANGE OF THE INSTRUMENT WILL BE 10 TO THE 6 POWER RAYLEIGHS. IN ORDER THAT THE SENSORS BE ABLE TO RESPOND IN A FRACTION OF A SECOND TO LARGE CHANGES IN SURFACE BRIGHTNESS WITHOUT ANY NOTICEABLE ENHANCEMENT IN THE BACKGROUND COUNT RATE, EACH ONE WILL CONTAIN A 1/100 ATTENUATOR AND AN ELECTRONIC CIRCUIT TO BACK-BIAS THE CATHODE. WITH THESE PROTECTIVE FEATURES IT WILL BE POSSIBLE TO MEASURE A DARK FEATURE WITH NO APPARENT ENHANCEMENT IN BACKGROUND WITHIN 120 MSEC AFTER A DIRECT VIEW OF THE SUN. PHOTONS REACHING THE CATHODE WILL BE RECORDED USING A PULSE-COUNTING SYSTEM. THE INTEGRATION TIME WILL BE 33 MSEC FOR CHANNEL 1 AND 132 MSEC FOR CHANNEL 2. PRIMARY COMMAND AND TELEMETRY FORMATTING SYSTEMS WILL BE SHARED BY THE TWO CHANNELS. THE EXPERIMENT CAN BE COMMANDED INTO ANY ONE OF SEVERAL OPERATING MODES DEPENDING ON THE SCIENCE REQUIREMENTS AND SPACECRAFT ATTITUDE. FOR EXAMPLE, IN THE FILTER-WHEEL MODE THE EXPERIMENT CAN OPERATE -- (1) FIXED FILTER - WHERE ANY ONE OF 8 POSSIBLE FILTER WHEEL POSITIONS IS IN PLACE, (2) FILTER CYCLING, WHERE FILTERS ARE SEQUENCED AT ONE OF THE FOLLOWING RATES - (A) ONCE PER NADIR, (B) ONCE PER 2 NADIR, (C) ONCE PER 4 SEC, (D) ONCE PER 8 SEC, (E) ONCE PER 16 SEC, (F) ONCE PER 32 SEC, AND (3) IMPULSIVE GO STEP -- IF LOGIC IS LOST. IN GENERAL, WHEN THE SPACECRAFT IS IN THE ORIENTED MODE, THE FILTER CYCLING COMMAND WILL PROBABLY BE USED. FOR AURORAL STUDIES AND SPATIALLY VARYING FEATURES, THE OBSERVATIONS WILL PROBABLY BE MADE WITH FIXED FILTERS. WHEN SPACECRAFT IS IN THE SPINNING MODE, EITHER FIXED FILTER OR FILTER CHANGE ON NADIR WILL PROBABLY BE USED. FOR MORE EXPERIMENT DETAILS, SEE "THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER," P. B. HAYS, ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 369 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COLD CATHODE ION GAUGE NSSDC ID AE-C -15

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.L.	CARTER	AEROSPACE CORP	EL SEGUNDO, CA
OI - C.J.	RICE	AEROSPACE CORP	EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE ION GAUGE TO BE FLOWN ON AE-C WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC

PRESSURE IN THE REGION BETWEEN 120 AND 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MB. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN-AXIS WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PSA WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT OBSERVED IN REAL TIME.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANOMETER NSSDC ID AE-C -16

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.L.	CARTER	AEROSPACE CORP	EL SEGUNDO, CA
OI - C.J.	RICE	AEROSPACE CORP	EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-C WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR B (PSB), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSB GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSB WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH IS MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE PERMITTED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS, THE WAKE-RAM PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- AE-D NSSDC ID AE-D
ALTERNATE NAMES- S 66, PL-7238, ATMOSPHERE EXPLORER-D

PLANNED LAUNCH DATE- 03/00/73 SPACECRAFT WEIGHT IN ORBIT- 433.6 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 129. MIN
APOAPSIS- 4000.00 KM ALT PERIAPSIS- 150.000 KM ALT INCLINATION- 98. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.W.	GRIMES	NASA-GSFC	GREENBELT, MD
PS - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ONE OBJECTIVE OF AE-D WILL BE TO INVESTIGATE THE CHEMICAL PROCESSES AND ENERGY TRANSFER MECHANISMS THAT CONTROL THE STRUCTURE AND BEHAVIOR OF THE EARTH'S ATMOSPHERE AND IONOSPHERE THROUGH THE REGION OF HIGH SOLAR ENERGY ABSORPTION. MEASUREMENTS WILL BE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, ATMOSPHERIC EMISSIONS, PARTICLE FLUXES, IONOSPHERE CURRENTS, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE, THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ONBOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SPACECRAFT IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF "RADIO SCIENCE", VOL. 8, NO. 4, APRIL, 1973.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION NSSDC ID AE-D -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.H.	BRACE	NASA-GSFC	GREENBELT, MD
OI - H.F.	THEIS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT WILL MEASURE THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN TO BE APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WILL BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG NSSDC ID AE-D -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.S.W.	CHAMPION	AFCRL	BEDFORD, MA
OI - F.A.	MARCOS	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE ALONG THE SPACECRAFT X AXIS, AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER NSSDC ID AE-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.P.	DOERING	JOHNS HOPKINS U	BALTIMORE, MD
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.C.	ARMSTRONG	APPLIED PHYSICS LAB	SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION TEMPERATURE NSSDC ID AE-D -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - D.R.	ZUCCARO	SW CNTR AD STUDIES	DALLAS, TX
OI - S.	SANTINI	U OF TEXAS	DALLAS, TX.

EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND FROM KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE

COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN THREE SEC IN THE NONSPINNING MODE. AN ADDITIONAL 3-SEC "DUCT" MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 ION/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER NSSDC ID AE-D -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.F.	HEATH	NASA-GSFC	GREENBELT, MD
OI - J.	OSANTOWSKI	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER D SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IONIZATION RATES AS A FUNCTION OF ALTITUDE FOR MOLECULAR NITROGEN AND ATOMIC OXYGEN. SECONDARY OBJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS, THREE PHOTODIODES, AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT WILL BE TRANSPARENT IN THE VICINITY OF THE PLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION, A CALIBRATION POSITION, AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS WILL BE WED TO EACH OF THE DETECTORS, THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS, FOR MAXIMUM SUN-VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER NSSDC ID AE-D -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.E.	HINTEREGGER	AFCRL	BEDFORD, MA
OI - D.E.	BEDO	AFCRL	BEDFORD, MA
OI - L.A.	HALL	AFCRL	BEDFORD, MA
OI - C.W.	CHAGNON	AFCRL	BEDFORD, MA
OI - J.E.	MANSON	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESOLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE

OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-D -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - F.J.	HEYDEN	MANILA OBS	THE PHILLIPINES
OI - K.	MAUERSBERGER	U OF MINNESOTA	MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 ATOMIC MASS UNITS (AMU). A DOUBLE-FOCUSING MATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100-MICROAMP BEAM OF 75-EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, FOR MOLECULAR NITROGEN GAS, APPROXIMATELY 10 TO THE -5 AMP OF RESOLVED MASS -28 IONS WILL APPEAR AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). ON COMMAND, THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV. AT THIS LOWER ENERGY, THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN, AND THEREFORE, IT WILL BE POSSIBLE TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, WILL INTERCEPT HALF THE BEAM. THIS GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER, AND THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES, SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON, (2) MINOR CONSTITUENT PROGRAMS THAT OMIT MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE, (3) A LOW-MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU, AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC, CORRESPONDING TO A SPATIAL RESOLUTION OF ABOUT 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.5 BY 10 TO THE -14 TO 4.8 BY 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 BY

10 TO THE +6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C, -D, AND -E,' A. O. NIER ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP.271 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-D -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.T.	PELZ	NASA-GSFC	GREENBELT, MD
OI - C.A.	REBER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION, NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ONBOARD EXPERIMENTS, NAMELY -- OPEN SOURCE SPECTROMETER (AE-D -07), SOLAR EUV SPECTROPHOTOMETER (AE-D -06), AND DENSITY-ACCELEROMETER (AE-D -02). THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE, A HYPERBOLIC ROD QUADRUPOLE ANALYZER, AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS, WILL BE -- 250 KM FOR MOLECULAR OXYGEN, 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN, 700 KM FOR ATOMIC OXYGEN, AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU), WILL BE -- (A) GEOPHYSICAL - 1, 2, 4, TOTAL, 16, 28, 32, SELECTED, 40, (B) ANALYTICAL - 12, 14, 18, 20, 22, 30, 44, CALIBRATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED, SELECTED, . . . (ANY MASS 1 TO 44), (D) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16-AMU STEPS), (E) SWEEP ANALOG 2, 3, 4, 5, 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL' FORMAT, THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN, HELIUM, OXYGEN, NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION IS DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK, WHILE THE INSTRUMENT IS FACING FORWARD. USING 'NORMAL' FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTROMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION, THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT, AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK ONE-THOUSANDTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16)

WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH POWER. THERE IS A PROVISION FOR THE INSTRUMENT ORIFICE TO BE COVERED DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C, -D, -E,' D. T. PELZ ET AL. RADIO SCIENCE. VOL. 8, NO. 4, PP. 272 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION — NSSDC ID AE-D -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE, INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE, THE BAFFLE WILL BE MADE TO OSCILLATE IN THE STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE ORIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS IONIZED NITROGEN BEAM WILL BE DIRECTED FROM A QUADRUPOLE ANALYZER, TUNED TO PASS THOSE PARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE, THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD, NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ONCE PER SPIN PERIOD WITH BAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY, EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE, THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT,' N. W. SPENCER, ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION COMPOSITION AND CONCENTRATION — NSSDC ID AE-D -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.H. HOFFMAN U OF TEXAS DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

A MAGNETIC ION MASS SPECTROMETER WILL BE FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT ION SPECIES IN THE MASS RANGE FROM 1 TO 90 ATOMIC MASS UNITS (AMU). MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS, THE ENTRANCE APERTURE WILL FACE FORWARD WHEN THE SPACECRAFT IS IN THE DESPUN MODE. THE ELECTRIC AND MAGNETIC FIELDS WILL BE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WILL BE PLACED ALONG THE FOCAL PLANE IN APPROPRIATE PLACES TO SIMULTANEOUSLY COLLECT IONS IN THE MASS RATIOS 1-4-16 AMU. IONOSPHERIC IONS WILL BE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1060 TO -225 V. THE THREE MASS RANGES MEASURED SIMULTANEOUSLY WILL BE 1 TO 4, 4 TO 16, AND 16 TO 64 AMU. FOLLOWING EACH SLIT WILL BE AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER-AMPLIFIER DETECTOR. THE DETECTOR OUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT, OR IT COULD BE FED TO A 'PEAK' CIRCUIT THAT WILL DETERMINE THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WILL BE TELEMETERED IN THE PRIMARY PEAKS MODE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WILL BE 1 SEC. OTHER MODES OF OPERATION WILL BE POSSIBLE. IN THE ANALOG SHORT MODE, THE THREE MASS RANGES WILL BE SWEPT IN 3 SEC, ALTERNATING WITH 1-SEC 'PEAKS' MODE SCANS. AN 8-SEC SWEEP TIME WILL BE REQUIRED IN THE ANALOG LONG MODE, AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCAN. AN OPTION WILL EXIST IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMBERS IN THE RATIO 1-4-16 TO GIVE HIGH SPATIAL RESOLUTION. THIS MODE, WHICH WILL ALSO INCLUDE AN OCCASIONAL 1-SEC SWEEP OF THE MASS SPECTRUM IN THE PEAKS MODE, WILL BE MOST USEFUL IN THE DESPUN SATELLITE ORIENTATION. MORE EXPERIMENT DETAIL CAN BE FOUND IN 'THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER,' J. H. HOFFMAN, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP.315-322, (APRIL 1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NITRIC OXIDE AIRGLOW NSSDC ID AE-D -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.A. BARTH U OF COLORADO BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS ULTRAVIOLET NITRIC-OXIDE EXPERIMENT (UVNO) CONSISTS OF A TWO-CHANNEL FIXED-GRATING EBERT SPECTROMETER WHICH WILL MEASURE THE AIRGLOW IN THE (1, 0) GAMMA BAND IN A 12-A REGION CENTERED AT 2150 A. THE OBSERVED INTENSITY IS PRODUCED BY RESONANCE FLUORESCENCE OF SUNLIGHT BY THE NITRIC-OXIDE MOLECULES IN THE INSTRUMENT'S FIELD OF VIEW. THE INTENSITY PROFILES OBTAINED WILL YIELD ALTITUDE PROFILES OF NITRIC-OXIDE DENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WILL BE MEASURED ALONG THE TRACK OF THE SATELLITE AT ALL TIMES WHEN IT IS ON THE SUNLIT SIDE OF THE EARTH. THE REMOTE SENSING CHARACTER OF THE UVNO EXPERIMENT PERMITS MEASUREMENTS OF NITRIC-OXIDE TO BE MADE AT ALTITUDES BOTH ABOVE AND BELOW SATELLITE PERIGEE. AS THE SPACECRAFT SPINS, THE SPECTROMETER, WHICH WILL LOOK OUTWARD THROUGH THE RIM OF THE SATELLITE, WILL REPEATEDLY HAVE ITS FIELD OF VIEW CARRIED DOWN THROUGH THE ATMOSPHERE ONTO THE EARTH'S LIMB, AND ALTITUDE PROFILES OF THE EMITTED AIRGLOW INTENSITY WILL BE OBTAINED. BELOW SOME ALTITUDE THE MEASURED SIGNAL AT 2150 A WILL BE CONTAMINATED BY RAYLEIGH SCATTERED SUNLIGHT. TO CORRECT FOR THIS CONTAMINATION, A SECOND CHANNEL WILL MEASURE ONLY SCATTERED LIGHT INTENSITY IN A 12-A REGION CENTERED AT 2190 A. THE TWO

CHANNELS WILL BE OPTICALLY AND ELECTRICALLY INDEPENDENT. NITRIC-OXIDE AIRGLOW INTENSITY WILL BE DETERMINED BY TAKING THE DIFFERENCE BETWEEN THESE TWO MEASUREMENTS. FROM THE CORRECTED SIGNAL, NITRIC-OXIDE DENSITY PROFILES WILL BE OBTAINED BETWEEN APPROXIMATELY 80 KM AND 250 KM. THE SENSOR'S SPHERICAL FUSED QUARTZ TELESCOPE MIRROR WILL HAVE A 125-MM FOCAL LENGTH, AND WILL FOCUS INCIDENT LIGHT ON THE ENTRANCE SLIT OF THE SPECTROMETER. FROM THIS SLIT THE LIGHT WILL STRIKE ONE-HALF OF THE EBERT MIRROR AND WILL BE COLLIMATED ONTO THE GRATING. THE 3600-LINES-PER-MM GRATING WILL RETURN THE LIGHT COLLIMATED TO THE OTHER HALF OF THE EBERT MIRROR, AND FOCUS IT ON TWO EXIT SLITS. THE SPECTROMETER FIELD OF VIEW WILL BE ZERO DEG FIFTEEN MIN BY FOUR DEG THIRTY NINE MIN. IN NORMAL OPERATION EACH CHANNEL WILL BE INTEGRATED FOR 20.8 MSEC AND READ OUT ALTERNATELY AT 10.4-MSEC INTERVALS. THE INSTRUMENT WILL HAVE LINEAR RESPONSE CHARACTERISTICS, AND THE OBSERVATION OF A 1-KR EMISSION RATE WILL PRODUCE, ON THE AVERAGE, 100 COUNTS PER INTEGRATION PERIOD IN THE 2150-A CHANNEL AND 60 COUNTS IN THE 2190-A CHANNEL. THE CAPABILITY WILL EXIST TO INHIBIT OPERATION OF THE 2190-A CHANNEL. WHEN THIS IS DONE, THE INTEGRATION TIME OF THE 2150-A CHANNEL IS HALVED AND THE ALTITUDE RESOLUTION OF THE NITRIC-OXIDE MEASUREMENT IS DOUBLED. THIS CAPABILITY WOULD BE USED WHEN IT IS DESIRED TO MEASURE THE NITRIC-OXIDE PROFILE WELL ABOVE THE RAYLEIGH SCATTERING LAYER IN THE ATMOSPHERE. THE DARK CURRENT CORRESPONDS TO ONE TO THREE COUNTS PER INTEGRATION PERIOD AND WILL NOT SIGNIFICANTLY AFFECT EXPERIMENT ACCURACY. THE INSTRUMENT WILL BE PROTECTED AGAINST CONTAMINATION FROM INTERNAL SCATTERING OF OFF-AXIS UNDISPERSED LIGHT. THE CONTAMINATION IS NOT EXPECTED TO BE MUCH GREATER THAN 10 PERCENT OF THE AIRGLOW SIGNAL, AND IT CAN BE ACCURATELY SUBTRACTED OUT AFTER FLIGHT DATA FROM NEAR APOGEE HAS BEEN USED TO MEASURE THE INSTRUMENT'S SCATTERING FUNCTION. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE UV NITRIC-OXIDE EXPERIMENT FOR THE ATMOSPHERE EXPLORER," C. A. BARTH, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 379 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRONS NSSDC ID AE-D -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HOFFMAN	NASA-GSFC	GREENBELT, MD
OI - D.S.	EVANS	NOAA	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE FROM ELECTRONS IN THE ENERGY RANGE 0.2 TO 25 KEV, (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURORAL ZONE, AND (3) THE MAGNETOSPHERIC SUBSTORM PRECIPITATION. THE INSTRUMENT WILL CONSIST OF 19 DETECTORS, EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WILL BE TWO MODES OF OPERATION, THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE, THERE WILL BE GOOD ENERGY RESOLUTION, MODERATE TEMPORAL RESOLUTION, AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION WILL BE SIMULTANEOUS WITH THE PRIMARY AERONOMICAL AND IONOSPHERIC EXPERIMENTS WHEN THE SATELLITE IS EITHER IN THE SPINNING OR DESPUN MODES. THE DATA MODE WILL PROVIDE SUFFICIENT ENERGY, PITCH ANGLE, AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RADIATION ENCOUNTERED IN THE AURORAL AND TRANS-AURORAL REGIONS. DATA ACQUISITION WILL OCCUR ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD IS OFF, ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOGEE PERIODS IN THE DESPIN MODE, THE DETECTORS WILL LOOK TOWARD THE EARTH ALONG FIELD LINES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AIRGLOW PHOTOMETER NSSDC ID AE-D -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.B.	HAYS	U OF MICHIGAN	ANN ARBOR, MI
OI - G.G.	SHEPHERD	YORK U	TORONTO, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE AIRGLOW EXPERIMENT WILL PROVIDE VOLUME EMISSION RATES FOR SEVERAL DAYGLOW, NIGHTGLOW, AND AURORAL OPTICAL EMISSION FEATURES. A PHOTOMETER CONTAINING TWO SEPARATE OPTICAL CHANNELS WILL BE USED. SPECTRAL SELECTION WILL BE ACCOMPLISHED WITH A COMMON FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND CALIBRATE POSITION. ANY ONE OF EIGHT POSSIBLE COMBINATIONS OF FILTERS CAN BE SELECTED FOR THE TWO CHANNELS THAT ARE SEPARATED IN ANGLE BY 90 DEG. ONE CHANNEL WILL HAVE A LARGE FIELD OF VIEW (3 DEG HALF-ANGLE) FOR HIGH SENSITIVITY, NORMALLY POINTING TOWARD THE LOCAL ZENITH, AND THE SECOND CHANNEL WILL HAVE A SMALL FIELD OF VIEW (0.75 DEG HALF-ANGLE) FOR HIGH SPATIAL RESOLUTION, POINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE DESPUN MODE. BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING DAYTIME BY MULTISTAGE BAFFLE SYSTEMS. PHOTONS THAT HAVE BEEN SPECTRALLY AND SPATIALLY SELECTED WILL BE SENSED BY A PULSE-COUNTING PHOTOMULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF 5 TIMES 10 TO THE 6 COUNTS/SEC. THE FILTERS CAN BE OPERATED IN SEVERAL MODES, E.G., FIXED FILTER AND AUTOMATIC FILTER CHANGES CAN BE SYNCHRONIZED EITHER TO SATELLITE ORIENTATION OR TO A FIXED-TIME BASE. BASIC DATA ANALYSIS WILL YIELD VOLUME EMISSION RATE ALONG THE SATELLITE TRACK, AND THE NARROW CHANNEL WILL PROVIDE DATA TO OBTAIN VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER,' P. B. HAYS, ET. AL., 'RADIO SCIENCE,' VOL. 8, NO. 4, PP. 369 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANOMETER NSSDC ID AE-D -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.L.	CARTER	AEROSPACE CORP	EL SEGUNDO, CA
OI - C.J.	RICE	AEROSPACE CORP	EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 NB. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 130 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1500 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND

WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PSA WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT OBSERVED IN REAL TIME.

ON 12/13/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COLD CATHODE ION GAUGE NSSDC ID AE-D -15

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - V.L. CARTER AEROSPACE CORP EL SEGUNDO, CA
OI - C.J. RICE AEROSPACE CORP EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION
THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR E (PSE), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSE GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSE WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CLOSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BE MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE ALLOWED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-RAM PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- AE-E NSSDC ID AE-E
ALTERNATE NAMES- S 80, ATMOSPHERE EXPLORER-E

PLANNED LAUNCH DATE- 09/00/75 SPACECRAFT WEIGHT IN ORBIT- 453.6 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 129. MIN
APOAPSIS- 4000.00 KM ALT PERIAPSIS- 150.000 KM ALT INCLINATION- 22. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.W.	GRIMES	NASA-GSFC	GREENBELT, MD
PS - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVE OF AE-E WILL BE TO INVESTIGATE THE CHEMICAL PROCESSES AND ENERGY TRANSFER MECHANISMS THAT CONTROL THE STRUCTURE AND BEHAVIOR OF THE EARTH'S ATMOSPHERE AND IONOSPHERE THROUGH THE REGION OF HIGH SOLAR ENERGY ABSORPTION. MEASUREMENTS WILL BE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, ATMOSPHERIC EMISSIONS, PARTICLE FLUXES, IONOSPHERE CURRENTS, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE, THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE RECORDER MODE. AN ONBOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SPACECRAFT IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF "RADIO SCIENCE," VOL. 8, NO. 4, APRIL, 1973.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION NSSDC ID AE-E -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.H.	BRACE	NASA-GSFC	GREENBELT, MD
OI - R.F.	THEIS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT WILL MEASURE THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN TO BE APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WILL BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH WILL PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG NSSDC ID AE-E -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.S.W. CHAMPION	AFCRL	BEDFORD, MA
OI - F.A. MARCOS	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE ALONG THE SPACECRAFT X AXIS, AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER NSSDC ID AE-E -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.P.	DOERING	JOHNS HOPKINS U	BALTIMORE, MD
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.C.	ARMSTRONG	APPLIED PHYSICS LAB	SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION TEMPERATURE NSSDC ID AE-E -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - D.R.	ZUCCARO	SW CNTR AD STUDIES	DALLAS, TX
OI - S.	SANTINI	U OF TEXAS	DALLAS, TX.

EXPERIMENT BRIEF DESCRIPTION
THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN 3 SEC. IN THE NONSPINNING MODE, AN ADDITIONAL 3-SEC "DUCT" MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER NSSDC ID AE-E -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.F.	HEATH	NASA-GSFC	GREENBELT, MD
OI - J.	OSANTOWSKI	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER E SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IONIZATION RATES AS A FUNCTION OF ALTITUDE FOR MOLECULAR NITROGEN AND ATOMIC OXYGEN. SECONDARY OBJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS, THREE PHOTODIODES, AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNBACKED METALLIC FILTERS THAT WILL BE TRANSPARENT IN THE VICINITY OF THE PLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION, A CALIBRATION POSITION, AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS WILL BE WED TO EACH OF THE DETECTORS, THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS, FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER NSSDC ID AE-E -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.E.	HINTEREGGER	AFCRL	BEDFORD, MA
OI - D.E.	BEDO	AFCRL	BEDFORD, MA
OI - L.A.	HALL	AFCRL	BEDFORD, MA
OI - J.E.	MANSON	AFCRL	BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESOLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-E -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - F.J.	HEYDEN	MANILA OBS	THE PHILLIPINES
OI - K.	MAUERSBERGER	U OF MINNESOTA	MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT, IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 48 AMU. A DOUBLE-FOCUSING MATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE SIMULTANEOUSLY IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 48 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100 MICROAMPERE BEAM OF 75 EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, APPROXIMATELY 10 TO THE -5 AMPERE OF RESOLVED MASS 28 IONS WILL APPEAR AT THE COLLECTOR FOR MOLECULAR NITROGEN GAS WHEN THE MOLECULAR NITROGEN PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV ON COMMAND. AT THIS LOWER ENERGY, THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN, AND, THEREFORE, IT WILL BE POSSIBLE TO TRY TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH- AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, WILL INTERCEPT HALF THE BEAM. THE GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER, AND, THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON, (2) MINOR CONSTITUENT PROGRAMS THAT OMIT MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE, (3) A LOW-MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU, AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS-30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC, CORRESPONDING TO A SPATIAL RESOLUTION OF APPROXIMATELY 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.4 TIMES 10 TO THE -14 TO 4.8 TIMES 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 TIMES 10 TO THE 6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C, -D, AND -E," A. O. NIER ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 271 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER NSSDC ID AE-E -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.T.	PELZ	NASA-GSFC	GREENBELT, MD
OI - C.A.	REBER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION, NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ONBOARD EXPERIMENTS, NAMELY -- OPEN SOURCE SPECTROMETER (AE-E -07), SOLAR EUV SPECTROPHOTOMETER (AE-E -06), AND DENSITY-ACCELEROMETER (AE-E -02). THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE, A HYPERBOLIC ROD QUADRUPOLE ANALYZER, AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS, WILL BE -- 250 KM FOR MOLECULAR OXYGEN, 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN, 700 KM FOR ATOMIC OXYGEN, AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU), WILL BE -- (A) GEOPHYSICAL - 1, 2, 4, TOTAL, 16, 28, 32, SELECTED, 40, (B) ANALYTICAL - 12, 14, 18, 20, 22, 30, 44, CALIBRATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED, SELECTED,, . . (ANY MASS 1 TO 44), (D) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16-AMU STEPS), (E) SWEEP ANALOG 2, 3, 4, 5, 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL' FORMAT, THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN, HELIUM, OXYGEN, NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION WILL BE DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK. WHILE THE INSTRUMENT IS FACING FORWARD, USING 'NORMAL' FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN IN ORBIT, THE PRESEALED SPECTROMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION, THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT, AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK ONE-THOUSANDTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL DYNAMIC RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH POWER. THERE IS PROVISION FOR THE INSTRUMENT ORIFICE TO BE COVERED

DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN "A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C, -D, -E." C. T. PELZ ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 272 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION — NSSDC ID AE-E -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE, INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE, THE BAFFLE WILL BE MADE TO OSCILLATE IN A STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE ORIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS IONIZED NITROGEN BEAM WILL BE DIRECTED INTO A QUADRUPOLE ANALYZER, TUNED TO PASS THOSE PARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE, THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD, NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE BAFFLE OPERATING) AND ONCE PER SPIN PERIOD WITH BAFFLE OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY, EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE BAFFLE EACH 2.0 SEC. IN THIS CASE, THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE BAFFLE SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN, "THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT," N. W. SPENCER, ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION COMPOSITION AND CONCENTRATION — NSSDC ID AE-E -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.C.	BRINTON	NASA-GSFC	GREENBELT, MD
OI - L.R.	SCOTT	NASA-GSFC	GREENBELT, MD
OI - M.W.	PHARO	NASA-GSFC	GREENBELT, MD
OI - H.A.	TAYLOR, JR.	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO MEASURE, THROUGHOUT THE AE ORBIT, THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ION SPECIES IN THE MASS RANGE 1 TO 72 ATOMIC MASS UNITS (AMU), AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE MASS RANGES, WHICH ARE EXPRESSED IN AMU, CAN BE SELECTED BY GROUND COMMAND -- RANGE A - 4 TO 1, RANGE B - 18 TO 2, RANGE C - 72 TO 8. EACH RANGE WILL NORMALLY BE SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALONG ORBIT), BUT THE SCAN TIME PER RANGE CAN BE INCREASED TO 5.1 SEC BY COMMAND. NORMAL OPERATION WILL CONSIST OF SEQUENCE ABCABC (72 TO 1 AMU IN 4.6 SEC), BUT OTHER COMBINATIONS SUCH AS BCBC AND CCCC MAY BE USED. LABORATORY AND IN-FLIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND MASS DISCRIMINATION WILL PERMIT DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CONCENTRATIONS. CORRELATION OF THESE MEASURED DATA WITH THE RESULTS FROM COMPANION EXPERIMENTS, 'ELECTROSTATIC PROBE (AE-E -01)' AND 'RETARDING POTENTIAL ANALYZER (AE-E -04),' SHOULD PERMIT INDIVIDUAL ION CONCENTRATIONS TO BE DETERMINED WITH AN ACCURACY OF PLUS OR MINUS 10 PERCENT. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WILL BE -- GUARD RING AND ION-ANALYZER TUBE, COLLECTOR AND PREAMPLIFIER ASSEMBLY, VENT, AND MAIN ELECTRONICS HOUSING. THE GUARD RING WILL NORMALLY BE AT GROUND POTENTIAL, BUT IT CAN BE PLACED AT -6 VOLTS BY COMMAND IF DESIRABLE, E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNET TUBE WITH 7 TO 5-CYCLE DRIFT SPACES WILL BE FLOWN, AND HAS BEEN MODIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO BE OBTAINED DOWN TO 120 KM ALTITUDE. SPECIFICALLY, A VENT WILL BE PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-DISK ION-CURRENT COLLECTOR WILL BE REPLACED BY A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PEAK-TO-PEAK R.F. VOLTAGE WILL VARY WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ, RANGE B - 5 MHZ, AND RANGE C - 2.5 MHZ. INTO THE VACUUM TIGHT ALUMINUM-CERAMIC CYLINDRICAL ANALYZER TUBE WILL BE A SERIES OF 16 PARALLEL TUNGSTEN-MESH GRIDS. THE BALANCE BETWEEN ION-CURRENT SENSITIVITY AND MASS-RESOLUTION IN A BENNETT SPECTROMETER MAY BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES CAN BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH ONE OF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT OUTPUT WILL BE A COMPRESSED ION CURRENT SPECTRUM WHICH WILL DISPLAY THE FULL DYNAMIC RANGE OF THE AMPLIFIER SYSTEM ON A SINGLE TELEMETRY CHANNEL. ONBOARD DATA PROCESSING WILL PROVIDE A READOUT OF PRIMARY EXPERIMENT DATA IN THE FORM OF TWO DIGITAL WORDS FOR EACH PEAK IN THE ION SPECTRUM. ONE EIGHT-BIT WORD WILL INDICATE PEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD WILL IDENTIFY SWEEP POSITION, I.E., SPECIES IDENTIFICATION. THE WORDS WILL BE READ OUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SEC. THE INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS WILL DEPEND PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SPIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER 'THE BENNETT ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER -C AND -E,' H. C. BRINTON ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 323-332 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AIRGLOW PHOTOMETER NSSDC ID AE-E -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.B.	HAYS	U OF MICHIGAN	ANN ARBOR, MI
OI - G.G.	SHEPHERD	YORK U	DOWNSVIEW, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE VOLUME EMISSION RATES FOR SEVERAL DAYGLOW AND NIGHTGLOW OPTICAL EMISSION FEATURES. A PHOTOMETER WILL BE USED, WHICH WILL CONTAIN TWO SEPARATE OPTICAL CHANNELS. SPECTRAL SELECTION WILL BE ACCUMPLISHED WITH A FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND CALIBRATE POSITION. THE TWO CHANNELS WILL BE SEPARATED IN ANGLE BY 90 DEG. ONE CHANNEL WILL HAVE A 3-DEG HALF-ANGLE CONE FIELD OF VIEW FOR HIGH SENSITIVITY AND WILL NORMALLY POINT TOWARD THE LOCAL ZENITH. THE SECOND CHANNEL WILL HAVE A FIELD OF VIEW OF 0.75-DEG HALF-ANGLE CONE FOR HIGH SPATIAL RESOLUTION POINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE ORIENTED MODE. BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING THE DAYTIME WITH MULTISTAGE BAFFLE SYSTEMS. ENTERING PHOTONS WILL BE MEASURED WITH A PULSE COUNTING PHOTOMULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF 5 TIMES 10 TO THE 6 COUNTS/SEC. THE SYSTEM DESIGN WILL PERMIT THE PHOTOMETERS TO MAKE VALID DAYGLOW MEASUREMENTS WITHIN 200 MSEC AFTER HAVING THE SUN IN THE FIELD OF VIEW. FILTERS CAN BE OPERATED IN SEVERAL MODES INCLUDING FIXED FILTER AND AUTOMATIC FILTER CHANGE SYNCHRONIZED TO SATELLITE ORIENTATION. THE TWO SEPARATE OPTICAL CHANNELS WILL BE MONITORED AT TIME INTERVALS CONSISTENT WITH THEIR ANGULAR RESOLUTION IN THE SPINNING MODE. THE NARROW CHANNEL WILL HAVE AN INTEGRATION PERIOD OF 30 MSEC AND THE WIDE CHANNEL A PERIOD OF 120 MSEC. BASIC DATA ANALYSIS WILL YIELD THE VOLUME EMISSION RATE ALONG THE SATELLITE TRACK, AND THE NARROW CHANNEL WILL PROVIDE VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER," P. E. HAYES, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 369 (1973).

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CAPACITANCE MANOMETER NSSDC ID AE-E -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.L.	CARTER	AEROSPACE CORP	EL SEGUNDO, CA
OI - C.J.	RICE	AEROSPACE CORP	EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AE-E WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MB. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY-SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PSA WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT OBSERVED IN REAL TIME.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COLD CATHODE ION GAUGE NSSDC ID AE-E -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - V.L. CARTER AEROSPACE CORP EL SEGUNDO, CA
OI - C.J. RICE AEROSPACE CORP EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION
THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-E IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR E (PSE), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSE GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PSE WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BE MEASURED BY AN AC BRIDGE CIRCUIT. AIR WILL BE ALLOWED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-RAM PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- AEROS-B NSSDC ID AEROS-B
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 07/00/74 SPACECRAFT WEIGHT IN ORBIT- 125. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
FED. REP. OF GERMANY UNKNOWN

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95. MIN
APOAPSIS- 960. KM ALT PERIAPSIS- 240. KM ALT INCLINATION- 97. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.L. WAGNER, JR. NASA-GSFC GREENBELT, MD
PM - H. SCHREIBER, JR. GSCHAFT FLER WELTRORSC BONN, W. GERMANY
PS - P. LAEMMERZAHL M.PLANCK INST.HEIDELBG HEIDLEBERG, W. GERMANY
PS - S.J. BAUER NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE AEROS-B SATELLITE WILL HAVE A CYLINDRICAL SHAPE, A DIAMETER OF 0.914 M, AND A HEIGHT OF 0.710 M. IT WILL BE LAUNCHED INTO AN ELLIPTICAL,

POLAR, NEARLY SUN-SYNCHRONOUS EARTH ORBIT. THE SPACECRAFT WILL BE SPIN-STABILIZED AT 10 RPM AND ORIENTED WITH THE SPIN AXIS TOWARD THE SUN. THE PURPOSE OF THE MISSION WILL BE TO STUDY THE STATE AND BEHAVIOR OF THE UPPER ATMOSPHERE AND IONOSPHERIC F RADIATION, ESPECIALLY WITH REGARD TO THE INFLUENCE OF THE SOLAR ULTRAVIOLET REGION. FIVE EXPERIMENTS WILL PROVIDE DATA WHICH WILL INCLUDE THE TEMPERATURE AND DENSITY OF ELECTRONS, IONS, AND NEUTRAL PARTICLES, THE COMPOSITION OF IONS AND NEUTRAL PARTICLES, AND SOLAR ULTRAVIOLET FLUX.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MASS SPECTROMETER (MS) NSSDC ID AEROS-B-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.K.H. KRANKOWSKY M.PLANCK INST.HEIDELEG HEIDELBERG, W. GERMANY
OI - P. LAEMMERZAHL M.PLANCK INST.HEIDELBG HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO PROVIDE MEASUREMENTS OF NEUTRAL AND IONIZED ATMOSPHERIC SPECIES IN THE MASS RANGE FROM 1 TO 44 AMU. THE QUADRUPOLE MASS ANALYZER, WITH ITS 'SEMI-OPEN' ION SOURCE, WILL BE SEALED UNDER VACUUM AND OPENED IN ORBIT. FOR AN ATMOSPHERE WITH AN EXOSPHERIC TEMPERATURE OF APPROXIMATELY 1500 DEG K, THE UPPER ALTITUDE LIMITS OF NEUTRAL MEASUREMENTS FOR DIFFERENT GAS SPECIES WILL BE -- MOLECULAR NITROGEN - 660 KM, MOLECULAR OXYGEN - 500 KM, ATOMIC OXYGEN - 800 KM, ARGON - 250 KM, AND HELIUM - 880 KM. ION DENSITIES FROM 1 PER CC TO 10 TO THE 6 PER CC CAN BE MEASURED THROUGHOUT THE ORBIT. THE ION SOURCE WILL BE OPERATED IN TWO MODES. NEUTRAL GAS SPECIES WILL BE PARTLY IONIZED BY A REGULATED 100-MICROAMPERE BEAM OF 75-EV ELECTRONS PRODUCED BY EITHER OF TWO REDUNDANT HOT FILAMENTS THAT CAN BE SELECTED BY GROUND COMMAND. THE IONS WILL BE FOCUSED INTO THE MASS ANALYZER BY AN ION LENS SYSTEM COMPOSED OF A REPELLING GRID AND TWO ACCELERATION LENSES. IN THE ION MODE, THE AMBIENT IONS DRIFTING INTO THE ION SOURCE REGION WILL BE ATTRACTED BY A NEGATIVELY-BIASED GRID AND SUBSEQUENTLY FOCUSED INTO THE ANALYZER. THE MASS RESOLUTION WILL BE ADJUSTED TO BE 30, AND A SWEEP THROUGH THE ENTIRE MASS RANGE WILL TAKE 1.22 SEC. AFTER LEAVING THE MASS ANALYZER, THE INDIVIDUAL ION CURRENTS WILL BE DETECTED BY A PARTICLE MULTIPLIER FOLLOWED BY A LOGARITHMIC ELECTROMETER, AND BY A GRID CURRENT FED INTO A LINEAR ELECTROMETER. THE VOLTAGE OUTPUT OF THE LOGARITHMIC ELECTROMETER WILL REPRESENT A QUANTITATIVE MEASURE OF THE CORRESPONDING PARTICLE NUMBER DENSITIES OF NEUTRALS WITHIN THE ION SOURCE. THE VOLTAGE OUTPUT OF THE LINEAR ELECTROMETER WILL REPRESENT A QUANTITATIVE MEASURE OF THE CORRESPONDING ION CURRENT (IONS/SEC) OF AMBIENT IONS ENTERING THE EQUIPMENT. THE UPPER LIMIT OF CURRENT THAT CAN BE MEASURED BY THE LOG AMPLIFIER WILL BE 5 TIMES 10 TO THE -6 AMP, CORRESPONDING TO A 0-V TELEMETRY OUTPUT SIGNAL. AUTOMATIC CALIBRATION AND REZEROING SIGNALS WILL BE INCLUDED. THE EXPERIMENT WILL WEIGH 7.0 KG, AND THE AVERAGE POWER DISSIPATED OVER AN ORBIT WILL BE 8 W.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGY DISTRIBUTION OF IONS AND ELECTRONS NSSDC ID AEROS-B-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K. SPENNER WKG GP SPC PHYS RES FREIBURG, W. GERMANY
OI - A. DUMBS WKG GP SPC PHYS RES FREIBURG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION
A RETARDING POTENTIAL ANALYZER WILL MEASURE THE ENERGY DISTRIBUTION OF ELECTRONS AND IONS. THE CORRESPONDING TEMPERATURES CAN BE DERIVED FROM THESE DISTRIBUTIONS. THE EXPERIMENT WILL OPERATE IN AN ELECTRON MODE AND IN AN ION MODE. THE INSTRUMENT WILL BE ESSENTIALLY A COLLECTOR, SHIELDED BY PARALLEL PLANE GRIDS. BY SWEEPING THE RETARDING VOLTAGE OF THE GRID, THE ENERGY SPECTRA OF THE IONOSPHERIC CHARGED PARTICLES CAN BE OBTAINED. THE PARTICLES WILL ONLY PASS THROUGH THE GRID AND REACH THE COLLECTOR IF THEIR KINETIC ENERGY EXCEEDS THE RETARDING POTENTIAL.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON CONCENTRATION IN THE IONOSPHERE NSSDC ID AEROS-B-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - E. NESKE WKG GP SPC PHYS RES FREIBURG, W. GERMANY
OI - R. KIST WKG GP SPC PHYS RES FREIBURG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION
THE IMPEDANCE PROBE AND VEHICLE BODY WILL COMPRISE TWO PLATES OF A CONDENSER. IMPEDANCE CHANGES DUE TO THE CHANGE IN DIELECTRIC (PLASMA) CHARACTERISTICS OF THE CONDENSER WILL BE OBSERVED BY MEASURING RESONANCE FREQUENCIES BETWEEN THE CAPACITATOR AND VARIABLE FEEDING FREQUENCIES. THE ELECTRON DENSITY CAN BE COMPUTED FROM THE OBSERVED RESONANCE FREQUENCY. FREQUENCIES WILL RANGE FROM 0.6 TO 10 MHZ, WHICH WILL CORRESPOND TO ELECTRON DENSITIES FROM 5 X 10E3 TO 10E6 ELECTRONS/CM CUBED.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR NSSDC ID AEROS-B-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G. SCHMIDTKE WKG GP SPC PHYS RES FREIBURG, W. GERMANY
OI - W. SCHWEIZER WKG GP SPC PHYS RES FREIBURG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A GRATING SPECTROMETER, A SOLAR COLLIMATOR, AND A PHOTOMULTIPLIER. IT WILL OPERATE IN 2 CHANNELS, 150 TO 510 A, AND 300 TO 1070 A, AND WILL BE USED TO MEASURE THE FLUX AND SPECTRAL DISTRIBUTION OF THE SOLAR EUV RADIATION AND ITS TEMPORAL AND SPATIAL VARIATIONS.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT NSSDC ID AEROS-B-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - D.T.	PELZ	NASA-GSFC	GREENBELT, MD
OI - G.P.	NEWTON	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI
OI - H.B.	NIEMANN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE IN SITU MEASUREMENTS OF THE TOTAL GAS DENSITY, THE KINETIC TEMPERATURE OF MOLECULAR NITROGEN IN THE THERMOSPHERE, AND THE MOLECULAR NITROGEN DENSITY. THE USEFUL ALTITUDE RANGE OF THE EXPERIMENT WILL BE DETERMINED AT THE UPPER LIMIT BY THE SIGNAL-TO-NOISE RATIO, AND AT THE LOWER LIMIT BY THE MAXIMUM INTERNAL NUMBER DENSITY AT WHICH THE ION SOURCE CAN PROPERLY OPERATE OR BY THE UPPER LIMIT OF DETECTION CAPABILITY. THE ION SOURCE SENSITIVITY CAN BE REDUCED UP TO A FACTOR OF 10 ON COMMAND. MOUNTED AT THE SATELLITE PERIPHERY WILL BE A SPHERICAL ANTECHAMBER WITH A KNIFE-EDGED ORIFICE FACING NORMAL TO THE SPIN AXIS. THIS CHAMBER, SEALED UNDER VACUUM BEFORE LAUNCH, WILL BE OPENED TO THE ATMOSPHERE ON COMMAND WHEN THE SPACECRAFT IS IN ORBIT. THE INCOMING ATMOSPHERIC SPECIES WILL UNDERGO COLLISIONS WITH THE CHAMBER WALLS, AND SOME OF THIS THERMALIZED GAS WILL ENTER A SMALL DUAL-FILAMENT ION SOURCE, THAT PRODUCES AN ION BEAM PROPORTIONAL TO THE CHAMBER DENSITY. THE BEAM WILL BE DIRECTED INTO A QUADRUPOLE ANALYZER, THAT TRANSMITS IONS WITH A MASS-TO-CHARGE RATIO OF 28, TO AN ELECTRON MULTIPLIER WHERE INDIVIDUAL IONS AT THE INPUT WILL BE CONVERTED TO PULSES OF ELECTRONS WHICH WILL BE COUNTED AT THE MULTIPLIER OUTPUT. THESE OUTPUT PULSES WILL BE AMPLIFIED AND SENT TO A DATA PROCESSOR THAT WILL PROVIDE DIGITAL OUTPUT SIGNALS, IN THE PROPER FORMAT, TO THE TELEMETRY SYSTEM. THUS, THE OBJECTIVE OF THE MEASUREMENT SYSTEM WILL BE TO PROVIDE A DIGITAL OUTPUT THAT IS PROPORTIONAL TO THE INSTANTANEOUS DENSITY OF NEUTRAL MOLECULAR NITROGEN IN THE SPHERICAL ANTECHAMBER. A TURN-ON SEQUENCE WILL PROVIDE THE NECESSARY VOLTAGES TO MEASURE THE CONCENTRATIONS OF SPECIES WITH MASS-TO-CHARGE RATIOS OF 4, 12, 14, 16, 18, 32, 40, AND 44. TOTAL DENSITY MEASUREMENTS CAN ALSO BE OBTAINED. THE INSTANEOUS VALUE OF THE NITROGEN DENSITY WILL BE SAMPLED A TOTAL OF 44 TIMES PER SPACECRAFT SPIN PERIOD, WITH INCREASED TIME RESOLUTION IN THE REGION OF THE SPIN POSITION WHERE THE ORIFICE NORMAL IS NEARLY PERPENDICULAR TO THE SATELLITE VELOCITY VECTOR.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG ANALYSIS NSSDC ID AEROS-B-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - M.	ROEMER	U OF BONN	BONN, W. GERMANY
OI - C.	WOLF-MATHIES	U OF BONN	BONN, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE AEROS ATMOSPHERIC DRAG DENSITY EXPERIMENT WILL PROVIDE INDIRECT MEASUREMENTS OF UPPER ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE. THE EXPERIMENT WILL HAVE NO UNIQUE HARDWARE ON BOARD. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. TO BE LAUNCHED INTO AN ELLIPTIC (APOGEE 864 KM, PERIGEE 218 KM) NEAR-POLAR ORBIT, THE AEROS SATELLITE IS EXPECTED TO YIELD SYSTEMATIC CHANGES IN DENSITY AS A FUNCTION OF ALTITUDE, LATITUDE, AND TIME. THE DATA OBTAINED WILL BE CORRELATED WITH DENSITY VALUES SIMULTANEOUSLY DERIVED FROM DIRECT PARTICLE DETECTION USING AN ONBOARD NEUTRAL DENSITY GAUGE.

ON 09/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ANS NSSDC ID ANS
ALTERNATE NAMES- ASTRO NETHERLAND SAT

PLANNED LAUNCH DATE- 08/00/74 SPACECRAFT WEIGHT IN ORBIT- 125. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
THE NETHERLANDS UNKNOWN
INTERNATIONAL UNKNOWN

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 95. MIN
APOAPSIS- 550.000 KM ALT PERIAPSIS- 550.000 KM ALT INCLINATION- 98. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W. BLOEMENDAL FOKKER VFW N.V. SCHIPHOLOL-OOST
PM - R.K. BROWNING NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE ASTRONOMICAL NETHERLANDS SATELLITE (ANS) WILL BE AN EARTH-ORBITING SUN-SYNCHRONOUS SATELLITE, DESIGNED FOR USE AS AN ASTRONOMICAL OBSERVATORY. THE SPACECRAFT WILL HAVE A NEAR-CIRCULAR ORBIT AND WILL BE ATTITUDE-CONTROLLED BY MAGNETIC COILS, REACTION WHEELS, AND A YO-YO. ATTITUDE SENSING WILL BE CARRIED OUT BY SOLAR SENSORS, HORIZON SENSORS, AND STAR SENSORS. TWO GUIDE STARS NEAR THE OBJECT BEING OBSERVED WILL SERVE AS THE FINAL POINTING REFERENCES. EXPERIMENTS ON BOARD WILL OBSERVE CELESTIAL OBJECTS IN UV AND X-RAY WAVELENGTHS.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- UV TELESCOPE NSSDC ID ANS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.J. VANDUINEN KAPTEYN OBS GRONINGEN, THE NETHERLANDS
OI - J. BORGMAN U OF GRONINGEN RODEN, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, WHICH WILL REQUIRE A POINTING ACCURACY OF 1 ARC-MIN, WILL CONSIST OF A SMALL CASSEGRAIN TELESCOPE COUPLED TO A GRATING SPECTROGRAPH. THE SPECTROGRAPH WILL COVER FIVE WAVELENGTH BANDS BETWEEN 1500 AND 3295 A, USING PHOTOMULTIPLIERS AS DETECTORS. THE EXPERIMENT IS DESIGNED TO BE SENSITIVE ENOUGH TO OBSERVE STARS UP TO THE 10TH MAGNITUDE.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- LOW-ENERGY X-RAY EXPERIMENT NSSDC ID ANS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C. DE JAGER U OF UTRECHT UTRECHT, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A MYLAR-WINDOW PROPORTIONAL COUNTER (44- TO 55-A PASSBAND), LOCATED AT THE FOCUS OF A GRAZING INCIDENCE RING PARABOLOID TELESCOPE, AND A TITANIUM-WINDOW PROPORTIONAL COUNTER (PASSBANDS OF 27- TO 35-A, 4- TO 12-A, AND 2- TO 4-A) LOCATED BEHIND A HONEYCOMB COLLIMATOR. THE EXPERIMENT, WHICH WILL OBSERVE X RAYS FROM COSMIC SOURCES, WILL REQUIRE AN INSTRUMENT POINTING ACCURACY OF 0.1 DEG.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- HIGH ANGULAR AND SPECTRAL RESOLUTION OBSERVATIONS OF COSMIC X-RAY SOURCES NSSDC ID ANS -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. GURSKY HARVARD COLLEGE OBS CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO OBSERVE HARD X RAYS FROM COSMIC SOURCES IN THE 2- TO 40-KEV ENERGY REGION. THE INSTRUMENTS WILL CONSIST OF TWO BERYLLIUM-WINDOWED PROPORTIONAL COUNTERS AND A TWO-CRYSTAL BRAGG SPECTROMETER MOUNTED OUTSIDE THE CENTRAL SQUARE TUBE NEAR THE TOP OF THE SATELLITE. THE PROPORTIONAL COUNTERS WILL EACH HAVE AN APPROXIMATELY 100-CM SQ COLLECTING AREA AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 6 ARC-MIN. THE CRYSTAL SPECTROMETERS WILL POINT WITH PLUS OR MINUS 1 ARC-MIN ANGULAR RESOLUTION. THE DETECTION LIMITS FOR THE PROPORTIONAL COUNTERS WILL BE ABOUT 3 X 10 TO THE MINUS THREE PHOTONS/SQ-CM-SEC (OR ABOUT 3 X 10 TO THE MINUS FIVE TIMES THE OBSERVED FLUX OF SCORPIUS X-1). THE BRAGG SPECTROMETER WILL DETECT IRON EMISSIONS OF GREATER THAN 1 PERCENT IRON IN A SOURCE 0.01 OF SCORPIUS X-1.

ON / / , THE SPACECRAFT MISSION WAS

****

SPACECRAFT COMMON NAME- ASTP NSSDC ID ASTP
ALTERNATE NAMES- APOLLO-SOYUZ TEST PROJECT

PLANNED LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OA
U.S.S.R. UNKNOWN

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN

APOAPSIS- 230. KM ALT PERIAPSIS- 230. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - L. CASEY NASA HEADQUARTERS WASHINGTON, DC
PS - BUSHUYEV UNKNOWN USSR

SPACECRAFT BRIEF DESCRIPTION
THE APOLLO-SOYUZ TEST PROJECT (ASTP) WILL BE THE FIRST INTERNATIONAL MANNED SPACE FLIGHT. IT WILL TEST A DOCKING AND RENDEZVOUS SYSTEM CONTRIBUTING TO DEVELOPMENT OF INTERNATIONAL SPACE RESCUE CAPABILITY AND FUTURE COOPERATION IN MANNED SPACE MISSIONS. THE SPACECRAFT WILL CARRY FOUR ASTRONOMY AND SPACE PHYSICS EXPERIMENTS, FIVE LIFE SCIENCES EXPERIMENTS, AND EIGHT SPACE APPLICATIONS EXPERIMENTS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EXTREME ULTRAVIOLET ASTRONOMY NSSDC ID ASTP -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.S. BOWYER U OF CALIFORNIA, BERK BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION
THIS ASTP EXPERIMENT WILL BE PERFORMED TO SEARCH FOR SOURCES OF EXTREME ULTRAVIOLET RADIATION (EUV) IN THE NIGHT SKY. THE PRINCIPAL INSTRUMENT WILL BE A FLUX-COLLECTING GRAZING-INCIDENCE TELESCOPE WITH AN EUV DETECTOR AT ITS FOCAL POINT, MOUNTED OUTSIDE THE SPACECRAFT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HELIUM GLOW NSSDC ID ASTP -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.S. BOWYER U OF CALIFORNIA, BERK BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION
THIS ASTP EXPERIMENT WILL BE PERFORMED TO MEASURE THE INTENSITY AND SPATIAL DISTRIBUTION OF HELIUM-FLUORESCENT RADIATION IN SELECTED REGIONS OF THE NIGHT SKY. THE MEASUREMENTS COULD GIVE THE DISTRIBUTION OF HELIUM IN INTERPLANETARY SPACE, AND INDICATE THE PENETRATION OF INTERSTELLAR HELIUM INTO THE SOLAR SYSTEM. MEASUREMENTS WILL BE MADE WITH A NARROW-PASSBAND PHOTOMETER, SENSITIVE TO HELIUM RADIATION AND POINTED TO AN ACCURACY OF 4 DEG.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET ATMOSPHERIC ABSORPTION NSSDC ID ASTP -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T.M. DONAHUE U OF PITTSBURGH PITTSBURGH, PA

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO MEASURE THE CONCENTRATION OF ATMOSPHERIC CONSTITUENTS, ESPECIALLY ATOMIC OXYGEN AND NITROGEN, IN THE ATMOSPHERE BY ULTRAVIOLET ABSORPTION AND RESONANCE-SCATTERING SPECTROSCOPY. UTILIZING THE SPACE BETWEEN THE TWO SPACECRAFT, ULTRAVIOLET LIGHT FROM RESONANCE LINE SOURCES WILL BE SENT BY A TELESCOPE MOUNTED ON THE APOLLO TO AN ARRAY OF CORNER CUBES ON THE SOYUZ AND RETURNED TO A SCANNING SPECTROMETER/DETECTOR ON THE APOLLO. THE EXPERIMENT WILL INTRODUCE A NEW TECHNIQUE FOR MEASURING ATMOSPHERIC CONSTITUENTS. THE DISTANCE BETWEEN THE TWO SPACECRAFT WILL BE VARIED TO ELIMINATE ABSORPTION EFFECTS OF CONTAMINANTS AROUND EITHER SPACECRAFT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SKY-EARTH X-RAY OBSERVATIONS NSSDC ID ASTP -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. FRIEDMAN NAVAL RESEARCH LAB WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO PRODUCE A DETAILED MAP OF CELESTIAL SOFT X-RAY EMISSIONS IN THE 0.1- TO 1.0-KEV RANGE. ROCKET OBSERVATIONS HAVE DETECTED A DIFFUSE BACKGROUND OF SOFT X-RAY RADIATION, BUT A SYSTEMATIC SKY SURVEY HAS NEVER BEEN MADE IN THE 0.1- TO 1.0-KEV ENERGY RANGE. SATELLITE OBSERVATIONS WILL PROVIDE FINER ANGULAR RESOLUTION AND STATISTICS NEEDED TO DETERMINE THE VARIOUS SOURCES THAT CONTRIBUTE. THE THIN-WINDOW, SOFT X-RAY DETECTOR WILL BE MOUNTED IN A BAY OF THE APOLLO SERVICE MODULE.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SURFACE TENSION INDUCED CONVECTION IN ENCAPSULATED LIQUID METALS IN ZERO G NSSDC ID ASTP -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.E. REED OAK RIDGE NATL LAB OAK RIDGE, TN
OI - F.J. BRUNI OAK RIDGE NATL LAB OAK RIDGE, TN

EXPERIMENT BRIEF DESCRIPTION

PAIRED SPECIMENS OF ALLOYS CONTAINING SMALL AMOUNTS OF GOLD WILL BE MELTED IN IRON AND GRAPHITE CAPSULES AND ALLOWED TO MIX. AFTER THE METALS HAVE SOLIDIFIED AND BEEN RETURNED TO EARTH, THEY WILL BE CUT INTO THIN SLICES AND THE SECTIONS ANALYZED FOR DISTRIBUTION OF GOLD TO DETERMINE THE PRESENCE OR ABSENCE OF CONVECTIVE EFFECTS CAUSED BY VARIATIONS IN SURFACE TENSION DURING THE HEATING.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFLUENCE OF WEIGHTLESSNESS ON THE IMMISCIBILITY OF MONOTECTIC ALLOY SYSTEMS NSSDC ID ASTP -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.Y. ANG NORTHROP CORP LAB HAWTHORNE, CA

EXPERIMENT BRIEF DESCRIPTION
SPECIMENS OF TWO DIFFERENT ALLOYS WILL BE MELTED AND SAMPLES WITHDRAWN AFTER VARYING PERIODS TO ASSESS HOW THE LACK OF STRATIFICATION IN WEIGHTLESS MIXTURES OF LIQUIDS OF DIFFERING DENSITIES MAY INFLUENCE THE APPROACH TO EQUILIBRIUM IN THE FORMATION OF INTERMETALLIC COMPOUNDS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ROLE OF CONVECTION IN SOLIDIFICATION PROCESS IN HIGH COERCIVE STRAIGHT MAGNET NSSDC ID ASTP -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D. LARSON GRUMMAN AEROSPACE BETHPAGE, NY
OI - T.Z. KATTAMIS U OF CONNECTICUT STORRS, CT

EXPERIMENT BRIEF DESCRIPTION
MAGNETIC MATERIALS WILL BE MELTED AND RESOLIDIFIED AT CONTROLLED RATES TO SEE WHETHER CAST MATERIALS WITH IMPROVED PROPERTIES CAN BE MADE UNDER WEIGHTLESS CONDITIONS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DETERMINATION OF ZERO-GRAVITY EFFECTS ON ELECTRONIC MATERIALS PROCESSING NSSDC ID ASTP -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H.C. GATOS MIT CAMBRIDGE, MA
OI - A.F. WITT MIT CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
A CYLINDRICAL CRYSTAL OF DOPED GERMANIUM WILL BE PARTLY MELTED AND THEN RESOLIDIFIED. DURING SOLIDIFICATION, ARTIFICIAL GROWTH BANDS WILL BE INTRODUCED INTO THE CRYSTAL BY ELECTRICAL PULSES AT 5-SEC INTERVALS, AND WILL PRODUCE HEATING AT THE SOLID/LIQUID INTERFACE. THE BANDS WILL PROVIDE A TIME REFERENCE FOR DETERMINATION OF MICROSCOPIC GROWTH RATES. THIS INFORMATION, AND MEASUREMENTS OF THE DISTRIBUTION OF MATERIAL WITHIN THE CRYSTAL, WILL MAKE POSSIBLE DETAILED ANALYSIS OF THE GROWTH PROCESS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CRYSTAL GROWTH FROM THE VAPOR PHASE IN ZERO-GRAVITY ENVIRONMENT NSSDC ID ASTP -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. WIEDEMEIER RENSSALAER POLY INST ROCHESTER, NY

EXPERIMENT BRIEF DESCRIPTION
THREE EXPERIMENTS WILL BE PERFORMED ON THE GROWTH OF SEMICONDUCTOR CRYSTALS IN THE FURNACE, USING DIFFERENT MATERIALS, TO SEE HOW THE GROWTH PROCESS IN WEIGHTLESSNESS DIFFERS FROM CRYSTAL GROWTH ON EARTH.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZERO-GRAVITY SOLIDIFICATION OF NACL-LIF EUTECTIC NSSDC ID ASTP -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A.S. YUE U OF CALIFORNIA, LA LOS ANGELES, CA
OI - C.W. YEH U OF CALIFORNIA, LA LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
SAMPLES OF A SODIUM-CHLORIDE AND LITHIUM-FLUORIDE COMPOSITION WITH A LOW MELTING POINT WILL BE MELTED IN THE FURNACE AND THEN SOLIDIFIED. THIS MATERIAL SOLIDIFIES IN THE FORM OF FIBERS OF LITHIUM-FLUORIDE EMBEDDED IN SODIUM-CHLORIDE THAT CAN ACT AS AN IMAGE-TRANSMITTING MEDIUM FOR INFRARED LIGHT. THE EXPERIMENT WILL ATTEMPT TO PRODUCE SAMPLES WITH A FIBER DISTRIBUTION SHOWING A HIGH DEGREE OF ORIENTATION, REGULARITY, AND FIBER CONTINUITY.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROPHORESIS NSSDC ID ASTP -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. HANNING MAX PLANCK INST WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS PURPOSE OF THIS EXPERIMENT WILL BE TO ANALYZE, PURIFY, AND ISOLATE SAMPLES FOR MEDICAL AND BIOLOGICAL RESEARCH. IT MAY CONTRIBUTE TOWARD DEVELOPMENT OF SEPARATION METHODS FOR PRODUCING VACCINES AND SERUMS IN SPACE FOR MEDICAL USE ON EARTH. HUMAN AND RABBIT BLOOD CELLS WILL BE INTRODUCED CONTINUOUSLY INTO A BUFFER FLUID WHICH WILL FLOW THROUGH AN ELECTRICAL FIELD. THE CELLS WILL BE SEPARATED INTO THEIR CONSTITUENTS AT VARIOUS ANGLES AS THEY MIGRATE THROUGH THE BUFFER FLUID. THE SEPARATED CONSTITUENTS OF THE CELLS CAN BE ANALYZED AND COLLECTED. THE ZERO-G SPACE ENVIRONMENT WILL ALLOW HIGHER FLOW RATE AND BETTER YIELD OF SEPARATION THAN CAN BE ACHIEVED IN EARTH'S GRAVITY. FACTORS LIKE HEAT CONVECTION, SEDIMENTATION, AND BUOYANCY LIMIT EFFECTIVE SEPARATION IN EARTH'S GRAVITY.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPACECRAFT-TO-SPACECRAFT DOPPLER TRACKING NSSDC ID ASTP -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.C. WEIFFENBACH SAO CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THE APOLLO-SOYUZ VHF RANGING SYSTEM WILL BE USED TO MEASURE CHANGES IN THE DISTANCE BETWEEN THE TWO SPACECRAFT AS INDICATIONS OF LOCAL ANOMALIES OF EARTH'S GRAVITY FIELD. THE STRUCTURE OF THE EARTH'S GRAVITY FIELD IS OF SCIENTIFIC INTEREST BECAUSE IT IS ONE OF THE CLUES TO INTERNAL DISTRIBUTION OF THE EARTH'S MASS. DATA ON GRAVITY ANOMALIES WILL CONTRIBUTE TO GEOLOGICAL AND GEOPHYSICAL STUDIES OF CONTINENTAL DRIFT, EARTHQUAKES, VOLCANIC

ACTIVITY, AND MINERAL RESOURCES.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POLYMORPHONUCLEAR LEUKOCYTE RESPONSE TO INFECTION NSSDC ID ASTP -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.R. MARTIN BAYLOR U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY POSSIBLE EFFECTS OF WEIGHTLESSNESS ON THE FUNCTION OF POLYMORPHONUCLEAR LEUKOCYTES. BLOOD SAMPLES WILL BE TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE MISSION AND COMPARATIVE STUDIES WILL BE MADE OF WHITE CELL RESPONSE TO BACTERIA. THE DATA WILL PROVIDE ADDITIONAL INFORMATION ON THE POSSIBLE EFFECTS OF A LONG-DURATION SPACE MISSION ON RESISTANCE TO BACTERIAL INFECTIONS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EFFECTS OF SPACE FLIGHT ON THE CELLULAR RESPONSE OF MAN NSSDC ID ASTP -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B.S. CRISWELL BAYLOR U HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY THE EFFECTS OF SPACE FLIGHT ON THE RESPONSE OF LYMPHOCYTE CELLS TO INFECTIOUS AGENTS. STUDIES WILL BE MADE FROM LYMPHOCYTES IN BLOOD SAMPLES TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE MISSION. THE DATA CAN BE COORDINATED WITH THAT OBTAINED ON THE POLYMORPHONUCLEAR LEUKOCYTE CELL EXPERIMENT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MICROBIAL EXCHANGE TEST NSSDC ID ASTP -15

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.R. TAYLOR NASA-JSC HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO QUANTITATIVELY MONITOR THE MICROBIAL LOAD OF CREWMEN AND THE DEGREE OF MICROBIAL EXCHANGE BETWEEN CREWMEN. MICROBIOLOGICAL SAMPLES WILL BE COLLECTED WITH SWABS FROM THE ASTRONAUTS AND COSMONAUTS AND FROM THE INTERIOR OF THE APOLLO AND SOYUZ SPACECRAFT AT SPECIFIED TIMES BEFORE, DURING, AND AFTER THE FLIGHT. INFLIGHT SAMPLES WILL BE COLLECTED BY THE CREWMEN WHILE THE TWO SPACECRAFT ARE DOCKED. COMPARISONS BETWEEN SAMPLE PERIODS, INDIVIDUALS, AND COLLECTION SITES WILL ESTABLISH MICROBIAL EXCHANGE PATTERNS.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BIOSTACK NSSDC ID ASTP -16

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. BUCKER U OF FRANKFURT FRANKFURT, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL PROVIDE DATA ON THE EFFECTS COSMIC RAYS AND OTHER SPACE FLIGHT RADIATION MAY HAVE ON DEVELOPMENT OF SELECTED BIOLOGICAL MATERIALS. SIMILAR EXPERIMENTS WERE FLOWN ABOARD THE APOLLO 16 AND 17 SPACECRAFT. LAYERS OF BACILLUS SUBTILIS SPORES (BACTERIA SPORES), COLPODA CUCULLUS CYSTS (PROTOZOA CYSTS), ARABIDOPSIS THALIANA SEEDS (WATERCRESS SEED), VICIA FABA RADICULEA (BEAN ROOTS), ARTEMIA SALINA EGGS (BRINE SHRIMP), AND TRIBOLIUM CASTENEUM EGGS (BEETLE EGGS) WILL BE STACKED ALTERNATELY WITH LAYERS OF DIFFERENT TRACK DETECTORS (NUCLEAR EMULSIONS, PLASTICS, AND SILVER CHLORIDE CRYSTALS). THE STACK WILL BE SEALED IN A SMALL CONTAINER AND PLACED ABOARD THE APOLLO SPACECRAFT. AFTER RECOVERY, A COMPARISON WILL BE MADE OF THE DEVELOPMENT OF THE BIOLOGICAL SAMPLES WITH BALLOON AND GROUND-BASED IRRADIATION EXPERIMENTS. ANY MUTATION OR OTHER DEVELOPMENT ANOMALIES WILL BE OF PARTICULAR INTEREST. DATA WILL CONTRIBUTE TOWARD ESTIMATING RADIATION HAZARDS DURING SPACE FLIGHT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LIGHT FLASHES AND OTHER SENSATIONS FROM COSMIC PARTICLES NSSDC ID ASTP -17

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.A. TOBIAS LAWRENCE LIVERMORE LAB LIVERMORE, CA
OI - T.F. BUDINGER U OF CALIFORNIA, BERK BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO ASCERTAIN THE FREQUENCIES AT WHICH COSMIC RAYS CAN BE DETECTED BY FLIGHT CREWS IN EARTH ORBIT, AND THE LATITUDES AT WHICH THE PHENOMENON OCCURS. DURING APOLLO MISSIONS, ASTRONAUTS REPORTED SEEING BRIGHT FLASHES AND STREAKS OF LIGHT DURING TOTAL DARKNESS. THE FLASHES ARE THOUGHT TO BE HEAVY PARTICLES FROM GALACTIC COSMIC RAYS INTERACTING WITH TISSUE IN OR NEAR THE RETINA OF THE EYE. HOWEVER, OBSERVATIONS BY THE APOLLO CREWS WERE NOT CONSISTENT AS TO THE FREQUENCY THE PHENOMENON OCCURRED. WHILE CARRYING OUT THE EXPERIMENT ON THE ASTP MISSION, CREWMEN WILL DON A SPECIALLY-FITTED FULL HEAD MASK WHICH WILL BE SOUNDPROOF AND LIGHTPROOF. THE MASK WILL BE WORN FOR PERIODS OF ONE TO TWO HOURS WHILE REPORTING LIGHT FLASH PHENOMENA OR SENSATIONS OF SOUND, TASTE, AND SMELL WHICH MIGHT BE CONSIDERED UNUSUAL IN CONNECTION WITH THESE LIGHT FLASHES. COSMIC PARTICLE DETECTORS, LIGHT-EMITTING DIODES, AND A SPEAKER SYSTEM FOR COMMUNICATION PURPOSES WILL BE BUILT INTO THE MASK. DATA WILL CONTRIBUTE TO LABORATORY STUDIES FOR DETECTION OF COSMIC RAYS AND ESTIMATING RADIATION HAZARDS DURING SPACE FLIGHT.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ASTP-APOLLO NSSDC ID ASTP-A
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 1B

FUNDING AGENCY
UNITED STATES NASA-OMSF

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 230. KM ALT PERIAPSIS- 230. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - LEE NASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN APOLLO SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S), RESPECTIVELY, AS A JOINT EFFORT CALLED THE APOLLO-SOYUZ TEST PROJECT (ASTP). THE SOYUZ SPACECRAFT WILL BE LAUNCHED FIRST, WITH A TWO-MAN CREW WHO WILL MANEUVER THEIR SPACECRAFT INTO A DOCKING ORBIT. THE APOLLO SPACECRAFT WILL BE LAUNCHED 7 1/2 HR LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ SPACECRAFT. THE DOCKING OF THE TWO SPACECRAFT IS TO OCCUR ABOUT TWO DAYS INTO THE MISSION. AFTER DOCKING, CREW TRANSFERS WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE SOYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT EXPERIMENTS AND PRESENT RADIO AND TV REPORTS. AFTER THE JOINT EXPERIMENTS HAVE BEEN COMPLETED, THE SPACECRAFT WILL DISENGAGE AND EACH WILL CONTINUE ITS SEPARATE MISSION.

ON 09/06/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ASTP-SOYUZ NSSDC ID ASTP-S
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- TYURATAM-BAIKONUR, U.S.S.R. LAUNCH VEHICLE-

FUNDING AGENCY
U.S.S.R. UNKNOWN

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 230. KM ALT PERIAPSIS- 230. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN APOLLO SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S), RESPECTIVELY, AS A JOINT EFFORT

CALLED THE APOLLO-SOYUZ TEST PROJECT (ASTP). THE SOYUZ SPACECRAFT WILL BE LAUNCHED FIRST, WITH A TWO-MAN CREW WHO WILL MANEUVER THEIR SPACECRAFT INTO A DOCKING ORBIT. THE APOLLO SPACECRAFT WILL BE LAUNCHED 7 1/2 HR LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ SPACECRAFT. THE DOCKING OF THE TWO SPACECRAFT IS TO OCCUR ABOUT TWO DAYS INTO THE MISSION. AFTER DOCKING, CREW TRANSFERS WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE SOYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT EXPERIMENTS AND PRESENT RADIO AND TV REPORTS. AFTER THE JOINT EXPERIMENTS HAVE BEEN COMPLETED, THE SPACECRAFT WILL DISENGAGE AND EACH WILL CONTINUE ITS SEPARATE MISSION.

ON 09/05/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ATS-F NSSDC ID ATS-F
ALTERNATE NAMES- PL-731A

PLANNED LAUNCH DATE- 04/00/74 SPACECRAFT WEIGHT IN ORBIT- 930. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES NASA-OA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.M. THOLE NASA-GSFC GREENBELT, MD
PS - R.W. ROCHELLE NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE PRIMARY OBJECTIVES OF ATS-F (APPLICATIONS TECHNOLOGY SATELLITE) WILL BE TO ERECT IN ORBIT A LARGE HIGH-GAIN STEERABLE ANTENNA STRUCTURE CAPABLE OF PROVIDING A GOOD QUALITY TV SIGNAL TO A GROUND-BASED RECEIVER AND TO MEASURE AND EVALUATE THE PERFORMANCE OF SUCH AN ANTENNA. A SECONDARY OBJECTIVE WILL BE TO DEMONSTRATE NEW CONCEPTS IN SPACE TECHNOLOGY IN THE AREAS OF AIRCRAFT CONTROL, LASER COMMUNICATIONS, AND VISUAL AND INFRARED MAPPING OF THE EARTH/ATMOSPHERE SYSTEM. THE SPACECRAFT WILL ALSO BE CAPABLE OF (1) MEASURING RADIO FREQUENCY INTERFERENCE IN SHARED FREQUENCY BANDS AND PROPAGATION CHARACTERISTICS OF MILLIMETER WAVES, (2) PERFORMING SPACECRAFT-TO-SPACECRAFT COMMUNICATION AND TRACKING EXPERIMENTS, AND (3) MAKING PARTICLE AND RADIATION MEASUREMENTS OF THE GEOSYNCHRONOUS ENVIRONMENT. CONFIGURED SOMEWHAT LIKE AN OPEN PARASOL, THE ATS-F SPACECRAFT WILL CONSIST OF FOUR MAJOR ASSEMBLIES -- (1) A 9.15-M-DIAM DISH ANTENNA, (2) TWO SOLAR CELL PADDLES MOUNTED AT RIGHT ANGLES TO EACH OTHER ON OPPOSITE SIDES OF AN UPPER EQUIPMENT MODULE, (3) AN EARTH-VIEWING EQUIPMENT MODULE (EVM) CONNECTED BY A TUBULAR MAST TO THE UPPER EQUIPMENT MODULE, AND (4) AN ATTITUDE CONTROL AND STABILIZATION SYSTEM. THE EVM, IN ADDITION TO HOUSING THE EARTH-VIEWING EXPERIMENTS, WILL PROVIDE SUPPORT FOR THE PROPULSION SYSTEM AND TANKS, BATTERIES, A MULTIFREQUENCY TRANSPONDER, AND THE TELEMETRY, COMMAND, AND THERMAL CONTROL SYSTEMS. THE UPPER EQUIPMENT MODULE WILL PROVIDE A PLATFORM FOR THE SPACE-VIEWING EXPERIMENTS. INERTIA WHEELS WILL BE THE PRIME MEANS FOR TORQUING THE SPACECRAFT, WITH BOTH HYDRAZINE AND

AMMONIA MULTIJET THRUSTER SYSTEMS INCLUDED TO PROVIDE THE NECESSARY TORQUES FOR UNLOADING THE WHEELS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS NSSDC ID ATS-F -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	KONRADI	NASA-JSC	HOUSTON, TX
OI - T.A.	FRITZ	NOAA	BOULDER, CO
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

SOLID-STATE DETECTORS WILL MEASURE THE DIRECTIONAL FLUXES OF PROTONS IN THE RANGE OF 20- TO 300-KEV IN SIX ENERGY STEPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOMETER EXPERIMENT NSSDC ID ATS-F -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.J.	COLEMAN, JR.	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - W.D.	CUMMINGS	GRAMBLING COLLEGE	GRAMBLING, LA

EXPERIMENT BRIEF DESCRIPTION

THE MAGNETIC FIELD WILL BE MEASURED USING THREE ORTHOGONAL FLUXGATE SENSORS. THE ACCURACY WILL BE 1/8 GAMMA WITH A RANGE OF 1024 GAMMA. THE TELEMETRY RATE WILL BE 450 BPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY PROTON/ELECTRON EXPERIMENT NSSDC ID ATS-F -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.	ARNOLDY	U OF NEW HAMPSHIRE	DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

A CHANNELTRON PRECEDED BY AN ELECTROSTATIC ANALYZER WILL BE USED TO MEASURE ELECTRONS FROM 2 TO 25 KEV IN 11 DIFFERENTIAL ENERGY WINDOWS AND PROTONS FROM 20 TO 500 KEV AT TWO DIFFERENTIAL PITCH ANGLES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION NSSDC ID ATS-F -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.R.	WINCKLER	U OF MINNESOTA	MINNEAPOLIS, MN

OI - G.K. PARKS U OF WASHINGTON SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL INVESTIGATE THE ORIGIN OF THE VAN ALLEN TRAPPED RADIATION. IT WILL CONSIST OF A MAGNETIC DEFLECTION SEPARATION SYSTEM AND A SOLID-STATE PARTICLE COUNTER SYSTEM. THE PARTICLE COUNTERS WILL HAVE DIRECTIONAL CAPABILITIES SO THAT PARTICLE PITCH ANGLES MAY BE DETERMINED. THE SYSTEM WILL RESPOND TO PROTONS IN THE RANGES 20 TO 50 KEV, 50 TO 150 KEV, AND 150 TO 500 KEV, AND TO ELECTRONS IN THE RANGES 20 TO 40 KEV, 100 TO 200 KEV, AND 1.0 TO 1.5 MEV.

ON 12/13/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- AURORAL PARTICLES EXPERIMENT NSSDC ID ATS-F -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.E. MCILWAIN U OF CALIFORNIA, SD SAN DIEGO, CA
OI - R.W. FILLIUS U OF CALIFORNIA, SD SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
A QUADRISPHERICAL ELECTROSTATIC ANALYZER AND ASSOCIATED CHANNELTRON WILL MEASURE ELECTRONS AND PROTONS FROM THERMAL ENERGIES TO 70 KEV IN 62 OVERLAPPING STEPS OVER A RANGE OF DIFFERENT PITCH ANGLES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION NSSDC ID ATS-F -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A.J. MASLEY MCDONNELL-DOUGLAS HUNTINGTON BEACH, CA
OI - P.R. SATTERBLOM MCDONNELL-DOUGLAS HUNTINGTON BEACH, CA

EXPERIMENT BRIEF DESCRIPTION
TWO SOLID-STATE TELESCOPES, ONE DIRECTED PERPENDICULAR TO AND THE OTHER DIRECTED PARALLEL TO THE LOCAL MAGNETIC FIELD DIRECTION, WILL EACH MEASURE PROTONS FROM 0.2 TO 300 MEV IN 12 ENERGY INTERVALS AND ALPHA PARTICLES FROM 1.2 TO 180 MEV IN 10 ENERGY INTERVALS. TWO MAGNETIC ELECTRON SPECTROMETERS, ORIENTED PARALLEL TO THE TWO TELESCOPES, WILL MEASURE ELECTRONS FROM 50 TO 800 KEV IN FOUR ENERGY INTERVALS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- OMNIDIRECTIONAL SPECTROMETER NSSDC ID ATS-F -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D. BLAKE AEROSPACE CORP EL SEGUNDO, CA
OI - J.B. PAULIKAS AEROSPACE CORP EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE OMNIDIRECTIONAL FLUXES AND SPECTRA OF ELECTRONS AND PROTONS. FOUR DETECTORS WILL COUNT

PROTONS FROM 2 OR 3 TO 10 MEV, 10 TO 21 MEV, 20 TO 40 MEV, AND 40 TO 80 MEV. THEY WILL ALSO COUNT, RESPECTIVELY, ELECTRONS OF ENERGIES GREATER THAN 80 KEV AND 250 KEV, 600 KEV, 1.2 MEV, AND 4 MEV.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR) NSSDC ID ATS-F -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.	SHENK	NASA-GSFC	GREENBELT, MD
OI - A.W.	MCCULLOCH	NASA-GSFC	GREENBELT, MD
OI - I.L.	GOLDBERG	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR) EXPERIMENT WILL PROVIDE BOTH DAY AND NIGHT CLOUDCOVER INFORMATION FOR DETERMINING CLOUD MOTIONS, TROPICAL AND EXTRATROPICAL STORM LIFE CYCLES, AND MESOSCALE PHENOMENA. THEY WILL ALSO BE USED FOR FOR CLOUD CLIMATOLOGY STUDIES. THE GVHRR WILL HAVE ONE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND ONE VISIBLE CHANNEL (0.55 TO 0.75 MICRON). THE INSTANTANEOUS FIELD OF VIEW WILL BE 0.3 MILLIRADIAN FOR THE INFRARED CHANNEL (10.8-KM RESOLUTION AT SUBSATELLITE POINT) AND 0.15 MILLIRADIANS FOR THE VISIBLE CHANNEL (5.4-KM RESOLUTION AT SUBSATELLITE POINT). THE DYNAMIC RANGE FOR THE INFRARED CHANNEL WILL BE FROM 0 TO 340 DEG K AND 1 TO 100 PERCENT ALBEDO FOR THE VISIBLE CHANNEL. THE INFRARED CHANNEL WILL HAVE A NOISE EQUIVALENT TEMPERATURE DIFFERENCE OF 1.5 DEG C AT 200 DEG K AND 0.5 DEG C AT 300 DEG K. DATA FROM THIS EXPERIMENT WILL BE USED TO DETERMINE SURFACE TEMPERATURES AND HORIZONTAL WIND VECTORS BASED ON CLOUD MOTIONS DERIVED FROM SEQUENTIAL IMAGES FORMED BY BOTH CHANNELS OF THE GVHRR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RADIO BEACON NSSDC ID ATS-F -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.	DAVIES	NOAA	BOULDER, CO
OI - R.E.	FRITZ	NOAA-ERL	BOULDER, CO
OI - E.K.	SCHIFFMACHER	NOAA-ERL	BOULDER, CO
OI - R.N.	GRUBB	NOAA	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A RADIO TRANSMITTER WILL RADIATE PLANE-POLARIZED, PHASE-RELATED TRANSMISSIONS NEAR 40, 41, 120, AND 360 MHZ. CONDITIONS BETWEEN THE SATELLITE AND A GROUND-BASED RECEIVER THAT CAN BE OBSERVED WILL BE TOTAL ELECTRON CONTENT ALONG THE TRANSMISSION PATH, IONOSPHERIC IRREGULARITIES, IONOSPHERIC SCINTILLATIONS, AND IONOSPHERIC ABSORPTION. DATA ON THESE CONDITIONS MAY BE DERIVED BY ANALYSIS OF THE CHANGES IN SIGNAL CHARACTERISTICS (POLARIZATION ROTATION, PHASE CHANGE, SIGNAL STRENGTH LOSS, ETC.) BETWEEN THE TRANSMITTER AND THE RECEIVER. THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY THE VARIATION OF THESE PHENOMENA WITH TIME, SOLAR ACTIVITY, AND MAGNETIC ACTIVITY AND THE RELATION OF THESE VARIATIONS TO IONOSPHERIC PROCESSES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- CAS-B NSSDC ID CAS-B
ALTERNATE NAMES- FR-2B, PL-702A, COOPERATIVE APPLICA.SAT.

PLANNED LAUNCH DATE- / / SPACECRAFT WEIGHT IN ORBIT- 934. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
FRANCE
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 113. MIN
APOAPSIS- 900.000 KM ALT PERIAPSIS- 500.000 KM ALT INCLINATION- 50. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - M.	TROUBLE	CEN	GIF-SUR-YVETTE, FRANCE
PS - P.	MOREL	CEN	GIF-SUR-YVETTE, FRANCE
PS - W.R.	BANDEEN	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
CAS-A WILL BE A GRAVITY-GRADIENT STABILIZED SATELLITE WHICH WILL FUNCTION PRIMARILY AS A COMMUNICATIONS SATELLITE TO RELAY WEATHER OBSERVATIONS OF ALTITUDE, PRESSURE, TEMPERATURE, MOISTURE, AND BALLOON LOCATION FROM CONSTANT DENSITY BALLOONS. AN ADDITIONAL PURPOSE WILL BE TO OBSERVE SUCCESSIVE BALLOON POSITIONS IN ORDER TO MAKE WINDS AT BALLOON LEVEL. SATELLITE SPIN IS EXPECTED TO BE NEAR ZERO RPM IN ORBIT, AND THE ATTITUDE WILL BE STABLE WITHIN 9 DEG OF LOCAL VERTICAL. MAGNETOMETERS AND SOLAR SENSORS WILL BE ON BOARD FOR DETERMINATION OF ATTITUDE. DATA WILL BE STORED ON BOARD THE SPACECRAFT AND UNLOADED ON COMMAND WHEN THE SPACECRAFT IS IN RANGE OF THE GROUND STATION.

ON / / . THE SPACECRAFT MISSION WAS

****

SPACECRAFT COMMON NAME- CAS-C NSSDC ID CAS-C
ALTERNATE NAMES- COOPERATIVE APPLICA.SAT.

PLANNED LAUNCH DATE- 11/00/74 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
CRC-NASA
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 29622.0 KM ALT PERIAPSIS- 29622.0 KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT IS DESIGNED AS A TEST VEHICLE TO SUPPORT TECHNOLOGICAL EQUIPMENT RELATING TO A HIGH-FREQUENCY COMMUNICATIONS SATELLITE. EXPERIMENTS WILL INCLUDE A 12-GHZ COMMUNICATIONS TV AND VOICE COMMUNICATIONS EXPERIMENTAL SYSTEM DESIGNED TO SERVE ISOLATED AND OR SMALL COMMUNITIES, A TRANSMITTER POWER TUBE TEST, A SOLAR CELL ARRAY TEST, AN ELECTRIC SPACECRAFT PROPULSION TEST, AND A SPECIALIZED SPACECRAFT STABILIZATION SYSTEM TEST. THE SATELLITE IS TO BE INSERTED IN GEOSYNCHRONOUS ORBIT IN 1974.

ON / / , THE SPACECRAFT MISSION WAS

****

SPACECRAFT COMMON NAME- CORSA NSSDC ID CORSA
ALTERNATE NAMES- COSMIC RAY SATELLITE

PLANNED LAUNCH DATE- 00/00/75 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- KAGOSHIMA, JAPAN LAUNCH VEHICLE- M-3S-C

FUNDING AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 6878. KM ALT PERIAPSIS- 6878. KM ALT INCLINATION- 30. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M. ODA U OF TOKYO TOKYO, JAPAN
PS - S. HAYAKAWA NAGOYA U NAGOYA, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THE COSMIC RADIATION SATELLITE WILL HAVE A CYLINDRICAL SHAPE, A DIAMETER OF 75 CM, AND A HEIGHT OF 60 CM. THE SPACECRAFT WILL BE STABILIZED WITH THE SPIN AXIS CONTROLLED TO POINT IN A NORTH-SOUTH DIRECTION. SIX THOUSAND SOLAR CELLS MOUNTED ON THE SIDE SURFACE WILL PROVIDE A TOTAL ELECTRIC POWER OF 15 W. THE PRIMARY OBJECTIVES OF THE SATELLITE WILL BE TO MEASURE VARIOUS COSMIC RADIATIONS IN ORDER TO STUDY THE ORIGIN AND PROPAGATION MECHANISMS OF SUCH QUANTA.

ON 05/00/71, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- COS-B NSSDC ID COS-B
ALTERNATE NAMES- COSMIC RAY SATELLITE-B, PL-7418

PLANNED LAUNCH DATE- 02/00/75 SPACECRAFT WEIGHT IN ORBIT- 100. KG

LAUNCH SITE- LAUNCH VEHICLE- EUROPA 2

FUNDING AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 2230. MIN
APOAPSIS- 100000. KM ALT PERIAPSIS- 350.000 KM ALT INCLINATION- 20. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THE COS-B SPACECRAFT WILL BE USED PRIMARILY TO STUDY EXTRATERRESTRIAL GAMMA RADIATION. THE OBJECTIVES OF THE COS-B MISSION WILL BE (1) TO ESTABLISH THE INTENSITY OF THE AVERAGE GAMMA-RAY FLUX, (2) TO EXAMINE THE LARGE-SCALE ANISOTROPY OF RADIATION OVER ANGULAR REGIONS CORRESPONDING TO GALACTIC FEATURES, (3) TO SEARCH FOR AND EXAMINE RADIO AND X-RAY SOURCES OF SMALL ANGULAR SIZE, ESPECIALLY THOSE SUCH AS SUPERNOVA REMNANTS AND QUASARS, (4) TO MEASURE THE ENERGY SPECTRA OF THE RADIATION, AND (5) TO SEARCH FOR LONG-TERM TIME VARIATIONS, AS OBSERVED IN SOME X-RAY SOURCES, AND FOR THE SHORT-TERM VARIATIONS CHARACTERISTIC OF PULSARS. THE CYLINDRICAL SPACECRAFT WILL BE SPIN STABILIZED, WITH THE GAMMA-RAY TELESCOPE ORIENTED ALONG THE SPACECRAFT SPIN AXIS. THE SPACECRAFT WILL BE LAUNCHED INTO A HIGHLY ECCENTRIC ORBIT SO THAT IT WILL SPEND MOST OF THE TIME OUTSIDE THE RADIATION BELTS.

ON 01/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- DAUGHTER NSSDC ID DAUGHTR
ALTERNATE NAMES- IMP-K PRIME, IME-D

PLANNED LAUNCH DATE- 11/00/76 SPACECRAFT WEIGHT IN ORBIT- 120. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 131000. KM ALT PERIAPSIS- 500. KM ALT INCLINATION- 28. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - A. HAWKYARD EUR SPACE TECH CENTER NOORDWIJK, THE NETHERLANDS
PS - D.E. PAGE EUR SPACE TECH CENTER NOORDWIJK, THE NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION

THE EXPLORER CLASS DAUGHTER SPACECRAFT IS PART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE -- (1) TO INVESTIGATE SOLAR-TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE. (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE MOTHER/DAUGHTER PORTION OF THE MISSION WILL CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN A HIGHLY ECCENTRIC EARTH ORBIT WITH APOGEE FROM 18 TO 23 EARTH RADII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION DISTANCE, AND WILL MAKE SIMULTANEOUS COORDINATED MEASUREMENTS TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES IN THE NEAR-EARTH SOLAR WIND, THE BOW SHOCK, AND INSIDE THE MAGNETOSPHERE.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE — NSSDC ID DAUGHTR-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	G.	PASCHMANN	MAX PLANCK INST	GERMANY
OI -	W.C.	FELDMAN	NASA-ARC	MOFFETT FIELD, CA
OI -	E.W.	HONES	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI -	K.	SCHINDLER	MAX PLANCK INST	GERMANY
OI -	H.	MIGGENRIEDER	MAX PLANCK INST	GERMANY
OI -	S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI -	H.	VOLK	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI -	H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI -	M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PLASMA VELOCITY DISTRIBUTIONS AND THEIR SPATIAL AND TEMPORAL VARIATIONS IN THE SOLAR WIND, BOW SHOCK, MAGNETOSHEATH, MAGNETOPAUSE, AND MAGNETOTAIL (WITHIN THE MAGNETOSPHERE). ONE-, TWO-, AND THREE-DIMENSIONAL VELOCITY DISTRIBUTIONS FOR POSITIVE IONS AND ELECTRONS WILL BE MEASURED USING TWO 90-DEG SPHERICAL ELECTROSTATIC ANALYZERS WITH CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS. IN CONJUNCTION WITH SIMILAR INSTRUMENTATION PROVIDED BY S. J. BAME/LASL FOR THE MOTHER SPACECRAFT, PROTONS FROM 50 EV TO 40 KEV (AND ELECTRONS FROM 5 EV TO 20 KEV) WILL BE MEASURED WITH 10 PERCENT ENERGY RESOLUTION IN TWO RANGES EACH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 50-EV TO 25-KEV ION AND 35-EV TO 7-KEV ELECTRON PLASMA PROBES — NSSDC ID DAUGHTR-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	A.	EGIDI	U OF ROME	ROME, ITALY
OI -	G.	MORENO	U OF ROME	ROME, ITALY
OI -	P.	CERULLI	U OF ROME	ROME, ITALY
OI -	V.	FORMISANO	U OF ROME	ROME, ITALY
OI -	S.C.	CANTARANO	U OF ROME	ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO GAIN A BETTER UNDERSTANDING OF THE INTERACTION OF THE SOLAR WIND WITH THE EARTH'S MAGNETIC FIELD BY MEASURING ION AND ELECTRON FLUXES AS FUNCTIONS OF DIRECTION AND ENERGY. ONE ELECTROSTATIC ANALYZER AND FIVE FARADAY CUPS WILL BE USED TO MEASURE THE ION DISTRIBUTION FUNCTION FROM 50 EV TO 25 KEV PER UNIT CHARGE. TWO FARADAY CUPS WILL BE USED TO MEASURE THE ELECTRON DISTRIBUTION FUNCTION FROM 36 EV TO 7 KEV. THE ELECTROSTATIC ANALYZER WILL HAVE SEVERAL NARROW ENERGY WINDOWS TO MAP THE PARTICLE (ION AND ELECTRON) DISTRIBUTION FUNCTION IN DETAIL. EACH OF THE FIVE FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS FLUX DETECTORS TO SIMULTANEOUSLY MAP THE ION DISTRIBUTION FUNCTION TO A COARSE ENERGY RESOLUTION. EACH OF THE TWO FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS A FLUX DETECTOR TO MAP THE ELECTRON DISTRIBUTION FUNCTION TO COARSE ENERGY RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- HOT PLASMA NSSDC ID DAUGHTR-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA
OI - V.M.	VASYLIUNAS	MIT	CAMBRIDGE, MA
OI - C.F.	KENNEL	U OF CALIFORNIA, LA	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND IONS. PROTONS AND ELECTRONS IN THE ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63 CONTIGUOUS ENERGY BANDS WITH AN ENERGY RESOLUTION (DELTA E/E) OF 0.17. A QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), EMPLOYING SEVEN CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO (ONE FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC ANALYZERS WILL BE FLOWN ON BOTH MOTHER AND DAUGHTER SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR PI STER SOLID-ANGLE WILL BE COVERED FOR PARTICLE VELOCITY VECTORS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MAGNETIC FIELDS NSSDC ID DAUGHTR-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.T.	RUSSELL	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - R.L.	MCPHERRON	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI -	HEDGECOCK	IMPERIAL COLLEGE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER THAT WILL MEASURE THE STEADY MAGNETIC FIELD AND ITS LOW-FREQUENCY VARIATIONS. THREE FIELD AMPLITUDE RANGES (MINUS TO PLUS 16, 64, AND 2048 GAMMAS) WILL BE AVAILABLE WITH RESOLUTION OF MINUS TO PLUS 1/32, 1/4, 1/16 GAMMA, RESPECTIVELY. THE FREQUENCY RESPONSE WILL BE 0 TO 10 HZ. AN IDENTICAL INSTRUMENT WILL BE FLOWN ON THE MOTHER SPACECRAFT, PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD MONOAXIAL PROBES — NSSDC ID DAUGHTR-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - E.J.	SMITH	NASA-JPL	PASADENA, CA
OI - R.W.	FREDERICKS	TRW SYSTEMS GROUP	REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

IN THIS EXPERIMENT, A SINGLE-AXIS SEARCH COIL MAGNETOMETER WITH A HIGH PERMEABILITY CORE AND A SINGLE ELECTRIC FIELD DIPOLE (RELATIVELY SHORT) WILL MEASURE WAVE PHENOMENON OCCURRING WITHIN THE MAGNETOSPHERE AND SOLAR WIND IN CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE MOTHER SPACECRAFT. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 10 KHZ FROM THE SEARCH COIL WILL BE 100 MS. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 200 KHZ FROM THE ELECTRIC DIPOLE WILL ALSO BE 100 MS. THE DIPOLE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- RADIO PROPAGATION RECEIVER — NSSDC ID DAUGHTR-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.C.	HARVEY	PARIS OBSERVATORY	PARIS, FRANCE
OI - R.	GENDRIN	CNET	PARIS, FRANCE
OI - J.R.	MCAFEE	NOAA	BOULDER, CO
OI - M.	PETIT	CNET	PARIS, FRANCE
OI - D.	JONES	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - J.M.	ETCHETO	CNET	PARIS, FRANCE
OI - R.J.L.	GRARD	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN RF TRANSMITTER ON THE MOTHER SATELLITE AND A RECEIVER ON THE DAUGHTER SATELLITE. THE TRANSMITTER WILL EMIT SIGNALS WITH A KNOWN PHASE RELATIONSHIP AT TWO CLOSELY SPACED FREQUENCIES NEAR 300 MHZ. THE RELATIVE PHASE DELAY OF THE LOWER FREQUENCY WILL BE OBSERVED BY THE RECEIVER. THIS PHASE DELAY IS CAUSED BY THE DIFFERENT EFFECT OF THE ELECTRONS ALONG THE PROPAGATION PATH ON THE TWO DIFFERENT SIGNAL FREQUENCIES INVOLVED. THESE PHASE DELAY OBSERVATIONS WILL BE CONVERTED INTO TOTAL ELECTRON CONTENT BETWEEN THE TWO SPACECRAFT, AND THEN NORMALIZED TO A STANDARD LENGTH PATH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS — NSSDC ID DAUGHTR-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - T.A.	FRITZ	NOAA	BOULDER, CO
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - E.	KEPPLER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - B.	WILKEN	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - G.	WIBBERENZ	U OF KIEL	KIEL, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA INSTABILITIES RESPONSIBLE FOR ACCELERATION, SOURCE AND LOSS MECHANISMS, AND BOUNDARY AND INTERFACE PHENOMENA THROUGHOUT THE ORBITAL RANGE OF MOTHER/DAUGHTER SATELLITES. A PROTON TELESCOPE AND AN ELECTRON SPECTROMETER WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SPECTRA AND ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON, SURFACE-BARRIER, TOTALLY DEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES, AREAS, AND CONFIGURATIONS. PROTONS IN 4 AND 16 CHANNELS BETWEEN 25 KEV AND 2 MEV AND ELECTRONS IN 4 AND 16 CHANNELS BETWEEN 20 KEV AND 2 MEV WILL BE MEASURED.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS NSSDC ID DAUGHTR-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A.	ANDERSON	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - C.I.	MENG	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - J.M.	BOSQUED	PAUL SABATIER U	TOULOUSE, FRANCE
OI - R.	PELLAT	PAUL SABATIER U	TOULOUSE, FRANCE
OI - F.V.	CORONITI	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - H.	REME	PAUL SABATIER U	TOULOUSE, FRANCE
OI - R.P.	LIN	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - G.K.	PARKS	U OF WASHINGTON	SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO DETERMINE, BY USING IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL EXTENT, PROPAGATION VELOCITY, AND TEMPORAL BEHAVIOR OF A WIDE VARIETY OF PARTICLE PHENOMENA. ELECTRONS WILL BE MEASURED IN TWO INTERVALS OVER THE ENERGY RANGE FROM 8 TO 200 KEV, AND PROTONS WILL BE MEASURED IN THREE INTERVALS OVER THE ENERGY RANGE FROM 10 TO 380 KEV. IDENTICAL INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES (ONE WITH A FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED-ENERGY ELECTRIC FIELD PARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- DIAPO NSSDC ID DIAPO

ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- KOUROU, FRENCH GUIANA, FRANCE LAUNCH VEHICLE- DIAMANT

FUNDING AGENCY
FRANCE

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 2500. KM ALT PERIAPSIS- 300. KM ALT INCLINATION- 80. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. ITS OBJECTIVES WILL BE TO STUDY THE ORIGIN AND ACCELERATION MECHANISMS OF MAGNETOSPHERIC IONS (1) BY MEASURING THE RELATIVE ABUNDANCES AND THE ANGULAR AND ENERGY DISTRIBUTION OF SINGLY IONIZED HYDROGEN AND HELIUM, DOUBLY IONIZED HELIUM, AND OXYGEN (6 PLUS) IONS AND (2) BY COMPARING THE RESULTS WITH THE IONOSPHERIC AND SOLAR WIND COMPOSITION. ADDITIONALLY, A STUDY OF MAGNETOSPHERIC SUBSTORMS IS PLANNED WITH MEASUREMENTS OF THE ANGULAR AND ENERGY DISTRIBUTION OF ELECTRONS FROM 50 EV TO 1 MEV, COMPLEMENTED WITH VLF AND MAGNETIC FIELD MEASUREMENTS.

ON 05/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- DUAL-A NSSDC ID DUAL-A
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- LAUNCH VEHICLE- UNDISC

FUNDING AGENCY
U.S.S.R.

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION
TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSIDES TOWARD THE NEUTRAL POINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM OBSERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC PARTICLE DETECTORS.

ON 01/10/73, THE SPACECRAFT MISSION WAS UNKNOWN.

****

SPACECRAFT COMMON NAME- DUAL-A1 NSSDC ID DUAL-A1
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- LAUNCH VEHICLE- UNDISC

FUNDING AGENCY
U.S.S.R.

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION
TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSIDES TOWARD THE NEUTRAL POINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM OBSERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC PARTICLE DETECTORS.

ON 01/10/73, THE SPACECRAFT MISSION WAS UNKNOWN.

****

SPACECRAFT COMMON NAME- ERTS-B NSSDC ID ERTS-B
ALTERNATE NAMES- EARTH RES. TECH SAT.-B, PL-7330

PLANNED LAUNCH DATE- 11/00/72 SPACECRAFT WEIGHT IN ORBIT- 816. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 103. MIN
APOAPSIS- 912.000 KM ALT PERIAPSIS- 912.000 KM ALT INCLINATION- 99.088 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - S. WEILAND NASA-GSFC GREENBELT, MD
PS - W.P. NORDBERG NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE EARTH RESOURCES TECHNOLOGY SATELLITE ERTS-B WILL BE A MODIFIED VERSION OF THE NIMBUS 4 METEOROLOGICAL SATELLITE. THE NEAR-POLAR ORBITING SPACECRAFT WILL SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GEOLOGY AND MINERAL RESOURCES, HYDROLOGY AND WATER RESOURCES, GEOGRAPHY, CARTOGRAPHY, ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES, AND METEOROLOGICAL PHENOMENA. TO ACCOMPLISH THESE OBJECTIVES THE SPACECRAFT WILL

BE EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A THREE-CAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADIOMETRIC IMAGES OF THE EARTH, (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS-B WILL CARRY TWO WIDE-BAND VIDEO TAPE RECORDERS (WBVTR) CAPABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM WILL PERMIT THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS WILL INCLUDE A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM, OPERATING AT 2287.5 AND 137.86 MHZ, FOR SPACECRAFT HOUSEKEEPING, ATTITUDE, AND SENSOR PERFORMANCE DATA. VIDEO DATA FROM THE THREE-CAMERA RBV SYSTEM WILL BE TRANSMITTED IN BOTH REAL TIME AND FROM THE WIDE-BAND RECORDER SYSTEM AT 2265.5 MHZ, WHILE INFORMATION FROM THE MSS WILL BE CONSTRAINED TO A 20-MHZ RF BANDWIDTH AT 2229.5 MHZ.

ON 00/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RETURN BEAM VIDICON (RBV) CAMERA SYSTEM NSSDC ID ERTS-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.	WEINSTEIN	NASA-GSFC	GREENBELT, MD
OI - T.M.	RAGLAND	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ERTS-B RETURN BEAM VIDICON (RBV) CAMERA SYSTEM WILL CONTAIN THREE INDEPENDENT CAMERAS COVERING THE THREE SPECTRAL BANDS FROM BLUE-GREEN (0.47 TO 0.575 MICRON) THROUGH YELLOW-RED (0.58 TO 0.68 MICRON) TO NEAR INFRARED (0.69 TO 0.83 MICRON). WHILE DESIGNED PRIMARILY TO OBTAIN INFORMATION FOR EARTH RESOURCE TYPE STUDIES, THE RBV CAMERA SYSTEM WILL ALSO BE USED TO CONDUCT METEOROLOGICAL STUDIES, I.E., TO INVESTIGATE ATMOSPHERIC ATTENUATION AND TO OBSERVE MESOSCALE PHENOMENA, WINTER MONSOON CLOUDS (JAPAN), SNOW COVER, ETC. THE THREE EARTH-ORIENTED CAMERAS WILL BE MOUNTED TO A COMMON BASE, STRUCTURALLY ISOLATED FROM THE SPACECRAFT TO MAINTAIN ACCURATE ALIGNMENT. EACH CAMERA WILL CONTAIN AN OPTICAL LENS, A 5.08-CM RETURN BEAM VIDICON, A THERMOELECTRIC COOLER DEFLECTION AND FOCUS COILS, A MECHANICAL SHUTTER, ERASE LAMPS, AND SENSOR ELECTRONICS. THE CAMERAS WILL BE SIMILAR EXCEPT FOR THE SPECTRAL FILTERS CONTAINED IN THE LENS ASSEMBLIES THAT PROVIDE SEPARATE SPECTRAL VIEWING REGIONS. THE VIEWED GROUND SCENE, 185 BY 185 KM IN AREA, WILL BE STORED ON THE PHOTOSENSITIVE SURFACE OF THE CAMERA TUBE, AND, AFTER SHUTTERING, THE IMAGE WILL BE SCANNED BY AN ELECTRON BEAM TO PRODUCE A VIDEO SIGNAL OUTPUT. EACH CAMERA WILL BE READ OUT SEQUENTIALLY, REQUIRING ABOUT 3.5 SEC FOR EACH OF THE SPECTRAL IMAGES. THE CAMERAS WILL BE RESHUTTERED EVERY 25 SEC TO PRODUCE OVERLAPPING IMAGES ALONG THE DIRECTION OF SPACECRAFT MOTION. VIDEO DATA FROM THE RBV WILL BE TRANSMITTED (2265.5) IN BOTH REAL-TIME AND TAPE RECORDER MODES. FROM A NOMINAL SPACECRAFT ALTITUDE OF 912 KM, THE RBV WILL HAVE A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD., AND WILL BE MADE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS WILL BE ABLE TO OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, S.D.

ON 00/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS) NSSDC ID ERTS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE ERTS-B MULTISPECTRAL SCANNER (MSS) WILL PROVIDE REPETITIVE DAY/NIGHT ACQUISITION OF HIGH-RESOLUTION MULTISPECTRAL DATA OF THE EARTH'S SURFACE ON A GLOBAL BASIS. WHILE ITS PRIMARY FUNCTION WILL BE TO OBTAIN INFORMATION IN VARIOUS AREAS SUCH AS AGRICULTURE, FORESTRY, GEOLOGY, AND HYDROLOGY, THE MSS SYSTEM WILL ALSO BE USED FOR OCEANOGRAPHIC AND METEOROLOGICAL PURPOSES, I.E., TO MAP SEA-ICE FIELDS, LOCATE AND TRACK MAJOR OCEAN CURRENTS, MONITOR BOTH AIR AND WATER POLLUTION, DETERMINE SNOW COVER, INVESTIGATE SEVERE STORM ENVIRONMENTS, ETC. THE MSS WILL CONSIST OF A 22.86-CM DOUBLE REFLECTOR-TYPE TELESCOPE, SCANNING MIRROR, FILTERS, DETECTORS, AND ASSOCIATED ELECTRONICS. THE SCANNER WILL OPERATE IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1 - 0.5 TO 0.6 MICRON, BAND 2 - 0.6 TO 0.7 MICRON, BAND 3 - 0.7 TO 0.8 MICRON, BAND 4 - 0.8 TO 1.1 MICRONS, AND BAND 5 - 10.4 TO 12.6 MICRONS. THIS LAST BAND, WHICH LIES IN THE THERMAL (EMISSIVE) PART OF THE SPECTRUM, WILL GIVE ERTS-B NIGHTTIME SENSING CAPABILITIES, A FEATURE LACKING IN THE MSS ON ERTS 1. INCOMING RADIATION WILL BE COLLECTED BY THE SCANNING MIRROR, WHICH WILL OSCILLATE 2.89 DEG TO EITHER SIDE OF NADIR AND SCAN CROSS-TRACK SWATHS 185 KM WIDE. THE ALONG-TRACK SCAN WILL BE PRODUCED BY THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCED AT THE IMAGE PLANE WILL BE RELAYED BY USE OF FIBER-OPTIC BUNDLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WILL BE ACCOMPLISHED. OPTICAL FILTERS WILL BE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX DETECTORS WILL BE EMPLOYED IN EACH OF THE FIRST FOUR SPECTRAL BANDS AND TWO IN THE FIFTH BAND -- BANDS 1 THROUGH 3 WILL USE PHOTOMULTIPLIER TUBES AS DETECTORS, BAND 4 WILL USE SILICON PHOTODIODES, AND BAND 5 WILL USE MERCURY-CADMIUM-TELLURIDE DETECTORS. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM WILL PROCESS THE SCANNER'S 26 CHANNELS OF DATA. THESE DATA WILL BE TIME-MULTIPLEXED AND THEN CONVERTED TO A PULSE-CODE MODULATED (PCM) SIGNAL BY AN A/D CONVERTER. THE DATA WILL THEN BE TRANSMITTED (2229.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR STORED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK THE NEXT TIME THE SPACECRAFT COMES WITHIN COMMUNICATION RANGE OF AN ACQUISITION STATION. DATA FROM THIS EXPERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD., AND WILL BE MADE AVAILABLE TO APPROVED INVESTIGATORS THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS WILL BE ABLE TO OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, S.D.

ON 00/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION SYSTEM (DCS) NSSDC ID ERTS-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE ERTS-B DATA COLLECTION SYSTEM (DCS) WILL PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WILL BE

COMPOSED OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP'S), (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS, WHICH INCLUDE REMOTE RECEIVING SITES AND THE GROUND DATA HANDLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS WILL PROVIDE A CONTINUAL FLOW OF INFORMATION FOR BETTER MANAGEMENT OF WILDLIFE, MARINE, AGRICULTURE, WATER, AND FORESTRY RESOURCES AND WILL LEAD TO IMPROVED WEATHER FORECASTS, POLLUTION CONTROL, AND EARTHQUAKE PREDICTION AND WARNING. THE ENVIRONMENTAL SENSORS TO BE MOUNTED ON A DCP WILL BE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REQUIREMENTS. FROM A PLANNED ORBIT OF 912 KM, THE SPACECRAFT WILL BE CAPABLE OF ACQUIRING DATA FROM DCP'S WITHIN A RADIUS OF 3143 KM FROM THE SUBSATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST ONCE EVERY 12 HR. THE DCP'S WILL TRANSMIT AT 401.55 MHZ. LACKING INTERROGATION CAPABILITIES, THE DCS EQUIPMENT IN THE SPACECRAFT IS ESSENTIALLY A RECEIVER. THE DATA WILL BE SIMPLY RECEIVED AND RETRANSMITTED (AT 2287.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WILL BE NO SIGNAL MULTIPLEXING OR DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WILL BE DESIGNED TO ACCOMMODATE UP TO 1000 DCP'S DEPLOYED THROUGHOUT THE CONTINENTAL UNITED STATES. HOWEVER, THE DCS PROBABLY WILL CONSIST OF ONLY A SMALL NUMBER OF INITIAL DCP'S, AND USER AGENCIES WILL BE ABLE TO PROCURE, INSTRUMENT, AND DEVELOP ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FROM THIS EXPERIMENT WILL BE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD.

ON 00/00/68, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ESGEO
ALTERNATE NAMES- GEOS, ESRO GEOS NSSDC ID ESGEO

PLANNED LAUNCH DATE- 08/00/76 SPACECRAFT WEIGHT IN ORBIT- 260. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 41878. KM ALT PERIAPSIS- 41878. KM ALT INCLINATION- 1. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.E. MULLINGER ESRO NOORDWIJK, THE NETHERLAND
PS - K. KNOTT ESRO NOORDWIJK, THE NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION
THE ESRO SPACECRAFT GEOS IS DESIGNED TO MAKE INTEGRATED SCIENTIFIC STUDIES OF THERMAL PLASMA DISTRIBUTION, ENERGETIC PARTICLES (EXCLUDING GALACTIC COSMIC RAYS), FIELDS, AND WAVES. THE SPACECRAFT WILL BE PUT INTO A GEOSTATIONARY EQUATORIAL ORBIT AND WILL BE SPIN STABILIZED WITH ITS SPIN AXIS ORIENTED PERPENDICULAR TO THE ORBITAL PLANE. THE SPACECRAFT WILL BE ATTITUDE STABILIZED USING THREE-AXIS THRUSTERS WITH A HYDRAZINE PROPULSION SYSTEM. A LONGITUDINAL SHIFT MANEUVERING BETWEEN 15 DEG W AND 50 DEG E IS ANTICIPATED. THE PLANNED SPIN RATE OF THE SPACECRAFT WILL BE BETWEEN 10 AND 60 RPM. NORMALLY, THE SPACECRAFT WILL BE LOCATED SOMEWHERE BETWEEN THE PLASMAPAUSE AND THE INNER EDGE OF THE PLASMA SHEET. IT IS EXPECTED, HOWEVER,

THAT UNDER EXTREMELY QUIET CONDITIONS THE PLASMASPHERE WILL EXTEND BEYOND 6.6 RE. THERE WILL BE NO ONBOARD TAPE RECORDER, AND SOME EXPERIMENTS WILL REQUIRE ONLINE COMPUTER CONTROL.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION — NSSDC ID ESGEO -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PFOTZER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - E.	KEPPLER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - B.	WILKEN	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - A.	KORTH	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - J.	MUENCH	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY THE ENERGY-DEPENDENT PITCH ANGLE DISTRIBUTION FOR ELECTRONS FROM 30 TO 200 KEV AND FOR PROTON FLUXES FROM 40 KEV TO 1.4 MEV IN TWO DIRECTIONS. THE EXPERIMENT WILL USE A MAGNETIC DEFLECTION SYSTEM AND TWO PARTICLE TELESCOPES. THE VIEWING ANGLE OF THE SYSTEM WILL BE 0 TO 120 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- THERMAL PLASMA FLOW — NSSDC ID ESGEO -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F.	BOYD	U COLLEGE, LONDON	LONDON, ENGLAND
OI - K.	NORMAN	U COLLEGE, LONDON	LONDON, ENGLAND
OI - W.J.	RAITT	U COLLEGE, LONDON	LONDON, ENGLAND
OI - G.L.	WRENN	U COLLEGE, LONDON	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZERS WILL BE USED TO STUDY THE THERMAL PLASMA AMBIENT IN THE REGION OF A GEOSTATIONARY ORBIT. MOUNTED ON AT LEAST A TWO-M BOOM, THE SENSORS WILL BE ORIENTED SO THAT ONE DETECTOR LOOKS PARALLEL TO THE SPACECRAFT SPIN AXIS AND ONE DETECTOR LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ION COMPOSITION — NSSDC ID ESGEO -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.	GEISS	U OF BERNE	BERNE, SWITZERLAND
OI - P.X.	EBERHARDT	U OF BERNE	BERNE, SWITZERLAND
OI - H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - H.	BALSIGER	U OF BERNE	BERNE, SWITZERLAND
OI - P.	HIRT	U OF BERNE	BERNE, SWITZERLAND
OI - A.	CHIELMETTI	U OF BERNE	BERNE, SWITZERLAND
OI - H.	LOIDL	U OF BERNE	BERNE, SWITZERLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY ION COMPOSITION, ENERGY SPECTRA, AND THE ANGULAR DISTRIBUTION OF LOW-ENERGY PARTICLES USING AN ELECTROSTATIC ANALYZER FOLLOWED BY A COMBINED ELECTROSTATIC MAGNETIC ANALYZER. THE DETECTOR WILL BE LOCATED ON THE SATELLITE BODY, POINTED PERPENDICULAR TO THE SPIN AXIS, I.E., IN THE SPACECRAFT ORBITAL PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION — NSSDC ID ESGEO -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	B.K.G. HULTQUIST	KIRUNA GEOPHYSICAL OBS	KIRUNA, SWEDEN
OI -	H. BORG	KIRUNA GEOPHYSICAL OBS	KIRUNA, SWEDEN
OI -	L.A. HOLMGREEN	KIRUNA GEOPHYSICAL OBS	KIRUNA, SWEDEN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PITCH ANGLE DISTRIBUTION OF ELECTRONS AND PROTONS IN THE 0.2- TO 20-KEV ENERGY RANGE USING 10 ELECTROSTATIC ANALYZERS. THE DETECTORS WILL BE LOCATED ON THE SPACECRAFT BODY AND WILL HAVE VIEWING ANGLES BETWEEN 0 AND 180 DEG RELATIVE TO THE SPIN AXIS. EMPHASIS WILL BE PUT ON ANGULAR RESOLUTION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VLF FIELD ANTENNA — NSSDC ID ESGEO -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	M. PETIT	CNET	PARIS, FRANCE
OI -	C. BEGHIN	GRI	ORLEANS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

A 20-M BALANCED DIPOLE NORMAL TO THE SPACECRAFT SPIN AXIS WILL BE USED TO DETECT VLF PLASMA RESONANCES EXITED BY SIGNALS EMITTED FROM THE SAME ANTENNA. THE INSTRUMENT IS DESIGNED TO CAPACITIVELY COUPLE TO THE THERMAL PLASMA.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROMAGNETIC WAVE FIELDS — NSSDC ID ESGEO -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	R. GENDRIN	CNET	PARIS, FRANCE
OI -	J.M. ETCHETO	CNET	PARIS, FRANCE
OI -	E. UNGSTRUP	DANISH INST SPACE RSCH	LYNGBY, DENMARK

EXPERIMENT BRIEF DESCRIPTION

ORTHOGONAL SHORT ELECTRIC DIPOLE AND MAGNETIC METAL CORE SEARCH COIL SYSTEMS, DESIGNED TO OBTAIN ELECTROSTATIC PLASMA WAVE MEASUREMENTS, WILL BE LOCATED ON THE TIPS OF FOUR BOOMS MOUNTED PARALLEL TO THE SATELLITE SPIN

AXIS. THE ELECTRIC ANTENNA SYSTEM WILL OPERATE BETWEEN 30 HZ AND 10 KHZ. AND THE MAGNETIC SYSTEM WILL OPERATE BETWEEN 0.1 HZ AND 3.5 KHZ.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DC FIELDS NSSDC ID ESGEO -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	PETERSEN	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - D.	JONES	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - K.	KNOTT	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - R.J.L.	GRARD	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE DC ELF AND VLF FIELDS BY MEANS OF A RECEIVER/ANTENNA SYSTEM. THE ANTENNA WILL CONSIST OF A PAIR OF SPHERES MOUNTED ON THE ENDS OF A 20-M BOOM THAT WILL EXTEND IN OPPOSITE DIRECTIONS FROM THE SPACECRAFT. THE ANTENNA WILL BE PERPENDICULAR TO THE SPIN AXIS OF THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DC ELECTRIC FIELD AND GRADIENT B ELECTRON BEAM DEFLECTION NSSDC ID ESGEO -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.	MELZNER	M.PLANCK INST,GARCHING	GARCHING, W. GERMANY
OI - H.	VOLK	M.PLANCK INST,GARCHING	GARCHING, W. GERMANY
OI - G.	METZNER	M.PLANCK INST,GARCHING	GARCHING, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

ELECTRON BEAMS EMITTED FROM BOOM-MOUNTED GUNS WILL BE DETECTED FROM THE MAIN SATELLITE TO DETERMINE, BY BEAM DEFLECTION, THE DC ELECTRIC FIELD AND GRADIENTS IN THE DC MAGNETIC FIELDS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER NSSDC ID ESGEO -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.	MARIANI	U OF AQUILA	AQUILA, ITALY
OI - M.	CANDIDI	NATL RSCH CNCL ITALY	ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY DC AND AND VLF MAGNETIC FIELDS USING A TRIAXIAL FLUXGATE MAGNETOMETER LOCATED AT THE END OF A 2-M BOOM.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- EXOS-A NSSDC ID EXOS-A
ALTERNATE NAMES- EXOSPHERIC SAT A

PLANNED LAUNCH DATE- 00/00/77 SPACECRAFT WEIGHT IN ORBIT- 75. KG

LAUNCH SITE- KAGOSHIMA, JAPAN LAUNCH VEHICLE- M-3S-H

FUNDING AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 3000.00 KM ALT PERIAPSIS- 250.000 KM ALT INCLINATION- 60. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. HIRAO UNIVERSITY OF TOKYO TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE OBJECTIVE WILL BE TO STUDY THE POLAR AURORA AND IONOSPHERE. THE PAYLOAD WILL CONSIST OF AN AUROAL XUV TELEVISION CAMERA AND MASS SPECTROMETER DESIGNED TO STUDY THE ELECTRON AND ION DENSITY AND TEMPERATURE. THERE WILL ALSO BE ENERGETIC PARTICLE DETECTORS DESIGNED TO STUDY THE FLUX OF ELECTRONS IN THE IONOSPHERE.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IONOSPHERIC PROBES NSSDC ID EXOS-A -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
IONOSPHERIC PROBES WILL OBSERVE ELECTRON DENSITY AND TEMPERATURE IN ADDITION TO ION DENSITY, COMPOSITION AND TEMPERATURE.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS NSSDC ID EXOS-A -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE THE FLUX OF ELECTRONS AND PROTONS IN THE MAGNETOSPHERE, USING ENERGETIC PARTICLE DETECTORS, ESPECIALLY IN THE POLAR REGIONS.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- X-RAY AND ULTRAVIOLET AURORAL TELESCOPES NSSDC ID EXOS-A -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
EXOS-A IS A JAPANESE SCIENTIFIC SATELLITE THAT WILL BE LAUNCHED DURING THE INTERNATIONAL MAGNETOSPHERIC STUDY, 1976-1978. THIS EXPERIMENT WILL CONTRIBUTE TO ONE OF THE SATELLITE'S OBJECTIVES OF EXPLORING THE POLAR IONOSPHERE, BY MEASURING AURORAL EMISSIONS WITH X-RAY AND ULTRAVIOLET AURORAL TELESCOPES.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOMETER NSSDC ID EXOS-A -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE THE EARTH'S MAGNETIC FIELD, ESPECIALLY OVER THE POLAR REGIONS, USING MAGNETOMETERS.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- EXOS-B NSSDC ID EXOS-B
ALTERNATE NAMES- EXOSPHERIC SAT B

PLANNED LAUNCH DATE- 00/00/78 SPACECRAFT WEIGHT IN ORBIT- 60. KG

LAUNCH SITE- KAGOSHIMA, JAPAN LAUNCH VEHICLE- M-3S-5

FUNDING AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 480. MIN
APOAPSIS- 30000. KM ALT PERIAPSIS- 500. KM ALT INCLINATION- 30. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - T. OBAYASHI UNIVERSITY OF TOKYO TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE WILL STUDY THE PLASMASPHERE UP TO GEOCENTRIC DISTANCES OF 30,000 KM. ITS PLASMA EXPERIMENTS WILL STUDY THE ELECTRON AND ION DENSITY AND TEMPERATURE. THE SPACECRAFT WILL

CARRY ENERGETIC PARTICLE DETECTORS. TO STUDY THE ELECTRON AND PROTON FLUX IN THE ENERGY RANGE 10 TO 10,000 EV. AND ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOSPHERIC PLASMA PROBE NSSDC ID EXOS-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE PLASMA PROBES TO MEASURE THE MAGNETOSPHERIC ELECTRON (AND ION) DENSITY AND TEMPERATURE UP TO AN ALTITUDE OF 30,000 KM.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS NSSDC ID EXOS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTRON AND PROTON FLUXES IN THE MAGNETOSPHERE IN THE ENERGY RANGE 10 EV TO 10 KEV, ESPECIALLY IN THE PLASMASPHERE REGION.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS NSSDC ID EXOS-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTROMAGNETIC FIELD FLUCTUATIONS THROUGHOUT THE PLASMASPHERE.

ON 03/00/73. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETOSPHERIC PLASMA NSSDC ID EXOS-B -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE MAGNETOSPHERIC PLASMA TO OBTAIN ELECTRON AND ION DENSITIES AND TEMPERATURES THROUGHOUT THE PLASMASPHERE.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- EXOS-C NSSDC ID EXOS-C
ALTERNATE NAMES- EXOSPHERIC SAT C

PLANNED LAUNCH DATE- 01/00/78 SPACECRAFT WEIGHT IN ORBIT- 100. KG

LAUNCH SITE- KAGOSHIMA, JAPAN LAUNCH VEHICLE- M-4S-H

FUNDING AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 500. KM ALT PERIAPSIS- 500. KM ALT INCLINATION- 50. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M. ODA U OF TOKYO TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THE PURPOSE OF THIS SPACECRAFT WILL BE TO MONITOR CHARGED PARTICLES AND X-RAY, GAMMA-RAY, UV, AND IR RADIATION FROM THE SUN AND GALAXIES. THE SPACECRAFT WILL BE PUT INTO A CIRCULAR ORBIT OF 500-KM ALTITUDE AND WILL BE CAPABLE OF PRECISE ATTITUDE CONTROL. FIVE DETECTOR SYSTEMS WILL BE USED TO ATTAIN THE GOALS OF THIS MISSION -- X-RAY TELESCOPES, A GAMMA-RAY TELESCOPE, A UV TELESCOPE, AN IR TELESCOPE, AND ENERGETIC PARTICLE DETECTORS.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- X-RAY AND GAMMA-RAY ASTRONOMICAL TELESCOPES NSSDC ID EXOS-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL OBSERVE ASTRONOMICAL SOURCES WITH X-RAY AND GAMMA-RAY TELESCOPES.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET TELESCOPE NSSDC ID EXOS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL OBJECTS IN THE UV REGION OF THE SPECTRUM.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED TELESCOPE NSSDC ID EXOS-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL OBJECTS IN THE INFRARED REGION OF THE SPECTRUM.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLES NSSDC ID EXOS-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT IS TO MEASURE ENERGETIC CHARGED PARTICLES OF BOTH SOLAR AND GALACTIC ORIGIN.

ON 03/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- GEOS-C NSSDC ID GEOS-C
ALTERNATE NAMES- GEODETIC SATELLITE-C

PLANNED LAUNCH DATE- 07/00/74 SPACECRAFT WEIGHT IN ORBIT- 241.0 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 103.5 MIN
APOAPSIS- 964. KM ALT PERIAPSIS- 890. KM ALT INCLINATION- 115. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.M. RADOS NASA-GSFC GREENBELT, MD
PS - J.H. BERBERT NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE SPACECRAFT WILL CONSIST OF AN OCTAHEDRON, TOPPED BY A TRUNCATED PYRAMID, WITH A PARABOLIC REFLECTOR FOR A RADAR ALTIMETER ON THE FLAT BOTTOM

SIDE. A METAL RIBBON BOOM WITH END MASS WILL EXTEND UPWARD APPROXIMATELY 20 FT FROM THE TOP OF THE PYRAMID. PASSIVE LASER RETROREFLECTOR CUBES WILL BE MOUNTED IN A RING AROUND THE PARABOLIC REFLECTOR WITH THE NORMAL VECTOR FROM EACH CUBE FACE 45 DEG OUTWARD FROM THE EARTH DIRECTION OF THE BOOM AXIS. A TURNSTILE ANTENNA FOR VHF AND UHF FREQUENCIES AND SEPARATE ANTENNAS FOR EARTH-VIEWING 324-MHZ DOPPLER, C-BAND, AND S-BAND TRANSPONDERS WILL BE MOUNTED SEPARATELY ON FLAT SURFACES NEXT TO THE PARABOLIC REFLECTOR. THE DIMENSION ACROSS THE FLATS OF THE OCTAHEDRON WILL BE 48 IN., AND THE SPACECRAFT WILL BE 43.75 IN. HIGH WITH A TOTAL WEIGHT OF 530 LBS. THE MISSION WILL PROVIDE THE STEPPING STONE BETWEEN THE ONGOING NATIONAL GEODETIC SATELLITE PROGRAM (NGSP) AND THE EMERGING EARTH AND OCEAN PHYSICS APPLICATION PROGRAM. IT WILL PROVIDE DATA WITH WHICH TO REFINE THE GEODETIC AND GEOPHYSICAL RESULTS OF THE NGSP AND WILL SERVE AS A TEST FOR NEW SYSTEMS. MISSION OBJECTIVES WILL BE TO PERFORM A SATELLITE ALTIMETRY EXPERIMENT IN CREIT, TO FURTHER SUPPORT THE CALIBRATION AND POSITION DETERMINATION OF NASA AND OTHER AGENCY C-BAND RADAR SYSTEMS, AND TO PERFORM A SATELLITE-TO-SATELLITE TRACKING EXPERIMENT WITH THE ATS-F SPACECRAFT USING AN S-BAND TRANSPONDER SYSTEM. THIS SYSTEM WILL ALSO BE USED FOR PERIODIC GEOS-C TELEMETRY DATA RELAY THROUGH ATS-F, TO FURTHER SUPPORT THE INTERCOMPARISON OF TRACKING SYSTEMS, TO INVESTIGATE THE SOLID-EARTH DYNAMIC PHENOMENA THROUGH PRECISION LASER TRACKING, TO FURTHER REFINE ORBIT DETERMINATION TECHNIQUES, THE DETERMINATION OF INTERDATUM TIES, AND GRAVITY MODELS, AND TO SUPPORT THE CALIBRATION AND POSITION DETERMINATION OF NASA-STDN S-BAND TRACKING SYSTEMS.

ON / / , THE SPACECRAFT MISSION WAS

****

SPACECRAFT COMMON NAME- GOES-E NSSDC ID GOES-E
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 07/00/76 SPACECRAFT WEIGHT IN ORBIT- 243. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES DEPTOFCOM

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FURCYCE NASA-GSFC GREENBELT, MD
PS - W.E. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
GOES-E WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT

MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) NSSDC ID GOES-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	UNKNOWN	NOAA-NESS	SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GOES-E WILL BE CAPABLE OF PROVIDING BOTH DAY AND NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A 'LINE STRETCHER,' WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR NSSDC ID GOES-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID GOES-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERE, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5-TO 3-A.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID GOES-B -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT) ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM NSSDC ID GOES-B -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 250K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

ON 05/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- GOES-C NSSDC ID GOES-C
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 11/00/76 SPACECRAFT WEIGHT IN ORBIT- 243. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES DEPTOFCOM

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCE NASA-GSFC GREENBELT, MD
PS - W.E. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
GOES-C WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE

EARTH/ATMOSPHERE SYSTEM. (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) NSSDC ID GOES-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GOES-C WILL BE CAPABLE OF PROVIDING BOTH DAY AND NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE

STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR NSSDC ID GOES-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID GOES-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5 TO 3-A.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID GOES-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT) ONE SENSOR WILL

BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM — NSSDC ID GOES-C -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- GP-A — NSSDC ID GRAVR-A
ALTERNATE NAMES- GRAVITATIONAL REDSHIFT P, GRAVR-A, RELATIVITY

PLANNED LAUNCH DATE- 02/00/75 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- WALLOPS ISLAND, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSSA

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. STONE NASA-MSFC HUNTSVILLE, AL
PS - R.F.C. VESSOT SAO CAMBRIDGE, MA

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT WILL CARRY ONE EXPERIMENT ON A FLIGHT OF ABOUT 3.5 HR TO AN ALTITUDE NEAR 18,530 KM. THE SPACECRAFT WILL WEIGH ABOUT 60 KG. UPON COMPLETION OF THE FLIGHT, THE SPACECRAFT SHOULD IMPACT IN THE ATLANTIC OCEAN

NEAR BERMUDA. THE SPACECRAFT WILL BE PROVIDED WITH CONTINUOUS TRACKING AND TELEMETRY FROM WALLOPS ISLAND AND BERMUDA. IT IS PLANNED TO STUDY GRAVITATIONAL EFFECT ON TIME MEASUREMENTS (RELATIVISTIC OR EINSTEIN REDSHIFT) BY USE OF A HYDROGEN MASER OSCILLATOR SYSTEM (CLOCK). THIS IS TO VERIFY ONE OF THE RESULTS EXPECTED FROM EINSTEIN'S GENERAL THEORY OF RELATIVITY. THE SPACECRAFT SUPPORT EXPERIMENT WILL CONSIST OF AN S-BAND TELEMETRY TRANSPONDER, A BATTERY, AND A COOLING SYSTEM.

ON 08/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GRAVITATIONAL POTENTIAL AS A FUNCTION OF TIME NSSDC ID GRAVR-A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	R.F.C. VESSOT	SAO	CAMBRIDGE, MA
OI -	M.W. LEVINE	SAO	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY THE RELATION BETWEEN TIME PASSAGE AND GRAVITATIONAL POTENTIAL. ACCORDING TO THE EINSTEIN GENERAL THEORY, TIME (FREQUENCY OF AN OSCILLATOR) PASSES SLOWER IN A STRONG GRAVITATIONAL FIELD, THAN IN A WEAKER FIELD (FREQUENCY SHIFT TOWARD THE RED, OR SLOWER FREQUENCY, END OF THE VISIBLE SPECTRUM). FREQUENCY COMPARISONS OF EQUIVALENT HYDROGEN MASER OSCILLATORS ON THE SPACECRAFT AND ON THE EARTH SHOULD PROVIDE OBSERVATIONAL SUPPORT OF THIS EFFECT. RELATIVISTIC FREQUENCY SHIFTS ARE EXPECTED TO OCCUR AS A RESULT OF BOTH VEHICLE VELOCITY AND CHANGE IN GRAVITATIONAL POTENTIAL. TWO SEPARATE SYSTEMS WILL BE USED TO MEASURE THESE SHIFTS. ONE SYSTEM WILL MEASURE THE ELAPSED PHASE CHANGES IN THE TRANSMISSION PATH, THE OTHER WILL MEASURE THE PHASE OF THE SPACECRAFT OSCILLATOR AS RECEIVED VIA THE TRANSMISSION PATH AND COMPARED TO THE EARTH-BASED OSCILLATOR. PHASE CHANGES IN THE TRANSMISSION PATH DUE TO ATMOSPHERIC EFFECTS, IONOSPHERIC EFFECTS, AND RANGE VARIATION WILL BE AUTOMATICALLY AND COHERENTLY CORRECTED.

ON 08/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- HAWKEYE NSSDC ID HAWKEYE
ALTERNATE NAMES- INJUN-F, NEUTRAL POINT EXPLORER, INJUN 6

PLANNED LAUNCH DATE- 11/00/74 SPACECRAFT WEIGHT IN ORBIT- 27.2 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1920. MIN
APOAPSIS- 89222.0 KM ALT PERIAPSIS- 200.000 KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.	ROGERS	U OF IOWA	IOWA CITY, IA
PS - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA

SPACECRAFT BRIEF DESCRIPTION
HAWKEYE WILL BE PART OF THE U.S. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. IT WILL STUDY THE NEUTRAL POINT REGION OF THE MAGNETOSPHERE. THE EXPERIMENTS WILL INCLUDE PARTICLE AND FIELD OBSERVATIONS AND LOW-ENERGY PLASMA STUDIES RELEVANT TO THE DYNAMICS OF SOLAR WIND INJECTION INTO THE MAGNETOSPHERE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER NSSDC ID HAWKEYE-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA
OI - M.N.	OLIVEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A TRIAXIAL FLUXGATE MAGNETOMETER CAPABLE OF OPERATION AT TWO LEVELS, LOW GAIN AND HIGH GAIN. IN THE HIGH-GAIN MODE THE MAGNETOMETER RANGE IS FROM ABOUT 0.1 TO 100 GAMMA (STRAY SATELLITE MAGNETIC FIELDS ARE TO BE CONSTRAINED TO LESS THAN 0.1 GAMMA). IN THE LOW-GAIN MODE THE MAGNETOMETER RANGE IS FROM 100 TO ABOUT 1000 GAMMA. THE EXPERIMENT WILL SURVEY THE MAGNETIC FIELDS IN THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CUSPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS NSSDC ID HAWKEYE-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA
OI - J.D.	CRAVEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF ONE LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA) ORIENTED PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE LEPEDEA WILL MEASURE PROTONS AND ELECTRONS IN 16 CHANNELS OVER AN ENERGY RANGE OF 50 EV TO 50 KEV. THE EXPERIMENT WILL SURVEY THE PARTICLE ENVIRONMENT OF THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CUSPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELF/VLF RECEIVERS NSSDC ID HAWKEYE-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO DETECTORS -- (1) A 16-CHANNEL SPECTRUM ANALYZER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 178 KHZ WITH LOGARITHMIC SPACING AND (2) A WIDE-BAND RECEIVER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 10 KHZ. THE SIGNALS FROM THE FIRST DETECTOR WILL BE SENT TO GROUND STATIONS DIRECTLY IN DIGITAL FORM, WHEREAS THE OUTPUT FROM THE SECOND DETECTOR WILL BE TRANSMITTED TO GROUND STATIONS IN ANALOG FORM. BOTH DETECTORS CAN BE USED IN CONNECTION WITH EITHER OF TWO ANTENNAS -- AN ELECTRIC DIPOLE ABOUT 42 METERS IN LENGTH FROM TIP TO TIP AND A SEARCH COIL ANTENNA. THE EXPERIMENT WILL MEASURE PLASMA WAVES IN THE MAGNETOSPHERE ESPECIALLY NEAR THE POLAR CUSPS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- HELIOS-A
ALTERNATE NAMES- HELIO-A, PL-741A
NSSDC ID HELIO-A

PLANNED LAUNCH DATE- 08/00/74 SPACECRAFT WEIGHT IN ORBIT- 210. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
FED. REP. OF GERMANY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 192. DAYS
APOAPSIS- AU RAD PERIAPSIS- 0.3 AU RAD INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A.	KUTZER	GSCHAFT FUR WELTFORSCH BONN, W. GERMANY	
PM - G.W.	OUSLEY	NASA-GSFC	GREENBELT, MD
PS - H.	PORSCHE	MAX PLANCK INST	W. GERMANY
PS - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE HELIOS A SPACECRAFT IS DESIGNED AS A SOLAR PROBE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUP OF GERMAN AND AMERICAN SCIENTISTS, WITH NASA SUPPLYING THE ATLAS CENTAUR LAUNCH VEHICLE AND WEST GERMANY SUPPLYING THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS
NSSDC ID HELIO-A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY
OI - A.	MAIER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 102.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 409.6 GAMMAS (RESOLUTION, 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 3 MIN. THUS, THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUDIED.

ON 12/16/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS NSSDC ID HELIO-A-02

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - F.	MARIANI	U OF AQUILA	AQUILA, ITALY
OI - L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI - S.C.	CANTARANO	U OF ROME	ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GAMMA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY BIT RATES, AVERAGES AND VARIANCES WILL BE COMPUTED ONBOARD FOR TRANSMISSION TO EARTH.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER NSSDC ID HELIO-A-03

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY
OI - G.	DEHMEL	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETOMETER. FOR THE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS, SPECTRAL RESOLUTION WILL BE OBTAINED. BECAUSE OF THE LOW DATA RATE AVAILABLE, SHORT-TERM HIGH-RESOLUTION DATA ON EVENTS (SHOCKS) WILL BE ACCOMPLISHED USING ONBOARD DATA STORAGE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS NSSDC ID HELIO-A-04

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J.	BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G.	STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTACTIC AND ELECTROMAGNETIC WAVE PHENOMA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04, HELIC-A-05, AND HELIC-A-06) WILL BE USED. THE ANALYZER IN EXPERIMENT HELIO-A-04 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESOLUTION (.LT. 1 SEC) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (IOWA)

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM ANALYSIS — NSSDC ID HELIO-A-05

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J.	BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G.	STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04, HELIC-A-05, AND HELIC-A-06). THE ANALYZER FOR HELIO-A-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY RESOLUTION (4 PERCENT) AND LOW TIME RESOLUTION (LESS THAN 1 MIN) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (MINNESOTA)

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- 50KHZ-2MHZ RADIO WAVE — NSSDC ID HELIC-A-06

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S.	KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J.	BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G.	STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A DUAL STEP-FREQUENCY RADIOMETER (5 KHZ BANDWIDTH), OPERATING BETWEEN 50 KHZ AND 2 MHZ IN A VARIABLE NUMBER OF STEPS. THE RADIOMETER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTRUM ANALYZERS, WHICH WILL COVER THE 10 HZ TO 100 KHZ SPECTRAL RANGE. THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COSMIC-RAY PARTICLES NSSDC ID HELIO-A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	WIBBERENZ	U OF KIEL	KIEL, W. GERMANY
OI - G.	GREEN	U OF KIEL	KIEL, WEST GERMANY
OI - R.	MUELLER	U OF KIEL	KIEL, WEST GERMANY
OI - M.	ITTE	U OF KIEL	KIEL, WEST GERMANY
OI - H.	KUNOW	U OF KIEL	KIEL, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT, IDENTICAL TO ONE PROPOSED FOR HELIOS-B, WILL BE TO GATHER INFORMATION ABOUT (1) PARTICLE FLOW, ENERGY, AND DIRECTION AS A FUNCTION OF DISTANCE FROM THE SUN, AND (2) GALACTIC COSMIC RAYS, E.G., TO MEASURE SOLAR PARTICLES CLOSE TO THE SUN, TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR PROTONS, ALPHA PARTICLES, AND ELECTRONS, TO MEASURE THE SPATIAL GRADIENT AND CHARGE SPECTRUM OF GALACTIC COSMIC RAYS, ETC. THE DETECTOR TO BE USED WILL CONSIST OF A SEMICONDUCTOR COUNTER, A CSI (TL) SCINTILLATOR, AND A QUARTZ CERENKOV COUNTER ENCLOSED BY AN ANTICOINCIDENCE CYLINDER, AND WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH OTHER ONBOARD EXPERIMENTAL RESULTS AND WITH DATA FROM SATELLITES IN EARTH ORBIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GALACTIC AND SOLAR COSMIC RAYS NSSDC ID HELIO-A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - E.C.	ROELOF	U OF NEW HAMPSHIRE	DURHAM, NH
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 TO ABOUT 800 MEV FOR PROTONS AND HEAVIER PARTICLES (Z LESS THAN 10) AND OF 0.05 TO 5 MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIC COMPOSITION OF GALACTIC AND SOLAR COSMIC RAYS WILL BE STUDIED. ADDITIONALLY, AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM SOLID-STATE DETECTORS. THE TELESCOPES AND THE X-RAY COUNTER WILL LOOK INTO THE ECLIPTIC PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PLASMA DETECTORS NSSDC ID HELIO-A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY

OI - H.	PELLKOFER	M.PLANCK INST.GARCHING	GARCHING, W.GERMANY
OI - J.H.	WOLFE	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THESE DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS, ALPHA PARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV, AN ANGULAR RESOLUTION OF 5 DEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESOLUTION OF 30 SEC WILL BE USED TO OBSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT PROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 15 V AND 1 KV, WILL BE USED TO OBSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN EIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL BE ABOUT 100 DEG.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC ELECTRON DETECTOR — NSSDC ID HELIO-A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.	KEPPLER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - B.	WILKEN	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY-SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PROTONS WILL BE DEFLECTED AND COUNTED SEPARATELY. THE POINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN APERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE ORDER OF MINUTES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZODIACAL LIGHT PHOTOMETER — NSSDC ID HELIO-A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.	LEINERT	LAND OBS	HEIDELBERG, W. GERMANY
OI - E.	PITZ	LAND OBS	HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PHOTOMETERS LOOKING AT 15 DEG, 30 DEG, AND 90 DEG FROM THE ECLIPTIC. THESE PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN UV, BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION, SIZE, AND NATURE OF INTERPLANETARY DUST PARTICLES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MICROMETEOROID DETECTOR AND ANALYZER — NSSDC ID HELIO-A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.	FECHTIG	M.PLANCK INST,HEIDELEG	HEICELBERG, WEST GERMANY
OI - J.	WEIPRAUCH	M.PLANCK INST,HEIDELBG	HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THECRIES ABOUT THE INTERPLANETARY DUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN, (2) THE CUT-OFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SOLAR PRESSURE INCREASES NEARER THE SUN, AND (3) THE NUMBER DENSITIES OF PARTICLES CHANGE NEAR THE ORBITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH HIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE MATERIAL TO VAPORIZE AND BECOME PARTIALLY IONIZED. THE GENERATED PLASMA CLOUD CAN THEN BE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) PART AND INTO POSITIVE IONS. THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED FROM THE IMPULSE HEIGHTS. A TIME-OF-FLIGHT MASS SPECTROMETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ION CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE DUST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE MINUS 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM, A MASS SPECTRUM MAY BE GATHERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- HELIOS-B NSSDC ID HELIC-B
ALTERNATE NAMES- HELIO-B, PL-751A

PLANNED LAUNCH DATE- 11/00/76 SPACECRAFT WEIGHT IN ORBIT- 210. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
FED. REP. OF GERMANY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 192. DAYS
APOAPSIS- AU RAD PERIAPSIS- 0.3 AU RAD INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A.	KUTZER	GSCHAFT FUR WELTFORSCH	BONN, W. GERMANY
PM - G.W.	CUSLEY	NASA-GSFC	GREENBELT, MD
PS - H.	PORSCHE	MAX PLANCK INST	W. GERMANY
PS - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE HELIOS-B SPACECRAFT IS DESIGNED AS A SOLAR PROBE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUP OF GERMAN AND U.S. SCIENTISTS, WITH NASA SUPPLYING THE ATLAS CENTAUR LAUNCH VEHICLE AND WEST GERMANY SUPPLYING THE SPACECRAFT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS — NSSDC ID HELIC-8-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY
OI - A.	MAIER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 102.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 409.6 GAMMAS (RESOLUTION, 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 3 MIN. THUS, THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUDIED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS NSSDC ID HELIO-8-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - F.	MARIANI	U OF AQUILA	AQUILA, ITALY
OI - L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI - S.C.	CANTARANO	U OF ROME	ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION

A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS, AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GAMMA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY BIT RATES, AVERAGES AND VARIANCES WILL BE COMPUTED ONBOARD FOR TRANSMISSION TO EARTH.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER — NSSDC ID HELIO-8-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY
OI - G.	DEHMEL	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETOMETER. FOR THE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS, SPECTRAL RESOLUTION WILL BE OBTAINED. BECAUSE OF THE LOW DATA RATE AVAILABLE, SHORT-TERM HIGH-RESOLUTION DATA ON EVENTS (SHOCKS) WILL BE OBTAINED USING ONBOARD DATA STORAGE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS NSSDC ID HELIO-B-04

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)	
PI - D.A. GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S. KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J. BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G. STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIC-B-04, HELIO-B-05, AND HELIO-B-06). THE ANALYZER IN EXPERIMENT HELIC-B-04 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESOLUTION (.LT. 1 SECOND) OVER THE FREQUENCY RANGE FROM 10 KZ TO 100 KHZ. (IOWA)

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM ANALYSIS NSSDC ID HELIO-B-05

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)	
PI - D.A. GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S. KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J. BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G. STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-B-04, HELIC-B-05, AND HELIO-B-06). THE ANALYZER FOR HELIO-B-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY RESOLUTION (4 PERCENT) AND LOW TIME RESOLUTION (ABOUT 1 MINUTE) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ. (MINNESOTA)

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- 50KHZ-2MHZ RADIO WAVE NSSDC ID HELIC-B-06

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)	
PI - D.A. GURNETT	U OF IOWA	IOWA CITY, IA
OI - P.S. KELLOGG	U OF MINNESOTA	MINNEAPOLIS, MN
OI - S.J. BAUER	NASA-GSFC	FLAGSTAFF, AZ
OI - R.G. STONE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT WILL CONSIST OF A DUAL STEP-FREQUENCY RADIOMETER (5 KHZ BANDWIDTH), OPERATING BETWEEN 50 KHZ AND 2 MHZ IN A VARIABLE NUMBER OF STEPS. THE RADIOMETER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTRUM ANALYZERS WHICH WILL COVER THE 10-HZ TO 100-KHZ SPECTRAL RANGE. THE PURPOSE OF THE EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COSMIC-RAY PARTICLES NSSDC ID HELIO-B-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	WIBBERENZ	U OF KIEL	KIEL, W. GERMANY
OI - G.	GREEN	U OF KIEL	KIEL, WEST GERMANY
OI - R.	MUELLER	U OF KIEL	KIEL, WEST GERMANY
OI - M.	ITTE	U OF KIEL	KIEL, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, IDENTICAL TO ONE PROPOSED FOR HELIOS-B, WILL BE TO GATHER INFORMATION ABOUT (1) PARTICLE FLOW, ENERGY, AND DIRECTION AS A FUNCTION OF DISTANCE FROM THE SUN, AND (2) GALACTIC COSMIC RAYS, E.G., TO MEASURE SOLAR PARTICLES CLOSE TO THE SUN. TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR PROTONS, ALPHA PARTICLES, AND ELECTRONS, TO MEASURE THE SPATIAL GRADIENT AND CHARGE SPECTRUM OF GALACTIC COSMIC RAYS, ETC. THE DETECTOR TO BE USED WILL CONSIST OF A SEMICONDUCTOR COUNTER, A CSI (TL) SCINTILLATOR, AND A QUARTZ CERENKOV COUNTER ENCLOSED BY AN ANTICOINCIDENCE CYLINDER AND WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH OTHER ONBOARD EXPERIMENTAL RESULTS AND WITH DATA FROM SATELLITES IN EARTH ORBIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GALACTIC AND SOLAR COSMIC RAYS NSSDC ID HELIO-B-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - E.C.	ROELOF	U OF NEW HAMPSHIRE	DURHAM, NH
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - K.G.	MCCRACKEN	U OF ADELAIDE	ADELAIDE, AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 TO ABOUT 800 MEV FOR PROTONS AND HEAVIER PARTICLES (Z LESS THAN 10) AND OF 0.05 TO 5 MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIC COMPOSITION OF GALACTIC AND SOLAR COSMIC RAYS WILL BE STUDIED. ADDITIONALLY, AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM SOLID-STATE DETECTORS. THE TELESCOPES AND THE X-RAY COUNTER WILL LOOK INTO THE ECLIPTIC PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PLASMA DETECTORS NSSDC ID HELIO-B-09

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - H.	PELLKOFER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - J.H.	WOLFE	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THESE DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS, ALPHA PARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV, AN ANGULAR RESOLUTION OF 5 DEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESOLUTION OF 30 SEC WILL BE USED TO OBSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT PROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 16 V AND 1 KV, WILL BE USED TO OBSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN EIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL BE ABOUT 100 DEG.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC ELECTRON DETECTOR NSSDC ID HELIO-B-10

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - E.	KEPPLER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - B.	WILKEN	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY
OI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PROTONS WILL BE DEFLECTED AND COUNTED SEPARATELY. THE POINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN APERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE ORDER OF MINUTES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ZODIACAL LIGHT PHOTOMETER NSSDC ID HELIO-B-11

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)		
PI - C.	LEINERT	LAND OBS	HEIDELBERG, W. GERMANY
OI - E.	PITZ	LAND OBS	HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PHOTOMETERS LOOKING AT 15 DEG, 30 DEG, AND 90 DEG FROM THE ECLIPTIC. THESE PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN WHITE LIGHT AND IN UV, BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION, SIZE, AND NATURE OF

INTERPLANETARY DUST PARTICLES.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MICROMETEOROID DETECTOR AND ANALYZER NSSDC ID HELIO-B-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. FECHTIG M.PLANCK INST.HEIDELBG HEIDELBERG, W. GERMANY
CI - J. WEITBRUCH M.PLANCK INST.HEIDELBG HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THEORIES ABOUT THE INTERPLANETARY DUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN, (2) THE CUT-OFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SOLAR PRESSURE INCREASES NEARER THE SUN, AND (3) THE NUMBER DENSITIES OF PARTICLES CHANGE NEAR THE ORBITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH HIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE MATERIAL TO VAPORIZE AND BECOME PARTIALLY IONIZED. THE GENERATED PLASMA CLOUD CAN THEN BE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) PART AND INTO POSITIVE IONS. FROM THE IMPULSE HEIGHTS, THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED. A TIME-OF-FLIGHT MASS SPECTROMETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ION CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE DUST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE MINUS 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM. A MASS SPECTRUM MAY BE GATHERED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- HELIOCENTRIC NSSDC ID HELOCTR
ALTERNATE NAMES- STP PROBE, IME-H

PLANNED LAUNCH DATE- 00/00/78 SPACECRAFT WEIGHT IN ORBIT- 465. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- 365. DAYS
APOAPSIS- 1. AU RAD PERIAPSIS- 1. AU RAD INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.J. MADDEN NASA-GSFC GREENBELT, MD
PS - K. OGILVIE NASA-GSFC GREENBELT, MD
PS - T.T. VON ROSENVINGE NASA-GSFC WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

THE EXPLORER CLASS HELIOCENTRIC SPACECRAFT WILL BE PART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE (1) TO INVESTIGATE SOLAR/TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE, (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE LAUNCH OF THREE COORDINATED SPACECRAFT IN THIS MISSION WILL PERMIT THE SEPARATION OF SPATIAL AND TEMPORAL EFFECTS. THE HELIOCENTRIC SPACECRAFT WILL BE PLACED NEAR A LIBRATION POINT IN THE EARTH/SUN GRAVITATIONAL FIELD, ALLOWING IT TO REMAIN BEYOND THE MAGNETOSPHERIC CAVITY IN THE SOLAR WIND. IT WILL THUS CONTINUOUSLY MONITOR CHANGES IN THE NEAR-EARTH INTERPLANETARY MEDIUM. BECAUSE BOTH THE MOTHER AND DAUGHTER SPACECRAFT WILL HAVE ECCENTRIC GEOCENTRIC ORBITS, IT IS HOPED THAT THIS MISSION WILL MEASURE THE CAUSE/EFFECT RELATIONSHIPS BETWEEN THE INCIDENT SOLAR PLASMA AND THE MAGNETOSPHERE. FINALLY, THE HELIOCENTRIC SPACECRAFT WILL ALSO PROVIDE A NEAR-EARTH BASE FOR MAKING COSMIC RAY AND OTHER PLANETARY MEASUREMENTS FOR COMPARISON WITH COINCIDENT MEASUREMENTS FROM DEEP-SPACE PROBES.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE — NSSDC ID HELOCTR-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - E.W.	HONES	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MAKE AN INTEGRATED STUDY OF THE NATURE, ORIGIN AND EVOLUTION OF STRUCTURE IN THE INTERPLANETARY MEDIUM. ALSO, THE TERMAL STATE OF THE INTERPLANETARY PLASMA WILL BE STUDIED, UNPERTURBED BY THE EARTH'S BOW SHOCK. IN THE EXPERIMENT PROTON AND ELECTRON SOLAR PLASMA WILL BE MEASURED FROM 150 EV TO 7 KEV AND 5 EV TO 2.5 KEV IN 12 AND 16 ENERGY STEPS, RESPECTIVELY. PROTONS WILL BE MEASURED BY A 135-DEG SPHERICAL ELECTROSTATIC ANALYZER IN BOTH TWO AND THREE DIMENSIONS. STEP ENERGY RESOLUTION FOR EACH ENERGY WINDOW WILL BE 4.2 PERCENT. ELECTRONS WILL BE MEASURED BY A 90-DEG SPHERICAL ELECTROSTATIC ANALYZER, ALSO IN TWO AND THREE DIMENSIONS. THE ENERGY WINDOW PER STEP FOR ELECTRONS WILL BE 10 PERCENT. CHANNELTRON ELECTRON MULTIPLIERS WILL BE USED AS DETECTORS FOR EACH OF THE ANALYZERS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MAGNETIC FIELDS — NSSDC ID HELOCTR-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.J.	SMITH	NASA-JPL	PASADENA, CA
OI - L.	DAVIS	CAL TECH	PASADENA, CA
OI - G.L.	SISCOE	U OF CALIFORNIA, LA	LOS ANGELES, CA

OI - D.E.	JONES	BRIGHAM YOUNG U	PROVO, UT
OI - B.T.	TSURUTANI	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTATION FOR THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED, TRIAXIAL VECTOR HELIUM MAGNETOMETER. MEASUREMENTS WILL BE MADE OF THE STEADY MAGNETIC FIELD AND ITS LOW FREQUENCY VARIATIONS. SEVEN FIELD AMPLITUDE RANGES (MINUS TO PLUS 4, 14, 42, 64C, 4,000, 22,000, AND 140,000 GAMMAS) WILL BE AVAILABLE. THE FREQUENCY RESPONSE WILL BE 0 TO 3 HZ WITH 3 BANDS (0.1 TO 1, 1 TO 3, 3 TO 10 HZ) FOR MEASUREMENTS OF FLUCTUATIONS PARALLEL TO THE SPACECRAFT SPIN AXIS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION NSSDC ID HELOCTR-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.K.	HOVESTADT	M.PLANCK INST.GARCHING	GARCHING, WEST GERMANY
OI - J.J.	O'GALLAGHER	U OF MARYLAND	COLLEGE PARK, MD
OI - C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI - G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD
OI - M.	SCHOLER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - L.A.	FISK	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE HELIOCENTRIC AND NOTHER SPACECRAFT, THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC HEAVY PARTICLES. MEASUREMENTS WILL BE MADE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES -- (1) SOLAR WIND IRON (5 KEV/CHARGE TO 20 MEV/NUCLEON), (2) SUPRATHERMAL MULTIPLE-CHARGED IONS (2 .LE. 26 IN THE ENERGY RANGE 5 TO 50 KEV/ NUCLEON), (3) LOW-ENERGY COSMIC RAYS (0.05 TO 20 MEV/NUCLEON), AND (4) TRAPPED PARTICLES (0.05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACECRAFT THAT WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES, THIN WINDOW PROPORTIONAL COUNTERS, AND POSITION SENSITIVE SOLID-STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS OVER THE ENTIRE ENERGY RANGE, I.E., 0.04 SQ CM STER FOR THERMAL AND SUPRATHERMAL SOLAR WIND MEASUREMENTS AND 3 SQ CM STER FOR LOW-ENERGY COSMIC RAY MEASUREMENTS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES NSSDC ID HELOCTR-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - T.T.	VON ROSENVING	NASA-GSFC	GREENBELT, MD
OI - L.A.	FISK	NASA-GSFC	GREENBELT, MD
CI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - M.A.I.	VAN HOLLEBEKE	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE COMPOSITION OF SOLAR COSMIC RAYS FROM HYDROGEN THROUGH IRON AND THE ELEMENTAL ABUNDANCE OF GALACTIC

COSMIC RAYS. THREE PARTICLE TELESCOPES PLUS A PROPORTIONAL COUNTER, FOR MEASUREMENT OF ELECTRONS AND X RAYS, WILL COMPRISE THE INSTRUMENTATION. NUCLEI WITH Z BETWEEN 1 AND 26 WILL BE MEASURED IN VARIOUS ENERGY WINDOWS IN THE RANGE 0.5-500 MEV PER NUCLEON. ISOTOPES IN THE 2 RANGES 1 TO 2, 3 TO 7, AND 8 TO 16 WILL BE MEASURED IN THE ENERGY RANGES 4 TO 80, 8 TO 120, AND 10 TO 200 MEV PER NUCLEON, RESPECTIVELY. ELECTRONS WILL BE MEASURED IN THE ENERGY RANGES 0.07 TO 0.2 MEV AND 0.3 TO 12 MEV.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- HIGH-ENERGY COSMIC RAYS NSSDC ID HELOCTR-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.H.	HECKMAN	LAWRENCE BERKELEY LAB	BERKELEY, CA
OI - D.	GREINER	U OF CALIFORNIA, BERK	BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE ISOTOPIC ABUNDANCE IN THE PRIMARY COSMIC RAYS FOR HYDROGEN THROUGH IRON. THE INSTRUMENT WILL BE A 10-ELEMENT SOLID-STATE PARTICLE TELESCOPE CONSISTING OF LITHIUM DRIFTED SILICON DETECTORS. ENERGY RANGES MEASURED WILL RUN FROM 31 TO 110 MEV FOR Z=1, AND FROM 125 TO 445 MEV FOR Z=26. ISOTOPIC RESOLUTION WILL BE LESS THAN 0.15 AMU FOR Z=1 THROUGH 26. DIRECTION OF INCIDENT NUCLEI WILL BE OBTAINED FROM A PAIR OF MULTI-WIRE PROPROTIONAL COUNTERS WITH 2 DEG RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- COSMIC-RAY ELECTRONS AND NUCLEI NSSDC ID HELOCTR-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - P.	MEYER	U OF CHICAGO	CHICAGO, IL
OI - P.	EVENSON	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE PROPAGATION WITHIN THE SOLAR SYSTEM AND THE PROPERTIES OF THE INTERPLANETARY MEDIUM. THE FOLLOWING SPECIES WILL BE RESOLVED -- (1) ELECTRONS (DIFFERENTIAL SPECTRUM FROM 5 TO 400 MEV), (2) PROTONS (DIFFERENTIAL SPECTRUM FROM 36 TO 13,000 MEV AND INTEGRAL SPECTRUM ABOVE 13 GEV), (3) HELIUM THROUGH SULFUR (Z FROM 2 THROUGH 16, DIFFERENTIAL SPECTRUM FROM 60 TO 13,000 MEV/NUCLEON AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLEON), AND (4) THE IRON GROUP (Z FROM 26 THROUGH 28, DIFFERENTIAL SPECTRUM FROM 150 TO 13,000 MEV/NUCLEON, AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLEON). A CHARGED PARTICLE TELESCOPE WILL BE USED TO MAKE THESE MEASUREMENTS. IT WILL CONSIST OF A CURVED SOLID-STATE DETECTOR, A GAS CERENKOV COUNTER, A SOLID-STATE DETECTOR, A CESIUM IODIDE SCINTILLATION DETECTOR, A PLASTIC SCINTILLATION COUNTER, AND A QUARTZ CERENKOV COUNTER. THE DESIGN OF THE TELESCOPE IS BASED ON THAT USED IN EXPERIMENT 68-014A-09 FOR OGO 5.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 20-HZ TO 1-KHZ MAGNETIC AND 20-HZ TO 100-KHZ ELECTRIC FIELD DETECTORS — NSSDC ID HELOCTR-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - E.J.	SMITH	NASA-JPL	PASADENA,CA
OI - R.W.	FREDERICKS	TRW SYSTEMS GROUP	REDONDO BEACH,CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO PROVIDE DATA FOR PLASMA WAVE STUDIES UNDERTAKEN TO GAIN A BETTER UNDERSTANDING OF THE WAVE PARTICLE INTERACTION AND PLASMA INSTABILITIES WHICH LEAD TO THE EQUIVALENT COLLISION PHENOMENA THAT PRODUCE APPARENT FLUID-LIKE BEHAVIOR IN THE SOLAR WIND NEAR 1 AU. AN ELECTRIC DIPOLE AND MAGNETIC SEARCH COIL, BOOM-MOUNTED AND ALIGNED ALONG THE SPACECRAFT SPIN AXIS, WILL BE USED TO MEASURE MAGNETIC FIELD WAVE LEVELS FROM 20 HZ TO 1 KHZ IN EIGHT CHANNELS AND ELECTRIC FIELD LEVELS FROM 20 HZ TO 100 KHZ IN 16 CHANNELS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC PROTONS — NSSDC ID HELOCTR-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.	ELLIOTT	IMPERIAL COLLEGE	LONDON, ENGLAND
OI - J.J.	VAN ROOIJEN	SPACE RESEARCH LAB	LEIDEN, THE NETHERLANDS
OI - J.N.	VAN GILS	SPACE RESEARCH LAB	LEIDEN, THE NETHERLANDS
OI - R.M.	VAN DEN NIEUWENHOF	SPACE RESEARCH LAB	LEIDEN, THE NETHERLANDS
OI - K.P.	WENZEL	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - L.D.	DE FEITER	SPACE RESEARCH LAB	LEIDEN, THE NETHERLANDS
OI - A.C.	DURNEY	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - T.R.	SANDERSON	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - R.J.	HYNDS	IMPERIAL COLLEGE	LONDON, UNITED KINGDOM
OI - V.	DOMINGO	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHRLANDS
OI - D.E.	PAGE	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - A.	BALOGH	IMPERIAL COLLEGE	LONDON, UNITED KINGDOM
OI - C.	DE JAGER	SPACE RESEARCH LAB	LEIDEN, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE ACCELERATION AND PROPAGATION PROCESSES IN DIFFERENT PARTS OF THE MAGNETOSPHERE AND IN INTERPLANETARY SPACE. MEASUREMENTS WILL BE MADE OF PROTONS FROM 0.03 TO 1.40 MEV AND ALPHA PARTICLES FROM 1.40 TO 6.00 MEV USING THREE TWO-ELEMENT TELESCOPES. ONE TELESCOPE WILL LOOK PARALLEL TO THE SPACECRAFT SPIN AXIS WHILE THE OTHERS WILL SCAN IN EIGHT SECTORS, MOUNTED AT 60 DEG AND 120 DEG TO THE SPIN AXIS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- X-RAYS AND ELECTRONS — NSSDC ID HELOCTR-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A.	ANDERSON	U OF CALIFORNIA, BERK	BERKELEY, CA

OI - R.P.	LIN	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - D.F.	SMITH	HIGH ALTITUDE OBS	BOULDER, CO
OI - S.R.	KANE	U OF CALIFORNIA, BERK	BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY INTERPLANETARY AND SOLAR ELECTRONS (2 TO 1000 KEV) IN THE TRANSITION ENERGY RANGE BETWEEN SOLAR WIND AND LOW-ENERGY COSMIC RAYS, AND TO STUDY SOLAR X RAYS (8 TO 72 KEV). THE ELECTRONS WILL BE MEASURED BY A PAIR OF PASSIVELY COOLED, SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES AND BY A HEMISPHERICAL PLATE ELECTROSTATIC ANALYZER WITH CHANNEL-MULTIPLIER DETECTORS. THE X RAYS WILL BE MEASURED BY A PROPORTIONAL COUNTER WITH A SODIUM IODIDE SCINTILLATOR.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 20-KHZ TO 3-MHZ RADIO MAPPING NSSDC ID HELOCTR-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.L.	STEINBERG	MEUDON OBSERVATORY	CHALATS MEUDON, FRANCE
OI - P.	COUTURIER	MEUDON OBSERVATORY	CHALATS MEUDON, FRANCE
OI - R.	KNOLL	MEUDON OBSERVATORY	CHALATS MEUDON, FRANCE
CI - J.	FAINBERG	NASA-GSFC	GREENBELT, MD
OI - R.G.	STONE	NASA-GSFC	GREENBELT, MD
OI - S.R.	MOSIER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF FOUR SELF-CALIBRATING RADIOMETERS THAT STEP THROUGH 16 FREQUENCIES BETWEEN 20 KHZ AND 3 MHZ. THESE RADIOMETERS ARE CONNECTED TO DIPOLE ANTENNAS. TYPE 3 SOLAR RADIO BURSTS WILL BE USED TO MAP MAGNETIC LINES OF FORCE IN AND OUT OF THE ECLIPTIC BETWEEN 0.05 AND 1 AU, THEREBY PRODUCING A THREE-DIMENSIONAL DESCRIPTION OF THE SOLAR WIND.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MASS SPECTROMETER FOR 470 TO 10,500 EV PER CHARGE AND 1 TO 5.6 AMU PER CHARGE NSSDC ID HELOCTR-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.W.	OGILVIE	NASA-GSFC	GREENBELT, MD
CI - J.	GEISS	U OF BERNE	BERNE, SWITZERLAND
OI - M.H.	ACUNA	NASA-GSFC	GREENBELT, MD
OI - M.A.	COPLAN	U OF MARYLAND	COLLEGE PARK, MD
CI - D.L.	LIND	NASA-JSC	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN ELECTROSTATIC ENERGY ANALYZER AND A WIEN VELOCITY FILTER CONFIGURED AS A MASS SPECTROMETER TO DETERMINE THE CHARGE STATE AND ISOTOPIC CONSTITUTION OF THE SOLAR WIND. THE INSTRUMENT WILL HAVE AN ENERGY PER UNIT CHARGE RANGE OF 0.47 TO 10.5 KEV AND A MASS PER UNIT CHARGE RANGE OF 1 TO 5.6.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- COSMIC-RAY COMPOSITION NSSDC ID HELOCTR-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - E.C. STONE CAL TECH PASADENA, CA
OI - R.E. VOGT CAL TECH PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO STUDY THE ISOTOPIC CONSTITUTION OF SOLAR MATTER AND GALACTIC COSMIC-RAY SOURCES, THE PROCESSES OF NUCLEOSYNTHESIS IN THE SUN AND IN THE GALAXY, AND THE ASTROPHYSICAL PARTICLE ACCELERATION PROCESSES. THE FOLLOWING SPECIES ARE TO BE RESOLVED -- LITHIUM THROUGH NICKEL (Z FROM 3 THROUGH 28 AND A FROM 6 THROUGH 64) IN THE ENERGY RANGE FROM 2 TO 200 MEV/NUCLEON. THE CORRESPONDING MASS RESOLUTION IS 0.065 TO 0.083 PROTON MASS FOR LITHIUM, AND 0.18 TO 0.22 PROTON MASS FOR IRON. THE ISOTOPIC ABUNDANCES AND ENERGY SPECTRA WILL BE MEASURED BY A HEAVY ISOTOPE SPECTROMETER TELESCOPE THAT USES SOLID-STATE CHARGED PARTICLE DETECTORS. ANTICOINCIDENCE GUARD RINGS AND SOLID-STATE MATRIX HODOSCOPE DETECTORS ARE EMPLOYED TO IMPROVE MASS AND ENERGY RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- SOLAR AND INTERPLANETARY MAGNETIC FIELDS NSSDC ID HELOCTR-13
(CORRELATIVE STUDY)

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - J.M. WILCOX STANFORD U STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF THE MEASUREMENT OF LARGE SCALE SOLAR MAGNETIC AND VELOCITY FIELDS WITH THE STANFORD GROUND-BASED SOLAR TELESCOPE, AND THE COMPARISON OF THESE MEASUREMENTS WITH MEASUREMENTS OF THE INTERPLANETARY MAGNETIC FIELD AND SOLAR WIND MADE BY OTHER EXPERIMENTS ON THIS SPACECRAFT. THE PURPOSE OF THE EXPERIMENT WILL BE TO STUDY THE LARGE SCALE STRUCTURE OF THE SOLAR MAGNETIC FIELD AND ITS EXTENSION INTO INTERPLANETARY SPACE BY THE SOLAR WIND.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- HELOS NSSDC ID HELOS
ALTERNATE NAMES- HI.ECCEN.LUN.OCCULT.SAT.

PLANNED LAUNCH DATE- 08/00/79 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- LAUNCH VEHICLE-

FUNDING AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS

ORBIT TYPE- ECCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 200000. KM ALT PERIAPSIS- KM ALT INCLINATION- 60.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN
PS - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THIS MISSION WILL BE THE MEASUREMENT OF THE POSITION, STRUCTURAL FEATURES, SPECTRAL, AND TEMPORAL CHARACTERISTICS OF COSMIC X-RAY SOURCES. THE POSITION AND DIAMETER OF COSMIC X-RAY SOURCES WILL BE DETERMINED BY THE OBSERVATION OF THE TIME AND SPEED WITH WHICH THE SOURCES DISAPPEAR BEHIND THE MOON DURING LUNAR OCCULTATIONS. THE ABILITY TO CORRECT BOTH THE ORBIT AND THE ORIENTATION OF THE SPACECRAFT, COUPLED WITH THE HIGHLY-ECCENTRIC ORBIT, WILL ENABLE THE SPACECRAFT TO OBSERVE ANY PORTION OF THE SKY FOR LONG PERIODS OF TIME. TEMPORAL VARIATIONS ON SCALES RANGING FROM TENS OF MICROSECONDS TO TENS OF HOURS WILL BE OBSERVABLE, AS WELL AS ENERGY SPECTRUM OBSERVATIONS AND ABSOLUTE FLUX MEASUREMENTS OF OBJECTS WITH AN INTENSITY GREATER THAN 5 TIMES 10 TO THE -5 THAT OF THE CRAB NEBULA. BRIGHT SOURCES WILL BE LOCATABLE TO WITHIN ARC-SEC IN POSITION.

ON 01/00/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC X-RAY PACKAGE NSSDC ID HELOS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, WHICH WILL OBSERVE COSMIC X-RAY SOURCES IN THE ENERGY RANGE OF 1.5 TO 20 KEV, WILL CONSIST OF PROPORTIONAL COUNTERS LOCATED BEHIND MODIFIED HONEYCOMB COLLIMATORS.

ON 01/00/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- LOW-ENERGY COSMIC X-RAY PACKAGE NSSDC ID HELOS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, WHICH WILL OBSERVE COSMIC X-RAY SOURCES IN THE 0.1- TO 2-KEV RANGE, WILL UTILIZE THIN-WINDOW, POSITION-SENSITIVE PROPORTIONAL COUNTERS LOCATED BEHIND GRAZING-INCIDENCE MIRRORS.

ON 01/00/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- IMP-J
ALTERNATE NAMES- PL-723A

NSSDC ID IMP-J

PLANNED LAUNCH DATE- 11/00/73 SPACECRAFT WEIGHT IN ORBIT- 270. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 17760. MIN
APOAPSIS- 243622. KM ALT PERIAPSIS- 213622. KM ALT INCLINATION- 29. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - W.R.	LIMBERIS	NASA-GSFC	GREENBELT, MD
PS - N.F.	NESS	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
IMP-J THE LAST SATELLITE OF THE IMP SERIES, IS A DRUM-SHAPED SPACECRAFT, 139.6 CM ACROSS AND 137.4 CM HIGH, INSTRUMENTED FOR STUDIES OF COSMIC RAYS, ENERGETIC SOLAR PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. ITS NEARLY CIRCULAR ORBIT AT 30 TO 40 EARTH RADII WILL PERMIT OBSERVATIONS IN NEAR INTERPLANETARY SPACE AND IN THE EARTH'S MAGNETOTAIL. THE SPACECRAFT SPIN AXIS IS TO BE NORMAL TO THE ECLIPTIC PLANE, AND THE SPIN RATE IS TO BE 23 RPM. MOST CHARACTERISTICS OF THE IMP-J MISSION ARE SIMILAR TO THOSE OF THE STILL ACTIVE IMP-7, THE PREVIOUS SPACECRAFT IN THE SUCCESSFUL IMP SERIES. IT IS PLANNED THAT IMP-J AND IMP-7 WILL BE ABOUT 180 DEG OUT OF PHASE IN THEIR SIMILAR ORBITS. IMP-J WAS SUCCESSFULLY LAUNCHED OCTOBER 26, 1973 (UT) AND WAS DESIGNATED EXPLORER 50.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD EXPERIMENTS NSSDC ID IMP-J -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - C.S.	SCEARCE	NASA-GSFC	GREENBELT, MD
OI - J.B.	SEEK	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER DESIGNED TO STUDY THE INTERPLANETARY AND GEOMAGNETIC TAIL MAGNETIC FIELDS. EACH SENSOR WILL HAVE THREE DYNAMIC RANGES, PLUS OR MINUS 12, PLUS OR MINUS 36, AND PLUS OR MINUS 108 GAMMAS. WITH THE AID OF A BIT COMPACTION SCHEME (DELTA MODULATION), THERE WILL BE 25 VECTOR MEASUREMENTS MADE AND TELEMETERED PER SECOND.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA NSSDC ID IMP-J -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI - A.J.	LAZARUS	MIT	CAMBRIDGE, MA
OI - J.H.	BINSACK	MIT	CAMBRIDGE, MA
OI - E.F.	LYON	MIT	CAMBRIDGE,MASS.

EXPERIMENT BRIEF DESCRIPTION

A MODULATED SPLIT-COLLECTOR FARADAY CUP WHICH WILL BE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, TRANSITION REGION, AND MAGNETOTAIL. ELECTRONS WILL BE STUDIED IN EIGHT LOGARITHMICALLY EQUISPACED ENERGY CHANNELS BETWEEN 17 EV AND 7 KEV. POSITIVE IONS WILL BE STUDIED IN EIGHT CHANNELS BETWEEN 50 EV AND 7 KEV. A SPECTRUM WILL BE OBTAINED EVERY EIGHT SPACECRAFT REVOLUTIONS. ANGULAR INFORMATION WILL BE OBTAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-DEG REVOLUTION OF THE SATELLITE OR MORE CLOSELY ABOUT THE SPACECRAFT SUN LINE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLID-STATE DETECTORS NSSDC ID IMP-J -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD
OI - C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI - D.K.	HOVESTADT	M.PLANCK INST.GARCHING	GARCHING, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES OBSERVED DURING SOLAR FLARES AND 27-DAY RECURRENT EVENTS. THE DETECTORS TO BE USED WILL INCLUDE (1) AN ELECTROSTATIC ANALYZER (TO SELECT PARTICLES OF THE DESIRED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICOINCIDENCE SHIELDING AND (2) A THIN WINDOW PROPORTIONAL COUNTER, SOLID-STATE PARTICLE TELESCOPE. THE EXPERIMENT WILL MEASURE PARTICLE ENERGIES FROM 0.1 TO 10 MEV PER CHARGE IN 12 BANDS AND WILL UNIQUELY IDENTIFY POSITRONS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES OF Z FROM 1 TO 8 (NO CHARGE RESOLUTION FOR Z GREATER THAN 8). TWO 1000-CHANNEL PULSE HEIGHT ANALYZERS, ONE FOR EACH DETECTOR, WILL BE INCLUDED IN THE EXPERIMENT PAYLOAD.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS NSSDC ID IMP-J -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 R(E) TO GIVE FURTHER DATA ON GEOMAGNETIC STORMS, AURORA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPHERIC PHENOMENA. THE DETECTOR WILL BE A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPEDEA - LOW ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 16 ENERGY INTERVALS BETWEEN 5 EV AND 50 KEV. IT WILL HAVE AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG. THE DETECTOR MAY BE

OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING GOOD ANGULAR RESOLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY BAND) ONCE EACH 272 SEC, AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIRE ENERGY RANGE IN FOUR DIRECTIONS WILL BE MEASURED EVERY 68 SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS NSSDC ID IMP-J -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.C.	ARMSTRONG	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WILL BE (1) TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW, (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNETOPAUSE, AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION WILL CONSIST OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLID-STATE DETECTORS AND A MAGNETIC FIELD TO DEFLECT ELECTRONS. TWO SIDE-MOUNTED DETECTORS WILL BE USED TO DETECT THE ELECTRONS DEFLECTED BY THE MAGNET. TWO ADDITIONAL SOLID-STATE DETECTORS WILL BE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV) PROTONS, ALPHA PARTICLES, AND CHARGED PARTICLES OF Z GREATER THAN 2. THE EXPERIMENT WILL BE DESIGNED TO MEASURE (1) PROTON FLUXES FROM 30 KEV TO GREATER THAN 8.6 MEV IN SIX RANGES, (2) ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV, (4) ALPHA PARTICLES IN FOUR RANGES, GREATER THAN 0.5 MEV, GREATER THAN 1.6 MEV, 2.2 TO 8.8 MEV, AND 8.8 TO 35 MEV, AND (5) CHARGED PARTICLES OF Z GREATER THAN 2 AT E GREATER THAN 5 MEV.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES NSSDC ID IMP-J -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.C.	STONE	CAL TECH	PASADENA, CA
OI - R.E.	VOGT	CAL TECH	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY (VIA DIFFERENTIAL ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES, ACCELERATION PROCESSES OF SOLAR PARTICLES, STORAGE IN THE INTERPLANETARY MEDIUM, AND SOLAR MODULATION OF PARTICLES IN THE INTERPLANETARY MEDIUM. THE DETECTOR TO BE USED IS A MULTI-ELEMENT, TOTALLY DEPLETED SOLID-STATE TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND IS TO BE OPERATED IN ONE OF THREE MODES -- (1) THE ENERGY RANGE MODE, (2) THE ELECTRON MODE (150 KEV TO 2.8 MEV), AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40 MEV/NUCLEON). THE DETECTOR WILL HAVE AN ANGULAR RESOLUTION OF PLUS TO MINUS 22 DEG.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS — NSSDC ID IMP-J -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - M.G.	MUNOZ	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INCREASE THE UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE SUN. THE DETECTOR WILL POINT ALONG THE SPACECRAFT SPIN AXIS. IT WILL BE A WINDOWLESS DE/DX VS E TELESCOPE WITH ANTICOINCIDENCE SHIELDING AND CAN BE OPERATED IN EITHER OF TWO MODES - (1) A HIGH-Z, LOW-E MODE HAVING AN ENERGY RANGE FROM 0.5 TO 50 MEV/NUCLEON AND A CHARGE RANGE Z FROM 5 TO 50 AND (2) A LOW MODE HAVING AN ENERGY RANGE 6 TO 1200 MEV/NUCLEON (ISOTOPES - HYDROGEN, DEUTERIUM, TRITIUM, HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR ELECTRONS WILL BE PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE OF THE DETECTOR WILL BE BE 50 DEG FULL ANGLE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS — NSSDC ID IMP-J -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.M.	KRIMIGIS	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - T.P.	ARMSTRONG	U OF KANSAS	LAWRENCE, KS
OI - J.A.	VAN ALLEN	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THREE SOLID-STATE DETECTORS IN AN ANTICOINCIDENCE PLASTIC SCINTILLATOR WILL OBSERVE ELECTRONS BETWEEN 0.2 AND 2.5 MEV, PROTONS BETWEEN 0.3 AND 500 MEV, ALPHA PARTICLES BETWEEN 2.0 AND 200 MEV, HEAVY PARTICLES WITH Z VALUES RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 8 MEV, HEAVY PARTICLES WITH Z VALUES RANGING BETWEEN 6 AND 8 WITH ENERGIES GREATER THAN 32 MEV, AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON, ALL WITH DYNAMIC RANGES OF 1 TO ONE MILLION (PER SQUARE CM-SEC-STER). FIVE THIN WINDOW GEIGER-MUELLER TUBES WILL OBSERVE ELECTRONS OF ENERGY GREATER THAN 15 KEV, PROTONS OF ENERGY GREATER THAN 250 KEV, AND X RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A, ALL WITH A DYNAMIC RANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY OF SOLAR ORIGIN WILL BE STUDIED, BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT WILL PERMIT COSMIC RAYS AND MAGNETOTAIL PARTICLES TO BE OBSERVED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR- AND COSMIC-RAY PARTICLES — NSSDC ID IMP-J -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD

OI - D.E.	HAGGE	NASA-JSC	HOUSTON, TX
CI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT WILL BE DESIGNED TO MEASURE ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WILL BE USED. THE FIRST SYSTEM WILL CONSIST OF A PAIR OF SOLID-STATE TELESCOPES WHICH MEASURE INTEGRAL FLUXES OF ELECTRONS ABOVE 150, 350, AND 700 KEV AND OF PROTONS ABOVE .05, .15, .50, .70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV. EXCEPT FOR THE .05 MEV PROTON MODE, ALL COUNTING MODES WILL HAVE UNIQUE SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WILL BE A SOLID-STATE DE/DX VS E TELESCOPE THAT LOOKS PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE WILL MEASURE Z = 1 TO 16 NUCLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WILL BE OBTAINED AS COUNTS IN THE DE/DX BUT NOT IN THE E SENSOR. THE THIRD DETECTOR SYSTEM WILL BE A THREE-ELEMENT TELESCOPE WHOSE AXIS MAKES AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE MIDDLE ELEMENT WILL BE A CSI SCINTILLATOR WHILE THE OTHER TWO ELEMENTS WILL BE SOLID-STATE SENSORS. THE INSTRUMENT WILL RESPOND TO ELECTRONS BETWEEN 2 AND 12 MEV AND TO Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT WILL ACT AS A DE/DX DETECTOR. ABOVE 80 MEV, IT WILL ACT AS A BIDIRECTIONAL TRIPLE DE/DX DETECTOR. FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR INTO EIGHT ANGULAR SECTORS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA NSSDC ID IMP-J -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. IONS AS HEAVY AS OXYGEN WILL BE RESOLVED WHEN THE SOLAR WIND TEMPERATURE IS LOW. ENERGY ANALYSIS WILL BE ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WILL BE STUDIED. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WILL BE STUDIED. IN THE MAGNETOTAIL, POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WILL BE STUDIED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROSTATIC FIELDS NSSDC ID IMP-J -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL ANTENNA SYSTEM WITH ELECTROMETERS TO MEASURE THE POTENTIAL DIFFERENCE BETWEEN THE TWO HALVES OF EACH ANTENNA WILL DETERMINE THE VECTOR ELECTROSTATIC FIELD WITH A SENSITIVITY OF 0.1 MV PER METER. ONE ANTENNA WILL LIE ALONG THE SPACECRAFT SPIN AXIS AND THE OTHER WILL BE NORMAL TO THIS AXIS. MEASUREMENTS WILL BE MADE IN THE SOLAR WIND, IN THE TRANSITION REGION, AND IN THE GEOMAGNETIC TAIL.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE NSSDC ID IMP-J -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - G.W.	PFEIFFER	U OF IOWA	IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

A WIDE-BAND RECEIVER WILL BE USED TO OBSERVE HIGH-RESOLUTION FREQUENCY-TIME SPECTRA, AND A SIX-CHANNEL NARROW-BAND RECEIVER WITH A VARIABLE CENTER FREQUENCY WILL BE USED TO OBSERVE WAVE CHARACTERISTICS. THE RECEIVERS WILL OPERATE FROM THREE ANTENNA SYSTEMS. THE FIRST SYSTEM WILL CONTAIN A PAIR OF LONG DIPOLE ANTENNAS (ONE, EXTENDABLE TO 400 FT, NORMAL TO THE SPACECRAFT SPIN AXIS AND THE OTHER ANTENNA, EXTENDABLE TO 20 FT, ALONG THE SPIN AXIS). THE SECOND SYSTEM WILL CONTAIN A BOOM-MOUNTED TRIAD OF ORTHOGONAL LOOP ANTENNAS. THE THIRD SYSTEM WILL CONSIST OF A BOOM-MOUNTED 20-IN. SPIN AXIS DIPOLE. THE MAGNETIC AND ELECTRIC FIELD INTENSITIES AND FREQUENCY SPECTRA, POLARIZATION, AND DIRECTION OF ARRIVAL OF NATURALLY OCCURRING RADIO NOISE IN THE MAGNETOSPHERE WILL BE OBSERVED. PHENOMENA TO BE STUDIED ARE THE TIME-SPACE DISTRIBUTION, ORIGIN, PROPAGATION, DISPERSION, AND OTHER CHARACTERISTICS OF RADIO NOISES OCCURRING ACROSS AND ON EITHER SIDE OF THE MAGNETOSPHERIC BOUNDARY REGION. THE FREQUENCY RANGE FOR ELECTRIC FIELDS WILL BE 0.3 HZ TO 200 KHZ AND FOR MAGNETIC FIELDS, IT WILL BE 20 HZ TO 200 KHZ.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- INDIAN SCIENTIFIC SAT. NSSDC ID INDASAT

ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/74 SPACECRAFT WEIGHT IN ORBIT- 300. KG

LAUNCH SITE- LAUNCH VEHICLE-

FUNDING AGENCY
INDIA ISRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 600. KM ALT PERIAPSIS- 600. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN UNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THE INDIAN SCIENTIFIC SATELLITE WILL BE THE FIRST SATELLITE WHOLLY DESIGNED AND FABRICATED IN INDIA. IT WILL BE LAUNCHED BY THE USSR AND WILL CARRY EXPERIMENTS COVERING THREE AREAS -- X-RAY ASTRONOMY, SOLAR NEUTRON AND GAMMA RAYS, AND IONOSPHERIC PHYSICS. THE SATELLITE WILL BE SPIN STABILIZED AND WILL BE LAUNCHED INTO A NEAR-CIRCULAR ORBIT. THE NECESSARY GROUND TELEMETRY AND TELECOMMAND STATIONS WILL BE ESTABLISHED AT SRIHARIKOTA.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME- X-RAY ASTRONOMY NSSDC ID INDASAT-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE A NAI (TL) SCINTILLATOR AND A PROPORTIONAL COUNTER TO MEASURE X RAYS IN THE ENERGY RANGE 2 TO 100 KEV FROM BOTH CELESTIAL SOURCES AND COSMIC BACKGROUND.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME- SOLAR NEUTRON AND GAMMA RAYS NSSDC ID INDASAT-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO DETECT EMISSION OF ENERGETIC NEUTRONS FROM 10 TO 500 MEV AND GAMMA RAYS FROM 200 KEV TO 20 MEV ASSOCIATED WITH VIOLENT OUTBURSTS ON THE SUN.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME- IONOSPHERIC ELECTRON TRAP AND UV CHAMBERS NSSDC ID INDASAT-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE AN ELECTRON TRAP TO MEASURE ELECTRON ENERGIES UP TO 100 EV, ALONG WITH UV CHAMBERS TO MONITOR THE SCATTERED LYMAN-ALPHA RADIATION AND OXYGEN EMISSIONS IN THE NIGHT SKY.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

****

SPACECRAFT COMMON NAME- INTASAT NSSDC ID INTASAT
ALTERNATE NAMES- INTA SATELLITE

PLANNED LAUNCH DATE- 07/00/75 SPACECRAFT WEIGHT IN ORBIT- 24.5 KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
SPAIN CNIE-INTA
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 1000. KM ALT PERIAPSIS- 1000. KM ALT INCLINATION- 100. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.M.	DURACO	CNIE-INTA	TORREJON, SPAIN
PS - L.S.	MUNTOSGUREN	CNIE-INTA	MADRID, SPAIN
PS - J.E.	JACKSON	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
INTASAT, THE FIRST SPANISH SATELLITE, WILL BE A SMALL, MAGNETICALLY STABILIZED SPACECRAFT WHICH WILL CARRY A BEACON EXPERIMENT FOR STUDY OF THE IONOSPHERE. THE SPACECRAFT WILL BE A 12-SIDED RIGHT PRISM, 44.5 CM ACROSS OPPOSITE FLAT SIDES, AND 45 CM HIGH. THE ATTITUDE CONTROL MAGNET WITH DAMPING BARS WILL PROVIDE ALIGNMENT TO THE LOCAL MAGNETIC FIELD VECTOR TO PLUS OR MINUS 10 DEG WITHIN 10 DAYS OF LAUNCH. THE 18-V POWER SYSTEM WILL BE OPERATED BY 12 NICKEL-CADMIUM BATTERIES CHARGED BY SOLAR CELLS ON THE SIDES OF THE SATELLITE. THE ORBIT PLANNED WILL BE SUN-SYNCHRONOUS, WITH EQUATOR CROSSING INITIALLY OCCURRING AT NOON AND MIDNIGHT LOCAL TIME. IT IS EXPECTED THAT MANY GROUND OBSERVERS (37 PLAN OBSERVATIONS AS OF SEPTEMBER 1973) WILL USE THE EXPERIMENT FOR IONOSPHERIC STUDY. TELEMETRY WILL BE PROVIDED FOR MONITORING AND CONTROL OF SPACECRAFT CONDITION.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

EXPERIMENT NAME- IONOSPHERIC BEACON NSSDC ID INTASAT-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS BEACON EXPERIMENT WILL CONSIST OF A TWO-FREQUENCY (40.0100 AND 40.01025 MHZ) TRANSMITTER, THAT WILL CONTINUOUSLY RADIATE LINEARLY

POLARIZED, STABLE AND UNMODULATED SIGNALS AT A MINIMUM POWER LEVEL OF 200 MW. THE TWO-BEACON MONOPOLE ANTENNA, ONE BEACON FOR EACH FREQUENCY, WILL EXTEND FROM THE TOP AND BOTTOM OF THE SPACECRAFT ALONG THE SPACECRAFT AXIS. PRESENTLY, 37 EXPERIMENTERS IN 21 DIFFERENT COUNTRIES ARE PLANNING TO PARTICIPATE, AND ADDITIONAL PARTICIPATION IS EXPECTED. THE EXPERIMENTERS WILL CALCULATE TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH FROM SATELLITE TO GROUND, AND WILL OBSERVE IONOSPHERIC IRREGULARITIES AND SCINTILLATIONS.

ON 10/30/73, THE SPACECRAFT MISSION WAS UNKNOWN.

****

SPACECRAFT COMMON NAME- ISS NSSDC ID ISS
ALTERNATE NAMES- IONOSPHERE SOUNDING SAT

PLANNED LAUNCH DATE- 02/00/78 SPACECRAFT WEIGHT IN ORBIT- 86. KG

LAUNCH SITE- TANEGASHIMA, JAPAN LAUNCH VEHICLE- NU

FUNDING AGENCY
JAPAN NASDA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 1000.00 KM ALT PERIAPSIS- 1000.00 KM ALT INCLINATION- 70. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. TAO RRL TOKYO, JAPAN
PS - K. TAO RRL TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE ISS OBJECTIVE WILL BE TO OBSERVE THE WORLDWIDE DISTRIBUTION OF THE VIRTUAL RANGE VS THE FREQUENCY (OBTAIN IONOGRAMS) OF THE TOPSIDE IONOSPHERE, AND TO OBSERVE THE WORLDWIDE DISTRIBUTION OF RADIO NOISE. THE IONOSPHERIC OBSERVATION WILL BE IN THE GENERAL RANGE OF 1 TO 15 MHZ. SEVERAL SUPPLEMENTAL OBSERVATIONS OF IN SITU PLASMA CHARACTERISTICS WILL ALSO BE CONDUCTED ALONG THE SATELLITE ORBIT. THESE OBSERVATIONS WILL INCLUDE DENSITY AND TEMPERATURE OF ELECTRONS, IONS MEASURED BY A RETARDING POTENTIAL TRAP, AN ION MASS SPECTROMETER, AND OBSERVATION OF THE EARTH'S MAGNETIC FIELD. THE SATELLITE WILL BE SPIN STABILIZED WITH ITS SPIN AXIS NORMAL TO THE ECLIPTIC PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER NSSDC ID ISS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT'S OBJECTIVE WILL BE TO OBTAIN A WORLDWIDE DISTRIBUTION OF THE VIRTUAL HEIGHT VS. FREQUENCY CHARACTERISTICS OF THE TOPSIDE

IONOSPHERE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RADIO NOISE NSSDC ID ISS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT'S OBJECTIVE WILL BE TO OBTAIN A WORLDWIDE DISTRIBUTION OF RADIO NOISE CAUSED BY ATMOSPHERICS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RETARDING POTENTIAL PROBE NSSDC ID ISS -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - S. MIYAZAKI RRL TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
NO INFORMATION IS PRESENTLY AVAILABLE ON THIS PROBE BUT IT IS PROBABLY AN ION TRAP. SUCH TRAPS USUALLY USE ONE OR MORE SCREEN GRIDS MOUNTED IN FRONT OF A COLLECTOR. THE SCREENS WILL HAVE A VARIABLE VOLTAGE PATTERN APPLIED TO PERMIT EITHER ELECTRON OR ION CURRENTS. FOR A GIVEN SCREEN VOLTAGE, A VOLTAGE PROFILE PROVIDED TO THE COLLECTOR WILL PRODUCE A CURRENT/VOLTAGE PROFILE. ANALYSIS OF THIS PROFILE CAN PROVIDE TEMPERATURE, COMPOSITION, AND DENSITY DATA FOR IONS AND/OR ELECTRONS.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION MASS SPECTROMETER NSSDC ID ISS -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - N. FUGONO RRL TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
BEING FLOWN TO CONTRIBUTE TO THE SUPPLEMENTAL OBSERVATIONS OF IN SITU PLASMA CHARACTERISTICS. THIS EXPERIMENT WILL MEASURE THE AMBIENT ION CONCENTRATIONS WITH AN ION MASS SPECTROMETER USED AS THE SENSOR.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ITOS-F NSSDC ID ITOS-F
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 10/18/73 SPACECRAFT WEIGHT IN ORBIT- 409. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 115.2 MIN
APOAPSIS- 1460.00 KM ALT PERIAPSIS- 1460.00 KM ALT INCLINATION- 102. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENT NASA-GSFC GREENBELT, MD
PS - I.L. GOLDBERG NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-F IS ONE IN A SERIES OF IMPROVED TIROS-M TYPE SATELLITES THAT WILL BE LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS SYSTEM. THE PRIMARY OBJECTIVE OF THE ITOS-F METEOROLOGICAL SATELLITE WILL BE TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WILL ALSO BE CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA OF SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE RECORDER MODE. A SECONDARY OBJECTIVE WILL BE TO OBTAIN GLOBAL SOLAR PROTON FLUX DATA ON A ROUTINE DAILY BASIS. THE PRIMARY SENSORS WILL CONSIST OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WILL BE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT WILL MEASURE 1 BY 1 BY 1.2 M. THE SATELLITE WILL BE EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WILL BE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT IS ACHIEVED. EACH PANEL WILL MEASURE OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WILL BE COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE ITOS DYNAMICS AND ATTITUDE CONTROL SYSTEM WILL MAINTAIN DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WILL BE MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT WILL PROVIDE THE DESIRED "EARTH LOCKING" ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WILL BE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR PROTON MONITOR NSSDC ID ITOS-F -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.O. BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION
THREE SOLID-STATE DETECTORS WILL MONITOR THE OMNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID-STATE DETECTORS WILL EACH MEASURE DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS), PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND ALPHA PARTICLES BETWEEN

12.5 AND 32 MEV. IN THE POLAR CAP REGION WHICH IS OF THE GREATEST INTEREST. THE TELESCOPES WILL VIEW PARALLEL TO, AND PERPENDICULAR TO, THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID-STATE DETECTOR WILL MEASURE DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR WILL LOOK IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCANNING RADIOMETER (SR) NSSDC ID ITOS-F -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-F SCANNING RADIOMETER (SR) SUBSYSTEM WILL CONSIST OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR, AND TWO SR RECORDERS. THIS SUBSYSTEM WILL PERMIT THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND, THE SEA, OR CLOUD TOPS VIEWED BY THE RADIOMETER. THE RADIOMETER WILL MEASURE REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON CHANNEL DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON CHANNEL DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR WILL NOT TAKE A PICTURE BUT INSTEAD WILL FORM AN IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSES ALONG ITS ORBITAL PATH, EACH ROTATION OF THE MIRROR WILL PROVIDE ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WILL BE PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) CAN BE STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA CAN ALSO BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL IS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WILL BE FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN IS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. FROM A PLANNED ALTITUDE OF 1460 KM, THE RADIOMETER WILL HAVE A GROUND RESOLUTION OF APPROXIMATELY 4 KM AT NADIR AND WILL BE CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +4 AND -1 DEG K, RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -G.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR) NSSDC ID ITOS-F -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-F VERY HIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT IS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT CAN BE PROGRAMMED TO RECORD UP TO 9 MIN OF DATA FOR REMOTE AREAS WHERE NO CDA

STATION IS WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSES. THE EXPERIMENT WILL INCLUDE TWO SCANNING RADIOMETERS, A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR WILL OPERATE SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NADIR). ONE VHRR CHANNEL WILL MEASURE REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS WILL PROVIDE MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL WILL MEASURE INFRARED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION WILL PERMIT BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR WILL FORM AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR, EXCEPT THAT BOTH RADIOMETERS WILL OPERATE SIMULTANEOUSLY. AS THE SATELLITE PROCEEDS IN ITS ORBIT, THE 400-RPM REVOLVING MIRRORS WILL SCAN THE EARTH'S SURFACE 180 DEG OUT OF PHASE (ONE MIRROR AT A TIME) AND PERPENDICULAR TO THE ORBIT PATH. THE VISIBLE AND INFRARED DATA WILL BE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL WILL BE TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WILL BE REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILS, THE SYSTEM WILL STILL BE CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RADIATION USING ONLY THE REMAINING RADIOMETER. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -G.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) NSSDC ID ITOS-F -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-F VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) WILL SENSE THE RADIANT ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 15.0, 14.8, 14.4, 14.1, 13.8, AND 13.4 MICRONS. THE GROSS ATMOSPHERIC WATER VAPOR CONTENT WILL BE DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WILL ALSO BE TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUDTOP TEMPERATURES. THE VTPR WILL CONSIST OF AN OPTICAL SYSTEM, DETECTOR AND ASSOCIATED ELECTRONICS, AND A SCANNING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH. THE GROUND AREA COVERED BY ONE SAMPLE OF DATA WILL BE APPROXIMATELY 50 BY 50 KM. AS EACH AREA IS SCANNED, THE OPTICAL SYSTEM WILL COLLECT, FILTER, AND DETECT THE RADIATION FROM THE EARTH AND SEPARATE IT INTO THE EIGHT SPECTRAL INTERVALS. THE RADIOMETER WILL OPERATE CONTINUOUSLY, TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WILL BE RECORDED THROUGHOUT THE ORBIT AND PLAYED BACK UPON COMMAND WHEN THE SATELLITE IS WITHIN COMMUNICATION RANGE OF A COMMAND AND DATA ACQUISITION STATION. GROUND PERSONNEL WILL USE THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -G.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ITOS-G NSSDC ID ITOS-G
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 07/00/75 SPACECRAFT WEIGHT IN ORBIT- 409. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 115.2 MIN
APOAPSIS- 1460.00 KM ALT PERIAPSIS- 1460.00 KM ALT INCLINATION- 102. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.	SARGENT	NASA-GSFC	GREENBELT, MD
PS - I.L.	GOLDBERG	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-G WILL BE ONE IN A SERIES OF IMPROVED TIROS-M TYPE SATELLITES THAT WILL BE LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS SYSTEM. THE PRIMARY OBJECTIVES OF THE ITOS-G METEOROLOGICAL SATELLITE WILL BE TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WILL ALSO BE CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA OF SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE RECORDER MODE. A SECONDARY OBJECTIVE WILL BE TO OBTAIN GLOBAL SOLAR PROTON DENSITY DATA ON A ROUTINE DAILY BASIS. THE PRIMARY SENSORS WILL CONSIST OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WILL BE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT WILL MEASURE 1 BY 1 BY 1.2 M. THE SATELLITE WILL BE EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WILL BE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT IS ACHIEVED. EACH PANEL WILL MEASURE OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WILL BE COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE ITOS DYNAMICS AND ATTITUDE CONTROL SYSTEM WILL MAINTAIN DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WILL BE MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT WILL PROVIDE THE DESIRED 'EARTH LOOKING' ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WILL BE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR PROTON MONITOR NSSDC ID ITOS-G -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.O. BOSTROM APPLIED PHYSICS LAB SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONTINUE THE ITOS SERIES OF JHU/APL EXPERIMENTS, WHICH ARE ALL TO BE THE SAME THROUGH ITOS-F. THREE SOLID-STATE DETECTORS WILL MONITOR THE OMNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID-STATE DETECTORS WILL EACH MEASURE DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS), PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP REGION WHICH IS OF THE GREATEST INTEREST, THE TELESCOPES WILL VIEW PARALLEL TO, AND PERPENDICULAR TO, THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR WILL MEASURE DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR WILL LOOK IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE. THE EXPERIMENTER HAS NOT YET DETERMINED WHETHER MINOR CHANGES WILL BE IMPLEMENTED FOR THIS ITOS-G EXPERIMENT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCANNING RADIOMETER (SR) NSSDC ID ITOS-G -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-G SCANNING RADIOMETER (SR) SUBSYSTEM WILL CONSIST OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR, AND TWO SR RECORDERS. THIS SUBSYSTEM WILL PERMIT THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND, THE SEA, OR CLOUD TOPS VIEWED BY THE RADIOMETER. THE RADIOMETER WILL MEASURE REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM IN THE 0.52- TO 0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON REGION DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR WILL NOT TAKE A PICTURE BUT INSTEAD WILL FORM AN IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSES ALONG ITS ORBITAL PATH, EACH ROTATION OF THE MIRROR WILL PROVIDE ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WILL BE PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) CAN BE STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA CAN ALSO BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL IS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WILL BE FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN IS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. FROM A PLANNED ALTITUDE OF 1460 KM, THE RADIOMETER WILL HAVE A GROUND RESOLUTION OF APPROXIMATELY 4 KM AT NADIR AND WILL BE CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +4 AND -1 DEG K, RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR) NSSDC ID ITOS-G -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE VERY HIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT IS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT CAN BE PROGRAMMED TO RECORD UP TO 9 MIN OF DATA FOR REMOTE AREAS WHERE NO CDA STATION IS WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSES. THE EXPERIMENT WILL INCLUDE TWO SCANNING RADIOMETERS, A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR WILL OPERATE SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NADIR). ONE CHANNEL WILL MEASURE REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS WILL PROVIDE MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL WILL MEASURE INFRARED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION WILL PERMIT BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR WILL FORM AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR, EXCEPT THAT BOTH RADIOMETERS WILL OPERATE SIMULTANEOUSLY. AS THE SATELLITE PROCEEDS IN ITS ORBIT, TWO 400-RPM REVOLVING MIRRORS WILL SCAN THE EARTH'S SURFACE 180 DEG OUT OF PHASE (ONE MIRROR AT A TIME) IN A LINE PERPENDICULAR TO THE ORBIT PATH. THE VISIBLE AND INFRARED DATA WILL BE TIME-MULTIPLEXED SO THAT THE SCAN OF THE INFRARED CHANNEL WILL BE TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WILL BE REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILS, THE SYSTEM WILL STILL BE CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RADIATION USING ONLY THE REMAINING RADIOMETER. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F, AND -G.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) NSSDC ID ITOS-G -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-G VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) WILL SENSE THE RADIANT ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 15.0, 14.8, 14.6, 14.1, 13.8, AND 13.4 MICRONS. THE GROSS ATMOSPHERIC WATER VAPOR CONTENT WILL BE DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WILL ALSO BE TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUDTOP TEMPERATURES. THE VTPR WILL CONSIST OF AN OPTICAL SYSTEM, DETECTOR AND ASSOCIATED ELECTRONICS, AND A SCANNING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH. AS EACH AREA IS SCANNED, THE OPTICAL SYSTEM

WILL COLLECT, FILTER, AND DETECT THE RADIATION FROM THE EARTH AND SEPARATE IT INTO THE EIGHT SPECTRAL INTERVALS. THE GROUND AREA COVERED BY ONE SAMPLE OF DATA WILL BE APPROXIMATELY 50 BY 50 KM. THE RADIOMETER WILL OPERATE CONTINUOUSLY, TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WILL BE RECORDED THROUGHOUT THE ORBIT AND WILL BE PLAYED BACK UPON COMMAND WHEN THE SATELLITE IS WITHIN COMMUNICATION RANGE OF A COMMAND AND DATA ACQUISITION STATION. GROUND PERSONNEL WILL USE THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ITOS-H NSSDC ID ITOS-H
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/76 SPACECRAFT WEIGHT IN ORBIT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 120. MIN
APOAPSIS- 1678.00 KM ALT PERIAPSIS- 1678.00 KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.A. STAMPFL NASA-GSFC GREENBELT, MD
PS - W. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-H WILL BE THE SECOND IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER, AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE, WATER VAPOR, AND OZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH, AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) NSSDC ID ITOS-H -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-H ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE), CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS -- ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-I AND -J.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) NSSDC ID ITOS-H -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.
OI - UNKNOWN METEOROLOGICAL OFFICE LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-H IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY CONSISTS OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 5.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 18- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE ITOS-I TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE

RADIATION IN THE 5.5-MM OXYGEN BAND.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) NSSDC ID ITOS-H -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPACE ENVIRONMENTAL MONITOR (SEM) NSSDC ID ITOS-H -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - W. SHENK NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV. OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ITOS-I NSSDC ID ITOS-I
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 120. MIN
APOAPSIS- 1678.00 KM ALT PERIAPSIS- 1578.00 KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.A. STAMPFL NASA-GSFC GREENBELT, MD
PS - W.E. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-I WILL BE THE THIRD IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE, WATER VAPOR, AND OZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE-FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) NSSDC ID ITOS-I -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE ITOS-I ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE), CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF

THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -J.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) NSSDC ID ITOS-I -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	NESS STAFF	NOAA-NESS	SUITLAND, MD
OI -	UNKNOWN	METEOROLOGICAL OFFICE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-I IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 18- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE IN THE 5.5-MM OXYGEN BAND.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) NSSDC ID ITOS-I -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	UNKNOWN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED

GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPACE ENVIRONMENTAL MONITOR (SEM) NSSDC ID ITOS-I -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV. OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- ITOS-J NSSDC ID ITOS-J
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/79 SPACECRAFT WEIGHT IN ORBIT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 120. MIN
APOAPSIS- 1678.00 KM ALT PERIAPSIS- 1678.00 KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.A.	STAMPFL	NASA-GSFC	GREENBELT, MD
PS - W.E.	SHENK	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

ITOS-J WILL BE THE FOURTH IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE, WATER VAPOR, AND OZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH, AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) — NSSDC ID ITOS-J -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI -	NESS STAFF	NOAA-NESS	SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-J ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE), CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -I.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) — NSSDC ID ITOS-J -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI -	NESS STAFF	NOAA-NESS	SUITLAND, MD.
OI -	UNKNOWN	METEOROLOGICAL OFFICE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-J IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE,

WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 18- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 5.5-MM OXYGEN BAND.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) NSSDC ID ITOS-J -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.6 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPACE ENVIRONMENTAL MONITOR (SEM) NSSDC ID ITOS-J -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV. OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- LAGEOS NSSDC ID LAGEOS
ALTERNATE NAMES- LASER GEODYNAMIC SAT.

PLANNED LAUNCH DATE- 00/00/76 SPACECRAFT WEIGHT IN ORBIT- 682. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 3700. KM ALT PERIAPSIS- 3700. KM ALT INCLINATION- 50. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R. DILLER NASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
LAGEOS WILL BE A VERY DENSE (HIGH MASS/AREA RATIO) LASER RETROREFLECTOR SATELLITE WHICH WILL PROVIDE A PERMANENT REFERENCE POINT IN A VERY STABLE ORBIT FOR SUCH PRECISION EARTH-DYNAMICS MEASUREMENTS AS CRUSTAL MOTIONS, REGIONAL STRAINS, FAULT MOTIONS, POLAR MOTION AND EARTH-ROTATION VARIATIONS, SOLID EARTH TIDES, AND OTHER KINEMATIC AND DYNAMIC PARAMETERS ASSOCIATED WITH EARTHQUAKE ASSESSMENT AND ALLEVIATION. LAGEOS, IN CONJUNCTION WITH APPROPRIATE LASER TRACKING SYSTEMS, WILL PERMIT EXTREME-PRECISION RANGING MEASUREMENTS FOR BOTH GEOMETRIC MODE (MULTILATERATION) AND ORBITAL DYNAMIC MODE DETERMINATIONS OF POSITIONS OF POINTS ON THE EARTH. IT WILL BE THE FIRST SPACECRAFT DEDICATED EXCLUSIVELY TO HIGH-PRECISION LASER RANGING AND WILL PROVIDE THE FIRST OPPORTUNITY TO ACQUIRE LASER-RANGING DATA THAT IS NOT DEGRADED BY ERRORS ORIGINATING IN THE TARGET SATELLITE. THE HIGH-ACCURACY RANGE MEASUREMENTS FROM THIS PERMANENT ORBITING REFERENCE POINT WILL BE USED TO ACCOMPLISH MANY EXTREME-PRECISION EARTH-DYNAMICS MEASUREMENTS REQUIRED BY THE EARTHQUAKE HAZARD ASSESSMENT AND ALLEVIATION OBJECTIVES OF THE EARTH AND OCEAN PHYSICS APPLICATIONS PROGRAM (EOPAP). THE PERFORMANCE IN ORBIT OF LAGEOS WILL BE LIMITED ONLY BY

DEGRADATION OF THE RETROREFLECTORS, SO MANY DECADES OF USEFUL LIFE CAN BE EXPECTED. THE HIGH MASS-TO-AREA RATIO AND THE PRECISE, STABLE (ATTITUDE-INDEPENDENT) GEOMETRY OF THE SPACECRAFT IN CONCERT WITH THE PROPOSED ORBIT WILL MAKE THIS SATELLITE THE MOST PRECISE POSITION REFERENCE AVAILABLE. BECAUSE IT WILL BE VISIBLE IN ALL PARTS OF THE WORLD AND WILL HAVE AN EXTENDED OPERATION LIFE IN ORBIT, LAGEOS CAN SERVE AS A FUNDAMENTAL GLOBAL STANDARD FOR DECADES.

ON 00/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- MARINER-J VENUS/MERCURY NSSDC ID MARINJ
ALTERNATE NAMES- MARINER 73, PL-732A

PLANNED LAUNCH DATE- 10/00/73 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- ATLAS-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC ORBIT PERIOD- DAYS
APOAPSIS- AU RAD PERIAPSIS- AU RAD INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - W.E.	GIBSON	NASA-JPL	PASADENA, CA
PS - N.W.	CUNNINGHAM	NASA HEADQUARTERS	WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE MARINER VENUS/MERCURY 73 IS DESIGNED TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANET MERCURY'S ENVIRONMENT, ATMOSPHERE, SURFACE, AND BODY CHARACTERISTICS, AND TO OBTAIN ENVIRONMENTAL AND ATMOSPHERIC DATA FROM VENUS DURING THE FLYBY OF VENUS. THE SPACECRAFT'S SECONDARY OBJECTIVE WILL BE TO PERFORM INTERPLANETARY EXPERIMENTS WHILE THE SPACECRAFT IS ENROUTE FROM EARTH TO MERCURY, AND TO OBTAIN EXPERIENCE WITH A DUAL PLANET GRAVITY ASSIST MISSION.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PHOTOGRAPHS OF MERCURY AND VENUS NSSDC ID MARINJ -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - B.C.	MURRAY	CAL TECH	PASADENA, CA
CI - M.J.S.	BELTON	KITT PEAK NATL OBS	TUCSON, AZ
OI - G.P.	KUIPER	U OF ARIZONA	TUCSON, AZ
OI - V.E.	SUOMI	U OF WISCONSIN	MADISON, WI
OI - N.J.	TRASK, JR.	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI - D.E.	GAULT	NASA-ARC	MOFFETT FIELD, CA
OI - B.W.	HAPKE	U OF PITTSBURGH	PITTSBURG, PA
CI - M.E.	DAVIES	RAND CORP	SANTA MONICA, CA
OI - B.T.	O'LEARY	CORNELL U	ITHACA, NY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL TAKE TELEVISION-VIDEO PHOTOGRAPHY OF BOTH VENUS AND MERCURY. THE OBJECTIVES OF THE EXPERIMENT WILL BE - (1) TO MAP AND IDENTIFY THE MAJOR PHYSIOGRAPHIC PROVINCES OF MERCURY, (2) TO DETERMINE THE ORIENTATION OF THE SPIN AXIS OF MERCURY, (3) TO COMBINE ALL OF THE MERCURY DATA TO ESTABLISH A CARTOGRAPHIC COORDINATE SYSTEM, (4) TO INVESTIGATE THE TIME-DEPENDENT PROPERTIES OF THE VENUS ULTRAVIOLET 'CLOUDS,' AND (5) TO OBTAIN HIGH-RESOLUTION IMAGERY OF THE MAIN CLOUDS OF VENUS. THE INSTRUMENT WILL BE A GEC 1 'VIDICON TUBE.' IT WILL HAVE A 42-SEC FRAMING RATE AND A 0.48- BY 0.37-DEG FIELD OF VIEW AND WILL USE TWO SPHERICAL TELESCOPE 150-MM OPTICS. IT IS PLANNED THAT APPROXIMATELY 6350 PICTURES, WITH A RESOLUTION OF 100 M, WILL BE OBTAINED.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- S- AND X-BAND RADIO PROPAGATION NSSDC ID MARINJ -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.T.	HOWARD	STANFORD U	STANFORD, CA
OI - G.S.	LEVY	NASA-JPL	PASADENA, CA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - A.J.	KLIORE	NASA-JPL	PASADENA, CA
OI - J.D.	ANDERSON	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE ONBOARD S- AND X-BAND RADIO SUBSYSTEMS TO OBTAIN INFORMATION ON THE MERCURIAN AND VENUSIAN MASSES, GRAVITIES, HARMONICS, EPHEMERIDES, IONOSPHERES, ATMOSPHERES, RADII, AND SURFACE CHARACTERISTICS.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MEASUREMENT OF PLASMA ENVIRONMENT NSSDC ID MARINJ -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI - J.H.	BINSACK	MIT	CAMBRIDGE, MA
OI - A.J.	LAZARUS	MIT	CAMBRIDGE, MA
OI - S.	OLBERT	MIT	CAMBRIDGE, MA
OI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - A.J.	HUNDHAUSEN	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - K.W.	OGILVIE	NASA-GSFC	GREENBELT, MD
OI - L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI - R.E.	HARTLE	NASA-GSFC	GREENBELT, MD
OI - C.W.	SNYDER	NASA-JPL	PASADENA, CA
OI - G.L.	SISCOE	U OF CALIFORNIA, LA	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

A SET OF HEMISPHERICAL ANALYZER PLATES AND AN ELECTRON MULTIPLIER, ALL MOUNTED ON A SCAN PLATFORM, WILL BE PROGRAMMED WITH A SEQUENCE OF ANALYZER

PLATE VOLTAGES TO DETERMINE THE DIRECTIONAL CHARACTERISTICS AND THE ENERGY SPECTRUM FOR ELECTRONS FROM 4 TO 400 EV AND IONS FROM 80 EV TO 8 KEV IN THE SOLAR WIND BETWEEN 0.4 AND 1 AU DISTANCE FROM THE SUN.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FLUXGATE MAGNETOMETER NSSDC ID MARINJ -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - K.W.	BEHANNON	NASA-GSFC	GREENBELT, MD
OI - R.P.	LEPPING	NASA-GSFC	GREENBELT, MD
OI - Y.C.	WHANG	CATHOLIC U	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO TRIAXIAL FLUXGATE MAGNETOMETERS DESIGNED TO MAKE VECTOR MEASUREMENTS OF THE MAGNETIC FIELD IN THE VICINITY OF MERCURY AND VENUS AND IN THE INTERPLANETARY MEDIUM. EACH SENSOR WILL HAVE DUAL OPERATING RANGES OF MINUS TO PLUS 16 GAMMAS AND 128 GAMMAS. BIAS OFFSET CAPABILITY WILL EXTEND THE OPERATING RANGE TO MINUS TO PLUS 4096 GAMMAS.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EUV SPECTROSCOPY NSSDC ID MARINJ -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.L.	BROADFOOT	KITT PEAK NATL OBS	TUCSON, AZ
OI - M.B.	MCELROY	KITT PEAK NATL OBS	TUSCON, AZ
OI - M.J.S.	BELTON	KITT PEAK NATL OBS	TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

TWO EUV GRATING SPECTROMETERS WILL BE USED (1) TO DETECT THE PRESENCE OF AN ATMOSPHERE ON MERCURY AND DETERMINE ITS STRUCTURE AND COMPOSITION, (2) TO OBSERVE AND DETERMINE THE STRUCTURE AND COMPOSITION OF THE VENUSIAN ATMOSPHERE, (3) TO MAP THE DIFFUSE GALACTIC AND INTERPLANETARY BACKGROUND RADIATION, AND (4) TO OBSERVE THE EARTH GEOCORONA, ESPECIALLY AT 584 AND 1216 A. THE EXISTENCE OF AN ATMOSPHERE ON MERCURY WILL BE DETERMINED BY USING ONE OF THE SPECTROMETERS TO OBSERVE THE ATMOSPHERE DURING SOLAR OCCULTATION IN FOUR CHANNELS -- 475 A, 740 A, 810 A, AND 890 A -- EACH HAVING A 40-A BANDWIDTH. THE SECOND SPECTROMETER WILL BE USED TO OBSERVE AIRGLOW EMISSIONS FROM THE EARTH, MERCURY, VENUS AND BACKGROUND SOURCES IN NINE CHANNELS -- 304 A, 584 A, 744 A, 736 A, 867 TO 879 A, 1048 A, 1216 A, 1304 A, 1657 A. FROM THESE DATA, THE MOST LIKELY CONSTITUENTS OF THE ATMOSPHERES OF MERCURY AND VENUS WILL BE DETERMINED.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TWO-CHANNEL IR RADIOMETER NSSDC ID MARINJ -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.C.	CHASE, JR.	SANTA BARBARA RSCH CEN	GOLETA, CA
OI - D.	MORRISON	U OF HAWAII	BERKELEY, CA
OI - G.	MUNCH	CAL TECH	PASADENA, CA
OI - G.	NEUGEBAUER	CAL TECH	PASADENA, CA
OI - J.M.	SAARI	BOEING SCI RSCH LABS	SEATTLE, WA
OI - E.C.	MINER	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

AN INFRARED RADIOMETER HAVING TWO CHANNELS, 22 TO 39 MICRONS (80 DEG K TO 300 DEG K) AND 10 TO 17 MICRONS (200 DEG K TO 650 DEG K), WILL BE USED TO OBSERVE THE THERMAL EMISSION FROM VENUS AND MERCURY IN TWO BROAD SPECTRAL BANDS. THE IR THERMAL EMISSION FROM THE SURFACE OF MERCURY BETWEEN LATE AFTERNOON AND EARLY MORNING (LOCAL TIME) AND DEVIATIONS FROM THE AVERAGE THERMAL BEHAVIOR OF THE SURFACE WILL BE MEASURED. MEASUREMENTS WILL ALSO BE MADE OF THE BRIGHTNESS TEMPERATURES OF VENUSIAN CLOUD TOPS AND LIMB DARKENING PHENOMENA.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLES NSSDC ID MARINJ-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - J.E.	LAMPORT	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE CHEMICAL AND ISOTOPIC SPECIES OF SOLAR CHARGED PARTICLES BOMBARDING THE ATMOSPHERE AND SURFACE OF MERCURY. THE MEASUREMENTS WILL ALSO INCLUDE A SEARCH FOR TRAPPED HIGH-ENERGY ELECTRONS AND PROTONS IN THE POSSIBLE MAGNETOSPHERES OF MERCURY AND VENUS. THE CHARGED PARTICLE TELESCOPE WOULD BE SENSITIVE TO ELECTRONS AND PROTONS WITH ENERGIES E.GT. 200 KEV AND E.GT. 600 KEV, RESPECTIVELY.

ON 07/11/70, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- MARINER 77A NSSDC ID MARN77A
ALTERNATE NAMES- MARINER JUPITER/SATURN A, OUTER PLANETS A

PLANNED LAUNCH DATE- 08/00/77 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - H.	SCHURMEIER	NASA-JPL	PASADENA, CA

SPACECRAFT BRIEF DESCRIPTION

THE OVERALL OBJECTIVES OF THE TWO SPACECRAFT, MARINER 77A AND MARINER 77B, WILL BE TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS OF JUPITER AND SATURN AND OF THE INTERPLANETARY MEDIUM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE TWO PLANETARY SYSTEMS BY OBTAINING (1) MEASUREMENTS OF THE ENVIRONMENT, ATMOSPHERE, AND BODY CHARACTERISTICS OF THE PLANETS AND ONE OR MORE OF THE SATELLITES OF EACH PLANET, (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN, AND (3) EXPLORATION OF THE INTERPLANETARY (OR INTERSTELLAR) MEDIUM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES WILL BE ATTAINED BY USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV, A COHERENT S- AND X-BAND RF RECEIVER, AN INFRARED INTERFEROMETER, ULTRAVIOLET SPECTROMETER, FLUXGATE MAGNETOMETERS, FARADAY CUPS, A PARTICLE ANALYZER, PARTICLE TELESCOPES, THE SISYPHUS METHOD PHOTOPOLARIMETER, AND A SWEEP FREQUENCY RADIO RECEIVER. THE TWO SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TV PHOTOGRAPHY NSSDC ID MARN77A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B.A. SMITH NEW MEXICO STATE U LAS CRUCES, NM

EXPERIMENT BRIEF DESCRIPTION
THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM, BASED ON THE MARINER 9 TV SYSTEM. THIS SYSTEM WILL INCLUDE ONE NARROW-ANGLE, LONG FOCAL LENGTH CAMERA AND ONE WIDE-ANGLE, SHORT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION, BUT THE RESOLUTION WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APPROACHES, AT JUPITER AND SATURN, THE RESOLUTION WILL BE 20 KM AND 5 KM, RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURN, GROSS DYNAMICAL PROPERTIES, ZONAL ROTATION, ORIENTATION OF SPIN AXIS, ZONAL SHEAR, VERTICAL SHEAR, FLOW INSTABILITIES, SPOTS, AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ADDITIONAL OBJECTIVES WILL INCLUDE THE STUDY OF THE MODE OF RELEASE OF INTERNAL ENERGY FLUX (SEARCH FOR CONVECTION CELLS AND ROLLS), STUDY OF GROWTH, DISSIPATION, MORPHOLOGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES, GROSS OPTICAL PROPERTIES, GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM, POLARIMETRY, NATURE OF CHROMOSPHERES, THIN STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE OBJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE -- (1) GROSS CHARACTERISTICS - SIZE, SHAPE, ROTATION, SPIN AXIS, CARTOGRAPHY, IMPROVED EPHEMERIDES AND MASSES, (2) GEOLOGY -- MAJOR PHYSIOGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES, LINEAMENTS, POLAR CAPS, EROSION PROCESSES, AND LOW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES, DETECTION OF ATMOSPHERES, FROSTS, AND LIKE STRATIFICATION OF AEROSOLS, (3) SURFACE PROPERTIES - COLORIMETRY, SCATTERING FUNCTION, NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS), AND SEARCH FOR NEW SATELLITES. STUDIES OF SATURN'S RINGS WILL BE CARRIED OUT. OBJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INDIVIDUAL RING COMPONENTS OR CLUMPS OF MATERIAL, (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESOLUTION, (3) SCATTERING FUNCTION, (4) COARSE POLARIMETRY, (5) OCCULTATION - OPTICAL DEPTH, AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS. OTHER OBJECTIVES WILL BE TO SEARCH FOR NEW COMETS, ASTEROIDS, AND TARGETS OF OPPORTUNITY.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER NSSDC ID MARN77A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - J.D.	ANDERSON	NASA-JPL	PASADENA, CA
OI - T.A.	CROFT	STANFORD U	STANFORD, CA
OI - G.L.	TYLER	STANFORD U	STANFORD, CA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - G.S.	LEVY	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE PROPAGATION PATH EFFECTS ON THE SPACECRAFT TELECOMMUNICATIONS SYSTEM TO INVESTIGATE SEVERAL AREAS OF INTEREST. S-BAND UPLINK SIGNALS, AND COHERENT X- AND S-BAND DOWNLINK SIGNALS WILL BE STUDIED. AREAS OF STUDY WILL INCLUDE PLANETARY NEUTRAL, ELECTRON, AND ION DENSITIES, TEMPERATURES, AND COMPOSITION. THEY WILL ALSO INCLUDE PHYSICAL PROPERTIES OF ASTEROIDS, SATURN'S RINGS, AND PLANETARY SURFACES. IN ADDITION, STUDIES WILL BE MADE OF MAGNETIC FIELDS, INTERSTELLAR AND SOLAR WIND ELECTRON DENSITIES, SOLAR CORONA STRUCTURE, PLANETARY 13-CM RADIO EMISSIONS, AND RELATIVITY.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY NSSDC ID MARN77A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HANEL	NASA-GSFC	GREENBELT, MD
OI - B.J.	CONRATH	NASA-GSFC	GREENBELT, MD
OI - V.G.	KUNDE	NASA-GSFC	GREENBELT, MD
OI - P.D.	LOWMAN, JR.	NASA-GSFC	GREENBELT, MD
OI - W.C.	MAGUIRE	NASA-GSFC	GREENBELT, MD
OI - J.C.	PEARL	NASA-GSFC	GREENBELT, MD
OI - J.	PIRRAGLIA	NASA-GSFC	GREENBELT, MD
OI - R.E.	SAMUELSON	NASA-GSFC	GREENBELT, MD
OI - T.E.	BURKE	NASA-JPL	PASADENA, CA
OI - P.	GIERASCH	CORNELL U	ITHACA, NY
OI - C.A.	PONNAMPERUMA	U OF MARYLAND	COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT USING AN INFRARED RADIOMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-MARS-71 IRIS, COMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLOBAL AND LOCAL ENERGY BALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BROAD-BAND MEASUREMENTS OF REFLECTED SOLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE H2/HE RATIO, AND THE ABUNDANCE OF CH4 AND NH3. VERTICAL TEMPERATURE PROFILES WILL BE OBTAINED ON THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE COMPOSITION, THERMAL PROPERTIES, AND SIZE OF PARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 200 TO 3300 1/CM, WHILE THE RADIOMETER RANGE WILL COVER 5000 TO 33,000 1/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR 51 CM IN DIAM, WITH A FIELD OF VIEW OF 0.25 DEG.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET SPECTROSCOPY NSSDC ID MARN77A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - A.L.	BROADFOOT	KITT PEAK NATL OBS	TUCSON, AZ
OI - H.W.	MOOS	JOHNS HOPKINS U	BALTIMORE, MD
OI - M.J.S.	BELTON	KITT PEAK NATL OBS	TUCSON, AZ
OI - D.F.	STROBEL	KITT PEAK NATL OBS	TUCSON, AZ
OI - T.M.	DONAHUE	U OF PITTSBURGH	PITTSBURGH, PA
OI - M.B.	MCELROY	HARVARD U	CAMBRIDGE, MA
OI - J.C.	MCCONNELL	HARVARD U	CAMBRIDGE, MA
OI - R.M.	GODDY	HARVARD U	CAMBRIDGE, MA
OI - A.	DALGARNO	HARVARD U	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVIOLET SPECTROMETER, UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 A, SIMILAR IN DESIGN TO THE INSTRUMENT CURRENTLY BEING PROVIDED FOR THE MARINER VENUS-MERCURY 73 MISSION. THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER, SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF H2 AND HE AND THE THERMAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL OBJECTIVE WILL BE TO STUDY THE DISTRIBUTION OF H2 AND HE IN THE INTERPLANETARY AND INTERSTELLAR MEDIUM.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS NSSDC ID MARN77A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - M.H.	ACUNA	NASA-GSFC	GREENBELT, MD
CI - K.W.	BEHANNON	NASA-GSFC	GREENBELT, MD
OI - L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
CI - R.P.	LEPPING	NASA-GSFC	GREENBELT, MD
OI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN, THE SOLAR WIND INTERACTION WITH THE MAGNETOSPHERES OF THESE PLANETS, AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND BOUNDARY WITH THE INTERSTELLAR MAGNETIC FIELD AND BEYOND. IF CROSSED, THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE PLUS OR MINUS 0.1 GAMMA, AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAMMA TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.8 KG AND CONSUME 5.2 WATTS.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PLASMA NSSDC ID MARN77A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI -	J.W.	BELCHER	MIT	CAMBRIDGE, MA
OI -	J.H.	BINSACK	MIT	CAMBRIDGE, MA
OI -	A.J.	LAZARUS	MIT	CAMBRIDGE, MA
OI -	S.	OLBERT	MIT	CAMBRIDGE, MA
OI -	V.M.	VASYLIUNAS	MIT	CAMBRIDGE, MA
OI -	L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI -	R.E.	HARTLE	NASA-GSFC	GREENBELT, MD
OI -	K.W.	OGILVIE	NASA-GSFC	GREENBELT, MD
OI -	G.L.	SISCOE	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI -	A.J.	HUNDHAUSEN	NATL CNTR ATMOS RSCH	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS, ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-POINTING DETECTOR WILL DETERMINE THE MACROSCOPIC PROPERTIES OF THE PLASMA IONS, OBTAINING ACCURATE VALUES OF THEIR VELOCITY, DENSITIES, AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH DELTA E/E EQUAL TO 29, 7.2, AND 1.8 PERCENT, ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOOKING FARADAY CUP WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 5.5 KG AND USE 6.5 W OF POWER.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE NSSDC ID MARN77A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	S.M.	KRIMIGIS	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI -	C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI -	G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD
OI -	L.J.	LANZEROTTI	BELL TELEPHONE LAB	MURRAY HILL, NJ
OI -	T.P.	ARMSTRONG	U OF KANSAS	LAWRENCE, KS
OI -	W.I.	AXFORD	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI -	C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETOSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER. THIS DETECTOR WILL MAKE MEASUREMENTS IN (1) THE DISTANT MAGNETOSPHERE AND BOW SHOCK OF JUPITER, (2) THE POSSIBLE MAGNETOSPHERE OF SATURN, AND (3) THE TRAPPED RADIATION BELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY RANGE OF THIS DETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR IONS. DURING THE INTERPLANETARY CRUISE PERIOD, PROTONS, ALPHA PARTICLES, AND HEAVIER NUCLEI (Z FROM 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 30 MEV, USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LOW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTORS TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1.8 MEV/NUCLEON).

ON 11/20/72, THE SPACECRAFT MISSION WAS APPRCVED.

EXPERIMENT NAME- HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE NSSDC ID MARN77A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATCR, OI=OTHER INVESTIGATOR)

PI - R.E.	VOGT	CAL TECH	PASADENA, CA
OI - J.R.	JOKIPII	CAL TECH	PASADENA, CA
OI - E.C.	STONE	CAL TECH	PASADENA, CA
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - W.R.	WEBBER	U OF NEW HAMPSHIRE	DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO DETERMINE, USING A HIGH-ENERGY TELESCOPE, THE ENERGY AND IDENTITY OF NUCLEI FOR ENERGIES BETWEEN 6 AND 500 MEV AND FOR NUCLEI RANGING IN ATOMIC NUMBER FROM 1 THROUGH 30. IN ADDITION, THIS TELESCCPE WILL MEASURE ELECTRONS OF ENERGIES FROM 3 TO 10 MEV. THE ENERGY AND IDENTITY OF NUCLEI WILL BE DETERMINED FOR ENERGIES BETWEEN 0.15 AND 30 MEV AND ATOMIC NUMBERS FROM 1 THROUGH 30 USING A LOW-ENERGY TELESCCPE. THESE MEASUREMENTS WILL ALLOW AN UNDERSTANDING (1) OF THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC-RAY SOURCES AND (2) OF THE ORIGIN AND ASSCCIATED ACCELERATION PROCESS AS WELL AS THE LIFE HISTORY AND DYNAMIC CONTRIBUTION OF COSMIC RAYS IN THE GALAXY. IN ADDITION, THE TRAPPED PLANETARY ENERGETIC PARTICLE ENVIRONMENT WILL BE STUDIED. THESE MEASUREMENTS WILL ALSC ALLOW AN UNDERSTANDING OF THE MODULATION OF COSMIC RAYS OVER AN EXTENDED REGICN OF INTERPLANETARY SPACE.

ON 11/20/72, THE SPACECRAFT MISSICN WAS APPROVED.

EXPERIMENT NAME- INTERPLANETARY DUST PARTICLE MEASUREMENT NSSDC ID MARN77A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATCR)

PI - R.K.	SOBERMAN	DREXEL INST OF TECH	PHILADELPHIA, PA
OI - B.A.	LINDBLAD	U OF LUND	SWEDEN
OI - E.	GRUN	MAX PLANCK INST	GERMANY
OI - F.B.	HOUSE	DREXEL INST OF TECH	PHILADELPHIA, PA
OI - H.	FECHTIG	MAX PLANCK INST	HEIDELBERG, WEST GERMANY

EXPERIMENT BRIEF DESCRIPTION

PARTICLE MEASUREMENTS WILL BE MADE USING THE SISYPHUS CONCEPT, IN WHICH SOLAR RADIATION REFLECTED FROM THE PARTICLE IS USED FOR DETECTION, RANGE, AND VELOCITY DETERMINATION. FOUR OPTICAL SYSTEMS HAVING OVERLAPPING CONICAL FIELDS OF VIEW WILL DETECT SUNLIT PARTICLES PASSING THROUGH THE OVERLAP REGION. THE TIMES OF ENTRANCE INTO AND EXIT FROM THE CONES WILL BE USED TO COMPLETELY DETERMINE THE PARTICLE'S TRAJECTORY RELATIVE TO THE INSTRUMENT AND ITS ORBIT IN THE SOLAR SYSTEM. THIS INSTRUMENT WILL BE SIMILAR TO THE ONE BEING FLOWN ON PIONEER 10. THE FIELDS OF VIEW WILL BE 2-DEG HALF-ANGLE, AND THE MIRRORS WILL BE 20 CM IN DIAM. THE MINIMUM DETECTIBLE PARTICLE RADIUS AT 1 AU WILL BE APPROXIMATELY 5 MICRONS. THIS WILL INCREASE TO ABOUT 35 MICRONS AT 10 AU. LIGHT FLASH AND ACOUSTICAL MEASUREMENTS OF PARTICLE IMPACT WILL ALSO BE INCLUDED.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SWEEP FREQUENCY (.02 TO 40 MHZ) RADIO RECEIVER — NSSDC ID MARN77A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.W.	WARWICK	U OF COLORADO	BOULDER, CO
OI - J.K.	ALEXANDER, JR.	NASA-GSFC	GREENBELT, MD
OI - T.D.	CARR	U OF FLORIDA	GAINESVILLE, FL
OI - F.T.	HADDOCK	U OF MICHIGAN	ANN ARBOR, MI
OI - D.H.	STAELIN	MIT	CAMBRIDGE, MA
OI - A.	BOISCHOT	MEUDON OBSERVATORY	PARIS, FRANCE
OI - C.C.	HARVEY	MEUDON OBSERVATORY	PARIS, FRANCE
OI - Y.	LEBLANC	MEUDON OBSERVATORY	PARIS, FRANCE
OI - W.E.	BROWN	NASA-JPL	PASADENA, CA
OI - S.	GULKIS	NASA-JPL	PASADENA, CA
OI - R.	PHILLIPS	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIO RECEIVER OPERATING IN BOTH POLARIZATION STATES, BETWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAE. STUDY OF THE RADIO EMISSION SIGNALS FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES WILL YIELD DATA CONCERNING THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A — NSSDC ID MARN77A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.F.	LILLIE	U OF COLORADO	BOULDER, CO
OI - C.W.	HORD	U OF COLORADO	BOULDER, CO
OI - K.	PANG	U OF COLORADO	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN 8-IN F/1.1 TELESCOPE, WHICH CAN SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR ONE OF EIGHT BANDS IN THE 2200- TO 7300-A SPECTRAL REGION, THEN ON TO A PHOTOMULTIPLER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA, INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION ON SIZE DISTRIBUTION AND COMPOSITION OF THE SATURN RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROPERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE HEIGHTS FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- MARINER 77E NSSDC ID MARN77E
ALTERNATE NAMES- MARINER JUPITER/SATURN B, OUTER PLANETS E

PLANNED LAUNCH DATE- 09/00/77 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H. SCHURMEIER NASA-JPL PASADENA, CA

SPACECRAFT BRIEF DESCRIPTION
THE OVERALL OBJECTIVES OF THE TWO SPACECRAFT, MARINER 77A AND MARINER 77B, WILL BE TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS, JUPITER AND SATURN, AND OF THE INTERPLANETARY MEDIUM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE TWO PLANETARY SYSTEMS BY OBTAINING (1) MEASUREMENTS OF THE ENVIRONMENT, ATMOSPHERE, AND BODY CHARACTERISTICS OF THE PLANETS AND ONE OR MORE OF THE SATELLITES OF EACH PLANET, (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN, AND (3) EXPLORATION OF THE INTERPLANETARY (OR INTERSTELLAR) MEDIUM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES WILL BE OBTAINED USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV, A COHERENT S- AND X-BAND RF RECEIVER, AN INFRARED INTERFEROMETER, AN ULTRAVIOLET SPECTROMETER, FLUXGATE MAGNETOMETERS, FARADAY CUPS, A PARTICLE ANALYZER, PARTICLE TELESCOPES, THE SISYPHUS METHOD PHOTOPOLARIMETER, AND A SWEEP FREQUENCY RADIO RECEIVER. THE TWO SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TV PHOTOGRAPHY NSSDC ID MARN77B-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B.A. SMITH NEW MEXICO STATE U LAS CRUCES, NM

EXPERIMENT BRIEF DESCRIPTION
THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM, BASED ON THE MARINER 9 TV SYSTEM. THIS SYSTEM WILL INCLUDE ONE NARROW-ANGLE, LONG FOCAL LENGTH CAMERA AND ONE WIDE-ANGLE, SHORT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION, BUT WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APPROACHES. AT JUPITER AND SATURN, THE RESOLUTION WILL BE 20 KM AND 5 KM, RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURN, GROSS DYNAMICAL PROPERTIES, ZONAL ROTATION, ORIENTATION OF SPIN AXIS, ZONAL SHEAR, VERTICAL SHEAR, FLOW INSTABILITIES, SPOTS, AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ADDITIONAL OBJECTIVES WILL INCLUDE THE STUDY OF THE MODE OF RELEASE OF INTERNAL ENERGY FLUX (SEARCH FOR CONVECTION CELLS AND ROLLS), STUDY OF GROWTH, DISSIPATION, MORPHOLOGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES, GROSS OPTICAL PROPERTIES, GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM, POLARIMETRY, NATURE OF CHROMOPHORES, THIN STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE OBJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE -- (1) GROSS CHARACTERISTICS - SIZE, SHAPE, ROTATION, SPIN AXIS, CARTOGRAPHY,

IMPROVED EPHEMERIDES AND MASSES, (2) GEOLOGY -- MAJOR PHYSIOGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES, LINEAMENTS, POLAR CAPS, EROSION PROCESSES, AND LOW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES, DETECTION OF ATMOSPHERES, FROSTS, AND LIMB STRATIFICATION OF AEROSOLS, (3) SURFACE PROPERTIES - COLORIMETRY, SCATTERING FUNCTION, NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS), AND SEARCH FOR NEW SATELLITES. STUDIES OF SATURN'S RINGS WILL BE CARRIED OUT. OBJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INDIVIDUAL RING COMPONENTS OR CLUMPS OF MATERIAL, (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESOLUTION, (3) SCATTERING FUNCTION, (4) COARSE POLARIMETRY, (5) OCCULTATION - OPTICAL DEPTH, AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS. OTHER OBJECTIVES WILL BE TO SEARCH FOR NEW COMETS, ASTEROIDS, AND TARGETS OF OPPORTUNITY.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER — NSSDC ID MARN77B-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - G.S.	LEVY	NASA-JPL	PASADENA, CA
OI - T.A.	CROFT	STANFORD U	STANFORD, CA
OI - G.L.	TYLER	STANFORD U	STANFORD, CA
OI - J.D.	ANDERSON	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE PROPAGATION PATH EFFECTS ON THE SPACECRAFT TELECOMMUNICATIONS SYSTEM TO INVESTIGATE SEVERAL AREAS OF INTEREST. S-BAND UPLINK SIGNALS WILL BE STUDIED. AREAS OF STUDY WILL INCLUDE PLANETARY NEUTRAL, ELECTRON, AND ION DENSITIES, TEMPERATURES, AND COMPOSITION. THEY WILL ALSO INCLUDE PHYSICAL PROPERITES OF ASTEROIDS, SATURN'S RINGS, AND PLANETARY SURFACES. IN ADDITION, STUDIES WILL BE MADE OF MAGNETIC FIELDS, INTERSTELLAR AND SOLAR WIND ELECTRON DENSITIES, SOLAR CORONA STRUCTURE, PLANETARY 13-CM RADIO EMISSIONS, AND RELATIVITY.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY — NSSDC ID MARN77B-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HANEL	NASA-GSFC	GREENBELT, MD
OI - C.A.	PONNAMPERUMA	U OF MARYLAND	COLLEGE PARK, MD
OI - T.E.	BURKE	NASA-JPL	PASADENA, CA
OI - P.	GIERASH	CORNELL U	ITHACA, NY
OI - J.	PIRRAGLIA	NASA-GSFC	GREENBELT, MD
OI - R.E.	SAMUELSON	NASA-GSFC	GREENBELT, MD
OI - W.C.	MAGUIRE	NASA-GSFC	GREENBELT, MD
OI - J.C.	PEARL	NASA-GSFC	GREENBELT, MD
OI - V.G.	KUNDE	NASA-GSFC	GREENBELT, MD
OI - P.D.	LOWMAN, JR.	NASA-GSFC	GREENBELT, MD
OI - B.J.	CONRATH	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT USING AN INFRARED RADIOMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-MARS 71 IRIS, COMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLOBAL AND LOCAL ENERGY BALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BROAD-BAND MEASUREMENTS OF REFLECTED SOLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE H2/HE RATIO, AND THE ABUNDANCE OF CH4 AND NH3. VERTICAL TEMPERATURE PROFILES WILL BE OBTAINED ON THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE COMPOSITION, THERMAL PROPERTIES, AND SIZE OF PARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 200 TO 3300 1/CM, WHILE THE RADIOMETER RANGE WILL COVER 5000 TO 33,000 1/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR 51 CM IN DIAM, WITH A FIELD OF VIEW OF 0.25 DEG.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET SPECTROSCOPY NSSDC ID MARN77B-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.L.	BROADFOOT	KITT PEAK NATL OBS	TUCSON, AZ
OI - A.	DALGARNO	HARVARD U	CAMBRIDGE, MA
OI - J.C.	MCCONNELL	HARVARD U	CAMBRIDGE, MA
OI - R.M.	GOODY	HARVARD U	CAMBRIDGE, MA
OI - T.M.	DONAHUE	U OF PITTSBURGH	PITTSBURGH, PA
OI - M.B.	MCELROY	HARVARD U	CAMBRIDGE, MA
OI - M.J.S.	BELTON	KITT PEAK NATL OBS	TUCSON, AZ
OI - D.F.	STROBEL	KITT PEAK NATL OBS	TUCSON, AZ
OI - H.W.	MOOS	JOHNS HOPKINS U	BALTIMORE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVIOLET SPECTROMETER UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 A, SIMILAR IN DESIGN TO THE INSTRUMENT CURRENTLY BEING PROVIDED FOR THE MARINER VENUS-MERCURY 73 MISSION. THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER, SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF H2 AND HE AND THE THERMAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL OBJECTIVE WILL BE TO STUDY THE DISTRIBUTION OF H2 AND HE IN THE INTERPLANETARY AND INTERSTELLAR MEDIUM.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS NSSDC ID MARN77B-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.F.	NESS	NASA-GSFC	GREENBELT, MD
OI - R.P.	LEPPING	NASA-GSFC	GREENBELT, MD
CI - F.M.	NEUBAUER	BRAUNSCHWEIG TECH U	BRAUNSCHWEIG, W. GERMANY
OI - K.W.	BEHANNON	NASA-GSFC	GREENBELT, MD
CI - L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI - M.H.	ACUNA	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN. THE SOLAR WIND INTERACTION WITH THE MAGNETOSPHERES OF THESE PLANETS, AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND BOUNDARY WITH THE INTERSTELLAR MAGNETIC FIELD, AND BEYOND, IF CROSSED. THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE PLUS OR MINUS 0.1 GAMMA, AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAMMA TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.8 KG AND CONSUME 5.2 WATTS.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PLASMA NSSDC ID MARN77B-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	H.S.	BRIDGE	MIT	CAMBRIDGE, MA
OI -	A.J.	LAZARUS	MIT	CAMBRIDGE, MA
OI -	S.	OLBERT	MIT	CAMBRIDGE, MA
OI -	J.W.	BELCHER	MIT	CAMBRIDGE, MA
OI -	V.M.	VASYLIUNAS	MIT	CAMBRIDGE, MA
OI -	L.F.	BURLAGA	NASA-GSFC	GREENBELT, MD
OI -	J.H.	BINSACK	MIT	CAMBRIDGE, MA
OI -	G.L.	SISCOE	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI -	A.J.	HUNDHAUSEN	NATL CNTR ATMOS RSCH	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS, ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-POINTING DETECTOR WILL DETERMINE THE MACROSCOPIC PROPERTIES OF THE PLASMA IONS, OBTAINING ACCURATE VALUES OF THEIR VELOCITY, DENSITIES, AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH DELTA E/E EQUAL TO 29, 7.2, AND 1.8 PERCENT, ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOOKING FARADAY CUP WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 5.5 KG AND USE 6.5 W OF POWER.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE NSSDC ID MARN77B-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	S.M.	KRIMIGIS	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI -	R.E.	HARTLE	NASA-GSFC	GREENBELT, MD
OI -	K.W.	OGILVIE	NASA-GSFC	GREENBELT, MD
OI -	C.O.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI -	T.P.	ARMSTRONG	U OF KANSAS	LAWRENCE, KS
OI -	W.I.	AXFORD	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI -	G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD
OI -	L.J.	LANZEROTTI	BELL TELEPHONE LAB	MURRAY HILL, NJ
OI -	C.Y.	FAN	U OF ARIZONA	TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETOSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER.

THIS DETECTOR WILL MAKE MEASUREMENTS (1) IN THE DISTANT MAGNETOSPHERE AND BOW SHOCK OF JUPITER, (2) THE POSSIBLE MAGNETOSPHERE OF SATURN, AND (3) THE TRAPPED RADIATION BELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY RANGE OF THIS DETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR IONS. DURING THE INTERPLANETARY CRUISE PERIOD, PROTONS, ALPHA PARTICLES, AND HEAVIER NUCLEI (Z FROM 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 30 MEV USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LOW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTORS TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1.8 MEV/NUCLEON).

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE — NSSDC ID MARN77B-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.E.	VOGT	CAL TECH	PASADENA, CA
OI - J.R.	JOKIPII	CAL TECH	PASADENA, CA
OI - E.C.	STONE	CAL TECH	PASADENA, CA
OI - F.B.	MCDONALD	NASA-GSFC	GREENBELT, MD
OI - B.J.	TEEGARDEN	NASA-GSFC	GREENBELT, MD
OI - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
OI - W.R.	WEBBER	U OF NEW HAMPSHIRE	DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO DETERMINE THE ENERGY AND IDENTITY OF NUCLEI, FOR ENERGIES BETWEEN 6 AND 500 MEV AND NUCLEI RANGING IN ATOMIC NUMBER FROM 1 THROUGH 30, USING A HIGH-ENERGY TELESCOPE. IN ADDITION, THIS TELESCOPE WILL MEASURE ELECTRONS OF ENERGIES FROM 3 TO 10 MEV. THE ENERGY AND IDENTITY OF NUCLEI WILL BE DETERMINED WITH ENERGIES BETWEEN 0.15 AND 30 MEV AND ATOMIC NUMBERS FROM 1 THROUGH 30, USING A LOW-ENERGY TELESCOPE. THESE MEASUREMENTS WILL ALLOW AN UNDERSTANDING (1) OF THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC-RAY SOURCES AND (2) OF THE ORIGIN AND ASSOCIATED ACCELERATION PROCESS AS WELL AS THE LIFE HISTORY AND DYNAMIC CONTRIBUTION OF COSMIC RAYS IN THE GALAXY. IN ADDITION, THE TRAPPED PLANETARY ENERGETIC PARTICLE ENVIRONMENT WILL BE STUDIED. THESE MEASUREMENTS WILL ALSO ALLOW AN UNDERSTANDING OF THE MODULATION OF COSMIC RAYS OVER AN EXTENDED REGION OF INTERPLANETARY SPACE.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INTERPLANETARY DUST PARTICLE MEASUREMENT — NSSDC ID MARN77E-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.K.	SOBLEMAN	DREXEL INST OF TECH	PHILADELPHIA, PA
OI - B.A.	LINDBLAD	U OF LUND	SWEDEN
OI - E.	GRUN	MAX PLANCK INST	W. GERMANY
OI - F.B.	HOUSE	DREXEL INST OF TECH	PHILADELPHIA, PA
OI - H.	FECHTIG	M.PLANCK INST,HEIDELBERG	HEIDELBERG, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

PARTICLE MEASUREMENTS WILL BE MADE USING THE SISYPHUS CONCEPT, IN WHICH SOLAR RADIATION REFLECTED FROM THE PARTICLE IS USED FOR DETECTION, RANGE, AND VELOCITY DETERMINATION. FOUR OPTICAL SYSTEMS HAVING OVERLAPPING CONICAL FIELDS OF VIEW WILL DETECT SUNLIT PARTICLES PASSING THROUGH THE OVERLAP REGION. THE TIMES OF ENTRANCE INTO AND EXIT FROM THE CONES WILL BE USED TO DETERMINE COMPLETELY THE PARTICLE'S TRAJECTORY RELATIVE TO THE INSTRUMENT AND ITS ORBIT IN THE SOLAR SYSTEM. THIS INSTRUMENT WILL BE SIMILAR TO THE ONE BEING FLOWN ON PIONEER 10. THE FIELDS OF VIEW WILL BE 2-DEG HALF-ANGLE, AND THE MIRRORS WILL BE 20 CM IN DIAM. THE MINIMUM DETECTIBLE PARTICLE RADIUS AT 1 AU WILL BE APPROXIMATELY 5 MICRONS. THIS WILL INCREASE TO ABOUT 35 MICRONS AT 10 AU. LIGHT FLASH AND ACOUSTICAL MEASUREMENTS OF PARTICLE IMPACT WILL ALSO BE INCLUDED.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SWEEP FREQUENCY (.02 TO 40 MHZ) RADIO RECEIVER — NSSDC ID MARN77E-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.W.	WARWICK	U OF COLORADO	BOULDER, CO
OI - W.E.	BROWN	NASA-JPL	PASADENA, CA
OI - S.	GULKIS	NASA-JPL	PASADENA, CA
OI - C.C.	HARVEY	MEUDON OBSERVATORY	PARIS, FRANCE
OI - Y.	LEBLANC	MEUDON OBSERVATORY	PARIS, FRANCE
OI - D.H.	STAELIN	MIT	CAMBRIDGE, MA
OI - A.	BOISCHOT	MEUDON OBSERVATORY	PARIS, FRANCE
OI - T.D.	CARR	U OF FLORIDA	GAINSVILLE, FL
OI - F.T.	HADDOCK	U OF MICHIGAN	ANN ARBOR, MI
OI - J.K.	ALEXANDER, JR.	NASA-GSFC	GREENBELT, MD
OI - R.	PHILLIPS	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIO RECEIVER OPERATING IN BOTH POLARIZATION STATES, BETWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAS. THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS WILL BE STUDIED BY INVESTIGATION OF THE RADIO EMISSION SIGNALS FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A — NSSDC ID MARN77E-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.F.	LILLIE	U OF COLORADO	BOULDER, CO
OI - C.W.	HORD	U OF COLORADO	BOULDER, CO
OI - K.	PANG	U OF COLORADO	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN 8-IN. F/1.1 TELESCOPE, WHICH WILL SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR ONE OF EIGHT BANDS IN THE 2200- TO 7300-A SPECTRAL REGION, THEN ON TO A PHOTOMULTIPLIER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA, INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION OF SIZE DISTRIBUTION AND COMPOSITION OF

SATURN'S RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROPERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE HEIGHTS FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

ON 11/20/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- MOTHER NSSDC ID MOTHER
ALTERNATE NAMES- IMP-K, IME-M

PLANNED LAUNCH DATE- 11/00/77 SPACECRAFT WEIGHT IN ORBIT- 270. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSS
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 131000. KM ALT PERIAPSIS- 500. KM ALT INCLINATION- 28. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.J.	MADDEN	NASA-GSFC	GREENBELT, MD
PS - J.H.	TRAINOR	NASA-GSFC	GREENBELT, MD
PS - K.	OGILVIE	NASA-GSFC	WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE EXPLORER CLASS MOTHER SPACECRAFT WILL BE PART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION. THE PURPOSES OF THE MISSION WILL BE -- (1) TO INVESTIGATE SOLAR/TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE, (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE MOTHER/DAUGHTER PORTION OF THE MISSION WILL CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN A HIGHLY ECCENTRIC EARTH ORBIT WITH APOGEE FROM 18 TO 23 EARTH RADII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION DISTANCE, AND WILL MAKE SIMULTANEOUS COORDINATED MEASUREMENTS TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES IN THE NEAR-EARTH SOLAR WIND, THE BOW SHOCK, AND INSIDE THE MAGNETOSPHERE.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE NSSDC ID MOTHER-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.J.	BAME	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - H.	MIGGENRIEDER	MAX PLANCK INST	GERMANY
OI - K.	SCHINDLER	MAX PLANCK INST	GERMANY
OI - J.R.	ASBRIDGE	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

OI - H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - H.	VOLK	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - M.D.	MONTGOMERY	LOS ALAMOS SCI LAB	LOS ALAMOS, NM
OI - G.	PASCHMANN	MAX PLANCK INST	GERMANY
OI - W.C.	FELDMAN	NASA-ARC	MOFFETT FIELD, CA
OI - E.W.	HONES	LOS ALAMOS SCI LAB	LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED, IN CONJUNCTION WITH A SIMILAR INSTRUMENT PROVIDED BY G. PASCHMANN OF MAX PLANCK INSTITUTE FOR FLIGHT ON THE DAUGHTER SPACECRAFT, TO STUDY THE PLASMA VELOCITY DISTRIBUTION AND ITS SPATIAL AND TEMPORAL VARIATIONS IN THE SOLAR WIND, BOW SHOCK, MAGNETOSHEATH, MAGNETOPAUSE, MAGNETOTAIL, AND MAGNETOSPHERE. PROTONS FROM 50 EV TO 40 KEV AND ELECTRONS FROM 5 EV TO 20 KEV WILL BE MEASURED IN ONE, TWO, AND THREE DIMENSIONS BY THREE 90-DEG SPHERICAL ELECTROSTATIC ANALYZERS. THE EXPERIMENT, WHICH WILL UTILIZE CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS, WILL OPERATE IN TWO RANGES, WITH ENERGY RESOLUTION FOR SEVERAL STEPS IN EACH RANGE OF 10 PERCENT OF THE CENTER ENERGY LEVEL.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- THREE-DIMENSIONAL (SIX AXIS), 6-EV TO 10-KEV ELECTRON SPECTROMETER — NSSDC ID MOTHER -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.W.	OGILVIE	NASA-GSFC	GREENBELT, MD
OI - J.D.	SCUDDER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO STUDY THE TRANSPORT COEFFICIENTS OF, AND TURBULENCE IN, THE COLLISIONLESS PLASMA REPRESENTED BY THE INTERPLANETARY MEDIUM AND MAGNETOSHEATH, LOW-ENERGY SOLAR ELECTRON EVENTS, AND BOW SHOCK ASSOCIATED ELECTRONS. TWO TRIAXIAL SYSTEMS OF 127-DEG CYLINDRICAL ELECTROSTATIC ANALYZERS WILL BE USED TO MAKE THREE-DIMENSIONAL MEASUREMENTS OF THE ELECTRON DISTRIBUTION FUNCTION FROM 6 EV TO 10 KEV. MEASUREMENTS WILL BE MADE IN TWO ENERGY RANGES WITH AN ENERGY RESOLUTION OF 0.07. THE ENTIRE SET OF SIX SIMULTANEOUS SPECTROMETER MEASUREMENTS WILL BE TAKEN WHILE THE SATELLITE ROTATES THROUGH 60 DEG. EACH SPECTROMETER AXIS WILL CONSIST OF THE CURVED PLATE ANALYZER AND A CHANNELTRON DETECTOR.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- HOT PLASMA — NSSDC ID MOTHER -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - L.A.	FRANK	U OF IOWA	IOWA CITY, IA
OI - V.M.	VASYLIUNAS	MIT	CAMBRIDGE, MA
OI - C.F.	KENNEL	U OF CALIFORNIA, LA	LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND IONS. PROTONS AND ELECTRONS IN THE ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63 CONTIGUOUS ENERGY BANDS WITH AN ENERGY RESOLUTION (DELTA E/E) OF 0.17. A

QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), EMPLOYING SEVEN CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO (ONE FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC ANALYZERS, WILL BE FLOWN ON BOTH THE MOTHER AND DAUGHTER SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR-PI STER SOLID ANGLE FOR PARTICLE VELOCITY VECTORS WILL BE COVERED.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MAGNETIC FIELDS NSSDC ID MOTHER -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.T.	RUSSELL	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - R.L.	MCPHERRON	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI -	HEDGECOCK	IMPERIAL COLLEGE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER THAT WILL MEASURE THE STEADY MAGNETIC FIELD AND ITS LOW-FREQUENCY VARIATIONS. THREE FIELD AMPLITUDE RANGES (MINUS TO PLUS 16, 64, AND 2048 GAMMAS) WILL BE AVAILABLE WITH RESOLUTION OF MINUS TO PLUS 1/32, 1/4, AND 1/16 GAMMA, RESPECTIVELY. THE FREQUENCY RESPONSE WILL BE 0 TO 10 HZ. AN IDENTICAL INSTRUMENT IS TO BE FLOWN ON THE DAUGHTER SPACECRAFT, PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION NSSDC ID MOTHER -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.K.	HOVESTADT	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - J.J.	O'GALLAGHER	U OF MARYLAND	COLLEGE PARK, MD
OI - M.	SCHOLER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - L.A.	FISK	NASA-GSFC	GREENBELT, MD
OI - C.Y.	FAN	U OF ARIZONA	TUCSON, AZ
OI - G.	GLOECKLER	U OF MARYLAND	COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE HELIOCENTRIC AND MOTHER SPACECRAFT, THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC HEAVY PARTICLES. THE MEASUREMENTS WILL BE MADE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES -- (1) SOLAR WIND IRON (5 KEV/CHARGE TO 20 MEV/NUCLEON), (2) SUPRATHERMAL MULTIPLE-CHARGED IONS (Z, Q LESS THAN OR EQUAL TO 26 IN THE ENERGY RANGE 5 TO 50 KEV/NUCLEON), AND (3) TRAPPED PARTICLES (0.05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACECRAFT WHICH WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES, THIN WINDOW PROPORTIONAL COUNTERS, AND POSITION-SENSITIVE SOLID-STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS OVER THE ENTIRE ENERGY RANGE, I.E., 0.04 CM SQ STER FOR THERMAL AND SUPRATHERMAL SOLAR WIND MEASUREMENTS, AND 3 CM SQ STER FOR LOW ENERGY COSMIC RAY MEASUREMENTS.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- DC TO 12-HZ ELECTRIC FIELD PROBE NSSDC ID MOTHER -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.S.	MOZER	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - M.C.	KELLEY	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - U.V.	FAHLESON	RIT	SWEDEN
OI - K.	KNOTT	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - A.	PETERSEN	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE QUASI-STATIC ELECTRIC FIELD IN THE PLASMASPHERE, MAGNETOSPHERE, MAGNETOSHEATH, AND SOLAR WIND. THE 4-IN.-DIAM SPHERES WILL BE MOUNTED AT THE END OF A 30-M BOOM IN THE SATELLITE SPIN PLANE. TO ATTEMPT TO OVERCOME THE SPACECRAFT SHEATH (A POTENTIAL PROBLEM WHICH PLAGUES MOST ELECTRIC FIELD DETECTORS), AN ELECTRON GUN IS INCLUDED ON THE SPACECRAFT BODY. THE INSTRUMENT IS TO BE SENSITIVE TO FIELDS FROM THRESHOLD TO 5 MV/M IN THE FREQUENCY BAND OF 0 TO 12 HZ.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES NSSDC ID MOTHER -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - F.L.	SCARF	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - R.W.	FREDERICKS	TRW SYSTEMS GROUP	REDONDO BEACH, CA
OI - E.J.	SMITH	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, IN CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE DAUGHTER SPACECRAFT, IS DESIGNED TO MEASURE WAVE PHENOMENA OCCURRING WITHIN THE MAGNETOSPHERE AND SOLAR WIND. TRIAXIAL SEARCH COILS WITH HIGH-PERMEABILITY CORES AND TRIAXIAL ELECTRIC DIPOLES WILL BE USED. THE SEARCH COILS WILL HAVE A FREQUENCY RESPONSE OF 10 HZ TO 10 KHZ. THE TIME REQUIRED FOR ONE 16-CHANNEL TRIAXIAL SPECTRUM ANALYSIS WILL BE 100 MS. BROADBAND DATA WILL ALSO BE AVAILABLE WITH A 10 KHZ BANDWIDTH ABOUT EVERY 1 MS. ELECTRIC FIELDS WILL BE MEASURED BY TWO ORTHOGONAL 123-M TIP-TO-TIP DIPOLES IN THE SPACECRAFT SPIN PLANE AND ONE 0.5-M DIPOLE ALONG THE SPIN AXIS. THE TIME REQUIRED FOR TRIAXIAL 12-CHANNEL SPECTRUM ANALYSIS FROM 10 HZ TO 200 KHZ WILL ALSO BE 100 MS. BROADBAND DATA WILL ALSO BE AVAILABLE WITH A 10-KHZ BANDWIDTH AND 1-MS TIME RESOLUTION.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- IMPEDANCE PROBE AND RADIO PROPAGATION TRANSMITTER NSSDC ID MOTHER -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.C.	HARVEY	PARIS OBSERVATORY	PARIS, FRANCE

OI - M.	PETIT	CNET	PARIS, FRANCE
OI - J.R.	MCAFEE	NOAA	BOULDER, CO
OI - D.	JONES	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - J.M.	ETCHETO	CNET	PARIS, FRANCE
OI - R.J.L.	GRARD	EUR SPACE TECH CENTER	NOORDWIJK, THE NETHERLANDS
OI - R.	GENDRIN	CNET	PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE THE PLASMA DENSITY NEAR THE MOTHER SATELLITE, AND WILL ALSO OBSERVE THE TOTAL ELECTRON CONTENT IN THE MAGNETOSPHERE BETWEEN THE MOTHER AND THE DAUGHTER SATELLITES. THESE DATA WILL ALLOW STUDY OF THE TIME AND SPACE VARIATIONS OF ELECTRON DENSITY IN THE MAGNETOSPHERE. THE EXPERIMENT WILL CONSIST OF TWO DISTINCT PARTS. THE MOTHER SATELLITE WILL CARRY A RESONANCE PROBE TO MEASURE LOCAL ELECTRON DENSITY. A RESONANCE PROBE TYPICALLY OBSERVES THE CURRENT FLOWING TO AN ELECTRODE FROM SPACE. WHEN THE ELECTRODE HAS AN RF VOLTAGE IMPRESSED ON ITS FUNDAMENTAL DC VOLTAGE, THE CURRENT WILL DEVIATE FROM ITS VALUE OBSERVED FOR THE DC VOLTAGE WITHOUT THE IMPRESSED RF. WHEN THE RF IS VARIED THROUGH A RANGE OF VALUES, A MAXIMUM DEVIATION OF CURRENT OCCURS WHEN THE RF EQUALS THE PLASMA FREQUENCY. THE ELECTRON DENSITY IS DIRECTLY OBTAINED FROM THE RF VALUE WHEN THE CURRENT DEVIATION IS MAXIMUM. THE RF THAT CAN BE USED FOR THIS EXPERIMENT WILL RANGE FROM 0 TO 256 KHZ, WHICH WILL MEASURE ELECTRON NUMBER DENSITIES UP TO 3200/CC. THE SECOND PART OF THIS EXPERIMENT WILL CONSIST OF AN RF TRANSMITTER ON THE MOTHER AND A RECEIVER ON THE DAUGHTER. THE TRANSMITTER WILL EMIT SIGNALS WITH A KNOWN PHASE RELATIONSHIP, AT TWO CLOSELY SPACED FREQUENCIES NEAR 300 MHZ. THE RELATIVE PHASE DELAY OF THE LOWER FREQUENCY WILL BE OBSERVED BY THE DAUGHTER RECEIVER. THE PHASE DELAY IS CAUSED BY THE DIFFERENT EFFECT OF THE ELECTRONS ALONG THE PROPAGATION PATH, ON THE TWO DIFFERENT SIGNAL FREQUENCIES INVOLVED. THESE PHASE DELAY DATA CAN BE CONVERTED INTO TOTAL ELECTRON CONTENT BETWEEN THE TWO SPACECRAFT, AND THEN NORMALIZED TO A STANDARD PATH LENGTH.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS NSSDC ID MOTHER -09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO
OI - C.G.	BOSTROM	APPLIED PHYSICS LAB	SILVER SPRING, MD
OI - B.	WILKEN	M.PLANCK INST.LINDAU	LINDAU, GERMANY
OI - T.A.	FRITZ	NOAA	BOULDER, CO
OI - G.	WIBBERENZ	U OF KIEL	LINDAU, W. GERMANY
OI - E.	KEPPLER	M.PLANCK INST.LINDAU	LINDAU, W. GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA INSTABILITIES RESPONSIBLE FOR ACCELERATION, SOURCE AND LOSS MECHANISMS, AND BOUNDARY AND INTERFACE PHENOMENA THROUGHOUT THE CRITAL RANGE OF THE MOTHER/DAUGHTER SATELLITES. A PROTON TELESCOPE AND AN ELECTRON SPECTROMETER WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SPECTRUM AND ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON SURFACE BARRIER TOTALLY-DEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES, AREAS, AND CONFIGURATIONS. PROTONS IN 6 CHANNELS BETWEEN 20 KEV AND 2 MEV, AND ELECTRONS IN 8 CHANNELS BETWEEN 20 KEV AND 1 MEV WILL BE MEASURED.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS NSSDC ID MOTHER -10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A.	ANDERSON	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - C.I.	MENG	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - F.V.	CORONITI	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - J.M.	BOSQUED	PAUL SABATIER U	TOULOUSE, FRANCE
OI - R.	PELLAT	PAUL SABATIER U	TOULOUSE, FRANCE
OI - G.K.	PARKS	U OF WASHINGTON	SEATTLE, WA
OI - R.P.	LIN	U OF CALIFORNIA, BERK	BERKELEY, CA
OI - H.	REME	PAUL SABATIER U	TOULOUSE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE, BY USING IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL EXTENT, PROPAGATION VELOCITY, AND TEMPORAL BEHAVIOR OF A WIDE VARIETY OF PARTICLE PHENOMENA. ELECTRONS ARE TO BE MEASURED IN TWO INTERVALS OVER THE ENERGY RANGE FROM 6 TO 200 KEV, AND PROTONS ARE TO BE MEASURED IN THREE INTERVALS OVER THE ENERGY RANGE FROM 10 TO 380 KEV. IDENTICAL INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES (ONE WITH A FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED-ENERGY ELECTRIC FIELD PARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- DC ELECTRIC FIELDS NSSDC ID MOTHER -11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.P.	HEPPNER	NASA-GSFC	GREENBELT, MD
OI - T.L.	AGGSON	NASA-GSFC	GREENBELT, MD
OI - N.C.	MAYNARD	NASA-GSFC	GREENBELT, MD
OI - D.A.	GURNETT	U OF IOWA	IOWA CITY, IA
OI - D.A.	CAUFFMAN	AEROSPACE CORP	EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY QUASI-STATIC ELECTRIC FIELD AND LOW-FREQUENCY PLASMA WAVES IN THE PLASMASPHERE, MAGNETOSPHERE, MAGNETOSHEATH, AND SOLAR WIND. A 100-M TIP-TO-TIP DIPOLE ANTENNA WILL BE USED TO MAKE DC AND AC ELECTRIC FIELD MEASUREMENTS IN THE FOLLOWING NINE FREQUENCY WINDOWS -- 0.1 TO 0.32 HZ, 0.32 TO 1 HZ, 1 TO 3.2 HZ, 3.2 TO 10 HZ, 10 TO 32 HZ, 32 TO 100 HZ, 100 TO 320 HZ, 320 TO 1000 HZ, AND 1000 TO 3200 HZ. DC MEASUREMENTS WILL BE MADE IN ANY OF 256 ANGULAR SECTIONS THREE TIMES OR 24 TIMES PER SEC, DEPENDING ON THE BIT RATE. DC MODE MEASUREMENTS WILL HAVE A TWO-STEP VARIABLE GAIN CONTROLLED FROM THE GROUND. THE RESOLUTION IN THE HIGHEST GAIN STATE WILL BE 0.12 MV WITH A DYNAMIC RANGE OF PLUS OR MINUS 0.983 V. THE AC MEASUREMENT ELECTRONICS WILL CONSIST OF TWO AMPLIFIER SECTIONS. ONE AMPLIFIER WILL BE USED FOR LOW-FREQUENCY CHANNELS, AND ONE FOR HIGH-FREQUENCY CHANNELS. GAIN FOR EACH AMPLIFIER WILL BE CONTROLLABLE INDEPENDENTLY FROM THE GROUND. IN THE HIGHEST GAIN MODE, EACH ANALYZER CHANNEL WILL HAVE A SENSITIVITY OF 0.6 MICROVOLTS RMS. THE EXPERIMENT CAN BE RUN IN EITHER A SUN-SENSOR SYNCHRONIZED OR FREE STATE AS CONTROLLED FROM THE GROUND. IN ADDITION, THE AC PORTION CAN BE RUN IN AN

AVERAGING MODE, OR AN ALTERNATING AVERAGING AND PEAK AMPLITUDE DETECTION MODE PER TELEMETRY READOUT SEQUENCE.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- PLASMA COMPOSITION NSSDC ID MOTHER -12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.D.	SHARP	LOCKHEED	PALO ALTO, CA
OI - G.	HAERENDEL	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - H.R.	ROSENBAUER	M.PLANCK INST.GARCHING	GARCHING, W. GERMANY
OI - R.G.	JOHNSON	LOCKHEED	PALO ALTO, CA
OI - E.G.	SHELLEY	LOCKHEED	PALO ALTO, CA
OI - J.	GEISS	U OF BERNE	BERNE, SWITZERLAND
OI - P.X.	EBERHARDT	U OF BERNE	BERNE, SWITZERLAND
OI - H.	BALSIGER	U OF BERNE	BERNE, SWITZERLAND

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE ION COMPOSITION AND ENERGY SPECTRA OF THE PLASMA WITHIN THE MAGNETOSPHERE, MAGNETOSHEATH, AND SOLAR WIND, AND TO DETERMINE THE ANGULAR DISTRIBUTION OF THE PLASMA IN THE MAGNETOSHEATH. AN ENERGETIC ION MASS SPECTROMETER WILL BE FLOWN THAT WILL HAVE AN ELECTROSTATIC ENERGY ANALYZER FOLLOWED BY A COMBINED CYLINDRICAL, ELECTROSTATIC/MAGNETIC MASS ANALYZER. A COMBINATION OF ELECTRON MULTIPLIERS WILL BE USED AS THE DETECTORS. THE ENERGY-PER-UNIT-CHARGE RANGE MEASURED WILL BE FROM 0 TO 40 KEV. THE MASS-PER-UNIT-CHARGE RANGE MEASURED WILL EXTEND FROM 1 TO 138 AMU.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- VLF WAVE INJECTION NSSDC ID MOTHER -13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.A.	HELLIWELL	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO PROVIDE DATA TO STUDY INTERACTIONS BETWEEN DISCRETE VLF WAVES AND ENERGETIC PARTICLES IN THE MAGNETOSPHERE. THE VLF WAVES WILL BE PRODUCED BY A GROUND-BASED TRANSMITTER. INJECTION OF THE WAVE BEYOND THE IONOSPHERE WILL BE ASSURED BY TRANSMITTER LOCATION IN A REGION WHERE THE MAGNETIC LINES OF FORCE ARE OPEN, IN THIS CASE SIPLE STATION, ANTARCTICA. THE INJECTED SIGNAL AND ANY STIMULATED VLF EMISSIONS WILL BE RECORDED THROUGH A LOOP ANTENNA BY A 1- TO 20-KHZ BROADBAND RECEIVER ON THE SATELLITE. THE OBSERVED PARAMETERS WILL BE INTENSITY OF RECEIVED RADIO FREQUENCY AS A FUNCTION OF TIME.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC RAYS NSSDC ID MOTHER -14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.A.	SIMPSON	U OF CHICAGO	CHICAGO, IL
OI - G.M.	MASON	U OF CHICAGO	CHICAGO, IL
OI - B.	CARTWRIGHT	U OF CHICAGO	CHICAGO, IL
OI - M.G.	MUNOZ	U OF CHICAGO	CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY A WIDE RANGE OF INTENSITIES ENCOUNTERED IN INTERPLANETARY SPACE AND THE MAGNETOSPHERE FOR ENERGETIC COSMIC RAY NUCLEONS. THE ISOTOPES TO BE SEPARATED ARE HYDROGEN 1, HYDROGEN 2, HELIUM 3, AND HELIUM 4 FROM 10 TO 150 MEV/NUCLEON. DIFFERENTIAL ENERGY SPECTRA ARE TO BE OBTAINED FOR HYDROGEN AND HELIUM FROM 0.5 TO 150 MEV/NUCLEON AND FOR LITHIUM THROUGH COBALT (Z FROM 3 THROUGH 27) IN THE ENERGY RANGE FROM 10 TO 700 MEV/NUCLEON. THE INSTRUMENTATION WILL CONSIST OF AN EXTENDED RANGE TELESCOPE (ERT) FORMED BY A COMBINATION OF SOLID-STATE DETECTORS, A CESIUM IODIDE SCINTILLATOR, AND A PLASTIC ANTICOINCIDENCE SCINTILLATOR.

ON 01/09/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- NIMBUS-F NSSDC ID NIMBS-F
ALTERNATE NAMES- PL-7318

PLANNED LAUNCH DATE- 06/00/74 SPACECRAFT WEIGHT IN ORBIT- 585. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 108. MIN
APOAPSIS- 1100.00 KM ALT PERIAPSIS- 1100.00 KM ALT INCLINATION- 100. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - S.	WEILAND	NASA-GSFC	GREENBELT, MD
PS - W.P.	NORDBERG	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE NIMBUS-F R AND D SATELLITE WILL SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT WILL CONSIST OF THREE MAJOR STRUCTURES -- (1) A HOLLOW TORUS-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HOUSING UNIT THAT IS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS-F WILL BE NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT THAT FORMS THE SATELLITE BASE WILL HOUSE THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS WILL PROVIDE MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS WILL PROVIDE SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WILL BE LOCATED ON TOP OF THE SPACECRAFT, WILL BE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM WILL PERMIT THE

SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG IN ALL THREE AXES (PITCH, ROLL, AND YAW). NINE EXPERIMENTS HAVE BEEN SELECTED FOR NIMBUS-F. THEY ARE THE (1) EARTH RADIATION BUDGET (ERB), (2) ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR), (3) HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS), (4) LIMB RADIANCE INVERSION RADIOMETER (LRIR), (5) PRESSURE MODULATED RADIOMETER (PMR), (6) SCANNING MICROWAVE SPECTROMETER (SCAMS), (7) TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR), (8) SATELLITE TRACKING AND DATA RELAY EXPERIMENT, AND (9) TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE). THIS COMPLEMENT OF ADVANCED SENSORS WILL BE CAPABLE OF (1) MAPPING TROPOSPHERIC TEMPERATURE, WATER VAPOR ABUNDANCE, AND CLOUD WATER CONTENT, (2) PROVIDING VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR, (3) TRANSMITTING REAL-TIME DATA TO A GEOSTATIONARY SPACECRAFT (ATS-F), AND (4) YIELDING DATA ON THE EARTH'S RADIATION BUDGET.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE)

NSSDC ID NIMBS-F-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.W.	KELLOGG	NATL CNTR ATMOS RSCH	BOULDER, CO
OI - P.	JULIAN	NATL CNTR ATMOS RSCH	BOULDER, CO
OI - V.E.	SUOMI	U OF WISCONSIN	MADISON, WI
OI - C.R.	LAUGHLIN	NASA-GSFC	GREENBELT, MD
OI - R.L.	TALLEY	PMI	SILVER SPRING, MD
OI - W.R.	BANDEEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE GOALS OF THE NIMBUS-F TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) WILL BE CLOSELY ASSOCIATED WITH THE OBJECTIVES OF GARP AND WILL INCLUDE (1) MEASURING UPPER ATMOSPHERIC WINDS OVER REMOTE REGIONS, (2) STUDYING THE RELATIVE AIR MOTION ALONG ISOBARIC SURFACES TO DETERMINE THE RATE OF CONVERSION OF ATMOSPHERIC POTENTIAL ENERGY INTO KINETIC ENERGY, AND (3) PROVIDING DIRECT MEASUREMENTS OF VARIOUS METEOROLOGICAL PARAMETERS THAT CAN SERVE AS REFERENCE POINTS IN ADJUSTING INDIRECT TEMPERATURE SOUNDINGS MADE FROM SATELLITES. THE EXPERIMENT WILL CONSIST OF TWO BASIC COMPONENTS - (1) APPROXIMATELY 300 CONSTANT LEVEL METEOROLOGICAL BALLOONS TO YIELD MEASUREMENTS OF WINDS, TEMPERATURE, AND PRESSURE IN THE TROPICS AND AT SOUTHERN HEMISPHERE MIDLATITUDES AT 150 MB (ABOUT 13.6-KM ALTITUDE), AND (2) THE NIMBUS-F RANDOM ACCESS MEASUREMENTS SYSTEM (RAMS) TO PROVIDE DATA COLLECTION AND LOCATION DETERMINATIONS FROM THE BALLOONS. THE 3.5-M-DIAM POLYESTER-MYLAR BALLOONS WILL BE EQUIPPED WITH A TRANSMITTER PACKAGE, SOLAR POWER SUPPLY, DIGITIZER/MODULATOR, AND SENSORS. THE SENSORS WILL CONSIST OF A RADIO ALTIMETER THAT WILL HAVE AN ACCURACY OF BETTER THAN PLUS OR MINUS 20 M, A BEAD THERMISTOR THAT WILL MONITOR THE AMBIENT AIR TEMPERATURE TO AN ACCURACY OF PLUS OR MINUS 0.5 DEG C, AND A PRESSURE SENSOR TO MEASURE THE 150-MB FLIGHT ALTITUDE TO AN ACCURACY OF PLUS OR MINUS 0.5 MB. A MAGNETIC CUTDOWN DEVICE WILL ALSO BE INCLUDED ON EACH BALLOON TO ELIMINATE ANY ACCIDENTAL OVERFLIGHTS INTO REGIONS OF THE NORTHERN HEMISPHERE NORTH OF 20 DEG N LATITUDE. THE RAMS ON BOARD THE SPACECRAFT WILL HAVE NO COMMAND OR CONTROL CAPABILITY OVER THE BALLOONS (THE BALLOONS WILL NOT BE INTERROGATED). IT WILL MERELY DETECT EACH BALLOON SIGNAL (401.2 MHZ) AND EXTRACT THE CARRIER FREQUENCY, BALLOON IDENTIFICATION, AND SENSOR DATA. THIS INFORMATION, ALONG WITH TIME REFERENCES, WILL BE STORED IN DIGITAL FORM FOR SUBSEQUENT RELAY TO A GROUND ACQUISITION STATION. THE BALLOON'S POSITION AND VELOCITY WILL BE DERIVED FROM THE RELATIVE MOTION BETWEEN THE PLATFORM AND THE SATELLITE BY MEASURING DOPPLER SHIFTS IN THE CARRIER SIGNAL RECEIVED

FROM THE BALLOON. TWERLE WILL BE CAPABLE OF A LOCATION ACCURACY OF 5 KM AND A PLATFORM VELOCITY ACCURACY OF 1 M/SEC.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS) NSSDC ID NIMBS-F-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.W.	MCCULLOCH	NASA-GSFC	GREENBELT, MD
OI - W.L.	SMITH	NOAA-NESS	SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS) WILL SUPPORT THE GARP DATA TEST SET BY PROVIDING VERTICAL TEMPERATURE PROFILES TWICE DAILY ON A GLOBAL BASIS, EXTENDING UP TO APPROXIMATELY 40 KM, AND INFORMATION ON THE WATER VAPOR DISTRIBUTION IN THE TROPOSPHERE. THE HIRS WILL MEASURE RADIANCES PRIMARILY IN FIVE SPECTRAL REGIONS -- (1) SEVEN CHANNELS NEAR THE 15-MICRON CARBON DIOXIDE ABSORPTION BAND, (2) TWO CHANNELS IN THE IR WINDOW, 11.1 AND 3.7 MICRONS, (3) TWO CHANNELS IN THE WATER VAPOR ABSORPTION BAND, 8.2 AND 6.7 MICRONS, (4) FIVE CHANNELS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND (5) ONE CHANNEL IN THE VISIBLE, 0.69-MICRON REGION. THE SOUNDER WILL CONSIST OF A CASSEGRAIN TELESCOPE, SCANNING MIRROR, DICHROMATIC BEAM SPLITTER, FILTER WHEEL, CHOPPER, AND ASSOCIATED ELECTRONICS. THE HIRS WILL SCAN THE EARTH'S SURFACE IN A PLANE NORMAL TO THE SPACECRAFT'S ORBITAL PATH WITH A MAXIMUM SCAN ANGLE OF 30 DEG TO EITHER SIDE OF NADIR.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) NSSDC ID NIMBS-F-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.T.	WILHEIT, JR.	NASA-GSFC	GREENBELT, MD
OI - A.T.	EDGERTON	AEROJET ELECTROSYSTEMS	AZUSA, CA

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) WILL MEASURE THE EARTH'S MICROWAVE EMISSION AT 37 GHZ. THE LIQUID WATER CONTENT OF CLOUDS, THE DISTRIBUTION AND VARIATION OF SEA ICE COVER, AND GROSS CHARACTERISTICS OF LAND SURFACES (VEGETATION, SOIL MOISTURE, AND SNOW COVER) WILL BE OBTAINED FROM THESE MEASUREMENTS. THE DICKE-TYPE RADIOMETER WILL CONSIST OF A SINGLE TIME-SHARING RECEIVER AND AN ELECTRICALLY SCANNING PHASED ARRAY ANTENNA OPERATING AT 0.8 CM (37 GHZ). THE ANTENNA BEAM ARRAY, A 90- BY 20- BY 12-CM BOX-LIKE STRUCTURE, WILL BE MOUNTED ON TOP OF THE SPACECRAFT SENSORY RING AND WILL BE POINTED IN THE DIRECTION OF THE SPACECRAFT'S FORWARD MOTION AND TILTED DOWN 40 DEG FROM THE SATELLITE VELOCITY VECTOR. THE ANTENNA BEAM WILL SCAN THE EARTH IN 100 DISCRETE STEPS FOR VARIOUS ANGLES EXTENDING UP TO 35 DEG ON EITHER SIDE OF THE ORBITAL PLANE. THE DEDUCED BRIGHTNESS TEMPERATURES SHOULD BE ACCURATE TO WITHIN 2 DEG K.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LIMB RADIANCE INVERSION RADIOMETER (LRIR) NSSDC ID NIMBS-F-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.C.	GILLE	NATL CNTR ATMOS RSCH	BOULDER, CO
OI - F.B.	HOUSE	DREXEL INST OF TECH	PHILADELPHIA, PA
OI - R.C.	CRAIG	FLORIDA STATE U	TALLAHASSEE, FL
OI - J.C.	BATES	HONEYWELL, AERO DIV	ST. PETERSBURG, FL

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F LIMB RADIANCE INVERSION RADIOMETER (LRIR) WILL PROVIDE CALIBRATED RADIANCE VERSUS ALTITUDE PROFILES BY INTERCEPTING RADIATION EMANATING FROM AN ATMOSPHERIC PATH WHICH IS TANGENTIAL TO A PARTICULAR GEOCENTRIC HEIGHT. THE LRIR WILL SENSE RADIATION IN FOUR SPECTRAL INTERVALS -- (1) THE 14.6- TO 15.9-MICRON CARBON DIOXIDE BAND, (2) THE 14.2- TO 17.3-MICRON CARBON DIOXIDE BAND, (3) THE 8.8- TO 10.1-MICRON OZONE BAND, AND (4) THE 20- TO 25-MICRON WATER VAPOR ROTATIONAL BAND. MEASUREMENTS TAKEN IN THE TWO CARBON DIOXIDE CHANNELS AND THE WATER VAPOR CHANNEL WILL BE USED TO CALCULATE GLOBAL TEMPERATURE AND WATER VAPOR PROFILES IN THE STRATOSPHERE AND LOWER MESOSPHERE. IN ADDITION, VALUES OF THE GEOSTROPHIC WIND UP TO 1 MB (APPROXIMATELY 48 KM) WILL BE DERIVED ANALYTICALLY FROM THE DEDUCED TEMPERATURE PROFILES. THE RADIOMETER WILL INCLUDE AN OPTICAL SYSTEM, A SCANNING MIRROR, CHOPPERS, AND ASSOCIATED ELECTRONICS, AND WILL EMPLOY AN AMMONIA-METHANE COOLER SYSTEM FOR THREE OF THE FOUR DETECTOR CHANNELS. THE DEDUCED TEMPERATURE PROFILES WILL HAVE AN RMS ACCURACY OF PLUS OR MINUS 3 DEG AT HEIGHTS ABOVE 15 KM, WHILE THE VALUES FOR OZONE WILL BE ACCURATE TO WITHIN PLUS OR MINUS 20 PERCENT AT 1 MB. WATER VAPOR VALUES AT THE SAME HEIGHT SHOULD BE WITHIN 50 PERCENT.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EARTH RADIATION BUDGET (ERB) NSSDC ID NIMBS-F-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.L.	SMITH	NOAA-NESS	SUITLAND, MD
OI - A.J.	DRUMMOND	EPPLEY LABS INC	NEWPORT, RI
OI - I.	RUFF	NOAA-NESS	SUITLAND, MD
OI - J.R.	HICKEY	EPPLEY LABS INC	NEWPORT, RI
OI - W.J.	SCHOLES	EPPLEY LABS INC	NEWPORT, RI
OI - D.T.	HILLEARY	NOAA-NESS	SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F EARTH RADIATION BUDGET (ERB) EXPERIMENT WILL (1) MEASURE REFLECTED AND EMITTED TERRESTRIAL RADIATION FLUXES IN CONJUNCTION WITH SOLAR RADIATION FOR DETERMINATION OF THE EARTH RADIATION BUDGET, (2) DETERMINE THE ANGULAR DISTRIBUTION OF TERRESTRIAL RADIATION FOR VARIOUS METEOROLOGICAL AND GEOGRAPHIC REGIMES, AND (3) CORRELATE MEASUREMENTS MADE USING IDENTICAL BUT INDEPENDENT CHANNELS CALIBRATED TO THE SAME STANDARD. INCOMING SOLAR RADIATION FROM 0.2 TO 50 MICRONS WILL NORMALLY BE MONITORED IN 10 SPECTRAL INTERVALS SEVERAL TIMES EACH DAY AND EVERY ORBIT DURING PERIODS OF SOLAR ACTIVITY. TERRESTRIAL RADIATION MEASUREMENTS WILL BE TAKEN CONTINUOUSLY IN 12 SPECTRAL INTERVALS ALSO FROM 0.2 TO 50 MICRONS. THE MEASUREMENTS WILL BE TAKEN IN TWO WAYS. FOUR CHANNELS USING WIDE-ANGLE OPTICS (133.3-DEG FIELD OF VIEW) WILL MEASURE THE TOTAL OUTGOING RADIATION INTEGRATED OVER THE ENTIRE EARTH DISC. THE SECOND SET OF MEASUREMENTS WILL COVER EIGHT SPECTRAL

INTERVALS AND WILL EMPLOY HIGH-RESOLUTION SCANNING TECHNIQUES TO MEASURE THE TERRESTRIAL RADIATION EMANATING FROM RELATIVELY SMALL AREAS OVER A RANGE OF VARIOUS ZENITH AND AZIMUTH ANGLES. THE INSTRUMENT WILL CONSIST OF TWO IDENTICAL SCANNING MULTICHANNEL RADIOMETER HEADS. ONE WILL SCAN FORWARD OF THE SPACECRAFT, AND THE OTHER WILL SCAN AFT. BOTH HEADS WILL VIEW OPPOSITE HORIZONS AT THE SAME TIME AND WILL SCAN DOWN TO NADIR TOGETHER. THE SCAN SWEEP AND RETURN WILL OCCUR IN 64 SEC. EACH HEAD WILL CONTAIN FOUR SHORTWAVE CHANNELS (0.2 TO 4.0 MICRONS) AND FOUR LONGWAVE CHANNELS (4.0 TO 50 MICRONS) WITH 0.25- BY 5.14-DEG FIELDS OF VIEW. THE CHANNELS WILL BE ORIENTED IN A DIRECTIONAL FAN TO COVER 20 DEG TO EACH SIDE OF THE ORBITAL PLANE. THE 64-SEC SCAN PERIOD WILL ALLOW AN AREA TO BE MEASURED FROM AS MANY AS 17 DIFFERENT ANGLES AS THE SPACECRAFT PASSES OVERHEAD.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- PRESSURE-MODULATED RADIOMETER (PMR) NSSDC ID NIMBS-F-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.T.	HOUGHTON	OXFORD U	OXFORD, ENGLAND
OI - C.D.	RODGERS	OXFORD U	OXFORD, ENGLAND
OI - E.J.	WILLIAMSON	OXFORD U	OXFORD, ENGLAND
OI - G.D.	PESKETT	OXFORD U	OXFORD, ENGLAND
OI - P.	CURTIS	OXFORD U	OXFORD, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F PRESSURE MODULATED RADIOMETER (PMR) EXPERIMENT WILL TAKE RADIOMETRIC MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND AT ALTITUDES BETWEEN 45 AND 70 KM ON A GLOBAL SCALE. BY APPROPRIATE MATHEMATICAL RETRIEVAL METHODS, THE TEMPERATURE STRUCTURE OF THE UPPER STRATOSPHERE AND LOWER MESOSPHERE WILL THEN BE DEDUCED. THE PRESSURE MODULATION TECHNIQUE WILL PERMIT THE EXTENSION OF SELECTIVE CHOPPING TECHNIQUES TO HIGHER ALTITUDES WHERE THE PRESSURE-BROADENED EMISSION LINES IN THE 15-MICRON CARBON DIOXIDE BAND BECOME SO NARROW THAT CONVENTIONAL SPECTROMETERS AND INTERFEROMETERS HAVE INSUFFICIENT SPECTRAL RESOLUTION. IN ADDITION TO PRESSURE SCANNING (IN DISCRETE STEPS), THE RADIOMETER WILL ALSO EMPLOY DOPPLER SCANNING ALONG THE DIRECTION OF FLIGHT. THE PMR WILL COMPRISE TWO SIMILAR RADIOMETER CHANNELS, EACH CONSISTING OF A PLANE SCANNING MIRROR, REFERENCE BLACKBODY, PRESSURE MODULATOR CELL, AND DETECTOR ASSEMBLY. THE PLANE MIRROR WILL BE GOLD-COATED AND MOUNTED AT 45 DEG ON A 90-DEG STEPPING MOTOR SO THAT THE FIELD OF VIEW OF THE CHANNEL MAY BE DIRECTED TO SPACE OR TO THE INTERNAL REFERENCE BLACKBODY FOR INFLIGHT RANGE AND ZERO CALIBRATION. THE MOTOR WILL BE MOUNTED ON A PAIR OF FLEXIBLE PIVOTS SO THAT THE MIRROR CAN BE ROTATED THROUGH PLUS OR MINUS 7-1/2 DEG FROM ITS REST POSITION TO GIVE THE REQUIRED DOPPLER SCAN. MAJOR COMPONENTS IN THE PRESSURE MODULATOR CELL WILL BE A MOVABLE PISTON, DIAPHRAGM, AND MAGNETIC DRIVE COIL. THE DETECTOR ASSEMBLY WILL CONSIST OF A FIELD LENS, A CONDENSING LIGHT PIPE, AND A PYROELECTRIC FLAKE BOLOMETER. EACH RADIOMETER WILL HAVE A FIELD OF VIEW THAT IS 20 DEG WHOLE ANGLE ACROSS THE SPACECRAFT'S LINE OF FLIGHT AND 40 DEG WHOLE ANGLE PARALLEL TO THE LINE OF FLIGHT. THE DEDUCED TEMPERATURE VALUES SHOULD BE WITHIN PLUS OR MINUS 2 DEG K AT 65 KM AND ABOUT PLUS OR MINUS 0.2 DEG K NEAR 50 KM.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SCANNING MICROWAVE SPECTROMETER (SCAMS) NSSDC ID NIMBS-F-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.H.	STAELIN	MIT	CAMBRIDGE, MA
OI - F.T.	BARATH	NASA-JPL	PASADENA, CA
OI - A.H.	BARRETT	MIT	CAMBRIDGE, MA
OI - W.B.	LENOIR	NASA-JSC	HOUSTON, TX
OI - W.	PHILLIPS	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F SCANNING MICROWAVE SPECTROMETER (SCAMS) IS DESIGNED TO MAP TROPOSPHERIC TEMPERATURE PROFILES, WATER VAPOR ABUNDANCE, AND CLOUD WATER CONTENT, AND TO OBTAIN SUCH DATA FOR WEATHER PREDICTION PURPOSES EVEN IN THE PRESENCE OF CLOUDS, WHICH BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. THE SCAMS WILL CONTINUOUSLY MONITOR EMITTED THERMAL RADIATION AT WAVELENGTHS OF 13.5, 9.5, 5.7, 4.9, AND 4.6 MM. THE THREE CHANNELS NEAR THE 5.0-MM OXYGEN ABSORPTION BAND WILL BE USED PRIMARILY TO DEDUCE ATMOSPHERIC TEMPERATURE PROFILES. THE TWO CHANNELS NEAR 10 MM WILL PERMIT WATER VAPOR AND CLOUD WATER CONTENT OVER CALM OCEANS TO BE ESTIMATED SEPARATELY. THE INSTRUMENT, A DICKE-SUPERHETERODYNE TYPE, WILL SCAN PLUS OR MINUS 45 DEG NORMAL TO THE ORBITAL PLANE WITH A 10-DEG FIELD OF VIEW. THE THREE OXYGEN CHANNELS WILL SHARE COMMON SIGNAL AND REFERENCE ANTENNAS. BOTH WATER VAPOR CHANNELS WILL HAVE THEIR OWN SIGNALS AND REFERENCE ANTENNAS. THE ABSOLUTE RMS ACCURACY OF THE OXYGEN CHANNELS WILL BE BETTER THAN 2 DEG K AND THAT OF THE WATER VAPOR CHANNELS BETTER THAN 1 DEG K. THE DYNAMIC RANGE FOR ALL CHANNELS WILL BE FROM 0 TO 400 DEG K.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR) NSSDC ID NIMBS-F-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.R.	BANDEEN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) WILL DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDOW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL WILL MEASURE CLOUDTOP TEMPERATURES AND WILL BE CAPABLE OF PRODUCING HIGH-RESOLUTION PICTURES OF CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE ORBIT. THE OTHER CHANNEL WILL OPERATE PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSORY DATA FROM THESE TWO CHANNELS WILL PRIMARILY BE USED TO SUPPORT OTHER, MORE SOPHISTICATED, METEOROLOGICAL EXPERIMENTS ON BOARD NIMBUS-F. THE INSTRUMENT WILL CONSIST OF A 12.7-CM CASSEGRAIN SYSTEM AND SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV, NO IMAGE IS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WILL BE COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR WILL ROTATE THROUGH 360 DEG AT 48 RPM AND WILL SCAN IN A PLANE NORMAL TO THE SPACECRAFT VELOCITY. THE ENERGY WILL THEN BE FOCUSED ON A DICHROMATIC BEAM SPLITTER WHICH WILL DIVIDE THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIS SENSOR WILL TRANSFORM THE RECEIVED RADIATION INTO ELECTRIC OUTPUT (VOLTAGES), WHICH WILL BE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TRACKING AND DATA RELAY NSSDC ID NIMES-F-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - F.O.	VONBUN	NASA-GSFC	GREENBELT, MD
OI - C.E.	COTE	NASA-GSFC	GREENBELT, MD
OI - W.J.	MILLER	FORDHAM U	NEW YORK, NY
OI - T.R.	BUCKLER	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE THE NIMBUS PORTION OF A COMMUNICATION LINK FROM NIMBUS TO ATS TO A GROUND STATION. THE PURPOSE OF THE EXPERIMENT WILL BE TO GAIN INFORMATION ON THE USE OF SUCH A LINK FOR RANGE AND RATE COMMUNICATIONS (FOR SATELLITE GEODETIC PURPOSES) AND FOR DATA COMMUNICATION FROM A LOW-ORBITING SPACECRAFT THROUGH A SYNCHRONOUS SPACECRAFT TO A GROUND TELEMETRY STATION. THE INSTRUMENTATION WILL INCLUDE AN S-BAND TRANSPONDER, A COMMAND DETECTOR/DECODER, AN ANTENNA PROGRAMMER, A DIGITAL EVALUATION MODULE, AN S-BAND ANTENNA, AND AN ANTENNA GIMBAL ASSEMBLY.

ON 02/00/68, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- OSO-I NSSDC ID OSO-I
ALTERNATE NAMES- OSO-EYE, PL-731D

PLANNED LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT IN ORBIT- 4280. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 96. MIN
APOAPSIS- 550.000 KM ALT PERIAPSIS- 550.000 KM ALT INCLINATION- 33. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.M.	THOLE	NASA-GSFC	GREENBELT, MD
PS - S.P.	MARAN	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE OSO SATELLITE SERIES WILL BE TO PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SOLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT, X-RAY AND GAMMA RADIATION. THE OSO I PLATFORM WILL CONSIST OF A 'SAIL' SECTION, WHICH WILL POINT TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN, AND A 'WHEEL' SECTION, WHICH WILL SPIN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND WILL CARRY FIVE EXPERIMENTS. ATTITUDE ADJUSTMENT WILL BE PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. POINTING CONTROL WILL PERMIT THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN

A 40- X 40-ARC-MIN TO 60- X 60-ARC-MIN RASTER PATTERN. IN ADDITION, THE POINTED SECTION MAY BE COMMANDED TO SELECT AND SCAN A 1- X 1-ARC-MIN OR 5- X 5-ARC-MIN REGION ANYWHERE ON THE SOLAR DISK. DATA WILL BE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY PCM/PM TELEMETRY. A COMMAND SYSTEM WILL PROVIDE FOR AT LEAST 512 GROUND-BASED COMMANDS.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-RESOLUTION ULTRAVIOLET SPECTROMETER NSSDC ID OSO-I -01
MEASUREMENTS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - E.C.	BRUNER, JR.	U OF COLORADO	BOULDER, CO
OI - G.	ATHAY	UNKNOWN	UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO MEASURE SOLAR ULTRAVIOLET LINE SHAPES (FROM 1050 A TO 2200 A IN WAVELENGTH) AND THEIR VARIATION WITH TIME AND POSITION ON THE DISK. THE INSTRUMENT WILL BE AN EBERT-TYPE HIGH-RESOLUTION SPECTROMETER MOUNTED IN THE OSO SAIL, AND WILL HAVE ENOUGH SELF-CONTAINED LOGIC TO OPERATE IN SEVERAL DIFFERENT MODES BY GROUND COMMAND.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CHROMOSPHERE FINE STRUCTURE STUDY NSSDC ID OSO-I -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - P.	LEMAIRE	U OF PARIS	PARIS, FRANCE
OI - A.	VIDAL-MADJAR	EUR SPACE TECH CENTER	PARIS, FRANCE
CI - R.M.	BONNETT	MARSHALL U	HUNTINGTON, WV
OI - J.C.	VIAL	CNRS	VERRIERES-LE-BUISSON, FRANCE

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO MEASURE SOLAR CHROMOSPHERIC SPATIAL AND WAVELENGTH STRUCTURE FOR THE FOLLOWING SPECTRAL LINES IN THE 1000-A TO 4000-A REGION -- LYMAN-ALPHA, LYMAN-BETA, THE H AND K LINES OF MAGNESIUM II, AND THE H AND K LINES OF CALCIUM II. THE INSTRUMENT, WHICH WILL BE COMPOSED OF A CASSEGRAIN TELESCOPE AND A GRATING SPECTROMETER, CAN OPERATE IN TWO MODES - (1) IT CAN HOLD A FIXED SOLAR LOCATION AND SCAN THE SPECTRAL LINES, (2) IT CAN SIMULTANEOUSLY FIX ON THREE OF THE SIX SPECTRAL LINES AND SCAN A 1-ARC-MIN X 1-ARC-MIN REGION OF THE SOLAR DISK.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS NSSDC ID OSO-I -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - R.	NOVICK	COLUMBIA U	NEW YORK, NY
OI - J.R.P.	ANGEL	COLUMBIA U	NEW YORK, NY
OI - P.A.	VANDENBOUT	COLUMBIA U	NEW YORK, NY
OI - M.	WEISSKOFF	COLUMBIA U	NEW YORK, NY
OI - R.S.	WOLFF	COLUMBIA U	NEW YORK, NY

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MONITOR CONTINUOUSLY THE SUN'S EMISSION IN THE 2- TO 6-KEV RANGE, AND TO OBTAIN A COMPLETE SPECTRUM IN THAT RANGE EVERY 12 SEC DURING FLARES. THE EXPERIMENT IS ALSO DESIGNED TO OBTAIN HIGH-RESOLUTION SPECTRA OF MANY CELESTIAL X-RAY SOURCES. THE INSTRUMENT WILL BE A SLITLESS BRAGG SPECTROMETER MOUNTED ON THE OSO WHEEL SECTION, WHICH WILL UTILIZE THE WHEEL ROTATION TO PROVIDE SPECTRAL SCANNING. THREE PROPORTIONAL COUNTERS WILL BE COLLIMATED TO OPTIMIZE DETECTION AT 2 KEV, 2.6 KEV, AND 7.2 KEV, RESPECTIVELY. THE GRAPHITE CRYSTAL WILL HAVE A 1000-CM-SQ AREA.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAPPING X-RAY HELIOMETER NSSDC ID OSO-I -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.L.	CULHANE	LOCKHEED	PALO ALTO, CA
OI - L.W.	ACTON	LOCKHEED	PALO ALTO, CA
OI - R.C.	CATURA	UNKNOWN	UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE THE LOCATION, SPECTRUM, AND INTENSITY OF INTERMEDIATE ENERGY X-RAYS (2- TO 30-KEV) FROM INDIVIDUAL SOLAR ACTIVE REGIONS AND FROM EXTRA-SOLAR X-RAY SOURCES. THE INSTRUMENT WILL CONSIST OF THREE INDEPENDENT X-RAY DETECTION SYSTEMS, EACH COMPOSED OF TWO GAS-FILLED PROPORTIONAL COUNTERS WHICH WILL VIEW SPACE THROUGH A MULTIPLE FAN-BEAM COLLIMATOR. THE FIELD OF VIEW WILL BE 2 ARC-MIN (FULL-WIDTH HALF-MAXIMUM), AND EACH PRIMARY DETECTOR WILL HAVE AN EFFECTIVE AREA OF 100 CM SQ.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOFT X-RAY BACKGROUND RADIATION INVESTIGATION NSSDC ID OSO-I -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.L.	KRAUSHAAR	U OF WISCONSIN	MADISON, WI
OI - A.	BUNNER	U OF WISCONSIN	MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE GALACTIC LATITUDE DEPENDENCE OF THE X-RAY BACKGROUND RADIATION IN THE 0.15- TO 45-KEV REGION, EMPHASIZING THE SOFT X-RAY REGION. TWO SETS OF THREE PROPORTIONAL COUNTERS MOUNTED ON THE OSO WHEEL WILL VIEW PARALLEL AND ANTIPARALLEL TO THE WHEEL SPIN DIRECTION THROUGH A 4- BY 4-DEG (FULL-WIDTH HALF-MAXIMUM) COLLIMATOR. SENSITIVITY IS EXPECTED TO BE ABOUT 1 PERCENT STATISTICAL ACCURACY NEAR THE GALACTIC POLES, AND ENERGY RESOLUTION WILL BE PROVIDED BY SELECTED FILTERS.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- COSMIC X-RAY SPECTROSCOPY NSSDC ID OSO-I -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - E.A.	BOLDT	NASA-GSFC	GREENBELT, MD
OI - S.S.	HOLT	NASA-GSFC	GREENBELT, MD
OI - P.J.	SERLEMITSOS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO OBTAIN THE SPECTRA OF X-RAY SOURCES AND THE DIFFUSE BACKGROUND IN THE ENERGY RANGE OF 2- TO 40-KEV, USING TWO PROPORTIONAL COUNTERS, ONE FILLED WITH ARGON, THE OTHER WITH XENON TO PRESSURES GREATER THAN 1 ATMOSPHERE. THE ARGON DETECTOR WILL EMPHASIZE ENERGIES BELOW 10 KEV, MECHANICALLY COLLIMATED TO A FIELD OF VIEW OF 1 DEG BY 5 DEG. THE XENON DETECTOR WILL EMPHASIZE ENERGIES ABOVE 10 KEV AND WILL HAVE A FIELD OF VIEW OF 1 DEG BY 20 DEG. THE DETECTORS WILL BE MOUNTED ON THE WHEEL SECTION, SO THAT THEY WILL BOTH BE OFFSET FROM THE SPIN AXIS BY ABOUT 5 DEG.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-ENERGY CELESTIAL X RAYS NSSDC ID OSO-I -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.J.	FROST	NASA-GSFC	GREENBELT, MD
OI - C.S.	WELLER, JR.	NAVAL RESEARCH LAB	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE ENERGY SPECTRA OF ALL KNOWN X-RAY SOURCES ABOVE THE INTENSITY THRESHOLD OF 10 TO THE MINUS 6 PHOTONS/CM-SQ-SEC-KEV IN THE ENERGY REGION .01 TO 1 MEV. THE INSTRUMENT WILL CONSIST OF 57-CM-SQ CSI (SODIUM) SCINTILLATION CRYSTALS SURROUNDED BY A HONEYCOMB-TYPE CSI (SODIUM) ANTICOINCIDENCE COLLIMATOR, WHICH WILL PROVIDE AN ACCEPTANCE ANGLE OF 6.30 DEG FROM THE VIEWING AXIS. THE INSTRUMENT WILL BE MOUNTED ON THE OSO WHEEL SECTION NEARLY PARALLEL TO THE SATELLITE SPIN AXIS.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EUV FROM EARTH AND SPACE NSSDC ID OSO-I -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.S.	WELLER, JR.	NAVAL RESEARCH LAB	WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, MOUNTED IN THE WHEEL SECTION, WILL OBTAIN SPATIAL AND TEMPORAL MEASUREMENTS OF EXTREME ULTRAVIOLET (EUV) EMISSIONS OF HYDROGEN, HELIUM, AND OXYGEN IN THE EARTH'S ATMOSPHERE AND IN INTERPLANETARY AND GALACTIC SPACE. THE INSTRUMENTATION WILL CONSIST OF TWO PHOTOMETERS DESIGNED TO MEASURE EUV RESONANCE RADIATION IN VARIOUS WAVELENGTHS FROM 150 TO 1070 A AND IN PORTIONS OF THE 1128- TO 1230-A BAND. EACH PHOTOMETER WILL CONSIST OF A CONTINUOUS CHANNEL ELECTRON MULTIPLIER USED AS A PHOTON DETECTOR, TOGETHER WITH A THIN METAL FILM OR A MAGNESIUM FLUORIDE-OXYGEN CELL TO SERVE AS OPTICAL BANDPASS FILTERS. THERE ARE FOUR SUCH BANDPASS FILTERS -- (1) A THIN FILM OF 1000-A-THICK AL AND 500-A-THICK CARBON (BANDWIDTH OF 150 TO 350 A),

(2) A THIN FILM OF 1000-A-THICK AL (BANDWIDTH OF 150 TO 800 A), (3) A THIN FILM OF 1500-A-THICK INDIUM (BANDWIDTH OF 740 TO 1070 A), AND (4) A CELL WITH MAGNESIUM FLUORIDE WINDOWS FILLED WITH ONE ATMOSPHERE OF OXYGEN (BANDWIDTH CONSISTING OF PORTIONS OF 1125 TO 1230 A). THESE BANDPASS FILTERS WILL BE MOUNTED ON A WHEEL IN FRONT OF THE PHOTOMULTIPLIERS, WHICH WILL BE ROTATED AT REGULAR INTERVALS TO CHANGE THE FILTERS. THIS WILL MAKE TWO OF THE INDICATED WAVELENGTH RANGES OPERATIONAL AT ANY GIVEN TIME. THE INSTRUMENT WILL BE MOUNTED WITH THE PHOTOMETER AXES AT A SMALL ANGLE WITH RESPECT TO THE SATELLITE-SUN LINE AND WITH SUFFICIENT BAFFLING THAT THE PHOTOMETERS WILL NEVER 'SEE' THE SUN.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS ORBITER NSSDC ID PIC78OR
ALTERNATE NAMES- PIONEER VENUS 1978 ORBIT

PLANNED LAUNCH DATE- 08/00/78 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- VENUSCENTRIC ORBIT PERIOD- MIN
APOAPSIS- KM ALT PERIAPSIS- KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THIS PIONEER CLASS SPACECRAFT IS TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME AS THE PIONEER VENUS PROBE SPACECRAFT REACHES THE VENUSIAN ATMOSPHERE. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE PIONEER VENUS PROBE SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP.

ON 06/14/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE A NSSDC ID PIC78PA
ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS PROBE BUS

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 380. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.R.	NUNAMAKER	NASA-ARC	MOFFET FIELD, CA
PS - L.	COLIN	NASA-ARC	MOFFET FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PIONEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 128 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- LANGMUIR PROBE NSSDC ID PIC78PA-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.F.	NAGY	U OF MICHIGAN	ANN ARBOR, MI
OI - P.M.	BANKS	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - L.H.	BRACE	NASA-GSFC	GREENBELT, MD
OI - T.M.	DONAHUE	U OF PITTSBURGH	PITTSBURGH, PA
OI - M.B.	MCELROY	HARVARD U	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A RETARDING POTENTIAL (LANGMUIR) PROBE WITH A CYLINDRICAL GUARD EXTENDING FROM THE SPACECRAFT. THE COLLECTOR WILL EXTEND ALONG THE AXIS OF THE GUARD AND PROJECT OUTWARD. AS THE VOLTAGE ON THE COLLECTOR IS SWEPT THROUGH A GIVEN RANGE, A VARYING CURRENT WILL FLOW THROUGH THE COLLECTOR. FROM THIS VOLTAGE/CURRENT PROFILE, ELECTRON DENSITIES AND TEMPERATURES CAN BE DETERMINED. THE PURPOSE OF THIS EXPERIMENT WILL BE TO HELP DETERMINE CHARACTERISTICS OF THE VENUSIAN IONOSPHERE.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ION MASS SPECTROMETER NSSDC ID PI078PA-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	H.A.	TAYLOR, JR.	NASA-GSFC	GREENBELT, MD
OI -	S.J.	BAUER	NASA-GSFC	GREENBELT, MD
OI -	T.M.	DONAHUE	U OF PITTSBURGH	PITTSBURGH, PA
OI -	P.A.	CLOUTIER	RICE U	HOUSTON, TX
OI -	R.E.	HARTLE	NASA-GSFC	GREENBELT, MD
OI -	H.C.	BRINTON	NASA-GSFC	GREENBELT, MD
OI -	F.C.	MICHEL	RICE U	HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS ION MASS SPECTROMETER EXPERIMENT WILL OBTAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE SOLAR WIND INTERACTION WITH VENUS, UPPER ATMOSPHERE PHOTOCHEMISTRY, AND THE MASS AND HEAT TRANSPORT CHARACTERISTICS OF THE ATMOSPHERE. A BENNETT ION SPECTROMETER, SIMILAR TO UNITS FLOWN ON MANY EARTH SATELLITES AND ROCKETS, WILL MEASURE VENUS' UPPER ATMOSPHERE ION CONCENTRATIONS IN THE MASS RANGE FROM 1 TO 60 ATOMIC MASS UNITS (AMU) FROM THE TIME OF CROSSING VENUS' BOWSHOCK TO BUS BURNUP.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL PARTICLE MASS SPECTROMETER NSSDC ID PIC78PA-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	U.	VON ZAHN	U OF BONN	BONN, W. GERMANY
OI -	A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI -	D.	HUNTEN	KITT PEAK NATL OBS	TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THIS NEUTRAL PARTICLE MASS SPECTROMETER EXPERIMENT WILL OBTAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE ORIGIN AND EVOLUTION OF VENUS' ATMOSPHERE, THE PRESENT ENERGY BALANCE AND DYNAMICS OF THE UPPER ATMOSPHERE, AND THE INTERACTION OF THE UPPER ATMOSPHERE WITH SOLAR RADIATION AND THE INTERPLANETARY MEDIUM. A MAGNETIC DEFLECTION, DOUBLE-FOCUSING MASS SPECTROMETER WILL BE FLOWN TO MEASURE THE UPPER ATMOSPHERE NEUTRAL MOLECULES IN THE MASS RANGE 1 TO 46 ATOMIC MASS UNITS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER NSSDC ID PI078PA-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	W.	KNUDSEN	LOCKHEED	PALO ALTO, CA
OI -	K.	SPENNER	MKG GP SPC PHYS RES	FREIBURG, GERMANY
OI -	R.	WHITTEN	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBSERVE DAYSIDE CHARACTERISTICS (ELECTRON AND ION, DENSITIES AND TEMPERATURES) OF THE VENUSIAN IONOSPHERE. THE INSTRUMENT WILL BE A PLANAR RETARDING POTENTIAL ANALYZER. ENTRANCE GRIDS CAN BE BIASED TO PERMIT ENTRY OF ELECTRONS OR IONS. A VOLTAGE SWEEP PROGRAMMED ON THE RETARDING GRIDS WILL ALLOW A VARYING

CURRENT TO FLOW TO THE COLLECTOR. ANALYSIS OF THIS VOLTAGE/CURRENT PROFILE WILL PRODUCE VALUES OF DENSITY AND TEMPERATURE.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET SPECTROMETER NSSDC ID PI078PA-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	STEWART	U OF COLORADO	BOULDER, CO
OI - C.A.	BARTH	U OF COLORADO	BOULDER, CO
OI - C.W.	HORD	U OF COLORADO	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN EBERT-FASTIE TYPE SPECTROMETER WITH A PROGRAMMED GRATING TO ANALYZE THE UV EMISSION OF UPPER ATMOSPHERE GASSES. THE INSTRUMENT WILL BE SIMILAR TO THE MODELS FLOWN ON MARINERS 6, 7, AND 9. THE MEASUREMENTS WILL PROVIDE INFORMATION ON THE COMPOSITION OF THE ATMOSPHERE, THE TEMPERATURE AND ENERGY BALANCE OF THE THERMOSPHERE, THE REASON FOR THE STABILITY OF CARBON DIOXIDE, AND THE ESCAPE OF HYDROGEN FROM VENUS. THE INSTRUMENT WILL OPERATE IN THE 1100 TO 3400 A REGION. THE INSTRUMENT WILL WEIGH ABOUT 3 KG AND WILL USE ABOUT 1.5 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING NSSDC ID PIC78PA-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PETTENGILL	MIT	CAMBRIDGE, MA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - R.	PRINN	MIT	CAMBRIDGE, MA
OI - J.	CHARNEY	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE B NSSDC ID PI078PB
ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS LARG PROBE

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 27. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.R.	NUNAMAKER	NASA-ARC	MOFFET FIELD, CA
PS - L.	COLIN	NASA-ARC	MOFFET FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PIONEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET. THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE NSSDC ID PIO78PB-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA
OI - S.	SOMMER	NASA-ARC	MOFFETT FIELD, CA
OI - R.	BLANCHARD	NASA-LARC	LANGLEY FIELD, VA
OI - D.A.	KIRK	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A THREE-AXIS ACCELEROMETER, PRESSURE SENSORS, AND TEMPERATURE SENSORS. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED BY THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R710E-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR THE LARGE PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THEY WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TURBULENCE. BY COMPARING ATMOSPHERE CONDITIONS ALONG THE LARGE PROBE TRAJECTORY WITH THOSE MEASURED BY THE SMALL PROBES, CIRCULATION MODELS OF THE ATMOSPHERE WILL BE DETERMINED. THE INSTRUMENTS WILL WEIGH ABOUT 2.5 KG AND WILL CONSUME ABOUT 7 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION — NSSDC ID PIO78PB-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - J.E.	BLAMONT	U OF PARIS	PARIS, FRANCE
OI - B.	RAGENT	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE THE CLOUDS. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORIES. COMPARISONS WITH THE MEASUREMENTS FROM THE SMALL PROBES WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER WILL OPERATE AT ABOUT 9000 A. THE EXPERIMENT WILL WEIGH ABOUT 0.5 KG AND USE ABOUT 1.2 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOUD PARTICLE SIZE SPECTROMETER — NSSDC ID PIO78PB-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=OTHER INVESTIGATOR)

PI - R.	KNOLLENBERG	U OF CHICAGO	CHICAGO, IL
OI - D.	HUNTEN	KITT PEAK NATL OBS	TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO MEASURE VENUS' CLOUD PARTICLE SIZES AND CONCENTRATIONS. A LASER WILL BE USED TO ILLUMINATE CLOUD PARTICLES. OPTICAL LENSES WILL IMAGE THE PARTICLE SHADOWS ON ARRAYS OF DETECTORS. THE PARTICLE SHADOWS WILL BE USED TO DETERMINE PARTICLE SIZE AND CONCENTRATION. THE FLIGHT SENSOR WILL BE SIMILAR TO THOSE FLOWN IN AIRCRAFT AND BALLOONS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- GAS CHROMATOGRAPH — NSSDC ID PIO78PB-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.I.	OYAMA	NASA-ARC	MOFFETT FIELD, CA
OI - J.	POLLACK	NASA-ARC	MOFFETT FIELD, CA
OI - G.	CARLE	NASA-ARC	MOFFETT FIELD, CA
OI - F.	WOELLER	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO DETERMINE THE COMPOSITION OF VENUS' LOWER ATMOSPHERE. FROM THESE MEASUREMENTS, DEDUCTIONS WILL BE MADE OF THE GASEOUS SOURCES OF INFRARED OPACITY, THE DEGREE OF DIFFERENTIATION OF VENUS' INTERIOR, THE DEGREE OF SIMILARITY BETWEEN THE SOLID BODIES OF EARTH AND VENUS, AND EVOLUTION OF VENUS' ATMOSPHERE. TWO GAS CHROMATOGRAPH COLUMNS WILL BE USED TO ANALYZE SAMPLES OF THE ATMOSPHERE DURING PROBE DESCENT.

THREE OR FOUR SAMPLES WILL BE ANALYZED.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- INFRARED RADIOMETER NSSDC ID PI078PB-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - V.E.	SUOMI	U OF WISCONSIN	MADISON, WI
OI - A.	FYMAT	NASA-JPL	PASADENA, CA
OI - J.	LENDELE	U OF LILLE	LILLE, FRANCE
OI - L.A.	SROMOVSKY	U OF WISCONSIN	MADISON, WI
OI - G.	DANIELSON	U OF WISCONSIN	MADISON, WI
OI - M.	HERMAN	U OF LILLE	LILLE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A SMALL NET-FLUX RADIOMETER TO MEASURE THE UPWARD AND DOWNWARD RADIATION FLUXES BETWEEN 0.2 AND 30 MICRONS DURING THE PROBE'S DESCENT TO THE SURFACE. THE OBJECTIVES WILL BE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THE INSTRUMENT WILL WEIGH ABOUT 395 GRAMS AND USE 1.3 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL PARTICLE MASS SPECTROMETER NSSDC ID PI078PB-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - J.E.	AINSWORTH	NASA-GSFC	GREENBELT, MD
OI - G.R.	CARIGNAN	U OF MICHIGAN	ANN ARBOR, MI
OI - D.	HUNTEN	KITT PEAK NATL OBS	TUCSON, AZ
OI - J.	LEWIS	MIT	BOSTON, MA
OI - H.B.	NIEMANN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO MEASURE THE COMPOSITION OF THE LOWER ATMOSPHERE OF VENUS. A MULTIPLE SAMPLE GAS INLET AND A QUADRUPOLE MASS SPECTROMETER WILL BE USED. ABOUT 10 SAMPLES OF VENUS' ATMOSPHERE WILL BE ANALYZED DURING THE PROBE DESCENT. THE ANALYZER, SIMILAR IN DESIGN TO THOSE FLOWN IN OGO AND AEROS SATELLITES, WILL HAVE A MASS RANGE FROM 1 TO 256 ATOMIC MASS UNITS (AMU) AND A DYNAMIC RANGE GREATER THAN 10 TO THE FIFTH POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR ENERGY PENETRATION INTO THE ATMOSPHERE NSSDC ID PI078PB-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - M.	TOMASKO	U OF ARIZONA	TUCSON, AZ
OI - W.	WOLFE	U OF ARIZONA	TUCSON, AZ
OI - A.	CLEMENTS	U OF ARIZONA	TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE REGIONS IN VENUS' ATMOSPHERE WHERE SOLAR ENERGY IS DEPOSITED. SIX NARROW-FIELD-OF-VIEW DETECTORS WILL BE USED TO MEASURE THE INTENSITY OF SCATTERED SOLAR LIGHT. AS THE PROBE DESCENDS THROUGH THE ATMOSPHERE, THE DIFFERENCE BETWEEN UPWARD-LOOKING AND DOWNWARD-LOOKING DETECTORS WILL INDICATE THE NET DOWNWARD FLUX.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SPIN-SCAN PHOTOMETER NSSDC ID PIC78PB-08

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)	
PI - J. WEINMAN	U OF WISCONSIN	MADISON, WI
OI - R.S. PARENT	U OF WISCONSIN	MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO MEASURE DIRECT SOLAR EXTINCTION AS THE PROBE DESCENDS, TO MEASURE THE SOLAR AUREOLE, AND TO OBTAIN A CRUDE PICTURE OF CLOUD STRUCTURE FROM BACKSCATTERED SUNLIGHT. A SINGLE NARROW-FIELD-OF-VIEW SENSOR WILL BE USED TO DETECT DIRECT AND SCATTERED SUNLIGHT. AS THE PROBE ROTATES, THE SENSOR WILL MEASURE THE AZIMUTHAL VARIATION OF SCATTERED SUNLIGHT.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING NSSDC ID PI078PB-09

EXPERIMENT PERSONNEL	(PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)	
PI - G. PETTENGILL	MIT	CAMBRIDGE, MA
OI - J. CHARNEY	MIT	CAMBRIDGE, MA
OI - I.I. SHAPIRO	MIT	CAMBRIDGE, MA
OI - R. PRINN	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE C NSSDC ID PI078PC
ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS SMAL PROBE

PLANNED LAUNCH DATE- 08/00/78 SPACECRAFT WEIGHT IN ORBIT- 1.5 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.R. NUNAMAKER NASA-ARC MOFFET FIELD, CA
PS - L. COLIN NASA-ARC MOFFET FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PIONEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE NSSDC ID PIC78PC-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - A. SEIFF NASA-ARC MOFFETT FIELD, CA
OI - S. SOMMER NASA-ARC MOFFETT FIELD, CA
OI - D. KIRK NASA-ARC MOFFETT FIELD, CA
OI - R. BLANCHARD NASA-ARC MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R71C6-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.6 OF W POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION — NSSDC ID PIC78PC-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.E.	BLAMONT	U OF PARIS	PARIS, FRANCE
OI - B.	RAGENT	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING — NSSDC ID PI078PC-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PETTENGILL	MIT	CAMBRIDGE, MA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - R.	PRINN	MIT	CAMBRIDGE, MA
OI - J.	CHARNEY	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE D — NSSDC ID PIC78PD
ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS SMAL PROBE

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 1.5 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES — LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.R.	NUNAMAKER	NASA-ARC	MOFFET FIELD, CA
PS - L.	COLIN	NASA-ARC	MOFFET FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PIONEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 125 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE NSSDC ID PIC78PO-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA
OI - S.	SOMMER	NASA-ARC	MOFFETT FIELD, CA
OI - D.A.	KIRK	NASA-ARC	MOFFETT FIELD, CA
OI - R.	BLANCHARD	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R71C6-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.6 W POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION — NSSDC ID PI078PD-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.E.	BLAMONT	U OF PARIS	PARIS, FRANCE
OI - B.	RAGENT	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING — NSSDC ID PI078PD-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PETTENGILL	MIT	CAMBRIDGE, MA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - R.	PRINN	MIT	CAMBRIDGE, MA
OI - J.	CHARNEY	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE E — NSSDC ID PI078PE
ALTERNATE NAMES- PIONEER VENUS 1978, PIONEER VENUS SMAL PROBE

PLANNED LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT IN ORBIT- 1.5 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - R.R.	NUNAMAKER	NASA-ARC	MOFFET FIELD, CA
PS - L.	COLIN	NASA-ARC	MOFFET FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS PIONEER CLASS SPACECRAFT IS DESIGNED TO LAUNCH FOUR SCIENTIFIC PROBES (ONE LARGE AND THREE SMALL) TOWARD THE SURFACE OF VENUS AND THEN ENTER THE ATMOSPHERE ITSELF, TRANSMITTING ADDITIONAL DATA TO THE EARTH UNTIL THE SPACECRAFT BURNS UP. AN INSTRUMENT-LADEN SISTER SHIP, PIONEER VENUS ORBITER, IS SCHEDULED TO GO INTO ORBIT AROUND VENUS AT ABOUT THE SAME TIME. THE PRIMARY OBJECTIVE OF THE TWIN MISSIONS WILL BE TO GATHER DETAILED INFORMATION ON VENUS' ATMOSPHERE AND CLOUDS, INCLUDING COMPOSITION AND STRUCTURE DOWN TO THE SURFACE OF THE PLANET, THE NATURE AND COMPOSITION OF THE CLOUDS, THE CIRCULATION PATTERN OF THE ATMOSPHERE, AND THE RADIATION FIELD IN THE LOWER ATMOSPHERE. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 128 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE REST OF THE SPACECRAFT (CALLED THE BUS) ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1 1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION. DURING ITS DESCENT, THE BUS WILL TRANSMIT INFORMATION TO EARTH AT 300 BPS, WHILE THE LARGE PROBE WILL TRANSMIT INFORMATION AT 100 BPS.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERE STRUCTURE NSSDC ID PI078PE-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA
OI - S.	SOMMER	NASA-ARC	MOFFETT FIELD, CA
OI - R.	BLANCHARD	NASA-LARC	LANGLEY FIELD, VA
OI - D.A.	KIRK	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAET VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R710E-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.8 W POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE AND DISTRIBUTION NSSDC ID PI078PE-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - J.E.	BLAMONT	U OF PARIS	PARIS, FRANCE
OI - B.	RAGENT	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.5 KG AND WILL USE ABOUT 1.2 W OF POWER.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING NSSDC ID PIC78PE-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.	PETTENGILL	MIT	CAMBRIDGE, MA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - R.	PRINN	MIT	CAMBRIDGE, MA
OI - J.	CHARNEY	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

ON 06/14/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SARI NSSDC ID SARI
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 00/00/76 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- KOUROU, FRENCH GUIANA, FRANCE LAUNCH VEHICLE- DIAMANT

FUNDING AGENCY
FRANCE

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 1500.00 KM ALT PERIAPSIS- 300.000 KM ALT INCLINATION- 90. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM -	UNKNOWN	UNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE'S OBJECTIVES WILL INCLUDE THE STUDY OF THE THERMAL PLASMA WITHIN THE MAGNETOSPHERE AND THE STUDY OF THE STRUCTURE AND ORIGINS OF NATURAL VLF NOISE. THE EXPERIMENTS WILL INCLUDE TRIAXIAL MAGNETIC AND ELECTRIC FIELD ANTENNAS (OF THE SPHERE DIPOLE TYPE) AND LOW-ENERGY ELECTRON DETECTORS IN THE ENERGY RANGE 5 TO 500 EV.

ON 01/10/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- SAS-C NSSDC ID SAS-C
ALTERNATE NAMES- PL-7430

PLANNED LAUNCH DATE- 04/00/74 SPACECRAFT WEIGHT IN ORBIT- 178.1 KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 96. MIN
APOAPSIS- 555.000 KM ALT PERIAPSIS- 555.000 KM ALT INCLINATION- 2.9 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M.R. TOWNSEND NASA-GSFC GREENBELT, MD
PS - C.E. FICHTEL NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
SAS-C WILL BE THE THIRD OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WILL BE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV, AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSIONS OF SAS-C WILL BE TO MEASURE THE X-RAY EMISSION OF DISCRETE EXTRAGALACTIC SOURCES, TO MONITOR THE INTENSITY AND SPECTRA OF GALACTIC X-RAY SOURCES FROM 0.2 TO 80 KEV, AND TO MONITOR THE X-RAY INTENSITY OF SCO-X-1. THE SPACECRAFT WILL BE LAUNCHED FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA, AFRICA, INTO A NEAR CIRCULAR EQUATORIAL ORBIT. FOUR SOLAR PADDLES WILL BE USED IN CONJUNCTION WITH A 12-CELL NICKEL-CADMIUM BATTERY TO PROVIDE 40 W OF AVERAGE POWER OVER THE ENTIRE ORBIT. THE SPACECRAFT WILL BE SPIN STABILIZED ALONG THE Z AXIS AND WILL ROTATE AT ABOUT 0.1 DEG/SEC. CHANGES TO THE SPIN AXIS ORIENTATION WILL BE BY GROUND COMMAND, EITHER IN REAL TIME OR DELAYED. THE SPIN AXIS CAN BE MADE TO EITHER BACK AND FORTH PLUS OR MINUS 2.5 DEG ACROSS A SELECTED SOURCE AT 0.01 DEG/SEC. THE EXPERIMENTS CAN LOOK ALONG THE Z AXIS OF THE SPACECRAFT, PERPENDICULAR TO IT, OR AT AN ANGLE.

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES NSSDC ID SAS-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	CLARK	MIT	CAMBRIDGE, MA
OI - H.V.D.	BRADT	MIT	CAMBRIDGE, MA
OI - W.H.G.	LEWIN	MIT	CAMBRIDGE, MA
OI - H.W.	SCHNOPPER	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVESTIGATE THE EXISTENCE OF VERY WEAK EXTRAGALACTIC X-RAY SOURCES. THE INSTRUMENT WILL VIEW A 100-DEG-SQ REGION OF THE SKY AROUND THE DIRECTION OF SPIN AXIS OF THE SATELLITE. THE NOMINAL TARGETS FOR A 1-YR STUDY WILL BE (1) THE VIRGO CLUSTER OF GALAXIES FOR 5 MONTHS, (2) THE GALACTIC EQUATOR FOR 1 MONTH, (3) THE ANDROMEDA NEBULA FOR 3 MONTHS, AND (4) THE LARGE MAGELLANIC CLOUD FOR 3 MONTHS. THE INSTRUMENTATION WILL CONSIST OF A 4-ARC-MIN FULL-WIDTH HALF-MAXIMUM MODULATION COLLIMATOR AND FIVE PROPORTIONAL COUNTERS SENSITIVE OVER THE ENERGY RANGE FROM 1.5 TO 10 KEV. THE ASPECT SYSTEM WILL PROVIDE INFORMATION ON THE ORIENTATION OF THE COLLIMATOR TO AN ACCURACY OF 15 ARC-SEC.

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ANALYSIS OF GALACTIC X-RAY SOURCES NSSDC ID SAS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	CLARK	MIT	CAMBRIDGE, MA
OI - H.V.D.	BRADT	MIT	CAMBRIDGE, MA
OI - W.H.G.	LEWIN	MIT	CAMBRIDGE, MA
OI - H.W.	SCHNOPPER	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO LOCATE GALACTIC X-RAY SOURCES TO 15 ARC-SEC AND TO MONITOR THE CELESTIAL SKY FOR FLARES. A 2-MIN, FULL-WIDTH HALF-MAXIMUM MODULATION COLLIMATOR, CONSISTING OF NINE SECTIONS WITH THE LINES OF MAXIMUM TRANSMISSION OF EACH SECTION ROTATED BY 20 DEG FROM THE PREVIOUS ONE, WILL BE USED TO DETERMINE SOURCE LOCATIONS WHILE THE SATELLITE IS BEING ROTATED BACK AND FORTH PLUS OR MINUS 5 DEG AT THE RATE OF 0.6 ARC-MIN/SEC. THREE COUNTERS WITH THREE ANODES EACH WILL DETECT THE X-RAYS IN THE ENERGY RANGE OF 1.8 TO 8 KEV. EACH OF THE NINE ANODES WILL HAVE ITS OWN CHANNEL, ALLOWING EACH OF THE NINE SECTIONS OF THE COLLIMATOR TO BE ANALYZED SEPARATELY. THE POINT OF INTERSECTION OF THE LINES OF POSITION IN NINE DIFFERENT DIRECTIONS WILL BE THE LOCATION OF THE X-RAY SOURCE. THE MONITORING OF THE CELESTIAL SKY WILL BE ACCOMPLISHED BY USING THREE SLAT COLLIMATORS, EACH 0.5 BY 50 DEG FULL-WIDTH HALF-MAXIMUM. THE COLLIMATORS WILL BE ORIENTED SO THAT THREE LINES OF POSITION WILL BE OBTAINED FOR ANY GIVEN SOURCE WHEN THE SATELLITE IS BEING SPUN AT A STEADY ROTATION OF 4 ARC-MIN/SEC ABOUT THE Z AXIS.

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- CONTINUOUS X-RAY FLUCTUATION MONITOR OF SCO X-1 NSSDC ID SAS-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	CLARK	MIT	CAMBRIDGE, MA
OI - H.V.D.	BRADT	MIT	CAMBRIDGE, MA
OI - W.H.G.	LEWIN	MIT	CAMBRIDGE, MA
OI - H.W.	SCHNOPPER	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

NINE ENERGY INTERVALS FROM 0.4 TO 80 KEV WILL BE MONITORED TO STUDY THE OVERALL INTENSITY VARIATIONS AS WELL AS THE CHANGES IN THE BROAD SPECTRUM AND IN THE INTENSITIES OF LINE EMISSIONS. THE COLLIMATOR WILL BE INCLINED BY APPROXIMATELY 31 DEG WITH RESPECT TO THE EQUATORIAL PLANE OF THE SATELLITE, WITH THE AXIS OF ROTATION POINTING TOWARD THE VIRGO CLUSTER OF GALAXIES. THE COLLIMATOR WILL VIEW SCORPIO FOR 140 DEG DURING EACH REVOLUTION OF THE SATELLITE. THE COLLIMATOR WILL BE A 12- BY 70-DEG (FULL-WIDTH HALF-MAXIMUM) SLAT COLLIMATOR.

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- X-RAY ABSORPTION CONTOURS OF THE GALAXY NSSDC ID SAS-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - G.W.	CLARK	MIT	CAMBRIDGE, MA
OI - H.V.D.	BRADT	MIT	CAMBRIDGE, MA
OI - W.H.G.	LEWIN	MIT	CAMBRIDGE, MA
OI - H.W.	SCHNOPPER	MIT	CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE DENSITY AND DISTRIBUTION OF INTERSTELLAR MATTER WILL BE DETERMINED BY MEASURING THE VARIATION IN THE INTENSITY OF THE LOW-ENERGY DIFFUSE EXTRAGALACTIC X-RAY BACKGROUND IN THE RANGE OF 0.2 TO 10 KEV AS A FUNCTION OF GALACTIC LATITUDE. TWO IDENTICAL DETECTION SYSTEMS WILL BE USED. EACH WITH A NEARLY CIRCULAR FIELD OF VIEW OF 3 DEG FULL-WIDTH HALF-MAXIMUM. THE FIELDS OF VIEW WILL BE CENTERED, RESPECTIVELY, 5 DEG ABOVE AND 5 DEG BELOW THE EQUATORIAL PLANE OF THE SATELLITE.

ON 03/03/69, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- IUE NSSDC ID SAS-D
ALTERNATE NAMES- INT. ULTRAVIOLET EXPL., SAS-D

PLANNED LAUNCH DATE- 00/00/76 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY

UNITED STATES	NASA-OSS
INTERNATIONAL	ESRO
	SRC

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 38000. KM ALT. PERIAPSIS- 38000. KM ALT INCLINATION- 28.9 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - G.W. LONGANECKER NASA-GSFC GREENBELT, MD

PS - C.E. FICHTEL NASA-GSFC GREENBELT, MD
PS - A. BOGGESS III NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE INTERNATIONAL ULTRAVIOLET EXPLORER IS THE FOURTH IN A PLANNED SERIES OF SMALL ASTRONOMICAL SATELLITES. THE OBJECTIVE OF THIS SATELLITE WILL BE TO OBTAIN ULTRAVIOLET SPECTRA OF STARS, PLANETS, AND OTHER CELESTIAL OBJECTS. THE SATELLITE IS TO BE JOINTLY BUILT AND OPERATED BY NASA, THE SPACE RESEARCH COUNCIL OF THE UNITED KINGDOM, AND THE EUROPEAN SPACE RESEARCH ORGANIZATION. MOST OF THE OBSERVING TIME WILL BE ALLOCATED TO GUEST OBSERVERS. THE SATELLITE WILL BE LAUNCHED INTO A GEOSYNCHRONOUS ORBIT LATE IN 1976. THE BASIC SCIENTIFIC PACKAGE WILL CONSIST OF A 45-CM, F/15 CASSEGRAIN TELESCOPE WITH A FIELD-OF-VIEW OF 10 ARC-MIN. THE ANALYSIS OF THE PHOTON DATA WILL BE MADE WITH A TWO-CAMERA, ECHELLE SPECTROGRAPH, USING A SEC VIDICON AS A DETECTOR. THE TWO CAMERAS WILL COVER THE SPECTRAL RANGES 1200 TO 1050 A AND 1800 TO 3300 A. THE SPECTROGRAPH CAN OPERATE EITHER IN A HIGH-RESOLUTION (0.1 A) OR LOW-RESOLUTION (6 A) MODE.

ON 12/15/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SPACE SHUTTLE NSSDC ID SHUTTLE
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 12/00/78 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE-

FUNDING AGENCY
UNITED STATES NASA-OMSF

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- KM ALT PERIAPSIS- KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M.S. MAIKIN NASA HEADQUARTERS WASHINGTON, DC
PM - R. THOMPSON NASA-JSC HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION
THE SPACE SHUTTLE PROJECT WILL CONSIST OF A SERIES OF REUSABLE SPACE TRANSPORTATION SYSTEMS THAT WILL BE USED IN THREE DIFFERENT WAYS -- (1) TO CARRY AUTOMATED SATELLITES TO NEAR-EARTH ORBIT FROM WHICH THEY MAY BE LAUNCHED TO HIGHER ALTITUDES WITH ADDITIONAL BOOSTER STAGES, (2) TO LAUNCH MAJOR AUTOMATED SATELLITES INTO NEAR-EARTH ORBIT AND TO PROVIDE REVISIT AND MAINTENANCE OPPORTUNITIES, AND (3) TO CARRY SCIENTIFIC EQUIPMENT INTO ORBIT AND RETURN TO EARTH AFTER PERIODS OF 7 TO 30 DAYS (SORTIE MISSIONS). THE 'FINAL REPORT OF THE SPACE SHUTTLE PAYLOAD PLANNING WORKING GROUPS' (NASA-GSFC, MAY 1973) PROPOSES THAT EXPERIMENTS BE CARRIED OUT IN THE FOLLOWING MAJOR FIELDS -- (1) ASTRONOMY, USING A LARGE SPACE TELESCOPE (LST) AND SEVERAL OTHER IR AND UV TELESCOPES, (2) ATMOSPHERIC AND SPACE PHYSICS, USING TRACER RELEASE TECHNIQUES, (3) HIGH-ENERGY ASTROPHYSICS (X-RAY ASTRONOMY, STRUCTURE AND DYNAMICS OF THE INTERSTELLER MEDIUM), USING VARIOUS TELESCOPES, SPECTROMETERS, PROPORTIONAL COUNTER ARRAYS, AND PROBES, (4) LIFE SCIENCES, AN AGGREGATE OF RELATED RESEARCH AND TECHNOLOGY EFFORTS INCLUDING

PLANETARY BIOLOGY, BROMIDICINE, BIOLOGY, AND ADVANCED TECHNOLOGY, (5) SOLAR PHYSICS, USING VARIOUS POLARIMETERS, SCINTILLATORS, PROPORTIONAL COUNTERS, SPARK CHAMBERS, AND NEUTRON DETECTORS, (6) COMMUNICATIONS AND NAVIGATION, (7) EARTH OBSERVATIONS, INCLUDING MONITORING OVER LONG PERIODS OF TIME OF THE PHYSICAL STATE AND DYNAMIC BEHAVIOR OF THE EARTH'S LAND SURFACE FEATURES AS WELL AS THE OTHER ELEMENTS OF GLOBAL ENVIRONMENT (AIR, WATER, AND ICE), (8) EARTH AND OCEAN PHYSICS, (9) MATERIALS PROCESSING AND SPACE MANUFACTURING, AND (10) SPACE TECHNOLOGY. APPROXIMATELY 445 LAUNCHES HAVE BEEN PROPOSED, TO COVER A PERIOD OF 12 YEARS.

ON 05/00/73, THE SPACECRAFT MISSION WAS PROPOSED.

****

SPACECRAFT COMMON NAME- SIRIO-A NSSDC ID SIRIO-A
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 00/00/74 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
ITALY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PRIMARILY A GEOSTATIONARY COMMUNICATIONS SATELLITE. IT WILL INCLUDE EXPERIMENTS MEASURING THE LOCAL PLASMA AND FIELD ENVIRONMENT AND THE FLUX OF LOW-ENERGY COSMIC RAYS. THE SATELLITE POINT WILL BE LOCATED AT 15 DEG W LONGITUDE.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SKYLAB CSM-3 NSSDC ID SL-4
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 10/00/73 SPACECRAFT WEIGHT IN ORBIT- 6033. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- SATURN 1B

FUNDING AGENCY
UNITED STATES NASA-OMSF

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 90. MIN
APOAPSIS- 435. KM ALT PERIAPSIS- 435. KM ALT INCLINATION- 50. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.G. SMITH NASA-JSC HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT WILL BE ALMOST IDENTICAL TO THE COMMAND AND SERVICE MODULE USED FOR APOLLO MISSIONS. MODIFICATIONS WILL BE MADE TO ACCOMODATE LONG-DURATION SKYLAB MISSIONS AND TO ALLOW THE SPACECRAFT TO REMAIN SEMI-DORMANT WHILE DOCKED TO THE SKYLAB CLUSTER. A CREW OF THREE MEN AND THEIR PROVISIONS WILL BE CARRIED. THE MISSION OF THIS SPACECRAFT WILL BE TO FERRY A CREW OF THREE TO THE SKYLAB COMPLEX AND RETURN THEM TO EARTH.

ON 01/00/67, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POTATO RESPIRATION NSSDC ID SL-4 -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - B.W. PINCE SPACE DEFENSE CORP BIRMINGHAM, MI
OI - F.A. BROWN, JR. NORTHWESTERN U EVANSTON, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, CARRIED IN THE CSM, WILL DETERMINE THE EFFECT OF REMOVING THE EARTH'S RHYTHMIC GEOPHYSICAL ENVIRONMENT ON THE RESPIRATORY BIORHYTHM OF A POTATO.

ON 01/00/67, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BODY FLUID BIOASSAY NSSDC ID SL-4 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.S. LEACH NASA-JSC HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS SKYLAB EXPERIMENT WILL BE TO ASSESS THE EFFECT OF SPACE FLIGHT ON ENDOCRINE-METABOLIC FUNCTIONS, INCLUDING FLUID AND ELECTROLYTE CONTROL MECHANISMS. THE DATA TO BE COLLECTED IN SUPPORT OF M073 WILL INCLUDE -- DAILY BODY WEIGHT, ACCURATE FOOD INTAKE (QUANTITY AND COMPOSITION), ACCURATE FLUID INTAKE, VOLUME OF A 24-HR URINE OUTPUT, SAMPLES OF POOLED 24-HR URINE OUTPUT (COLLECTED AND PROCESSED INFLIGHT FOR RETURN AND POSTFLIGHT ANALYSIS), AND PREFLIGHT, INFLIGHT, AND POSTFLIGHT BLOOD SAMPLES TAKEN FOR ANALYSIS. URINE WILL BE ANALYZED FOR SODIUM, POTASSIUM, ALDOSTERONE, EPINEPHRINE, NOREPINEPHRINE, ANTIDIURETIC HORMONES (ADH), URINE OSMOLALITY, HYDROCORTISONE, TOTAL BODY WATER, AND TOTAL AND FRACTIONAL KETOSTEROIDS. BLOOD WILL BE ANALYZED FOR RENIN, SODIUM, POTASSIUM, CHLORIDE, PLASMA OSMOLALITY, EXTRACELLULAR FLUID VOLUME (ECF), PARATHYROID HORMONE, THYROCALCITONIN, THYROXINE, ADRENOCORTICOTROPIC HORMONE (ACTH), HYDROCORTISONE, AND TOTAL BODY WATER. ALL HARDWARE USED IN M073 WAS A PART OF OTHER SYSTEMS. HARDWARE USED IN THIS EXPERIMENT, ALONG WITH THE SYSTEMS OF WHICH THEY ARE A PART, INCLUDED THE URINE MEASUREMENT AND COLLECTION SYSTEM (A PART OF THE HABITABILITY SUPPORT SYSTEM), THE SPECIMEN MASS MEASUREMENT (A PART OF M074 (73-027A-26)), AND THE BODY MASS MEASUREMENT (A PART OF M172 (73-027A-32)).

ON 01/00/67. THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SAN MARCO C-2 NSSDC ID SMAR-C2
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 01/15/74 SPACECRAFT WEIGHT IN ORBIT- KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY
UNITED STATES NASA-OSS
ITALY CRA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 1600. KM ALT PERIAPSIS- 180. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - A.J. CAPORALE NASA-GSFC GREENBELT, MD
PS - G.P. NEWTON NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE ITALIAN-BUILT SAN MARCO C-2 SPACECRAFT WILL BE PART OF A COOPERATIVE SPACE EFFORT BETWEEN THE ITALIAN SPACE COMMISSION (CRS) AND NASA. THE SCIENTIFIC OBJECTIVE OF SAN MARCO C-2 WILL BE TO PROVIDE MEASUREMENTS OF THE DIURNAL VARIATIONS OF EQUATORIAL NEUTRAL THERMOSPHERE DENSITY, COMPOSITION, AND TEMPERATURE FOR CORRELATION WITH SIMULTANEOUS ATMOSPHERIC EXPLORER C (AE-C) DATA, TO BE USED IN STUDIES OF THE PHYSICS AND DYNAMICS OF THE LOWER THERMOSPHERE. THE SPACECRAFT WILL CARRY (1) A NEUTRAL ATMOSPHERE COMPOSITION EXPERIMENT (NACE) TO DETERMINE UPPER ATMOSPHERIC (160 KM AND ABOVE) CONCENTRATIONS OF ARGON, HELIUM, ATOMIC OXYGEN AND MOLECULAR OXYGEN AND NITROGEN, (2) A NEUTRAL ATMOSPHERIC TEMPERATURE EXPERIMENT TO DETERMINE THE TEMPERATURE OF AMBIENT MOLECULAR NITROGEN AND (3) AN ACCELEROMETER TO MEASURE ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY ACCELEROMETER NSSDC ID SMAR-C2-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - L. BROGLIO NATL RSCH CNCL ITALY ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION
THE STRUCTURE OF THE SAN MARCO C-2 SPACECRAFT WILL FORM AN INTEGRAL PART OF THE DRAG BALANCE EXPERIMENT. THE OUTER SHELL OF THE SPACECRAFT WILL BE CONNECTED THROUGH A SERIES OF FLEXIBLE ARMS TO A HEAVIER INTERNAL STRUCTURE. THE DRAG BALANCE SYSTEM WILL MEASURE THE RELATIVE TRANSLATIONS ALONG THREE ORTHOGONAL AXES. BY APPLYING A DRAG COEFFICIENT TO THE MEASURED FORCES, THE ATMOSPHERIC DENSITY CAN BE OBTAINED. DENSITY VALUES OBTAINED FROM THIS EXPERIMENT WILL BE CORRELATED WITH SIMULTANEOUS MEASUREMENTS

OBTAINED FROM EXPERIMENTS TO BE FLOWN ON ATMOSPHERIC EXPLORER C (AE-C).

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL ATMOSPHERE COMPOSITION NSSDC ID SMAR-C2-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - G.P. NEWTON NASA-GSFC GREENBELT, MD
OI - N.W. SPENCER NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE FLOWN AT EQUATORIAL LATITUDES TO DETERMINE THE CONCENTRATIONS AND TEMPORAL (INCLUDING DIURNAL) FLUCTUATIONS OF THE FOLLOWING NEUTRAL UPPER ATMOSPHERE CONSTITUENTS -- ARGON, MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, AND HELIUM. THE MEASUREMENTS OBTAINED WILL BE CORRELATED WITH APPROPRIATE ATMOSPHERIC EXPLORER C DATA. A MAGNETIC MASS SPECTROMETER WILL BE USED.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE NSSDC ID SMAR-C2-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - N.W. SPENCER NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE FLOWN TO DETERMINE BY DIRECT MEASUREMENT THE TEMPERATURE AND DENSITY OF MOLECULAR NITROGEN AT SEVERAL ALTITUDES IN THE UPPER ATMOSPHERE. THE DATA OBTAINED WILL BE USED TO STUDY TEMPORAL FLUCTUATIONS, AND THEY WILL ALSO BE CORRELATED WITH ATMOSPHERIC EXPLORER C MEASUREMENTS. THE SENSOR WILL BE A SMALL OMEGATRON TUNED TO MEASURE MOLECULAR NITROGEN, AND WILL HAVE A SPECIALLY SHAPED APERTURE. TEMPERATURE WILL BE MEASURED DURING A SPIN-SCAN BY OBSERVING THE RESPONSE AS A FUNCTION OF ANGLE WITH THE SATELLITE VELOCITY VECTOR.

ON 06/00/73, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SMS-A NSSDC ID SMS-A
ALTERNATE NAMES- PL-7120, SYNCH METEOROLOGCL SAT A, SYNC MET SAT A

PLANNED LAUNCH DATE- 10/00/73 SPACECRAFT WEIGHT IN ORBIT- 243. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1440. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCE NASA-GSFC GREENBELT, MD
PS - W.E. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SMS-A WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENTAL MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND A THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF- AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) NSSDC ID SMS-A -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-A WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM)

WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STORED AND TIME STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST AT APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR NSSDC ID SMS-A -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID SMS-A -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5- TO 3-A.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID SMS-A -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM NSSDC ID SMS-A -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA TO EXISTING SMALL GROUND-BASED APT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMS WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SMS-B NSSDC ID SMS-B
ALTERNATE NAMES- PL-731E, SYNCH METEOROLOGCL SAT B, SYNC MET SAT B

PLANNED LAUNCH DATE- 02/00/74 SPACECRAFT WEIGHT IN ORBIT- 243. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1400. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V.	FORDYCE	NASA-GSFC	GREENBELT, MD
PS - W.E.	SHENK	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SMS-B WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTE EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEMS. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR NSSDC ID SMS-B -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.J.	WILLIAMS	NOAA-ERL	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID SMS-B -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5- TO 3-A.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID SMS-B -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) NSSDC ID SMS-B -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-B WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL

USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM NSSDC ID SMS-B -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA TO EXISTING SMALL GROUND-BASED APT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION FOR ONE SMS WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SMS-C NSSDC ID SMS-C

ALTERNATE NAMES- GOES-A

PLANNED LAUNCH DATE- 08/00/74 SPACECRAFT WEIGHT IN ORBIT- 243. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 1436. MIN
APOAPSIS- 35700. KM ALT PERIAPSIS- 35700. KM ALT INCLINATION- 0.0 DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V.	FORDYCE	NASA-GSFC	GREENBELT, MD
PS - W.E.	SHENK	NASA-GSFC	GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE SMS-C/GEOS-A WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) NSSDC ID SMS-C -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	NESS STAFF	NOAA-NESS	SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION
THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-C WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS,

SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NADIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NADIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR NSSDC ID SMS-C -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID SMS-C -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - D.J. WILLIAMS NOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATON CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE

DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5- TO 3-A.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC FIELD MONITOR NSSDC ID SMS-C -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM NSSDC ID SMS-C -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

ON 12/18/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SRATS NSSDC ID SRATS
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 00/00/74 SPACECRAFT WEIGHT IN ORBIT- 70. KG

LAUNCH SITE- KAGOSHIMA, JAPAN LAUNCH VEHICLE- M-3S-C

FUNDING AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 2000. KM ALT PERIAPSIS- 250. KM ALT INCLINATION- 30. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. HIRAO U OF TOKYO TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
SRATS (SOLAR RADIATION AND THERMOSPHERIC SATELLITE) WILL BE AN AERONOMY RESEARCH SATELLITE. IT WILL HAVE AN OCTAGONAL COLUMN FORM (75 CM IN DIAM AND 65 CM IN HEIGHT), IN WHICH THE EXPERIMENT INSTRUMENTS WILL BE MOUNTED. THE SATELLITE WILL BE SPIN STABILIZED IN A ROLLING WHEEL MODE BY A GEOMAGNETIC ATTITUDE CONTROL SYSTEM. FOUR PLASMA PROBES CAN BE EXTENDED PERPENDICULAR TO THE SPIN AXIS BY 0.5-M METALLIC BOOMS. POWER AT AN AVERAGE RATE OF 15 W WILL BE PROVIDED BY 6000 SILICON N-P SOLAR CELLS. THE OBJECTIVES OF THE SATELLITE WILL BE TO STUDY THE IONOSPHERE SYSTEMATICALLY BY SIMULTANEOUSLY OBSERVING SOLAR IONIZING RADIATIONS (HYDROGEN LYMAN-ALPHA AND X RAYS), THE ULTRAVIOLET ALBEDO OF THE EARTH, POSITIVE ION COMPOSITION, AND PLASMA PARAMETERS SUCH AS ELECTRON AND ION DENSITIES AND TEMPERATURES IN THE IONOSPHERE.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- SOLAR X-RAY MONITOR NSSDC ID SRATS -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - M. MATSUOKA U OF TOKYO TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF THE TOTAL DISC INTENSITY OF SOLAR X RAYS WILL BE MADE WITH PROPORTIONAL COUNTERS.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- HYDROGEN LYMAN-ALPHA NSSDC ID SRATS -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T. OSHIO OSAKA CITY U OSAKA, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF HYDROGEN LYMAN-ALPHA EMISSION WILL BE MADE WITH A LIF-NO IONIZATION CHAMBER.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- GEOCORONAL ULTRAVIOLET GLOW NSSDC ID SRATS -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - T. TOHMATSU U OF TOKYO TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
OBSERVATIONS OF HYDROGEN, HELIUM, AND ATOMIC OXYGEN LINES WILL BE MADE WITH TWO IONIZATION CHAMBERS AND FOUR METALLIC THIN-FILM CHANNELTRON PHOTON COUNTERS.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- ELECTRON DENSITY MEASUREMENT NSSDC ID SRATS -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - H. OHYA KYOTO U KYOTO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF LOCAL ELECTRON DENSITY WILL BE MADE BY MEANS OF AN IMPEDANCE PROBE.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- ELECTRON TEMPERATURE NSSDC ID SRATS -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - K. HIRAO U OF TOKYO TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
ELECTRON TEMPERATURE WILL BE DIRECTLY MEASURED WITH AN IMPROVED TYPE OF ELECTRON TEMPERATURE PROBE FOR STRUCTURAL STUDY OF THE IONOSPHERE.

ON / / , THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- PLASMA DIAGNOSIS NSSDC ID SRATS -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
A RETARDING POTENTIAL TRAP WILL BE USED FOR A MULTI-PURPOSE EXPERIMENT ON PLASMA DENSITY, TEMPERATURE, AND ION COMPOSITION OF THE THERMOSPHERIC

PLASMA. LANGMUIR CURVES WILL BE TRANSMITTED THROUGH A 128-CHANNEL MAGNETIC-CORE MEMORY ANALYZER.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- IONIC COMPOSITION NSSDC ID SRATS -07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CHIEF INVESTIGATOR)
PI - N. FUGONO RRL TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
A BENNETT TYPE ION-MASS SPECTROMETER WILL BE USED FOR CONTINUOUS MONITORING OF H+, HE+, AND O+ DENSITIES IN THE TOPSIDE IONOSPHERE.

ON / / . THE SPACECRAFT MISSION WAS

EXPERIMENT NAME- EARTH ULTRAVIOLET ALBEDO NSSDC ID SRATS -08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, CI=CHIEF INVESTIGATOR)
PI - T. TOHMATSU U OF TOKYO TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
TWO FILTER PHOTOMETERS WILL MONITOR THE OZONE CONTENT IN THE MESOSPHERE AND UPPER STRATOSPHERE THROUGH MEASUREMENTS OF THE INTENSITY OF ULTRAVIOLET ALBEDOS AT 2500 AND 2900 A AND THEIR ANGULAR DISTRIBUTIONS.

ON / / . THE SPACECRAFT MISSION WAS

****

SPACECRAFT COMMON NAME- SOLRAD 11A NSSDC ID SRD-11A
ALTERNATE NAMES- SRD-11A, SOLRAD HI-TRIP, SESP NO.NRL-111-0264, NRL-111

PLANNED LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT IN ORBIT- 102.15 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-NAVY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3140. MIN
APOAPSIS- 127622. KM ALT PERIAPSIS- 127622. KM ALT INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - E.W. PETERKIN NAVAL RESEARCH LAB WASHINGTON, DC
PS - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

SOLRAD 11A WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES, WHICH WILL BE ORIENTED TOWARDS THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME, CONTINUOUS MONITORING OF SOLAR X-RAY, UV, AND ENERGETIC PARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE BROAD-BAND ION CHAMBERS OBSERVING SOLAR X-RAYS BETWEEN 0.1 AND 60 A, PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SOLAR X-RAYS BETWEEN 2 AND 150 KEV, AN EUV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 1000 A, A VARIABLE RESOLUTION EBERT-FASTIE SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A), A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALPHA PARTICLE MONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING BRAGG SCATTERING AND THE OTHER UTILIZING THOMPSON SCATTERING), A BRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES, A LARGE-AREA AURORAL X-RAY DETECTOR, AND A PASSIVELY COOLED SOLID STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

ON 00/00/71, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- SOLRAD 11B NSSDC ID SRO-11B
ALTERNATE NAMES- SOLRAD HI-TRIP, NRL-111, PL-723F, SESP NO.NRL-111-0264, SOLRAD

PLANNED LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT IN ORBIT- 102.15 KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN 3C

FUNDING AGENCY
UNITED STATES DOD-NAVY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3140. MIN
APOAPSIS- 127622. KM ALT PERIAPSIS- 127622. KM ALT INCLINATION- 0. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - E.W. PETERKIN NAVAL RESEARCH LAB WASHINGTON, DC
PS - R.W. KREPLIN NAVAL RESEARCH LAB WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
SOLRAD 11B WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES, WHICH WILL BE ORIENTED TOWARDS THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME, CONTINUOUS MONITORING OF SOLAR X-RAY, UV, AND ENERGETIC PARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE BROADBAND ION CHAMBERS OBSERVING SOLAR X-RAYS BETWEEN 0.1 AND 60 A, PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SOLAR X-RAYS BETWEEN 2 AND 150 KEV, AN EUV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 1000 A, A VARIABLE RESOLUTION EBERT-FASTIE SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A), A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALPHA PARTICLE MONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING BRAGG SCATTERING AND THE OTHER UTILIZING THOMPSON SCATTERING), A BRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES, A LARGE-AREA AURORAL X-RAY DETECTOR, AND A PASSIVELY COOLED SOLID STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

ON 00/00/71, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- TIROS-N NSSDC ID TIROS-N
ALTERNATE NAMES-

PLANNED LAUNCH DATE- 10/00/78 SPACECRAFT WEIGHT IN ORBIT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- DELTA

FUNDING AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 120. MIN
APOAPSIS- 1678.00 KM ALT PERIAPSIS- 1676.00 KM ALT INCLINATION- 103. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.A. STAMPFL NASA-GSFC GREENBELT, MD
PS - W. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
TIROS-N WILL BE THE PROTOTYPE FOR THE THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE SUN-SYNCHRONOUS PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUDCOVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE AND WATER VAPOR PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL BE A SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH, AND A DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE-FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.036 DEG/SEC.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) NSSDC ID TIROS-N-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - NESS STAFF NOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS--CHANNEL 1, 0.4 TO 1.0 MICRON (VISIBLE), CHANNEL 2, 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3, 10.5 TO 12.5 MICRONS (IR WINDOW) AND CHANNEL 4,

6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H, -I, AND -J.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) NSSDC ID TIROS-N-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	NESS STAFF	NOAA-NESS	SUITLAND, MD.
OI -	UNKNOWN	METEOROLOGICAL OFFICE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON TIROS-N IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 18- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS, USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR CAN BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE WILL EXTEND FROM THE SURFACE TO THE TROPOPAUSE AND WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS MAY EVENTUALLY INCLUDE TWO ADDITIONAL INSTRUMENTS - ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 5.5-MM OXYGEN BAND. PRESENTLY, THESE TWO ADDITIONAL UNITS WILL NOT FLY ON TIROS-N BUT WILL BE ADDED TO SUBSEQUENT MISSIONS (ITOS-F, -I, AND -J).

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) NSSDC ID TIROS-N-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI -	UNKNOWN	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND WILL BE RETRANSMITTED WHEN THE SPACECRAFT COMES IN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

ON 01/00/72, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- UK 5 NSSDC ID UK-5
ALTERNATE NAMES- UNITED KINGDOM 5, PL-7328

PLANNED LAUNCH DATE- 06/00/74 SPACECRAFT WEIGHT IN ORBIT- 129. KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- MIN
APOAPSIS- 450.000 KM ALT PERIAPSIS- 450.000 KM ALT INCLINATION- 37. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.L. EAKER NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE UK-5 SPACECRAFT IS DESIGNED TO CARRY SIX EXPERIMENTS WHICH WILL MEASURE THE SPECTRUM, POLARIZATION, AND PULSAR FEATURES OF NON-SOLAR X-RAY SOURCES. THE SPACECRAFT WILL BE SPIN STABILIZED, AND TWO EXPERIMENTS WILL SCAN THE SKY PERPENDICULAR TO THE SPIN AXIS WHILE FOUR EXPERIMENTS WILL BE POINTED PARALLEL TO THE SPIN AXIS. DATA WILL BE STORED ON BOARD THE SPACECRAFT IN A CORE STORAGE AND DUMPED TO GROUND STATIONS ONCE PER ORBIT.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- 0.3- TO 30-KEV COSMIC X-RAY WITH A ROTATION COLLIMATOR NSSDC ID UK-5 -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F. BOYD	U COLLEGE, LONDON	LONDON, ENGLAND
OI - P.A. WILLMORE	U COLLEGE, LONDON	LONDON, ENGLAND
OI - P.W. SANFORD	U COLLEGE, LONDON	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL COMBINE THE FUNCTION OF OBSERVING X-RAYS IN DIFFERENT ENERGY RANGES WITH THAT OF STAR TRACKING. THE EXPERIMENT WILL CONTAIN A ROTATION COLLIMATOR, UTILIZING THE SATELLITE SPIN, BEHIND WHICH THERE WILL BE THREE DETECTORS. THE FIELD OF VIEW WILL BE A CONE WITH A SEMI-ANGLE OF 10 DEG TO 20 DEG, DEPENDING ON THE TYPE OF RADIATION VIEWED BY THE DIFFERENT DETECTORS. THE FIRST DETECTOR WILL BE A VISIBLE LIGHT PHOTOMULTIPLIER WHICH WILL ENABLE THE SPIN AXIS TO BE ACCURATELY DETERMINED BY VIEWING THE BACKGROUND OF OPTICAL STARS. SECONDLY, THERE WILL BE AN ARRAY OF CHANNEL ELECTRON MULTIPLIERS, WITH SELECTABLE FILTERS, COVERING THE WAVELENGTH RANGE 0.3 TO 6 KEV. THIRD, THERE WILL BE A GROUP OF PROPORTIONAL COUNTERS COVERING THE RANGE 2.5 TO 30 KEV. IT IS BELIEVED THAT SOURCE POSITIONS CAN BE DETERMINED TO WITHIN 2 ARC-MIN FOR BRIGHT SOURCES.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- 2- TO 10-KEV SKY SURVEY NSSDC ID UK-5 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A. POUNDS	U OF LEICESTER	LEICESTER, ENGLAND
OI - B.A. COOKE	U OF LEICESTER	LEICESTER, ENGLAND
OI - D.J. ADAMS	U OF LEICESTER	LEICESTER, ENGLAND
OI - R. GRIFFITHS	U OF LEICESTER	LEICESTER, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A LARGE-AREA PROPORTIONAL COUNTER ARRANGED TO VIEW IN A DIRECTION PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE SATELLITE ROTATION, THEREFORE, WILL ALLOW A SCAN OF A 360-DEG BAND OF THE SKY. IF THE SATELLITE SPIN AXIS IS ARRANGED TO POINT AT A GALACTIC POLE, THE WHOLE OF THE MILKY WAY MAY BE SCANNED AT ONCE. THE EXPERIMENT WILL COVER THE PHOTON ENERGY RANGE 1.5 TO 20 KEV AND WILL EFFECT A HIGH-SENSITIVITY SURVEY, OBTAINING SOURCE LOCATIONS, INTENSITY, AND SPECTRA. A NUMBER OF DIFFERENT MODES OF OPERATION WILL BE USED IN WHICH THE AVAILABLE STORAGE SPACE IN THE CORE STORE CAN OBTAIN SPATIAL INFORMATION AT THE EXPENSE OF SPECTRAL RESOLUTION OR CONVERSELY. THE SENSITIVITY OF THE EXPERIMENT WILL ALLOW THE DETECTION OF SOURCES OF THE ORDER OF 10 TO THE MINUS FOUR TIMES THE INTENSITY OF SCO XR-1, WITHIN THE TIME OF ABOUT ONE DAY. THE ABILITY OF THE SURVEY INSTRUMENTS TO DETERMINE THE POSITIONS OF SOURCE WILL DEPEND ON THE STRENGTH OF THE SOURCE AND THE NUMBER OF OTHER SOURCES IN A GIVEN PART OF THE SKY. A SOURCE OF 5 X 10 TO THE MINUS THREE TIMES THE STRENGTH OF SCO XR-1 CAN BE LOCATED WITH A PRECISION OF ABOUT 15 ARC-MIN.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-RESOLUTION SOURCE SPECTRA NSSDC ID UK-5 -03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.L.F. BOYD	U COLLEGE, LONDON	LONDON, ENGLAND

OI - P.A.	WILLMORE	U COLLEGE, LONDON	LONDON, ENGLAND
OI - P.W.	SANFORD	U COLLEGE, LONDON	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A HIGH-RESOLUTION PROPORTIONAL COUNTER SPECTROMETER WITH A 128-CHANNEL PULSE HEIGHT ANALYZER, AND WILL RESPOND TO PHOTONS IN THE 2 TO 30 KEV ENERGY RANGE. THE SPECTRA OF SOURCES WILL THEREFORE BE EXAMINED IN GREATER DETAIL THAN HAS BEEN PREVIOUSLY POSSIBLE. LINE EMISSION FOR CERTAIN ELEMENTS (E.G. IRON) MAY ALSO BE IDENTIFIED. THE DETECTOR WILL VIEW IN A DIRECTION PARALLEL TO THE SPIN AXIS AND, THEREFORE, WILL CONTINUE TO OBSERVE THE SAME PIECE OF SKY FOR AS LONG AS THE POSITION OF THE SATELLITE SPIN AXIS REMAINS UNALTERED. THE EXPERIMENT AXIS WILL POINT APPROXIMATELY TWO DEG OFF THE SPIN AXIS, SO, WHEN OBSERVING A SOURCE ALSO TWO DEG OFF THE SPIN AXIS, THE SOURCE WILL PASS IN AND OUT OF THE FIELD OF VIEW DURING EACH ROTATION. THIS WILL PERMIT THE BACKGROUND FLUX TO BE SAMPLED EVERY SPIN PERIOD, BY RECORDING THE SPECTRAL INFORMATION IN FOUR SETS OF LOCATIONS, EACH CORRESPONDING TO A QUADRANT OF THE SPIN CYCLE. THIS WILL OVERCOME THE LACK OF INFORMATION ON POSSIBLE FLUCTUATIONS IN THE BACKGROUND FLUX DURING AN ORBITS INTEGRATION. THE EXPERIMENT CAN ALSO BE OPERATED IN A MODE IN WHICH PERIODICITIES IN THE RANGE TYPICAL OF PULSAR FREQUENCIES WILL BE DETECTED.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- POLARIMETER/SPECTROMETER NSSDC ID UK-5 -04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.A.	POUNDS	U OF LEICESTER	LEICESTER, ENGLAND
OI - B.A.	COOKE	U OF LEICESTER	LEICESTER, ENGLAND
OI - D.J.	ADAMS	U OF LEICESTER	LEICESTER, ENGLAND
OI - R.	GRIFFITHS	U OF LEICESTER	LEICESTER, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE A POLARIMETER/SPECTROMETER OPERATING IN THE 2- TO 8-KEV RANGE. IT WILL USE TWO LARGE PLANE CRYSTALS, LITHIUM HYDRIDE AND GRAPHITE, IN A BRAGG SPECTROMETER WITH A HONEYCOMB COLLIMATOR. IT WILL BE MOUNTED TO VIEW ALONG THE SATELLITE SPIN AXIS AND EXAMINE THE RADIATION OF INDIVIDUAL X-RAY SOURCES FOR POSSIBLE POLARIZATION AND/OR THE EXISTENCE OF LINE EMISSIONS. IN A SOURCE OF THE BRIGHTNESS OF THE CRAB NEBULA, A POLARIZATION OF 2.5 PERCENT CAN BE DETECTED. THE EXPERIMENT WILL ALSO CONDUCT SEARCHES FOR PULSAR ACTIVITY. THE NATURE OF THE EXPERIMENT WILL MAKE IT POSSIBLE TO EXAMINE THE POLARIZATION OF THE PULSAR ITSELF BY LOOKING FOR DIFFERENT PULSAR BEHAVIOR IN THE SEPARATE POLARIZATION COMPONENTS.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-ENERGY COSMIC X-RAY SPECTRA NSSDC ID UK-5 -05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.	ELLIOTT	IMPERIAL COLLEGE	LONDON, ENGLAND
OI - J.J.	QUENBY	IMPERIAL COLLEGE	LONDON, ENGLAND
OI - A.R.	ENGEL	IMPERIAL COLLEGE	LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO EXTEND THE SPECTRAL INFORMATION ON SELECTED X-RAY SOURCES IN THE ENERGY REGION ABOVE 20 KEV. MEASUREMENTS WILL BE POSSIBLE UP TO 2 MEV, ALTHOUGH THE EFFICIENCY OF THE DETECTOR FALLS STEEPLY AT THIS ENERGY. THE DETECTOR AXIS WILL BE INCLINED A FEW DEG WITH RESPECT TO THE SATELLITE SPIN AXIS SO THAT IT CONES AS THE SATELLITE SPINS. THE COUNTING RATE RESULTING FROM A POINT SOURCE A FEW DEG FROM THE SPIN AXIS WILL THUS BE MODULATED WITH THE SPIN PERIOD. THIS MODULATION WILL BE DETECTED BY DIVIDING THE SPIN CYCLE INTO FOUR SECTORS AND ANALYZING THE DIFFERENT COUNTING RATES IN EACH. IN THIS WAY, THE SOURCE INTENSITY CAN BE DETERMINED FROM THE AMPLITUDE OF THE MODULATION. FOR PULSAR OBSERVATIONS, A LARGE ENERGY WINDOW AT THE LOWER END OF THE DETECTOR RANGE WILL BE USED. THE OBSERVATIONS IN THIS ENERGY REGION WILL BE ANALYZED FOR A PULSAR PERIODICITY IN A SPECIAL SYSTEM WHICH WILL BE PART OF THE SPACECRAFT DATA HANDLING ELECTRONICS.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ALL-SKY MONITOR NSSDC ID UK-5 -06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.S.	HOLT	NASA-GSFC	GREENBELT, MD
OI - E.A.	BOLOT	NASA-GSFC	GREENBELT, MD
OI - P.J.	SERLEMITSOS	NASA-GSFC	GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL SCAN THE X-RAY EMISSION FROM THE ENTIRE CELESTIAL SPHERE AT ALL TIMES, THEREBY COVERING THE LARGE AREAS THAT LIE OUTSIDE THE FIELD OF VIEW OF OTHER ON-BOARD EXPERIMENTS. IT WILL BE A VALUABLE AID IN PROGRAMMING SATELLITE MANEUVERS SO THAT TRANSIENT EVENTS IN THE X-RAY SKY, SUCH AS NEARBY NOVAE AND X-RAY FLARES, MAY BE RAPIDLY MADE AVAILABLE FOR STUDY, WITH GREATER RESOLUTION BY THE OTHER EXPERIMENTS.

ON 09/00/70, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- VIKING-A NSSDC ID VIKNG-A
ALTERNATE NAMES- PL-733A

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN ORBIT- 3216. KG

LAUNCH SITE- CAPE KENNEDY, UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- MARSCENTRIC ORBIT PERIOD- 1476. MIN
APOAPSIS- 36410. KM ALT PERIAPSIS- 4410. KM ALT INCLINATION- 20. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.J.	MARTIN	NASA-LARC	HAMPTON, VA
PS - G.A.	SOFFEN	NASA-LARC	HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE VIKING SPACECRAFT WILL CONSIST OF AN ORBITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF ORBITING THE PLANET MARS IN A HIGH-ECCENTRICITY ELLIPTICAL ORBIT. A LANDER WILL SEPARATE FROM THE ORBITER, ENTER THE MARTIAN ATMOSPHERE, AND SOFT-LAND ON THE SURFACE. ORBITAL, ENTRY, AND SCIENTIFIC DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SPIN-STABILIZED, SOLAR-CELL-POWERED SATELLITE. BOTH THE ORBITER AND LANDER WILL HAVE A 90-DAY LIFE EXPECTANCY. THERE WILL BE A 500-W POWER CAPACITY FOR THE ORBITER AND A 70-W CAPACITY FOR THE LANDER. SCIENTIFIC AND PHOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 125 LB FOR THE ORBITER AND 70 LB FOR THE LANDER.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IMAGERY ORBITER NSSDC ID VIKNG-A-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - M. CARR	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI - W.A. BAUM	LOWELL OBSERVATORY	FLAGSTAFF, AZ
OI - H. MASURSKY	US GEOLOGICAL SURVEY	FLAGSTAFF, AZ
OI - D.U. WISE	U OF MASSACHUSETTS	AMHERST, MA
OI - B.H. BRIGGS	U OF ADELAIDE	ADELAIDE, AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION WILL BE TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESOLUTION OF THE ORBITER IMAGING SYSTEM WILL BE 30 M PER LINE OR BETTER AT A REFERENCE ALTITUDE OF 1000 KM, WITH IMAGE SMEARING FROM ORBITER MOTION TO BE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION, THE ORBITER WILL BE REQUIRED TO PHOTOGRAPH WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40-KM CROSS-TRACK BY 500-KM DOWN-TRACK ON A SINGLE ORBITAL PASS FROM THE NEAR-PERIAPSIS PORTION OF THE ORBIT. THE NEAR-PERIAPSIS COVERAGE REQUIREMENT AFTER LANDER SEPARATION WILL OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RADIUS CENTERED ON THE LANDER. TO OBTAIN BOTH BROAD AREA AND HIGH RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE OBTAINABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 100 TO 1, AND THE SENSITIVITY WILL BE SUFFICIENT TO OBTAIN PICTURES AS CLOSE TO THE TERMINATOR AS PRACTICAL USING THREE COLOR FILTERS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR RADIOMETRY -- THERMAL MAPPING NSSDC ID VIKNG-A-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.H. KIEFFER	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - G. MUNCH	CAL TECH	PASADENA, CA
OI - E.D. MINER	NASA-JPL	PASADENA, CA
OI - G. NEUGEBAUER	CAL TECH	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE INFRARED RADIOMETRY EXPERIMENT WILL BE TO OBTAIN SURFACE TEMPERATURE DATA OF MARS TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS, TO MONITOR THE REGIONS SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RADIOMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. THE INFRARED RADIOMETER WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE TEMPERATURE RESOLUTION WILL BE AT LEAST PLUS OR MINUS 1 DEG K AT 200 DEG K AND THE MEASUREMENT RANGE WILL BE 150 TO 300 DEG K. AT A REFERENCE ALTITUDE OF 1000 KM, THE SPATIAL RESOLUTION WILL BE 10 KM SQUARED OR BETTER AFTER THE LANDER HAS SEPARATED FROM THE ORBITER.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAPOR MAPPING NSSDC ID VIKNG-A-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.B.	FARMER	NASA-JPL	PASADENA, CA
OI - D.	LAPORTE	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETRY EXPERIMENT WILL BE TO DETERMINE THE HORIZONTAL DISTRIBUTION OF WATER VAPOR TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED SPECTROMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE 0.05 TO 1.0 MM PRECIPITABLE WATER WITH A RESOLUTION OF AT LEAST 0.01 MM AT 0.2 MM. THE SPATIAL RESOLUTION WILL BE 20 KM SQ OR LESS AFTER LANDER SEPARATION.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION NSSDC ID VIKNG-A-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - M.B.	MCELROY	KITT PEAK NATL OBS	TUSCON, AZ
OI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE VIKING ENTRY ATMOSPHERIC COMPOSITION EXPERIMENT IS DESIGNED TO PROVIDE THE COMPOSITION DATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE. A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER, MOUNTED IN AN OPENING IN THE AEROSHELL WITH ITS ELECTRON IMPACT OPEN ION SOURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL, WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL OBTAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES, AND IN PARTICULAR FOR BOTH ATOMIC AND MOLECULAR OXYGEN, CARBON MONOXIDE, AND CARBON DIOXIDE. TWO COLLECTORS WILL

BE USED -- ONE COVERING THE MASS RANGE FROM 1 TO 7 AMU AND THE OTHER SIMULTANEOUSLY COVERING THE RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEEPING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEP PERIOD WILL BE APPROXIMATELY 5 SEC. AND A DYNAMIC RANGE OF 10 TO THE 5 WILL BE PROVIDED WITHIN EACH SPECTRUM. AFTER CALIBRATION, THE INSTRUMENT WILL BE SEALED UNDER VACUUM AND OPENED WHEN THE LANDER IS RELEASED FROM THE ORBITER. DURING ENTRY, THE LANDER WILL BE TRAVELING WITH ITS AXIS ORIENTED ESSENTIALLY ALONG THE VELOCITY VECTOR SO THAT THE AMBIENT SPECIES WILL ENTER AT AN ANGLE NORMAL TO THE ENTRANCE PLANE. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE IONOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE, WHICH WILL BE MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE AND COLLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THE FIRST (ENTRANCE GRID), SECOND, AND LAST GRID WILL BE GROUNDED TO THE SPACECRAFT. THE THIRD AND FOURTH GRIDS TOGETHER WILL COMPRISE THE RETARDING GRID, AND THE FIFTH GRID, THE SUPRESSOR GRID, WILL BE HELD AT A FIXED POTENTIAL OPPOSITE IN SIGN TO THAT ON THE RETARDING GRID. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID. ONE RAMP WILL COVER THE VOLTAGE RANGE FROM -75 TO 0 V (IN ABOUT 1 SEC), USED TO MEASURE SOLAR WIND ELECTRONS AND IONOSPHERIC PHOTOELECTRONS. ANOTHER WILL COVER FROM -3 TO 0 V (IN ABOUT ONE SEC), AND MEASURE ELECTRON TEMPERATURES IN THE IONOSPHERE. THE LAST RAMP WILL COVER FROM +20 TO 0 V (IN ABOUT 2 SEC), AND PROVIDE ION TEMPERATURE AND ION CONCENTRATIONS DATA. WHEN THE LANDER IS ALIGNED WITH ITS AXIS ALONG THE VELOCITY VECTOR, THE LOW-ENERGY PLASMA WILL ENTER THE RPA AT AN ANGLE NEARLY NORMAL TO THE APERTURE GRID. EACH PARAMETER WILL BE EVALUATED APPROXIMATELY EVERY 4 KM IN ALTITUDE, A SMALL DISTANCE COMPARED TO THE ANTICIPATED SCALE HEIGHTS. MORE EXPERIMENT DETAIL CAN BE FOUND IN 'ENTRY SCIENCE EXPERIMENT FOR VIKING 1975,' BY A. O. C. NIER ET AL, ICARUS, VOL. 16, PP. 74, 1972.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC STRUCTURE NSSDC ID VIKNG-A-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - M.B.	MCELROY	KITT PEAK NATL OBS	TUSCON, AZ
OI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE THROUGH MEASUREMENT OF ACCELERATION, PRESSURE, AND TEMPERATURE. THE ACCELEROMETER OF THE GUIDANCE AND CONTROL SYSTEM MAY BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BIOLOGY INVESTIGATION NSSDC ID VIKNG-A-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.P.	KLEIN	NASA-ARC	MOFFETT FIELD, CA
OI - J.	LEDERBERG	STANFORD U	STANFORD, CA
OI - A.	RICH	MIT	CAMBRIDGE, MA
OI - W.W.	VISHNIAC	U OF ROCHESTER	ROCHESTER, NY
OI - N.H.	HOROWITZ	NASA-JPL	PASADENA, CA
OI - V.I.	OYAMA	NASA-ARC	CHICAGO, IL
OI - G.V.	LEVIN	BIOSPHERICS INC	ROCKVILLE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF 4 PARTS. IT WILL MEASURE -- (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE, (2) THE CARBON DIOXIDE RELEASED FROM PREVIOUSLY FIXED CARBON DIOXIDE, (3) THE CARBON DIOXIDE RELEASED FROM ADDED LABELED ORGANIC COMPOUNDS, AND (4) THE LIGHT SCATTERED FROM A LIQUID SAMPLE, AS A MEASURE OF THE INCREASE IN PARTICLES. IT WILL ATTEMPT TO DETERMINE THE PRESENCE OF LIFE ON MARS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MOLECULAR ANALYSIS NSSDC ID VIKNG-A-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.	BIEMANN	MIT	CAMBRIDGE, MA
OI - H.C.	UREY	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - D.M.	ANDERSON	CRREL	LA JOLLA, CA
OI - T.C.	OWEN	ILLINOIS INST OF TECH	CHICAGO, IL
CI - J.	ORO	U OF HOUSTON	HOUSTON, TX
OI - L.E.	ORGEL	SALK INST BIOL STUDIES	SAN DIEGO, CA
OI - G.P.	SHULMAN	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION WILL BE TO ANALYZE THE MARTIAN SURFACE FOR ITS ORGANIC CONTENT BY VAPORIZING MATERIAL ONTO A HIGH-EFFICIENCY GAS CHROMATOGRAPHIC COLUMN WHICH IN TURN WILL BE CONNECTED TO A FAST SCANNING (15 SEC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAPOR PRESSURE, AND ULTIMATELY TO DECOMPOSE PYROLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRADATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. IN ORDER TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE ORGANIC COMPOUND WHICH IS ONE PART PER HUNDRED MILLION (0.01 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12-200 WITH UNITS RESOLUTION OR BETTER. THE RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION PYROLYSIS UP TO 500 DEG C IN TWO OR THREE PRESCRIBED STEPS OF 30 SEC. PROVISIONS HAVE TO BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 5-10 PERCENT OF SAMPLE WEIGHT) DOES NOT IMPAIR THE FUNCTION OF THE MASS SPECTROMETER. THIS MAY BE ACCOMPLISHED BY VENTING THE EXCESS GAS BEFORE IT REACHES THE MASS SPECTROMETER. EIGHT DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 90 DAYS OF THE MISSION COVERING DIURNAL AND SEASONAL CHANGES WILL BE STUDIED. THE ORGANIC INVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE OPERATION OF THE ATMOSPHERIC ANALYSES REQUIRED DURING THE FIRST THREE DAYS. A SEPARATE DETECTOR AT THE OUTPUT OF THE GAS CHROMATOGRAPH

AND A CARRIER GAS SEPARATOR WILL BE PROVIDED. THE DETECTOR WILL PROVIDE ADDITIONAL CHROMATOGRAPHIC DATA THAT WILL BE HELPFUL IN INTERPRETING THE MASS SPECTRA.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOIL WATER NSSDC ID VIKNG-A-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	SHORTHILL	BOEING SCI RSCH LABS	SEATTLE, WA
OI - H.J.	MOORE	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI - R.F.	SCOTT	CAL TECH	PASADENA, CA
OI - R.E.	HUTTON	TRW SYSTEMS GROUP	REDONDO BEACH, CA.

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SOIL WATER EXPERIMENT WILL BE TO DETERMINE THE AMOUNTS AND FORMS OF OCCURRENCE OF FREE AND BOUND WATER IN SOIL SAMPLES OBTAINED FROM TWO DEPTHS, 0-5 CM AND 5-10 CM. THREE SAMPLES WILL BE ANALYZED AND, IF POSSIBLE, ONE ANALYSIS WILL BE CONDUCTED JUST BEFORE AND ANOTHER AFTER THE WAVE OF DARKENING. THE METHOD OF DETERMINATION WILL BE SCANNING CALORIMETRY FROM AMBIENT TEMPERATURE (AS LOW AS POSSIBLE) TO THE HIGHEST POSSIBLE TEMPERATURE (UP TO 750 DEG C) WITH DETERMINATION OF EFFLUENT WATER AS A REQUIREMENT. THE RATE OF TEMPERATURE SCAN SHOULD BE SLOW ENOUGH TO DISTINGUISH ENDOTHERMS IN A RATIO OF 1.7 IN THE FIRST 30 DEG OF SAMPLE TEMPERATURE RISE. THE SAMPLE WILL CONTAIN LESS THAN 1 PART PER 10 MILLION OF WATER RELEASED FROM THE LANDER. IF FROZEN WATER EXISTS IN THE SOIL, IT WILL BE MAINTAINED SOLID UNTIL INITIATION OF THE ANALYSIS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FACSIMILE CAMERA NSSDC ID VIKNG-A-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.A.	MUTCH	BROWN U	PROVIDENCE, RI
OI - C.	SAGAN	CORNELL U	ITHACA, NY
OI - A.B.	BINDER	ILLINOIS INST OF TECH	CHICAGO, IL
OI - E.C.	MORRIS	US GEOLOGICAL SURVEY	FLAGSTAFF, AZ
OI - A.	YOUNG	NASA-JPL	PASADENA, CA
OI - F.O.	HUCK	NASA-LARC	HAMPTON, VA
OI - E.C.	LEVINTHAL	STANFORD U	PALO ALTO, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE TV IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANDING SITE, PROVIDING DATA WITH BIOLOGICAL, GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESOLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG, WITH A CAPABILITY OF OBTAINING A COMPLETE 0-360-DEG HORIZONTAL PANORAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW THE HORIZONTAL PLANE OF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 30-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.5 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND THE ENTIRE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF OBTAINING VISUAL COLOR IMAGERY. PROVISION WILL BE MADE FOR POSSIBLE LATER MODIFICATION

TO OPERATE IN THREE SPECTRAL BANDS. HORIZONTAL STEREO WITH A MINIMUM BASE OF 1 M WILL BE REQUIRED.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGY EXPERIMENT NSSDC ID VIKNG-A-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.L.	HESS	FLORIDA STATE U	TALLAHASSEE, FL
OI - C.B.	LEOVY	U OF WASHINGTON	SEATTLE, WA
OI - R.M.	HENRY	NASA-LARC	HAMPTON, VA
OI - J.	RYAN	WMO	GENEVA, SWITZERLAND
OI - V.P.	KUETTNER	NOAA	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND OBTAIN INFORMATION ABOUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED ARE PRESSURE, TEMPERATURE, WIND VELOCITY, AND WATER VAPOR CONTENT OF THE MARTIAN ATMOSPHERE. DIURNAL AND TEMPORAL VARIATIONS OF THE PARAMETERS WILL BE OF PARTICULAR IMPORTANCE. PRESSURE, TEMPERATURE, AND WIND VELOCITY ARE TO BE MEASURED AT LEAST EVERY TWO MIN. WATER VAPOR IS TO BE MEASURED AT LEAST EVERY TWO HR. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANDER LIFETIME. THE SENSORS MAY BE MOUNTED ON STRUCTURES ALREADY AVAILABLE, SUCH AS FOOTPADS, ANTENNA MASTS, IMAGERY MASTS, OR THE SAMPLER ARM.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEISMOLOGY NSSDC ID VIKNG-A-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.L.	ANDERSON	CAL TECH	PASADENA, CA
OI - F.F.	PRESS	MIT	CAMBRIDGE, MA
OI - M.N.	TOKSOZ	MIT	BOSTON, MA
OI - G.	SUTTON	U OF HAWAII	HONOLULU, HI
OI - R.L.	KOVACH	STANFORD U	PALO ALTO, CA
OI - G.V.	LATHAM	U OF TEXAS	GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOMETRY INVESTIGATION WILL DETERMINE THE SEISMIC BACKGROUND AND EVENT ACTIVITY OF MARS. THREE PERPENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER AS BROAD A FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE BAND 0.05 TO 10 HZ). THE RESOLUTION WILL BE 50 MILLIMICRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ, WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY NARROW BAND FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOMETER CAN BE MOUNTED EITHER IN THE EQUIPMENT AREA OF THE LANDER, ON A FOOTPAD, OR REMOTELY DEPLOYED. REMOTE DEPLOYMENT WILL BE THE PREFERRED MODE. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 5 DEG IN BOTH AZIMUTH AND ELEVATION. IF THE SENSOR IS ATTACHED TO THE LANDER, TRANSMISSIBILITY OF THE LANDER SHOULD BE GREATER THAN 0.8 FOR FREQUENCIES LESS THAN 10 HZ AND THERE SHOULD BE NO UNDAMPED RESONANCES LESS THAN APPROXIMATELY 10 HZ.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY NSSDC ID VIKNG-A-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - C.A. BARTH U OF COLORADO BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, TO BE MOUNTED ON THE LANDER VEHICLE, IS DESIGNED TO MEASURE THE AMOUNT OF 2500-A AND 3400-A UV RADIATION THAT REACHES THE MARTIAN SURFACE TO DETERMINE WHETHER ATMOSPHERIC FILTERING IS DUE TO A MOLECULAR ABSORBER OR PARTICLE SCATTERING. THE DETECTOR WILL BE A TWO-CHANNEL UV PHOTOMETER WITH 100-A BANDWIDTH FILTERS FOR BOTH CHANNELS, AND A FIELD OF VIEW OF 10 DEG BY 10 DEG. THE DETECTOR WILL POINT WITHIN 30 DEG OF THE LANDER VEHICLE. BOTH CHANNELS WILL BE SAMPLED EVERY 8 MIN.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC PROPERTIES NSSDC ID VIKNG-A-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - R.B. HARGRAVES PRINCETON U PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS, WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNETS FOR SAMPLING.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RADIO COMMUNICATION AND RADAR LANDING SYSTEMS PLUS X BAND NSSDC ID VIKNG-A-14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.H.	MICHAEL, JR.	NASA-LARC	HAMPTON, VA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA
OI - M.E.	DAVIES	RAND CORP	SANTA MONICA, CA
OI - G.S.	LEVY	NASA-JPL	PASADENA, CA
OI - D.L.	CAIN	NASA-JPL	PASADENA, CA
OI - M.	GRUSSI	RAYTHEON CORP	SUDBURY, MA
OI - G.L.	TYLER	STANDFORD U	STANDFORD, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL UTILIZE THE LANDER-TO-EARTH AND ORBITER-TO-EARTH S-BAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAPABILITIES). THE LANDER-TO-ORBITER UHF RELAY LINK, THE RADAR ALTIMETER, THE TERMINAL DESCENT LANDING RADAR, AND THE ORBITER-TO-EARTH X-BAND DOWNLINK. THE RESULTING DATA WILL BE USED TO DETERMINE THE MARTIAN GRAVITATIONAL FIELD, AXIS OF ROTATION, EPHEMERIS, FIGURE, ATMOSPHERE, STRUCTURE, IONOSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE

LANDER LOCATION. IN RELATIVITY STUDIES. TO STUDY THE INTERPLANETARY MEDIUM. AND. IF CONDITIONS PERMIT. TO STUDY THE SOLAR CORONA.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- VIKING-B NSSDC ID VIKNG-B
ALTERNATE NAMES- PL-7338

PLANNED LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT IN ORBIT- 3216. KG

LAUNCH SITE- CAPE KENNEDY. UNITED STATES LAUNCH VEHICLE- TITAN-CENT

FUNDING AGENCY
UNITED STATES NASA-OSSA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- MARSCENTRIC ORBIT PERIOD- 1476. MIN
APOAPSIS- 36410. KM ALT PERIAPSIS- 4410. KM ALT INCLINATION- DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER. PS=PROJECT SCIENTIST)
PM - D.J. MARTIN NASA-LARC HAMPTON. VA

SPACECRAFT BRIEF DESCRIPTION
THE VIKING SPACECRAFT WILL CONSIST OF AN ORBITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF ORBITING MARS IN A HIGHLY ECCENTRIC. ELLIPTICAL ORBIT. A LANDER WILL BE SEPARATED. WILL ENTER THE MARTIAN ATMOSPHERE. AND SOFT-LAND ON THE SURFACE. ORBITAL. ENTRY. AND SCIENCE DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SPIN-STABLIZED. SOLAR-CELL-POWERED SATELLITE. THE ORBITER AND LANDER BOTH WILL HAVE A 90-DAY LIFE EXPECTANCY. THERE WILL BE A 500-W POWER CAPACITY FOR THE ORBITER AND A 700-W CAPACITY FOR THE LANDER. SCIENTIFIC AND PHOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 125 LB FOR THE ORBITER AND 70 LB FOR THE LANDER.

ON 12/00/69. THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IMAGERY ORBITER NSSDC ID VIKNG-B-01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. OI=OTHER INVESTIGATOR)

PI - M.	CARR	US GEOLOGICAL SURVEY	MENLO PARK. CA
OI - W.A.	BAUM	LOWELL OBSERVATORY	FLAGSTAFF. AZ
OI - H.	MASURSKY	US GEOLOGICAL SURVEY	FLAGSTAFF. AZ
OI - D.U.	WISE	U OF MASSACHUSETTS	AMHERST. MA
OI - B.H.	BRIGGS	U OF ADELAIDE	ADELAIDE. AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION WILL BE TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS. TO MONITOR THE REGION SURROUNDING THE LANDER. AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESOLUTION OF THE ORBITER IMAGING SYSTEM WILL BE 30 METERS PER LINE OR BETTER AT A REFERENCE

ALTITUDE OF 1000 KM WITH IMAGE SMEARING FROM ORBITER MOTION TO BE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION, IT WILL BE REQUIRED TO COVER COMPLETELY WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40 KM CROSS-TRACK BY 500 KM DOWN-TRACK ON A SINGLE ORBITAL PASS FROM THE NEAR-PERIAPSIS PORTION OF THE ORBIT. THE NEAR-PERIAPSIS COVERAGE REQUIREMENT AFTER LANDER SEPARATION WILL BE TO OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RADIUS, CENTERED ON THE LANDER, ON A SINGLE ORBITAL PASS. THE CAPABILITIES PROVIDED TO ACCOMPLISH THE ABOVE REQUIREMENTS WILL BE UTILIZED TO ACCOMPLISH THE OTHER CITED PURPOSES. TO OBTAIN BOTH BROAD-AREA AND HIGH-RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE OBTAINABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 100 TO 1, AND THE SENSITIVITY WILL BE SUFFICIENT TO OBTAIN PICTURES AS CLOSE TO THE TERMINATOR AS PRACTICAL, USING THREE COLOR FILTERS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR RADIOMETRY -- THERMAL MAPPING NSSDC ID VIKNG-B-02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.H.	KIEFFER	U OF CALIFORNIA, LA	LOS ANGELES, CA
OI - G.	MUNCH	CAL TECH	PASADENA, CA
OI - E.D.	MINER	NASA-JPL	PASADENA, CA
OI - G.	NEUGEBAUER	CAL TECH	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE INFRARED RADIOMETRY EXPERIMENT WILL BE TO OBTAIN SURFACE TEMPERATURE DATA FROM MARS TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS, TO MONITOR THE REGIONS SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RADIOMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE TEMPERATURE RESOLUTION WILL BE AT LEAST PLUS OR MINUS 1 DEG K AT 200 DEG K AND THE MEASUREMENT RANGE WILL BE 150 TO 300 DEG K. AT A REFERENCE ALTITUDE OF 1000 KM, THE SPATIAL RESOLUTION WILL BE 10 KM SQ OR BETTER AFTER THE LANDER HAS SEPARATED FROM THE ORBITER.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAPOR MAPPING NSSDC ID VIKNG-B-03

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.B.	FARMER	NASA-JPL	PASADENA, CA
OI - D.	LAPORTE	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETRY EXPERIMENT WILL BE TO DETERMINE THE HORIZONTAL DISTRIBUTION OF WATER VAPOR TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FOR FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED SPECTROMETER WILL BE BORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE 0.05 TO 1.0 MM PRECIPITABLE WATER WITH A RESOLUTION OF AT LEAST 0.01 MM AT 0.2 MM. THE SPATIAL RESOLUTION WILL

BE 20 KM SQ OR LESS AFTER LANDER SEPARATION.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION NSSDC ID VIKNG-B-04

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - M.B.	MCELROY	KITT PEAK NATL OBS	TUSCON, AZ
OI - W.B.	HANSON	U OF TEXAS	DALLAS, TX
OI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE VIKING ENTRY ATMOSPHERIC COMPOSITION EXPERIMENT IS DESIGNED TO PROVIDE THE COMPOSITION DATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE. A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER, MOUNTED IN AN OPENING IN THE AEROSHELL WITH ITS ELECTRON IMPACT 'OPEN' ION SOURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL, WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL OBTAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES, SPECIFICALLY FOR BOTH ATOMIC AND MOLECULAR OXYGEN, CARBON MONOXIDE, AND CARBON DIOXIDE. TWO COLLECTORS WILL BE USED, ONE FOR THE MASS RANGE FROM 1 TO 7 AMU, AND THE OTHER SIMULTANEOUSLY MEASURING IN THE MASS RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEEPING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEP PERIOD WILL BE APPROXIMATELY 5 SEC, AND A DYNAMIC RANGE OF 10 TO THE 5 POWER WILL BE PROVIDED WITHIN EACH SPECTRUM. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE IONOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE, WHICH IS MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE GRID AND COLLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID. ONE RAMP WILL COVER THE VOLTAGE RANGE FROM -75 V TO 0 V (IN ABOUT 1 SEC), WHICH WILL BE USED TO MEASURE SOLAR WIND ELECTRONS AND IONOSPHERIC PHOTOELECTRONS, ONE FROM -3 V TO 0 V (IN ABOUT 1 SEC), WHICH WILL BE USED TO MEASURE ELECTRON TEMPERATURE IN THE IONOSPHERE, AND THE LAST FROM +20 V TO 0 V (IN ABOUT 2 SEC), WHICH WILL BE USED TO PROVIDE ION TEMPERATURE AND ION CONCENTRATIONS DATA. MORE EXPERIMENT DETAILS CAN BE FOUND IN, 'ENTRY SCIENCE EXPERIMENT FOR VIKING 1975,' ICARUS, VOL 16, PG 74-91, 1972, BY A. O. NIER, ET AL.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ATMOSPHERIC STRUCTURE NSSDC ID VIKNG-B-05

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - A.O.C.	NIER	U OF MINNESOTA	MINNEAPOLIS, MN
OI - M.B.	MCELROY	KITT PEAK NATL OBS	TUSCON, AZ
OI - W.B.	HANSON	U OF TEXAS	DALLAS, TX

OI - N.W.	SPENCER	NASA-GSFC	GREENBELT, MD
OI - A.	SEIFF	NASA-ARC	MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PARTICULAR ELEMENTS OF MARTIAN ATMOSPHERIC STRUCTURE TO BE DETERMINED WILL BE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE. THE MEASUREMENTS TO BE MADE TO DETERMINE THESE ATMOSPHERIC PARAMETERS ARE ACCELERATION, PRESSURE, AND TEMPERATURE. THE ACCELEROMETER OF THE GUIDANCE AND CONTROL SYSTEM MAY BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- BIOLOGY INVESTIGATION NSSDC ID VIKNG-B-06

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - H.P.	KLEIN	NASA-ARC	MOFFETT FIELD, CA
OI - J.	LEDERBERG	STANFORD U	PALO ALTO, CA
OI - A.	RICH	MIT	CAMBRIDGE, MA
OI - W.W.	VISHNIAC	U OF ROCHESTER	ROCHESTER, NY
OI - N.H.	HOROWITZ	NASA-JPL	PASADENA, CA
OI - V.I.	OYAMA	NASA-ARC	CHICAGO, IL
OI - G.V.	LEVIN	BIOSPHERICS INC	ROCKVILLE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF 4 PARTS. IT WILL MEASURE -- (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE, (2) THE CARBON DIOXIDE RELEASED FROM PREVIOUSLY FIXED CARBON DIOXIDE, (3) THE CARBON DIOXIDE RELEASED FROM ADDED ORGANIC COMPOUNDS, AND (4) THE LIGHT SCATTERED FROM A LIQUID SAMPLE, AS A MEASURE OF THE INCREASE IN PARTICLES.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MOLECULAR ANALYSIS NSSDC ID VIKNG-B-07

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - K.	BIEMANN	MIT	CAMBRIDGE, MA
OI - H.C.	UREY	U OF CALIFORNIA, SD	SAN DIEGO, CA
OI - D.M.	ANDERSON	CRREL	LA JOLLA, CA
OI - T.C.	OWEN	ILLINOIS INST OF TECH	CHICAGO, IL
OI - J.	ORO	U OF HOUSTON	HOUSTON, TX
OI - L.E.	ORGEL	SALK INST BIOL STUDIES	SAN DIEGO, CA
OI - G.P.	SHULMAN	NASA-JPL	PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION WILL BE ANALYZE THE MARTIAN SURFACE FOR ITS ORGANIC CONTENT BY VAPORIZING MATERIAL ONTO A HIGH-EFFICIENCY GAS CHROMATOGRAPHIC COLUMN WHICH IN TURN WILL BE CONNECTED TO A FAST SCANNING (15 SEC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAPOR PRESSURE, AND ULTIMATELY TO DECOMPOSE PYROLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRADATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. IN ORDER TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER

SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE ORGANIC COMPOUND WHICH IS 1 PART PER HUNDRED MILLION (0.01 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12 TO 200 AMU, WITH UNIT RESOLUTION OR BETTER. THE RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION PYROLYSIS UP TO 500 DEG C IN TWO OR THREE PRESCRIBED STEPS OF 30 SECONDS. PROVISIONS HAVE TO BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 5 TO 10 PERCENT OF SAMPLE WEIGHT) DOES NOT IMPAIR THE FUNCTION OF THE MASS SPECTROMETER. THIS MAY BE ACCOMPLISHED BY VENTING THE EXCESS GAS BEFORE IT REACHES THE MASS SPECTROMETER. EIGHT DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 90 DAYS OF THE MISSION COVERING DIURNAL AND SEASONAL CHANGES WILL BE STUDIED. THE ORGANIC INVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE OPERATION OF THE ATMOSPHERIC ANALYSES REQUIRED DURING THE FIRST THREE DAYS. A SEPARATE DETECTOR AT THE OUTPUT OF THE GAS CHROMATOGRAPH AND A CARRIER GAS SEPARATOR WILL BE PROVIDED. THE DETECTOR WILL PROVIDE ADDITIONAL CHROMATOGRAPHIC DATA THAT WILL BE HELPFUL IN INTERPRETING THE MASS SPECTRA.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SOIL WATER NSSDC ID VIKNG-B-08

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.W.	SHORTHILL	BOEING SCI RSCH LABS	SEATTLE, WA
OI - H.J.	MOORE	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI - R.F.	SCOTT	CAL TECH	PASADENA, CA
OI - R.E.	HUTTON	TRW SYSTEMS GROUP	REDONDO BEACH, CA.

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SOIL WATER EXPERIMENT INVESTIGATION WILL BE TO DETERMINE THE AMOUNTS AND FORMS OF OCCURRENCE OF FREE AND BOUND WATER IN SOIL SAMPLES OBTAINED FROM TWO DEPTH RANGES, 0 TO 5 CM AND 5 TO 10 CM. THREE SAMPLES WILL BE ANALYZED AND, IF POSSIBLE, ONE ANALYSIS WILL BE CONDUCTED BEFORE AND ONE AFTER THE WAVE OF DARKENING. THE METHOD OF DETERMINATION WILL BE SCANNING CALORIMETRY FROM AMBIENT TEMPERATURE (AS LOW AS POSSIBLE) TO AS HIGH AS POSSIBLE UP TO 750 DEG C, WITH DETERMINATION OF EFFLUENT WATER A REQUIREMENT. THE RATE OF TEMPERATURE SCAN SHOULD BE SLOW ENOUGH TO DISTINGUISH ENDOTHERMS IN A RATIO OF 1 TO 7 IN THE FIRST 30 DEG OF SAMPLE TEMPERATURE RISE. THE SAMPLE WILL CONTAIN LESS THAN ONE PART PER 10 MILLION OF WATER RELEASED FROM THE LANDER. IF FROZEN WATER EXISTS IN THE SOIL, IT WILL BE MAINTAINED SOLID UNTIL INITIATION OF THE ANALYSIS.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- FACSIMILE CAMERA NSSDC ID VIKNG-B-09

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - T.A.	MUTCH	BROWN U	PROVIDENCE, RI
OI - C.	SAGAN	CORNELL U	ITHACA, NY
OI - A.B.	BINDER	ILLINOIS INST OF TECH	CHICAGO, IL
OI - E.C.	MORRIS	US GEOLOGICAL SURVEY	FLAGSTAFF, AZ
OI - A.	YOUNG	NASA-JPL	PASADENA, CA
OI - F.O.	HUCK	NASA-LARC	HAMPTON, VA
OI - E.C.	LEVINTHAL	STANFORD U	PALO ALTO, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE TV IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANDING SITE, PROVIDING DATA WITH BIOLOGICAL, GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESOLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG WITH A CAPABILITY OF OBTAINING A COMPLETE 360-DEG HORIZONTAL PANORAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW (OUTER EDGE OF FIELD-OF-VIEW) THE HORIZONTAL PLANE OF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 3-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.5 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND THE ENTIRE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF OBTAINING VISUAL COLOR IMAGERY. PROVISION WILL BE MADE FOR POSSIBLE LATER MODIFICATION TO OPERATE IN THREE SPECTRAL BANDS. HORIZONTAL STEREO WITH A MINIMUM BASE OF 1 M WILL BE REQUIRED.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- METEOROLOGY EXPERIMENT NSSDC ID VIKNG-B-10

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - S.L.	HESS	FLORIDA STATE U	TALLAHASSEE, FL
OI - C.B.	LEOVY	U OF WASHINGTON	SEATTLE, WA
OI - R.M.	HENRY	NASA-LARC	HAMPTON, VA
OI - J.	RYAN	WMO	GENEVA, SWITZERLAND
OI - V.P.	KUETTNER	NOAA	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE METEOROLOGICAL EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND OBTAIN INFORMATION ABOUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED WILL BE PRESSURE, TEMPERATURE, WIND VELOCITY, AND WATER VAPOR CONTENT OF THE MARTIAN ATMOSPHERE. DIURNAL AND TEMPORAL VARIATIONS OF THE PARAMETERS WILL BE OF PARTICULAR IMPORTANCE. PRESSURE, TEMPERATURE, AND WIND VELOCITY WILL BE MEASURED AT LEAST EVERY 2 MIN. WATER VAPOR WILL BE MEASURED AT LEAST EVERY 2 HR. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANDER LIFETIME. THE SENSORS MAY BE MOUNTED ON STRUCTURES ALREADY AVAILABLE SUCH AS FOOTPADS, ANTENNA MASTS, IMAGERY MASTS, OR THE SAMPLER ARM.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- SEISMOLOGY NSSDC ID VIKNG-B-11

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - D.L.	ANDERSON	CAL TECH	PASADENA, CA
OI - F.	PRESS	MIT	CAMBRIDGE, MA
OI - M.N.	TOKSOZ	MIT	CAMBRIDGE, MA
OI - G.	SUTTON	U OF HAWAII	HONOLULU, HI
OI - R.L.	KOVACH	STANDFORD U	PALO ALTO, CA
OI - G.V.	LATHAM	U OF TEXAS	GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOMETRY INVESTIGATION WILL BE TO DETERMINE THE SEISMIC BACKGROUND AND EVENT ACTIVITY OF MARS. THREE PERPENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER AS BROAD A FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE BAND 0.05 TO 10 HZ). THE RESOLUTION WILL BE 50 MILLIMICRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ, WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY NARROW-BAND FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOMETER CAN BE MOUNTED EITHER IN THE EQUIPMENT AREA OF THE LANDER, ON A FOOTPAD, OR REMOTELY DEPLOYED. REMOTE DEPLOYMENT WILL BE THE PREFERRED MODE. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 5 DEG IN BOTH AZIMUTH AND ELEVATION. IF THE SENSOR IS ATTACHED TO THE LANDER, TRANSMISSIBILITY OF THE LANDER SHOULD BE GREATER THAN 0.8 FOR FREQUENCIES LESS THAN 10 HZ AND THERE SHOULD BE NO UNDAMPED RESONANCES LESS THAN APPROXIMATELY 10 HZ.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY NSSDC ID VIKNG-B-12

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - C.A.	BARTH	U OF COLORADO	BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, TO BE MOUNTED ON THE LANDER VEHICLE, IS DESIGNED TO MEASURE THE AMOUNT OF 2500-A AND 3400-A UV RADIATION THAT REACHES THE MARTIAN SURFACE, TO DETERMINE WHETHER ATMOSPHERIC FILTERING IS DUE TO A MOLECULAR ABSORBER OR PARTICLE SCATTERING. THE DETECTOR WILL BE A TWO-CHANNEL UV PHOTOMETER WITH 100-A BANDWIDTH FILTERS FOR BOTH CHANNELS, AND A FIELD OF VIEW OF 10 DEG BY 10 DEG. THE DETECTOR WILL POINT WITHIN 30 DEG OF THE LANDER VEHICLE. BOTH CHANNELS WILL BE SAMPLED EVERY 8 MIN.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- MAGNETIC PROPERTIES NSSDC ID VIKNG-B-13

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - R.B.	HARGRAVES	PRINCETON U	PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS, WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNETS FOR SAMPLING.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- RADIO COMMUNICATION AND RADAR LANDING SYSTEMS PLUS X BAND NSSDC ID VIKNG-B-14

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)

PI - W.H.	MICHAEL, JR.	NASA-LARC	HAMPTON, VA
OI - I.I.	SHAPIRO	MIT	CAMBRIDGE, MA
OI - G.	FJELDBO	NASA-JPL	PASADENA, CA

CI - M.E.	DAVIES	RAND CORP	SANTA MONICA, CA
OI - G.S.	LEVY	NASA-JPL	PASADENA, CA
OI - D.L.	CAIN	NASA-JPL	PASADENA, CA
CI - M.	GROSSI	RAYTHEON CORP	SUDBURY, MA
OI - G.L.	TYLER	STANFORD U	STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE LANDER-TO-EARTH AND ORBITER-TO-EARTH S-BAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAPABILITIES), THE LANDER-TO-ORBITER UHF RELAY LINK, THE RADAR ALTIMETER, THE TERMINAL DESCENT LANDING RADAR, AND THE ORBITER-TO-EARTH X-BAND DOWNLINK. THE RESULTING DATA WILL BE USED TO DETERMINE THE MARTIAN GRAVITATIONAL FIELD, AXIS OF ROTATION, EPHEMERIS, FIGURE, ATMOSPHERE, STRUCTURE, IONOSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE LANDER LOCATION, IN RELATIVITY STUDIES, TO STUDY THE INTERPLANETARY MEDIUM, AND, IF CONDITIONS PERMIT, TO STUDY THE SOLAR CORONA.

ON 12/00/69, THE SPACECRAFT MISSION WAS APPROVED.

****

SPACECRAFT COMMON NAME- X-4 NSSDC ID X-4
ALTERNATE NAMES- UK X-4

PLANNED LAUNCH DATE- 02/28/74 SPACECRAFT WEIGHT IN ORBIT- 90. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES LAUNCH VEHICLE- SCOUT

FUNDING AGENCY

MAS
COPTRC+IC

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 90. MIN
APOAPSIS- 750. KM ALT PERIAPSIS- 750. KM ALT INCLINATION- 98. DEG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.	TALBOT	NASA-LARC	LANGLEY FIELD, VA
PM - R.	STANIFORTH	HAWKER-SIDDELEY	STEVENAGE, ENGLAND

SPACECRAFT BRIEF DESCRIPTION

THE X-4 SATELLITE WILL BE THE SECOND TECHNOLOGICAL SATELLITE OF THE BRITISH SPACE PROGRAM WHEN IT IS PLACED IN A LOW (500 KM), CIRCULAR, SUN-SYNCHRONOUS ORBIT IN 1974 BY A NASA SCOUT LAUNCH VEHICLE. THE SPACECRAFT WILL BE PART OF BRITIAN'S CONTRIBUTION TO GARP AND THE WORLD WEATHER WATCH PROGRAM FOR THE 1970'S. PRIMARILY AN EXPERIMENTAL METEOROLOGICAL SATELLITE, THE X-4 SPACECRAFT WILL ALSO TEST THE FEASIBILITY OF USING A PROPANE GAS JET SYSTEM FOR HIGH ACCURACY (0.02 TO 0.1 DEG) TRIAXIAL ATTITUDE CONTROL. THE SPACECRAFT WILL TENTATIVELY CARRY TWO METEOROLOGICAL EXPERIMENTS -- A HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER AND A LOW-RESOLUTION EARTH ALBEDO RADIOMETER. THE SATELLITE WILL BE IN THE FORM OF A BOX, 80.5 CM HIGH WITH A SQUARE BASE 65.0 CM ON A SIDE. MOUNTED ON THE SATELLITE BASE FACING EARTHWARD WILL BE (1) THE IR RADIOMETER, (2) THE EARTH ALBEDO SENSOR, (3) THE ALBEDO HORIZON DETECTORS, (4) A LIGHT, INEXPENSIVE CANOPUS STAR SENSOR, (5) A COARSE SUN SENSOR ARRAY, (6) A TWO-AXIS FINE SUN SENSOR, AND (7) FOUR VHF AERIALS, ATTACHED TO EITHER SIDE OF THE BOX STRUCTURE WILL BE FLEXIBLE

DEPLOYABLE SOLAR PANELS WITH WRAPAROUND CONTACT SOLAR CELLS. THESE PANELS, WHICH WILL HAVE CONSIDERABLE STRETCH CAPABILITY, WILL BE STOWED IN CONCERTINA FASHION WITH INTERLEAVING STRIPS TO AVOID VIBRATIONAL DAMAGE DURING LAUNCH. THEY WILL BE DEPLOYED AFTER LAUNCH AND WILL MEASURE 256 CM FROM ONE PANEL TO THE OTHER. LOCATED WITHIN THE BOX-SHAPED SPACECRAFT WILL BE -- (1) A FOUR-TRACK TAPE RECORDER WITH 1.6 MILLION BITS OF STORAGE CAPACITY, (2) STRAPPED-DOWN INTEGRATING GYROS, (3) A BATTERY, (4) A DATA ENCODER AND PROGRAMMER/ROUTER, AND (5) VARIOUS SENSOR AND ATTITUDE CONTROL ELECTRONICS. THE X-4 SATELLITE WILL GENERATE ABOUT 400 KILOBITS OF INFORMATION PER ORBIT. DATA WILL BE RECORDED ON THE ONBOARD TAPE RECORDER AT 64 BITS/SEC AND REPLAYED FROM THE RECORDER OR TRANSMITTED DIRECTLY AT 2048 BITS/SEC AT 137 MHZ. THE SATELLITE SPIN RATE WILL BE LOWERED AFTER SEPARATION BY CONVENTIONAL YO-YO TECHNIQUES AND THEN BROUGHT TO NEAR ZERO BY THE PRIME GAS JET SYSTEM.

ON 00/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER NSSDC ID X-4 -01

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER BEING PLANNED FOR THE X-4 SATELLITE WILL BE SIMILAR TO THE OXFORD/HERIOT-WATT TYPE RADIOMETER USED IN THE NIMBUS PROGRAM.

ON 00/00/72, THE SPACECRAFT MISSION WAS APPROVED.

EXPERIMENT NAME- EARTH ALBEDO RADIOMETER NSSDC ID X-4 -02

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE EARTH ALBEDO RADIOMETER DESIGNED FOR THE X-4 SATELLITE WILL BE A LOW-RESOLUTION INFRARED SENSOR CAPABLE OF MEASURING THE GLOBAL DISTRIBUTION OF REFLECTED SOLAR AND LONG WAVE RADIATION LEAVING THE EARTH'S ATMOSPHERE.

ON 00/00/72, THE SPACECRAFT MISSION WAS APPROVED.

Indexes

SECTION 3 - INDEXES FOR ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

Sequential Listing of Spacecraft and Experiments

Sequential Listing of Spacecraft and Experiments

The following pages contain a list of the names for all spacecraft and experiments included in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report. The order of these names is chronological, by spacecraft launch date (corresponding to NSSDC ID Code), for the active spacecraft. The planned spacecraft listing immediately follows the active spacecraft listing and is in alphabetical order by NSSDC ID Code (usually a contraction of the spacecraft common name). The order of these entries is as given in Sections 1 and 2. Each name is followed by the NSSDC ID Code and page number on which the spacecraft or experiment is described in this Report.

Spacecraft Name Index

Spacecraft Name Index

The following index lists all spacecraft described in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report in alphabetical order by common name and alternate names. For each alternate name, the common name is also given. Each spacecraft name entry is followed by the NSSDC ID Code and the page number on which the spacecraft is described in this Report.

SPACECRAFT NAME

PRECEDING PAGE BLANK NOT FILMED

Investigator Name Index

Investigator Name Index

The following index lists (in alphabetical order) the names of the principal and other investigators associated with each experiment described in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report. The current organizational affiliation of the investigator is also shown. Under each investigator's name is listed each of the experiment entries with which he is associated. Each experiment entry contains the spacecraft and experiment name, NSSDC ID Code, and the page number on which the experiment is described in this document.

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

INVESTIGATORS AND EXPERIMENTS

PAGE

Current Experiment Institution Index

Current Experiment Institution Index

The following list indicates those experiments from Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) associated with a given institution at the present time. The list is in alphabetical order by institution name. Each experiment associated with an institution is listed alphabetically by spacecraft common name under the name of the institution. Each experiment entry contains the spacecraft and experiment name, NSSDC ID Code, and the page number on which the experiment is described in this document.

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

PAGE

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

PAGE

NASA-GSFC

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

CURRENT EXPERIMENT INSTITUTION

Phenomenon Measured Indexes

Phenomenon Measured Indexes

General Description

The Phenomenon Measured Indexes consist of (1) bar graphs showing the operational history of fields and particles experiments and (2) listings of experiments by phenomenon measured. Both of these index displays were produced with the aid of an NSSDC automated set of experiment-level phenomenon measured keywords. The search and retrieval capability made possible by these keywords is available to the space science community, and a brief description of the keyword scheme follows. Detailed descriptions of the format and content of the two index displays appear on page 471 and page 497, respectively.

Keywords are assigned to a maximum of 10 separate modes of operation for each satellite experiment. These keywords (identified in the following paragraphs) describe (a) what is measured by a given experiment mode, (b) where the measurement is made (or for remote sensors, what objects are sensed), (c) when the measurement is made, and (d) the numerical ranges for a maximum of four characteristics of the measurement (e.g., particle energy).

a. What: A given experiment mode is considered to measure one of five basically different phenomena: (1) electromagnetic fields, (2) charged particles, (3) microscopic neutral particles, (4) macroscopic bodies, and (5) "other."

   1. Electromagnetic fields: In this category electric fields, magnetic fields, and electromagnetic radiation are separately identifiable. For electric and magnetic fields, the number of orthogonal components measured is specifiable; while for electromagnetic radiation (waves), the type (gamma rays through radio waves) and numerical frequency range of the measurement can be specified.

   2. Charged particles: For charged particles, species (e.g., protons, electrons) and an indication of the extent of species resolution can be specified. An indicator of spectral resolution, the numerical energy range, and flux directionality characteristics can all be specified.

   3. Microscopic neutral particles: Microscopic neutral particles may be molecules, atoms, or neutrons. Mass range and species resolution are specifiable, as is the measured characteristic (e.g., flux, density, pressure).

4. Macroscopic bodies: These keywords identify the body, the characteristic being measured (e.g., temperature, gravitational field), and the measurement technique (e.g., photography, seismic experiment).

5. Other: These keywords indicate whether the experiment is related to one of four categories: earth sciences, life sciences, material sciences, and spacecraft engineering and technology.

b. Where: For the earth's vicinity, space is subdivided as follows:

1. Earth and its lower atmosphere

2. Altitude between 65 and 3000 km. In this range, space is categorized in three separate latitude intervals.

3. The magnetosphere above 3000 km in six regions:

a. $L < 2\ R_E$
b. $2R_E < L < 6R_E$
c. $6R_E < L < 10R_E$
d. high polar ($L > 10\ R_E$, $R < 10\ R_E$)
e. magnetotail ($L > 10\ R_E$, $R > 10\ R_E$, nightside)
f. dayside magnetosheath and its boundaries

Interplanetary space is subdivided into cislunar and distant regions.

Major macroscopic bodies (sun, moon, individual planets) are specifiable as the location of measurements or as the source of remotely sensed electromagnetic radiation.

c. When: In describing when data are obtained in individual experiment modes, a series of up to five dates may be specified for a given experiment. Then for each of the four time intervals thus defined, the extent of data usefulness (nominal, less than nominal, useless) is specifiable for each mode.

This discussion of the experiment keyword scheme has been brief, but most of the capabilities have been mentioned. Further information on the capabilities and use of this system is available from NSSDC.

Bar Graphs of Fields and Particles Experiment Operational History

A. Bar Graphs of Fields and Particles Experiment Operational History

The operational history for charged particle and field experiments appearing in Sections 1 (Descriptions of Active Spacecraft and Experiments) and 2 (Descriptions of Planned Spacecraft and Experiments) of this Report are indexed by means of a series of bar graphs generated using the NSSDC automated file and Stromberg-Datagraphix 4060 plotter. The plots allow the user to determine quickly what fields and particles experiments are active or planned in a given energy range and/or in a given time interval. The plots also indicate the operational status of the experiments as a function of time.

The charged particle experiments are divided into three groups based on the region in which the observations were made:

1. Near-Earth (65 to 3000 km altitude)

2. Magnetosphere (above 3000 km altitude, including magnetosheath and magnetotail)

3. Interplanetary

The magnetic field experiments are also divided into two groups based on the region in which the observations were made:

1. Near-Earth - Magnetosphere (a combination of Groups 1 and 2 mentioned above)

2. Interplanetary

The electric field experiments are indexed together.

A title at the top of each plot indicates the type of observation made and the region of observation indexed. For charged particle index plots, the threshold energy (eV/nucleon) of the energy channel of observation of an experiment is plotted as a function of the experiment operational history (years). The operational history of an active experiment is indicated by using solid line segments over periods of normal operation, by using dashed line segments over periods when the operational performance was partial, and by using dotted line segments where the experiment was inoperable or at least was placed in an operational off mode. A short vertical tick mark below the line indicates when a status change occurred. Note that a maximum of only three intervals of operation can be displayed because of restrictions in the keywording scheme used in the NSSDC automated file. A given experiment may measure one or more particle species over one or more energy channels. More detailed operational information appears in the appropriate brief description in this Report. The planned spacecraft experiments have been arbitrarily assigned an estimated operational period of two years. Note that the threshold energy scale may be distorted to accommodate the information plotted. The energy tick marks are merely approximate indicators of threshold energy. A vertical dashed line bisects each bar graph at the date on which the graph was generated, to emphasize the distinction between active and planned experiments.

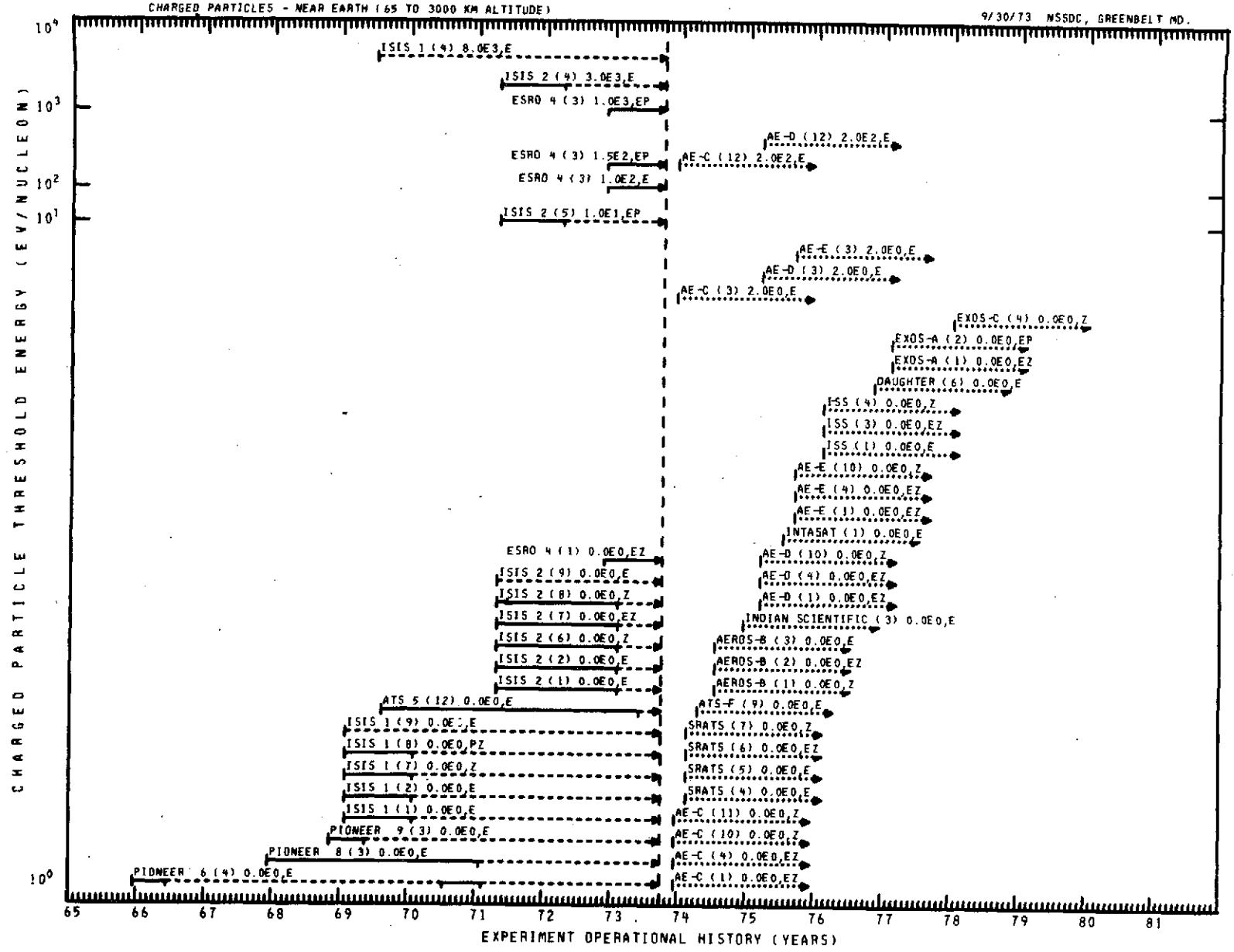
The caption above each plotted time period for the threshold energy channel of a given charged particle experiment shows the spacecraft common name, the experiment number in parentheses, the energy threshold of the energy channel in FORTRAN E format, e.g., 200. = 2.E2, and the species measured. The following code is used to describe the species measured:

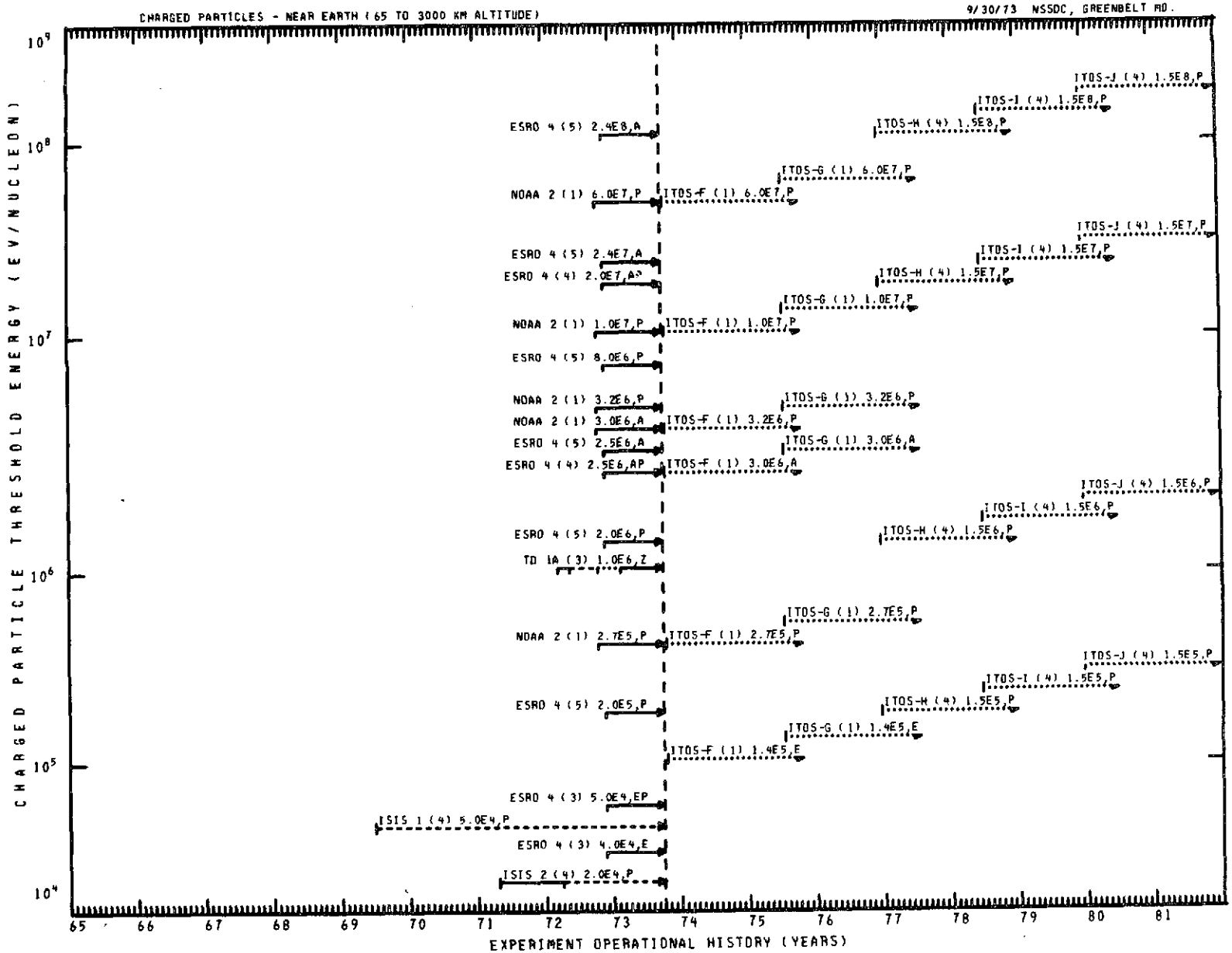
A = alpha particle
E = electron
P = proton
Z = other particles including deuterons, tritons, positrons, Z = 2 nuclei (not alpha particles), particles with Z > 2, and ions.

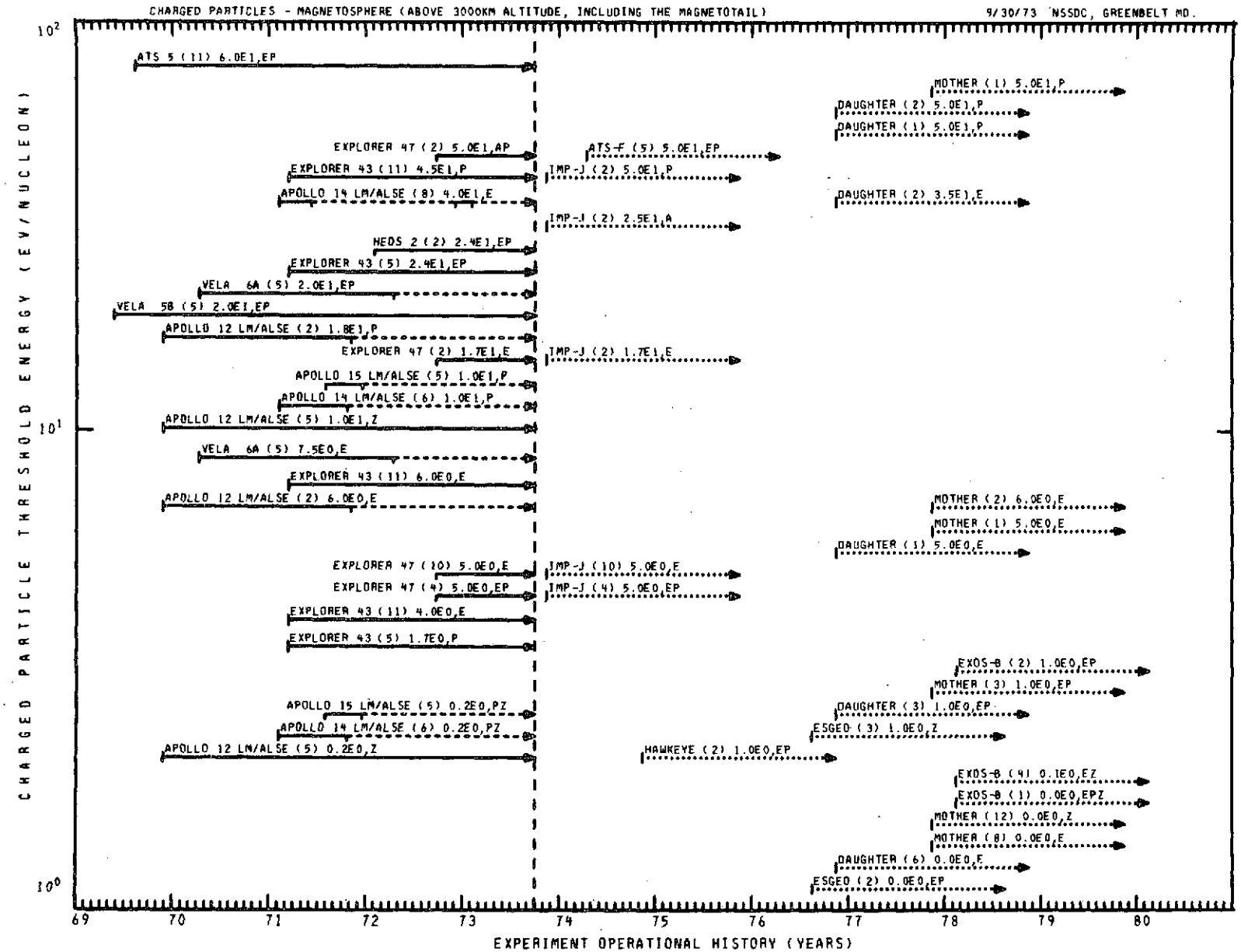
For example, the caption "PION 11 (2) 6.0E7, P" means that spacecraft Pioneer 11, experiment number 2, contains a proton energy channel with a threshold of 60 MeV/nucleon. Reference to the Spacecraft Name Index reveals this spacecraft has NSSDC ID Code 73-019A; therefore, the experiment has NSSDC ID Code 73-019A-02.

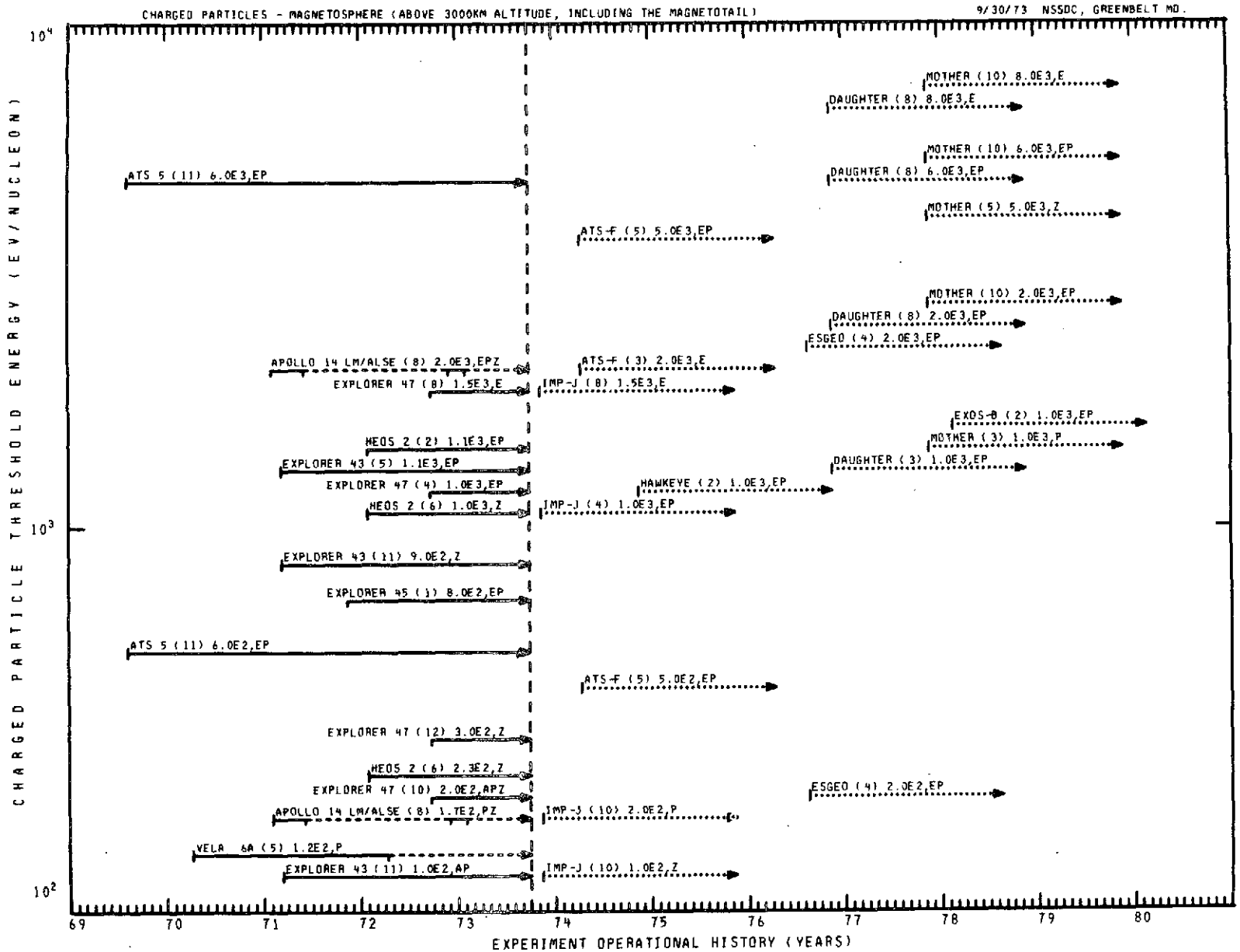
No attempt is made in this index to distinguish between directional and omnidirectional observations or to present the upper bound of the energy measurement. The appropriate brief description includes this information. Note that some experiment energy thresholds may not appear in the graphs because of the manner in which the energy ranges were keyworded in the NSSDC automated file. Note also that some thermal energy long-baseline electron measurements, e.g., experiment number 3 on Pioneers 8 and 9, appear under "Near-Earth" as well as "Interplanetary" because of assumptions made in analyzing the data.

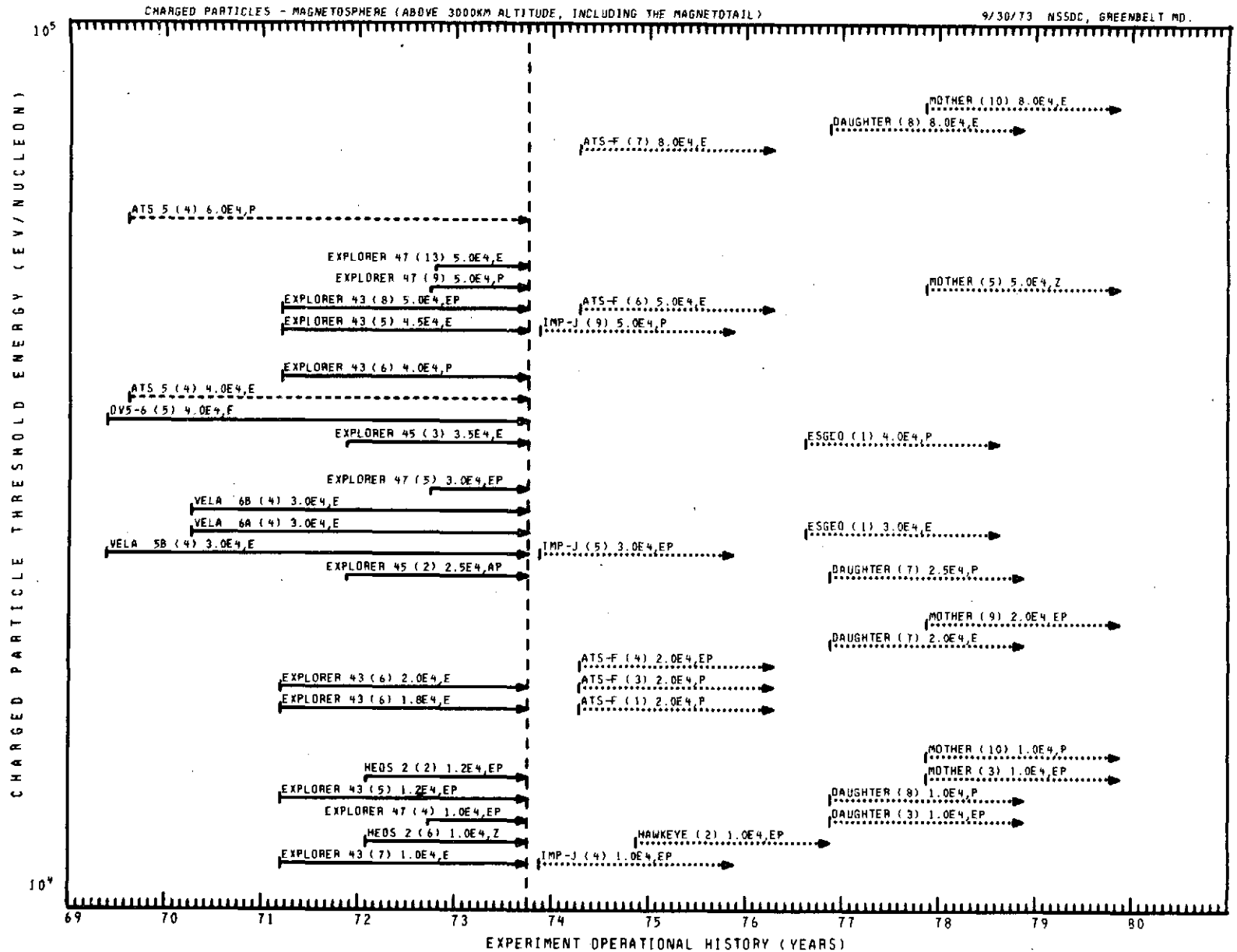
The experiment operational history of magnetic and electric field active and planned experiments is displayed on indexing plots similar to those of the charged particles, except that the experiments are ordered alphabetically along the vertical axis by spacecraft common name. Also, the caption above each plotted time period for a given experiment indicates only the spacecraft common name and experiment number. Note that the magnetic field plots include VLF experiments which measure the magnetic field component of electromagnetic radiation. Similarly, for the electric field plot, VLF experiments are included which measure the electric field component of electromagnetic radiation.

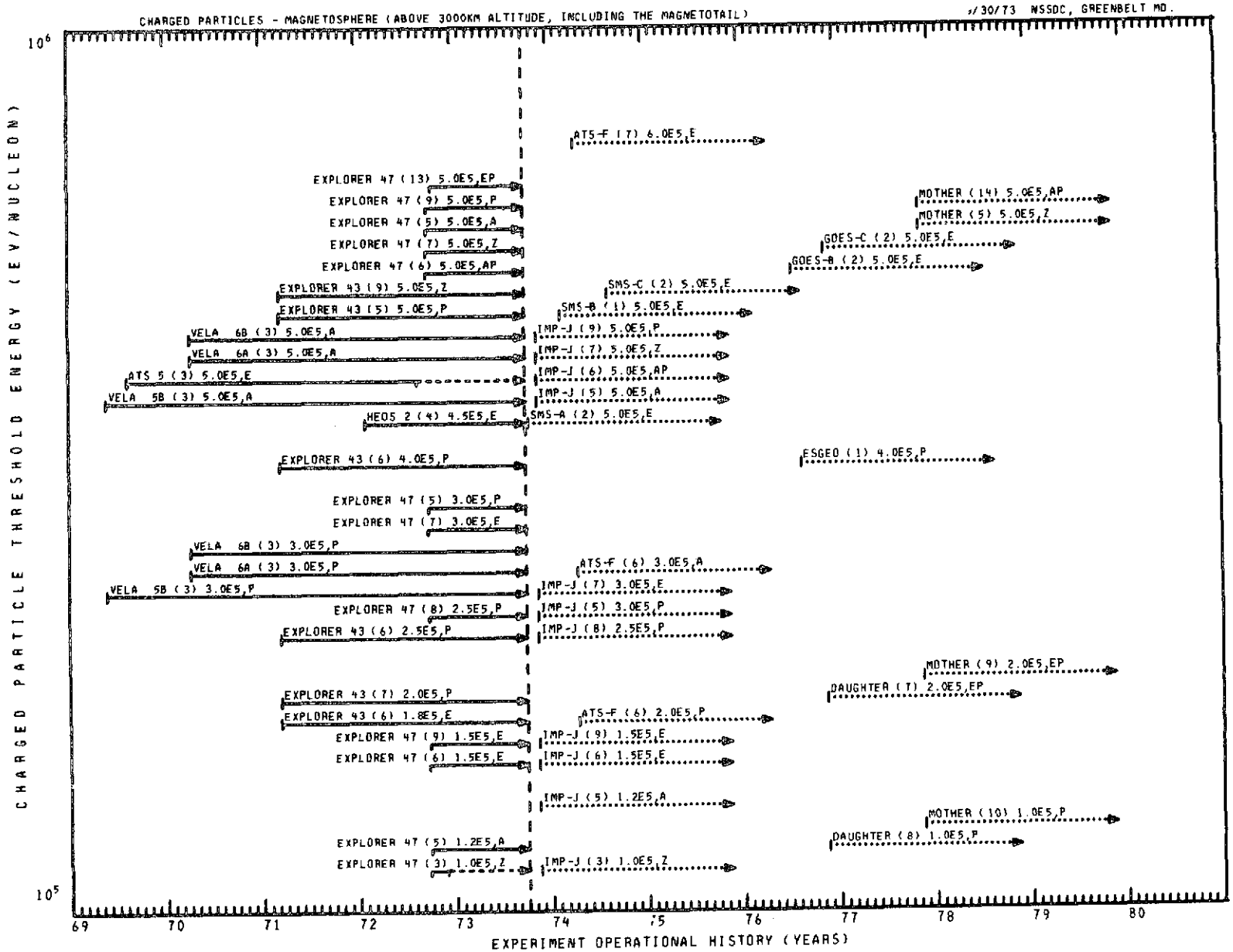


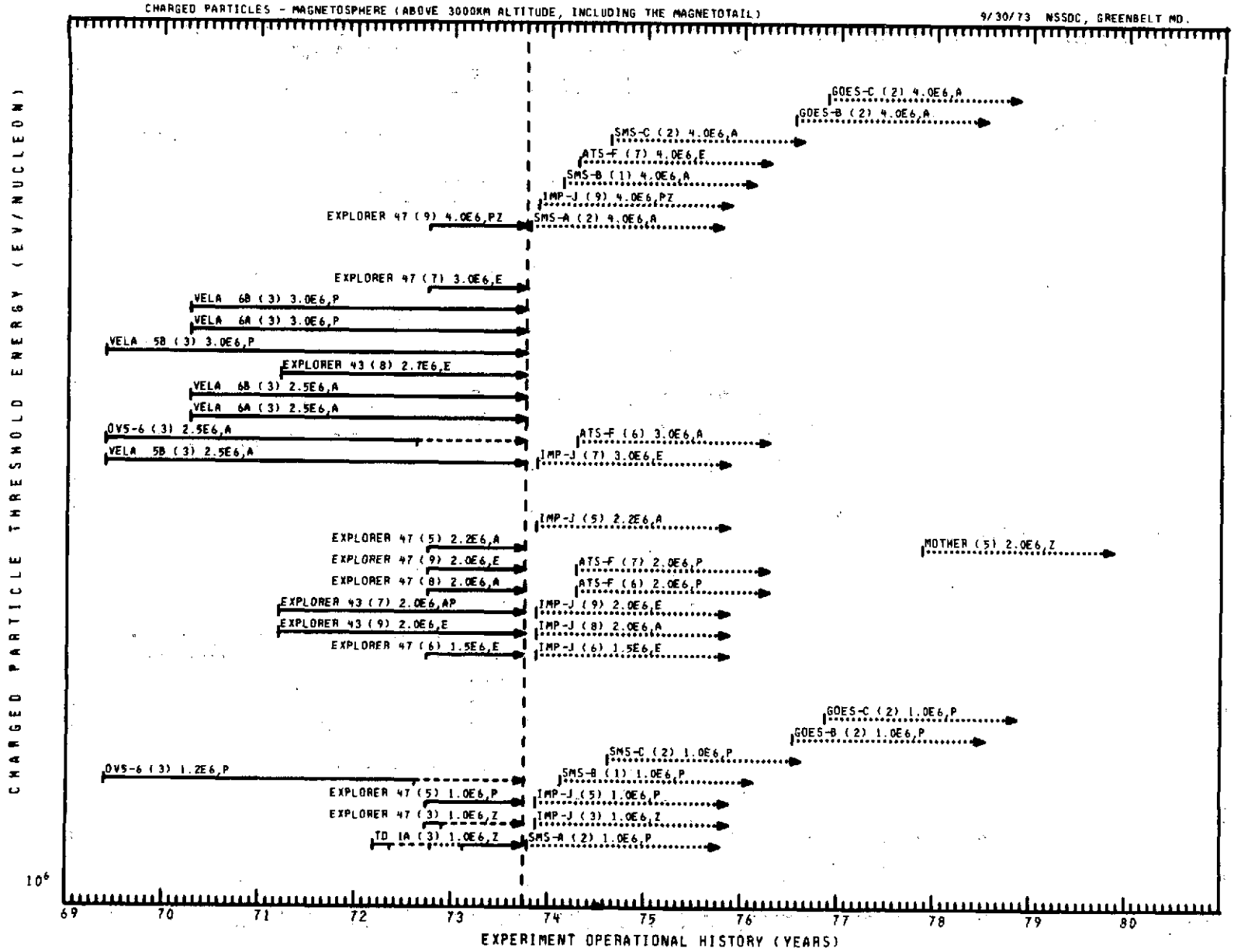

CHARGED PARTICLES - NEAR EARTH (65 TO 3000 KM ALTITUDE)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
EXPERIMENT OPERATIONAL HISTORY (YEARS)
ESRO 4 (5) 2.4E8,A
ITOS-J (4) 1.5E8,P
ITOS-I (4) 1.5E8,P
ITOS-H (4) 1.5E8,P
ITOS-G (1) 6.0E7,P
NOAA 2 (1) 6.0E7,P
ITOS-F (1) 6.0E7,P
ITOS-J (4) 1.5E7,P
ESRO 4 (5) 2.4E7,A
ITOS-I (4) 1.5E7,P
ESRO 4 (4) 2.0E7,A
ITOS-H (4) 1.5E7,P
ITOS-G (1) 1.0E7,P
NOAA 2 (1) 1.0E7,P
ITOS-F (1) 1.0E7,P
ESRO 4 (5) 8.0E6,P
NOAA 2 (1) 3.2E6,P
ITOS-G (1) 3.2E6,P
NOAA 2 (1) 3.0E6,A
ITOS-F (1) 3.2E6,P
ESRO 4 (5) 2.5E6,A
ITOS-G (1) 3.0E6,A
ESRO 4 (4) 2.5E6,AP
ITOS-F (1) 3.0E6,A
ITOS-J (4) 1.5E6,P
ITOS-I (4) 1.5E6,P
ESRO 4 (5) 2.0E6,P
ITOS-H (4) 1.5E6,P
TD 1A (3) 1.0E6,Z
ITOS-G (1) 2.7E5,P
NOAA 2 (1) 2.7E5,P
ITOS-F (1) 2.7E5,P
ITOS-J (4) 1.5E5,P
ITOS-I (4) 1.5E5,P
ESRO 4 (5) 2.0E5,P
ITOS-H (4) 1.5E5,P
ITOS-G (1) 1.4E5,E
ITOS-F (1) 1.4E5,E
ESRO 4 (3) 5.0E4,EP
ISIS 1 (4) 5.0E4,P
ESRO 4 (3) 4.0E4,E
ISIS 2 (4) 2.0E4,P

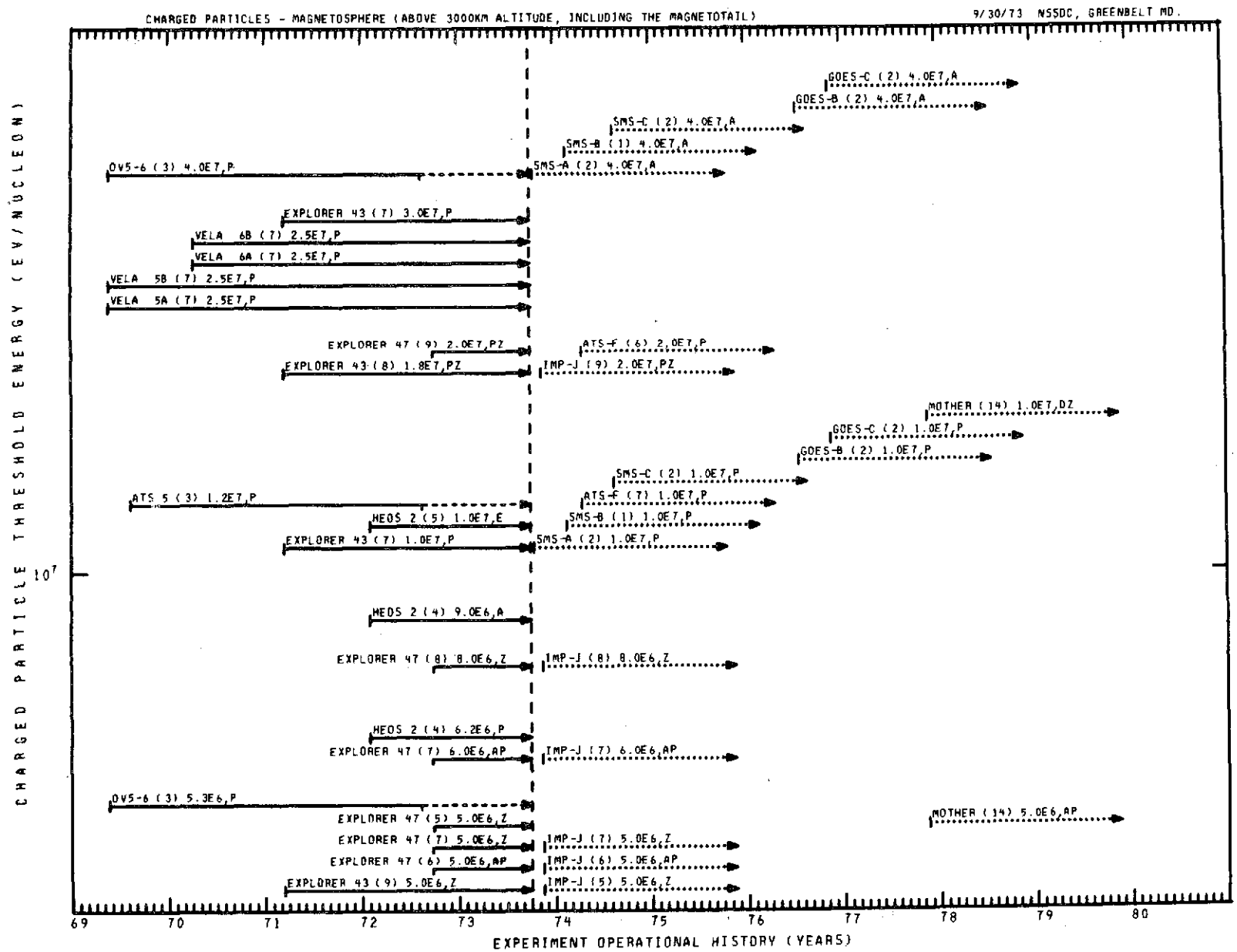

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^2
10^1
10^0
ATS 5 (11) 6.0E1,EP
EXPLORER 47 (2) 5.0E1,AP
EXPLORER 43 (11) 4.5E1,P
APOLLO 14 LM/ALSE (8) 4.0E1,E
MEDS 2 (2) 2.4E1,EP
EXPLORER 43 (5) 2.4E1,EP
VELA 6A (5) 2.0E1,EP
VELA 5B (5) 2.0E1,EP
APOLLO 12 LM/ALSE (2) 1.8E1,P
EXPLORER 47 (2) 1.7E1,E
APOLLO 15 LM/ALSE (5) 1.0E1,P
APOLLO 14 LM/ALSE (6) 1.0E1,P
APOLLO 12 LM/ALSE (5) 1.0E1,Z
VELA 6A (5) 7.5E0,E
EXPLORER 43 (11) 6.0E0,E
APOLLO 12 LM/ALSE (2) 6.0E0,E
EXPLORER 47 (10) 5.0E0,E
EXPLORER 47 (4) 5.0E0,EP
EXPLORER 43 (11) 4.0E0,E
EXPLORER 43 (5) 1.7E0,P
APOLLO 15 LM/ALSE (5) 0.2E0,PZ
APOLLO 14 LM/ALSE (6) 0.2E0,PZ
APOLLO 12 LM/ALSE (5) 0.2E0,Z
ATS-F (5) 5.0E1,EP
IMP-J (2) 5.0E1,P
IMP-J (2) 2.5E1,A
IMP-J (2) 1.7E1,E
IMP-J (10) 5.0E0,E
IMP-J (4) 5.0E0,EP
MOTHER (1) 5.0E1,P
DAUGHTER (2) 5.0E1,P
DAUGHTER (1) 5.0E1,P
DAUGHTER (2) 3.5E1,E
MOTHER (2) 6.0E0,E
MOTHER (1) 5.0E0,E
DAUGHTER (1) 5.0E0,E
EXOS-B (2) 1.0E0,EP
MOTHER (3) 1.0E0,EP
DAUGHTER (3) 1.0E0,EP
ESGEO (3) 1.0E0,Z
HAWKEYE (2) 1.0E0,EP
EXOS-B (4) 0.1E0,EZ
EXOS-B (1) 0.0E0,EPZ
MOTHER (12) 0.0E0,Z
MOTHER (8) 0.0E0,E
DAUGHTER (6) 0.0E0,E
ESGEO (2) 0.0E0,EP
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

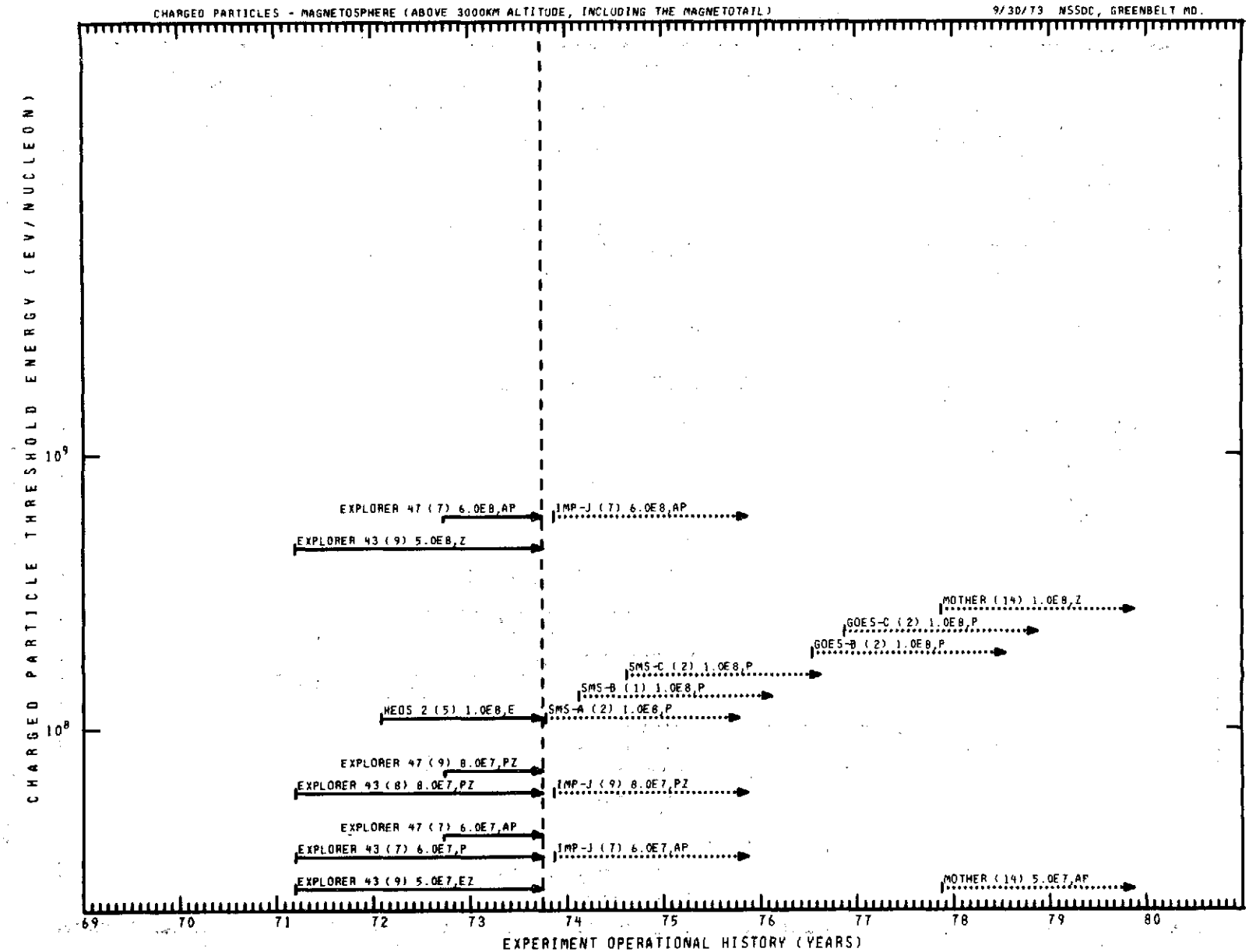

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
EXPERIMENT OPERATIONAL HISTORY (YEARS)
MOTHER (10) 8.0E3,E
DAUGHTER (8) 8.0E3,E
MOTHER (10) 6.0E3,EP
DAUGHTER (8) 6.0E3,EP
ATS 5 (11) 6.0E3,EP
MOTHER (5) 5.0E3,Z
ATS-F (5) 5.0E3,EP
MOTHER (10) 2.0E3,EP
DAUGHTER (8) 2.0E3,EP
ESGEO (4) 2.0E3,EP
APOLLO 14 LM/ALSE (8) 2.0E3,EPZ
ATS-F (3) 2.0E3,E
EXPLORER 47 (8) 1.5E3,E
IMP-J (8) 1.5E3,E
EXOS-B (2) 1.0E3,EP
MOTHER (3) 1.0E3,P
HEOS 2 (2) 1.1E3,EP
DAUGHTER (3) 1.0E3,EP
EXPLORER 43 (5) 1.1E3,EP
HAWKEYE (2) 1.0E3,EP
EXPLORER 47 (4) 1.0E3,EP
HEOS 2 (6) 1.0E3,Z
IMP-J (4) 1.0E3,EP
EXPLORER 43 (11) 9.0E2,Z
EXPLORER 45 (1) 8.0E2,EP
ATS 5 (11) 6.0E2,EP
ATS-F (5) 5.0E2,EP
EXPLORER 47 (12) 3.0E2,Z
HEOS 2 (6) 2.3E2,Z
EXPLORER 47 (10) 2.0E2,APZ
ESGEO (4) 2.0E2,EP
APOLLO 14 LM/ALSE (8) 1.7E2,PZ
IMP-J (10) 2.0E2,P
VELA 6A (5) 1.2E2,P
EXPLORER 43 (11) 1.0E2,AP
IMP-J (10) 1.0E2,Z
10^4
10^3
10^2
69
70
71
72
73
74
75
76
77
78
79
80

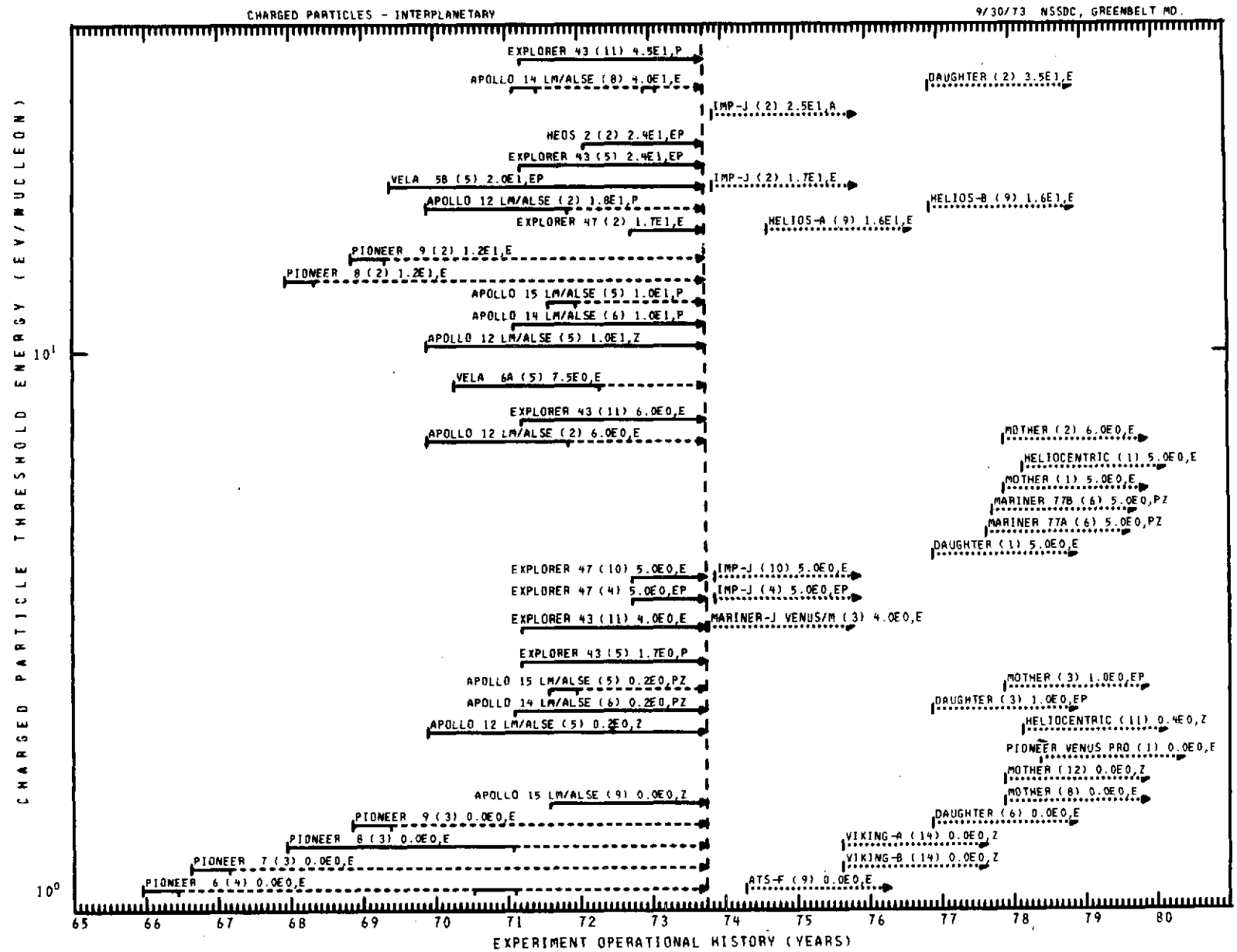

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^5
10^4
ATS 5 (4) 6.0E4,P
EXPLORER 47 (13) 5.0E4,E
EXPLORER 47 (9) 5.0E4,P
EXPLORER 43 (8) 5.0E4,EP
EXPLORER 43 (5) 4.5E4,E
EXPLORER 43 (6) 4.0E4,P
ATS 5 (4) 4.0E4,E
OV5-6 (5) 4.0E4,E
EXPLORER 45 (3) 3.5E4,E
EXPLORER 47 (5) 3.0E4,EP
VELA 6B (4) 3.0E4,E
VELA 6A (4) 3.0E4,E
VELA 5B (4) 3.0E4,E
EXPLORER 45 (2) 2.5E4,AP
EXPLORER 43 (6) 2.0E4,E
EXPLORER 43 (6) 1.8E4,E
HEOS 2 (2) 1.2E4,EP
EXPLORER 43 (5) 1.2E4,EP
EXPLORER 47 (4) 1.0E4,EP
HEOS 2 (6) 1.0E4,Z
EXPLORER 43 (7) 1.0E4,E
ATS-F (7) 8.0E4,E
ATS-F (6) 5.0E4,E
IMP-J (9) 5.0E4,P
IMP-J (5) 3.0E4,EP
ATS-F (4) 2.0E4,EP
ATS-F (3) 2.0E4,P
ATS-F (1) 2.0E4,P
IMP-J (4) 1.0E4,EP
HAWKEYE (2) 1.0E4,EP
MOTHER (10) 8.0E4,E
DAUGHTER (8) 8.0E4,E
MOTHER (5) 5.0E4,Z
ESGEO (1) 4.0E4,P
ESGEO (1) 3.0E4,E
DAUGHTER (7) 2.5E4,P
MOTHER (9) 2.0E4,EP
DAUGHTER (7) 2.0E4,E
MOTHER (10) 1.0E4,P
MOTHER (3) 1.0E4,EP
DAUGHTER (8) 1.0E4,P
DAUGHTER (3) 1.0E4,EP
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

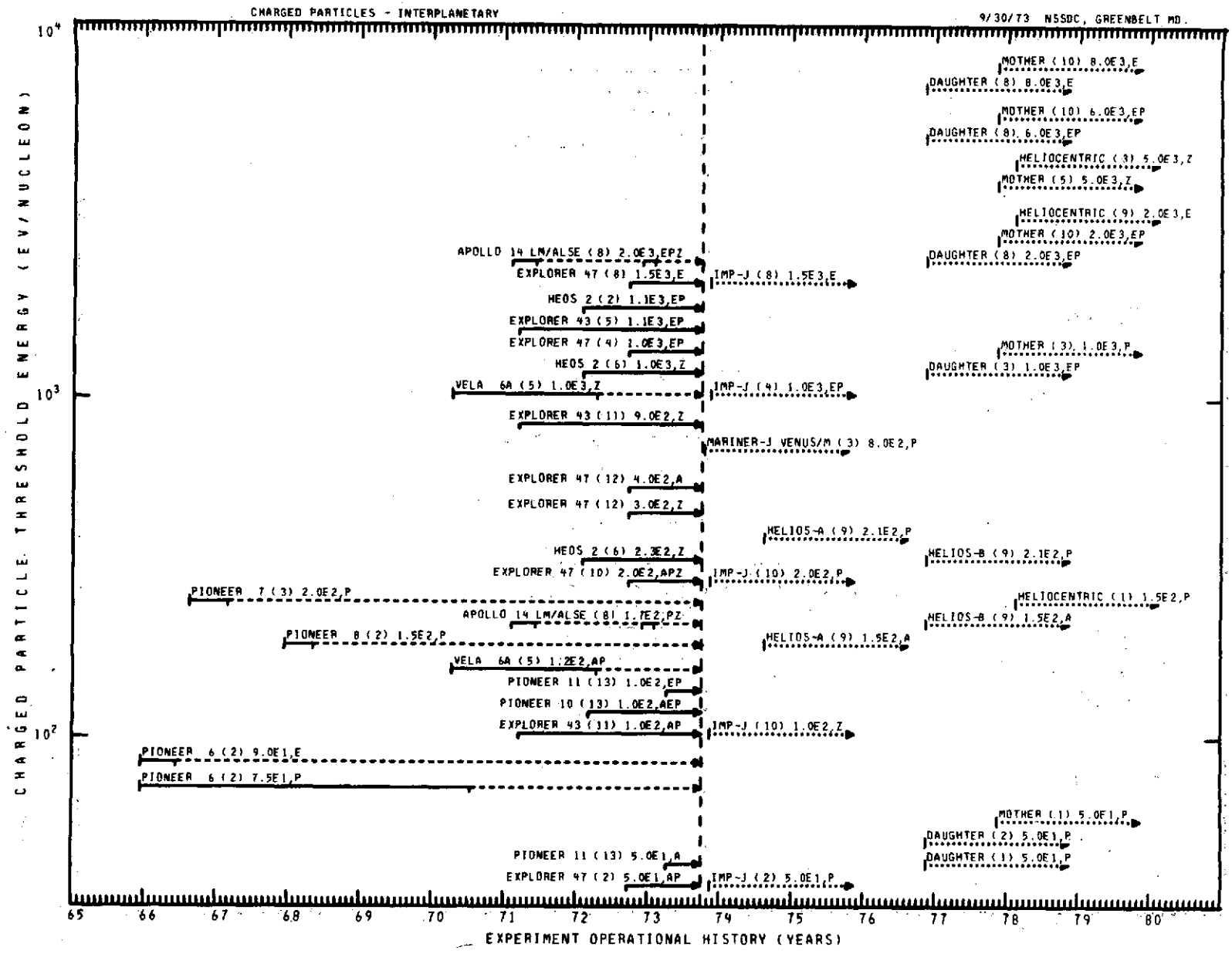

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
7/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^6
10^5
EXPERIMENT OPERATIONAL HISTORY (YEARS)
69
70
71
72
73
74
75
76
77
78
79
80
ATS-F (7) 6.0E5,E
EXPLORER 47 (13) 5.0E5,EP
EXPLORER 47 (9) 5.0E5,P
EXPLORER 47 (5) 5.0E5,A
EXPLORER 47 (7) 5.0E5,Z
EXPLORER 47 (6) 5.0E5,AP
EXPLORER 43 (9) 5.0E5,Z
EXPLORER 43 (5) 5.0E5,P
VELA 6B (3) 5.0E5,A
VELA 6A (3) 5.0E5,A
ATS 5 (3) 5.0E5,E
VELA 5B (3) 5.0E5,A
HEOS 2 (4) 4.5E5,E
EXPLORER 43 (6) 4.0E5,P
EXPLORER 47 (5) 3.0E5,P
EXPLORER 47 (7) 3.0E5,E
VELA 6B (3) 3.0E5,P
VELA 6A (3) 3.0E5,P
VELA 5B (3) 3.0E5,P
EXPLORER 47 (8) 2.5E5,P
EXPLORER 43 (6) 2.5E5,P
EXPLORER 43 (7) 2.0E5,P
EXPLORER 43 (6) 1.8E5,E
EXPLORER 47 (9) 1.5E5,E
EXPLORER 47 (6) 1.5E5,E
EXPLORER 47 (5) 1.2E5,A
EXPLORER 47 (3) 1.0E5,Z
MOTHER (14) 5.0E5,AP
MOTHER (5) 5.0E5,Z
GOES-C (2) 5.0E5,E
GOES-B (2) 5.0E5,E
SMS-C (2) 5.0E5,E
SMS-B (1) 5.0E5,E
IMP-J (9) 5.0E5,P
IMP-J (7) 5.0E5,Z
IMP-J (6) 5.0E5,AP
IMP-J (5) 5.0E5,A
SMS-A (2) 5.0E5,E
ESGEO (1) 4.0E5,P
ATS-F (6) 3.0E5,A
IMP-J (7) 3.0E5,E
IMP-J (5) 3.0E5,P
IMP-J (8) 2.5E5,P
MOTHER (9) 2.0E5,EP
DAUGHTER (7) 2.0E5,EP
ATS-F (6) 2.0E5,P
IMP-J (9) 1.5E5,E
IMP-J (6) 1.5E5,E
IMP-J (5) 1.2E5,A
MOTHER (10) 1.0E5,P
DAUGHTER (8) 1.0E5,P
IMP-J (3) 1.0E5,Z

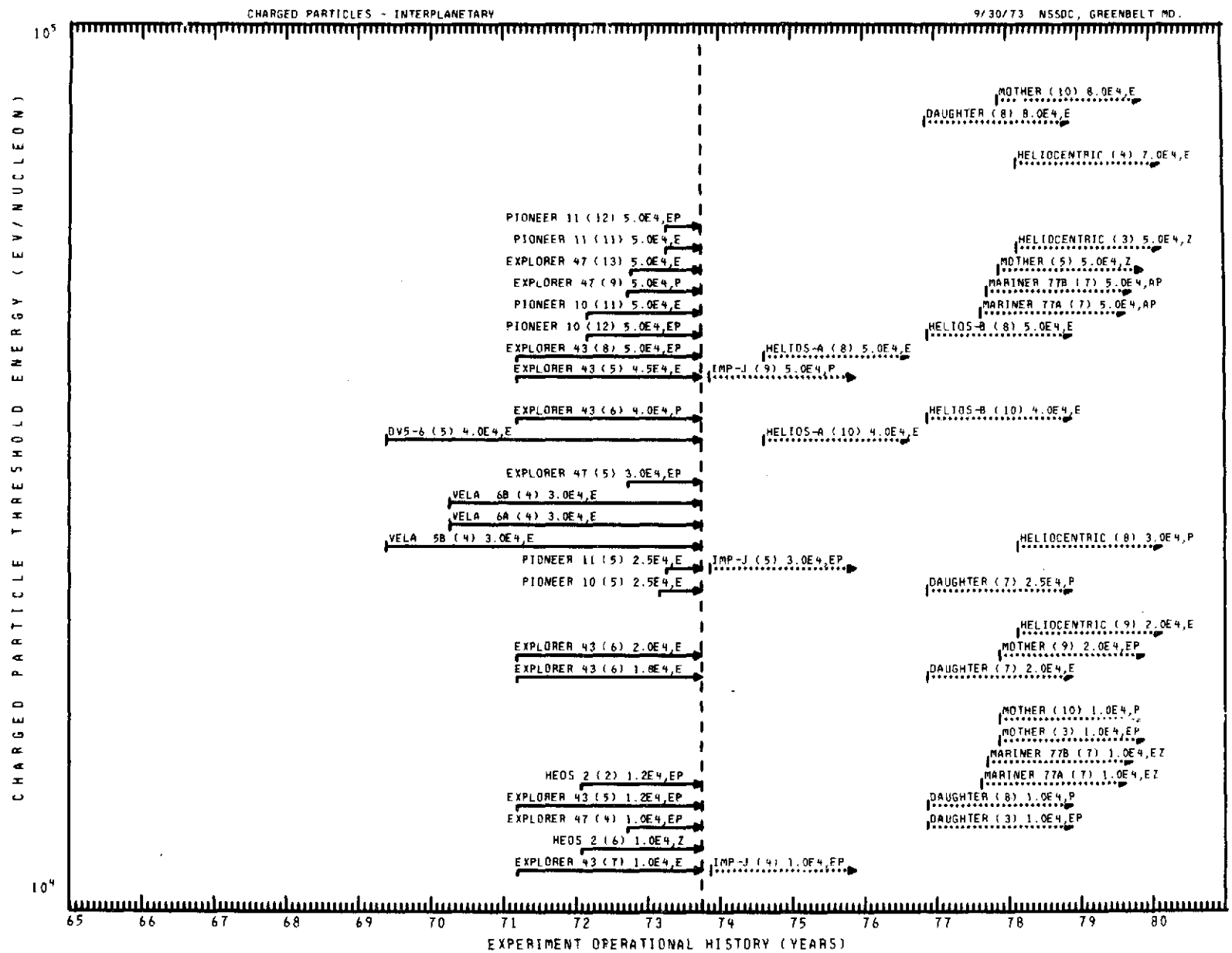

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
EXPERIMENT OPERATIONAL HISTORY (YEARS)
10⁶
69
70
71
72
73
74
75
76
77
78
79
80
GOES-C (2) 4.0E6,A
GOES-B (2) 4.0E6,A
SMS-C (2) 4.0E6,A
ATS-F (7) 4.0E6,E
SMS-B (1) 4.0E6,A
IMP-J (9) 4.0E6,PZ
EXPLORER 47 (9) 4.0E6,PZ
SMS-A (2) 4.0E6,A
EXPLORER 47 (7) 3.0E6,E
VELA 6B (3) 3.0E6,P
VELA 6A (3) 3.0E6,P
VELA 5B (3) 3.0E6,P
EXPLORER 43 (8) 2.7E6,E
VELA 6B (3) 2.5E6,A
VELA 6A (3) 2.5E6,A
OVS-6 (3) 2.5E6,A
ATS-F (6) 3.0E6,A
VELA 5B (3) 2.5E6,A
IMP-J (7) 3.0E6,E
IMP-J (5) 2.2E6,A
EXPLORER 47 (5) 2.2E6,A
MOTHER (5) 2.0E6,Z
EXPLORER 47 (9) 2.0E6,E
ATS-F (7) 2.0E6,P
EXPLORER 47 (8) 2.0E6,A
ATS-F (6) 2.0E6,P
EXPLORER 43 (7) 2.0E6,AP
IMP-J (9) 2.0E6,E
EXPLORER 43 (9) 2.0E6,E
IMP-J (8) 2.0E6,A
EXPLORER 47 (6) 1.5E6,E
IMP-J (6) 1.5E6,E
GOES-C (2) 1.0E6,P
GOES-B (2) 1.0E6,P
SMS-C (2) 1.0E6,P
OVS-6 (3) 1.2E6,P
SMS-B (1) 1.0E6,P
EXPLORER 47 (5) 1.0E6,P
IMP-J (5) 1.0E6,P
EXPLORER 47 (3) 1.0E6,Z
IMP-J (3) 1.0E6,Z
TD 1A (3) 1.0E6,Z
SMS-A (2) 1.0E6,P

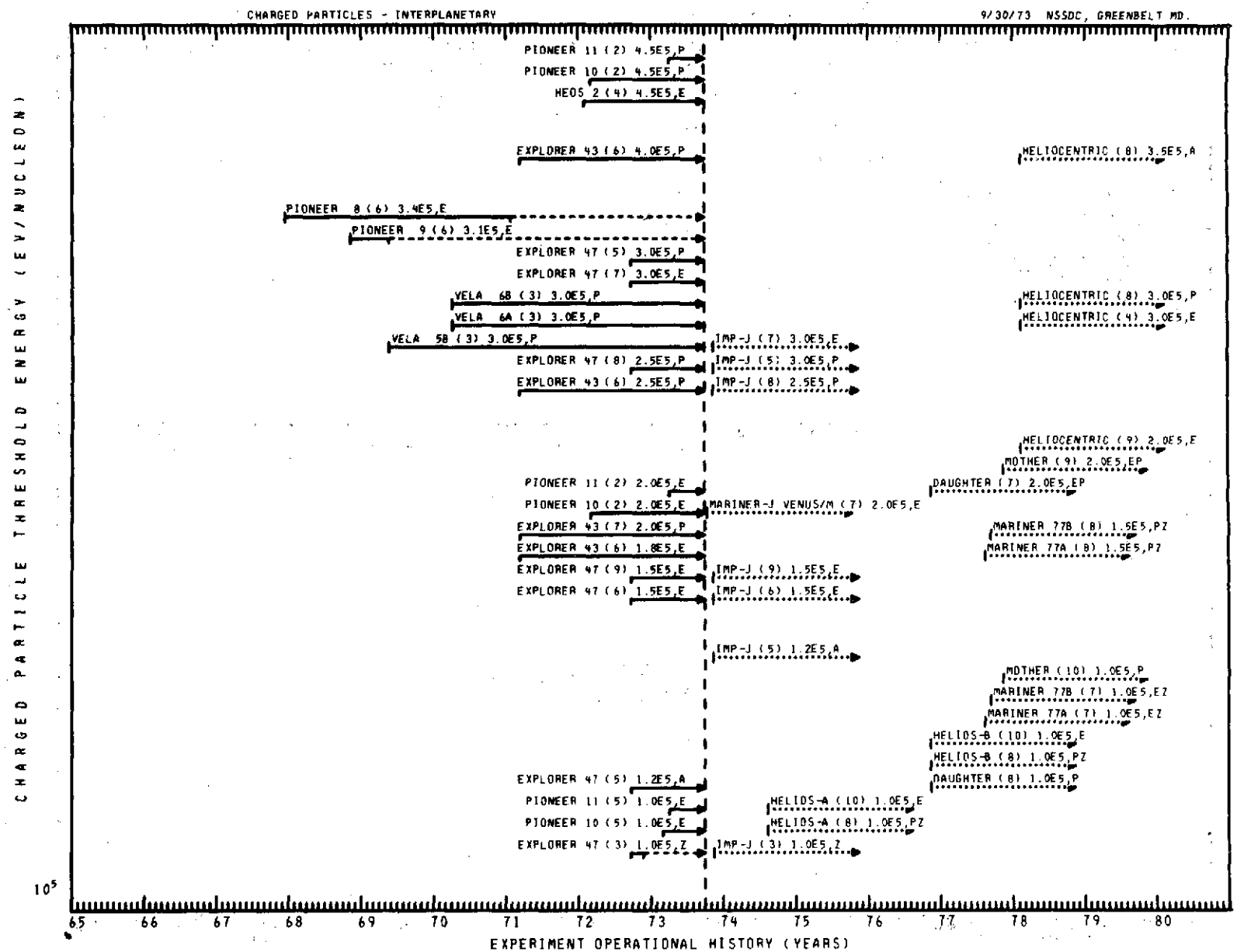

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^7
GOES-C (2) 4.0E7,A
GOES-B (2) 4.0E7,A
SMS-C (2) 4.0E7,A
SMS-B (1) 4.0E7,A
OV5-6 (3) 4.0E7,P
SMS-A (2) 4.0E7,A
EXPLORER 43 (7) 3.0E7,P
VELA 6B (7) 2.5E7,P
VELA 6A (7) 2.5E7,P
VELA 5B (7) 2.5E7,P
VELA 5A (7) 2.5E7,P
EXPLORER 47 (9) 2.0E7,PZ
ATS-F (6) 2.0E7,P
EXPLORER 43 (8) 1.8E7,PZ
IMP-J (9) 2.0E7,PZ
MOTHER (14) 1.0E7,DZ
GOES-C (2) 1.0E7,P
GOES-B (2) 1.0E7,P
SMS-C (2) 1.0E7,P
ATS 5 (3) 1.2E7,P
ATS-F (7) 1.0E7,P
HEOS 2 (5) 1.0E7,E
SMS-B (1) 1.0E7,P
EXPLORER 43 (7) 1.0E7,P
SMS-A (2) 1.0E7,P
HEOS 2 (4) 9.0E6,A
EXPLORER 47 (8) 8.0E6,Z
IMP-J (8) 8.0E6,Z
HEOS 2 (4) 6.2E6,P
EXPLORER 47 (7) 6.0E6,AP
IMP-J (7) 6.0E6,AP
OV5-6 (3) 5.3E6,P
MOTHER (14) 5.0E6,AP
EXPLORER 47 (5) 5.0E6,Z
EXPLORER 47 (7) 5.0E6,Z
IMP-J (7) 5.0E6,Z
EXPLORER 47 (6) 5.0E6,AP
IMP-J (6) 5.0E6,AP
EXPLORER 43 (9) 5.0E6,Z
IMP-J (5) 5.0E6,Z
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

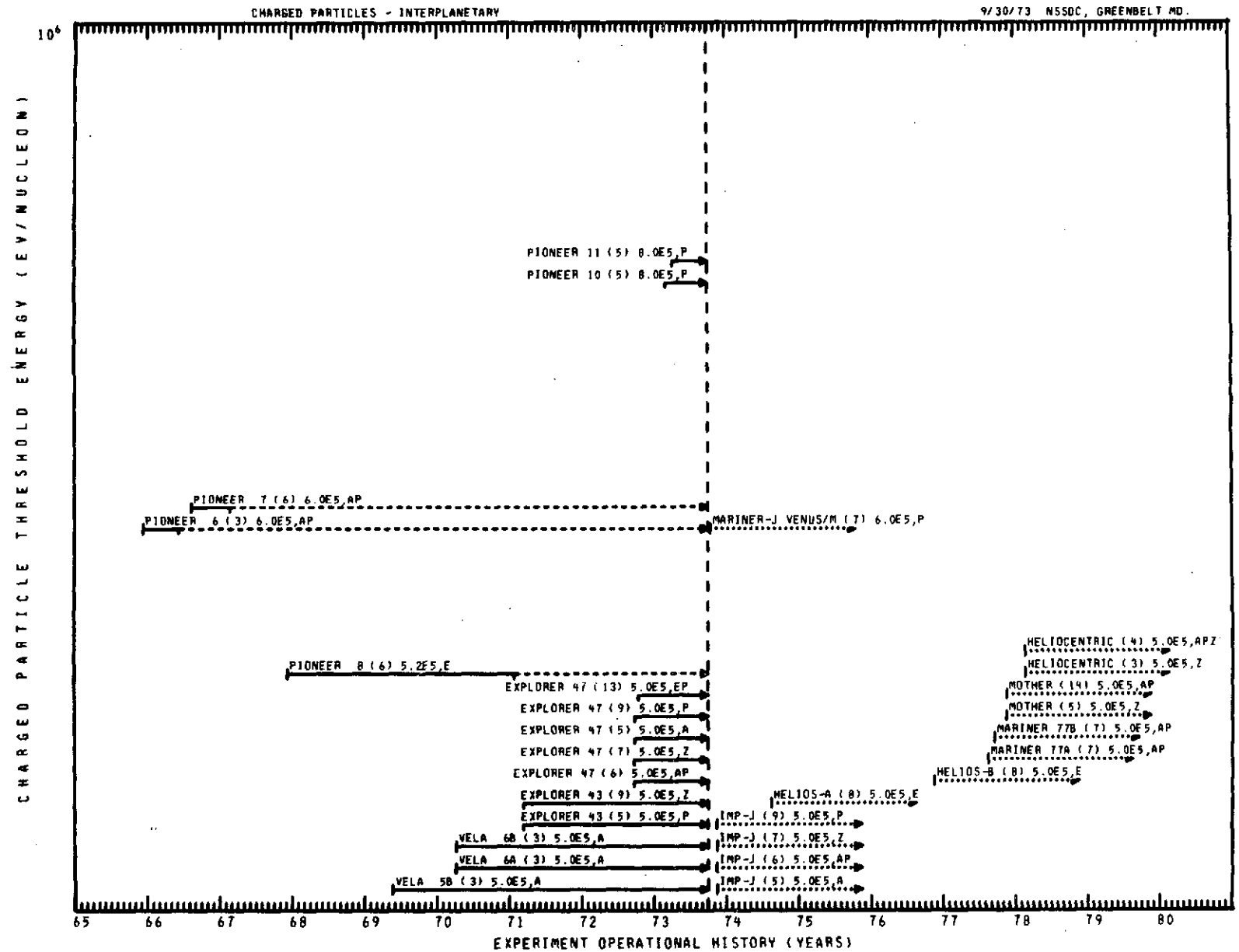

CHARGED PARTICLES - MAGNETOSPHERE (ABOVE 3000KM ALTITUDE, INCLUDING THE MAGNETOTAIL)
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^9
10^8
EXPLORER 47 (7) 6.0E8,AP
IMP-J (7) 6.0E8,AP
EXPLORER 43 (9) 5.0E8,Z
MOTHER (14) 1.0E8,Z
GOES-C (2) 1.0E8,P
GOES-B (2) 1.0E8,P
SMS-C (2) 1.0E8,P
SMS-B (1) 1.0E8,P
HEOS 2 (5) 1.0E8,E
SMS-A (2) 1.0E8,P
EXPLORER 47 (9) 8.0E7,PZ
EXPLORER 43 (8) 8.0E7,PZ
IMP-J (9) 8.0E7,PZ
EXPLORER 47 (7) 6.0E7,AP
EXPLORER 43 (7) 6.0E7,P
IMP-J (7) 6.0E7,AP
EXPLORER 43 (9) 5.0E7,EZ
MOTHER (14) 5.0E7,AP
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

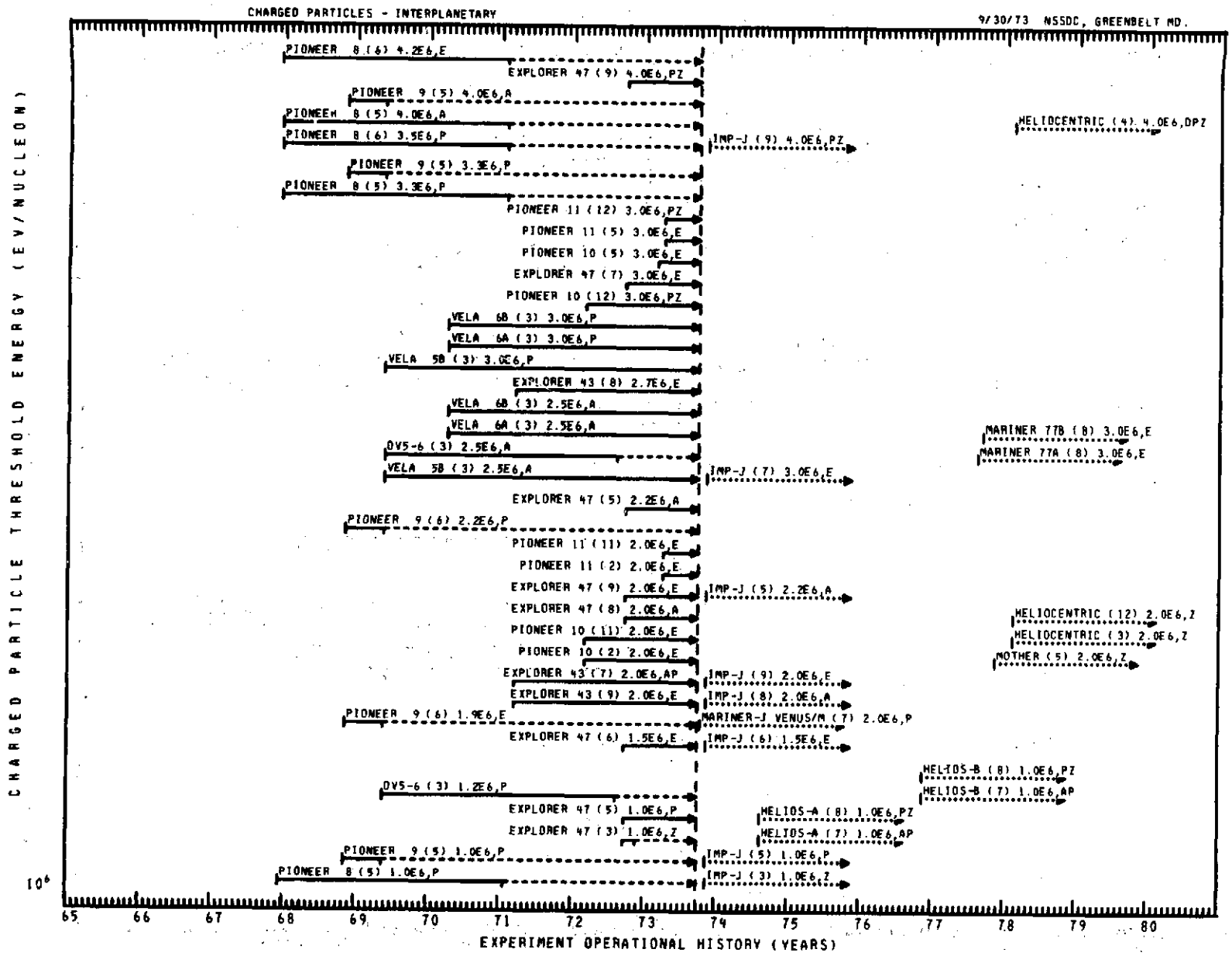

CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
EXPLORER 43 (11) 4.5E1,P
APOLLO 14 LM/ALSE (8) 4.0E1,E
DAUGHTER (2) 3.5E1,E
IMP-J (2) 2.5E1,A
HEOS 2 (2) 2.4E1,EP
EXPLORER 43 (5) 2.4E1,EP
VELA 5B (5) 2.0E1,EP
IMP-J (2) 1.7E1,E
APOLLO 12 LM/ALSE (2) 1.8E1,P
HELIOS-B (9) 1.6E1,E
EXPLORER 47 (2) 1.7E1,E
HELIOS-A (9) 1.6E1,E
PIONEER 9 (2) 1.2E1,E
PIONEER 8 (2) 1.2E1,E
APOLLO 15 LM/ALSE (5) 1.0E1,P
APOLLO 14 LM/ALSE (6) 1.0E1,P
APOLLO 12 LM/ALSE (5) 1.0E1,Z
VELA 6A (5) 7.5E0,E
EXPLORER 43 (11) 6.0E0,E
APOLLO 12 LM/ALSE (2) 6.0E0,E
MOTHER (2) 6.0E0,E
HELIOCENTRIC (1) 5.0E0,E
MOTHER (1) 5.0E0,E
MARINER 77B (6) 5.0E0,PZ
MARINER 77A (6) 5.0E0,PZ
DAUGHTER (1) 5.0E0,E
EXPLORER 47 (10) 5.0E0,E
IMP-J (10) 5.0E0,E
EXPLORER 47 (4) 5.0E0,EP
IMP-J (4) 5.0E0,EP
EXPLORER 43 (11) 4.0E0,E
MARINER-J VENUS/M (3) 4.0E0,E
EXPLORER 43 (5) 1.7E0,P
APOLLO 15 LM/ALSE (5) 0.2E0,PZ
APOLLO 14 LM/ALSE (6) 0.2E0,PZ
APOLLO 12 LM/ALSE (5) 0.2E0,Z
MOTHER (3) 1.0E0,EP
DAUGHTER (3) 1.0E0,EP
HELIOCENTRIC (11) 0.4E0,Z
PIONEER VENUS PRO (1) 0.0E0,E
MOTHER (12) 0.0E0,Z
MOTHER (8) 0.0E0,E
APOLLO 15 LM/ALSE (9) 0.0E0,Z
DAUGHTER (6) 0.0E0,E
PIONEER 9 (3) 0.0E0,E
PIONEER 8 (3) 0.0E0,E
VIKING-A (14) 0.0E0,Z
PIONEER 7 (3) 0.0E0,E
VIKING-B (14) 0.0E0,Z
PIONEER 6 (4) 0.0E0,E
ATS-F (9) 0.0E0,E
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^1
10^0
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

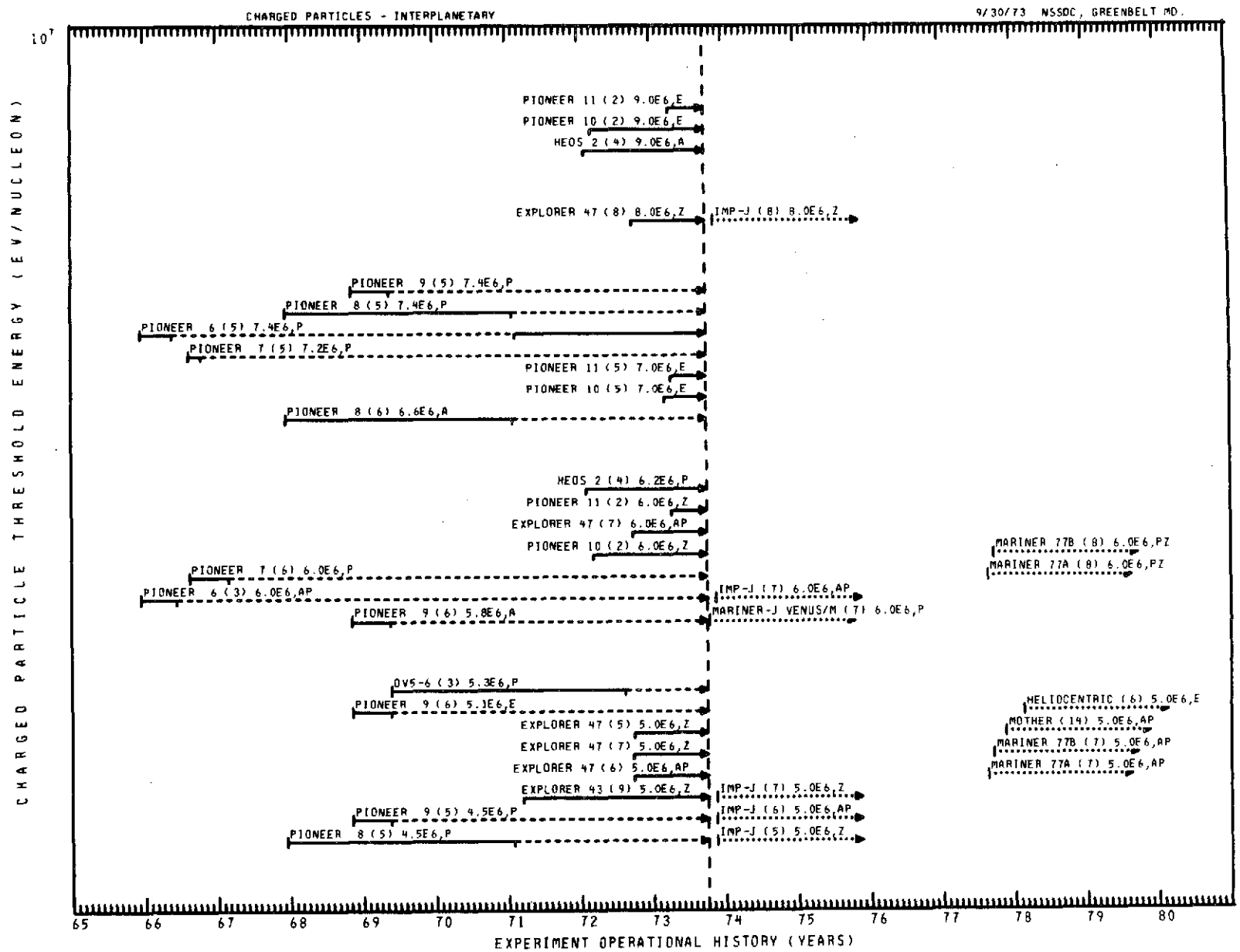

CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^4
10^3
10^2
MOTHER (10) 8.0E3,E
DAUGHTER (8) 8.0E3,E
MOTHER (10) 6.0E3,EP
DAUGHTER (8) 6.0E3,EP
HELIOCENTRIC (3) 5.0E3,Z
MOTHER (5) 5.0E3,Z
HELIOCENTRIC (9) 2.0E3,E
MOTHER (10) 2.0E3,EP
DAUGHTER (8) 2.0E3,EP
APOLLO 14 LM/ALSE (8) 2.0E3,EPZ
EXPLORER 47 (8) 1.5E3,E
IMP-J (8) 1.5E3,E
HEOS 2 (2) 1.1E3,EP
EXPLORER 43 (5) 1.1E3,EP
EXPLORER 47 (4) 1.0E3,EP
MOTHER (3) 1.0E3,P
DAUGHTER (3) 1.0E3,EP
HEOS 2 (6) 1.0E3,Z
VELA 6A (5) 1.0E3,Z
IMP-J (4) 1.0E3,EP
EXPLORER 43 (11) 9.0E2,Z
MARINER-J VENUS/M (3) 8.0E2,P
EXPLORER 47 (12) 4.0E2,A
EXPLORER 47 (12) 3.0E2,Z
HELIOS-A (9) 2.1E2,P
HELIOS-B (9) 2.1E2,P
HEOS 2 (6) 2.3E2,Z
EXPLORER 47 (10) 2.0E2,APZ
IMP-J (10) 2.0E2,P
PIONEER 7 (3) 2.0E2,P
HELIOCENTRIC (1) 1.5E2,P
APOLLO 14 LM/ALSE (8) 1.7E2,PZ
HELIOS-B (9) 1.5E2,A
PIONEER 8 (2) 1.5E2,P
HELIOS-A (9) 1.5E2,A
VELA 6A (5) 1.2E2,AP
PIONEER 11 (13) 1.0E2,EP
PIONEER 10 (13) 1.0E2,AEP
EXPLORER 43 (11) 1.0E2,AP
IMP-J (10) 1.0E2,Z
PIONEER 6 (2) 9.0E1,E
PIONEER 6 (2) 7.5E1,P
MOTHER (1) 5.0E1,P
DAUGHTER (2) 5.0E1,P
DAUGHTER (1) 5.0E1,P
PIONEER 11 (13) 5.0E1,A
EXPLORER 47 (2) 5.0E1,AP
IMP-J (2) 5.0E1,P
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

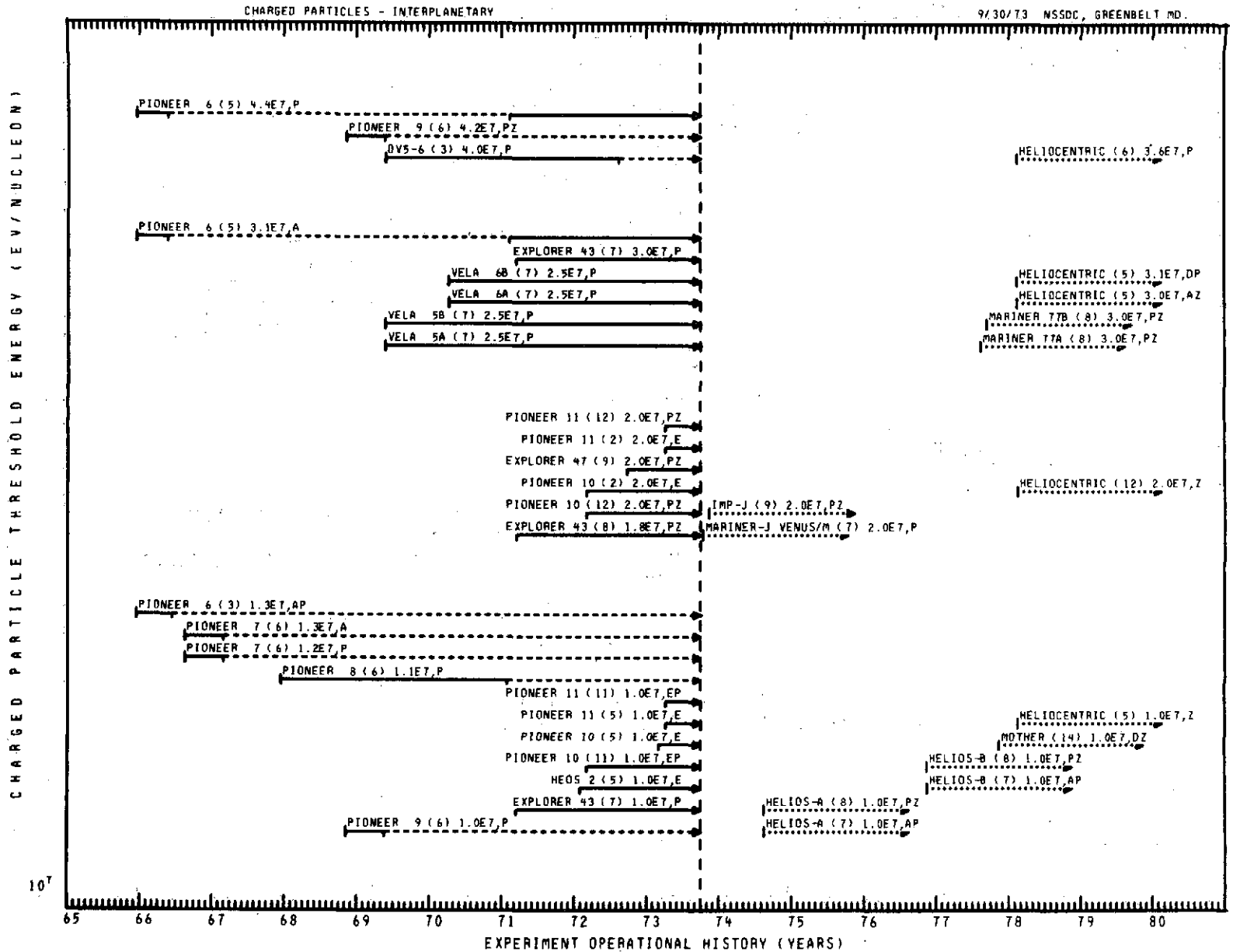

CHARGED PARTICLES - INTERPLANETARY
9/30/73 N55DC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^5
10^4
MOTHER (10) 8.0E4,E
DAUGHTER (8) 8.0E4,E
HELIOCENTRIC (4) 7.0E4,E
PIONEER 11 (12) 5.0E4,EP
PIONEER 11 (11) 5.0E4,E
EXPLORER 47 (13) 5.0E4,E
EXPLORER 47 (9) 5.0E4,P
PIONEER 10 (11) 5.0E4,E
PIONEER 10 (12) 5.0E4,EP
EXPLORER 43 (8) 5.0E4,EP
EXPLORER 43 (5) 4.5E4,E
HELIOCENTRIC (3) 5.0E4,Z
MOTHER (5) 5.0E4,Z
MARINER 77B (7) 5.0E4,AP
MARINER 77A (7) 5.0E4,AP
HELIOS-B (8) 5.0E4,E
HELIOS-A (8) 5.0E4,E
IMP-J (9) 5.0E4,P
EXPLORER 43 (6) 4.0E4,P
DV5-6 (5) 4.0E4,E
HELIOS-B (10) 4.0E4,E
HELIOS-A (10) 4.0E4,E
EXPLORER 47 (5) 3.0E4,EP
VELA 6B (4) 3.0E4,E
VELA 6A (4) 3.0E4,E
VELA 5B (4) 3.0E4,E
PIONEER 11 (5) 2.5E4,E
PIONEER 10 (5) 2.5E4,E
IMP-J (5) 3.0E4,EP
HELIOCENTRIC (8) 3.0E4,P
DAUGHTER (7) 2.5E4,P
EXPLORER 43 (6) 2.0E4,E
EXPLORER 43 (6) 1.8E4,E
HELIOCENTRIC (9) 2.0E4,E
MOTHER (9) 2.0E4,EP
DAUGHTER (7) 2.0E4,E
MOTHER (10) 1.0E4,P
MOTHER (3) 1.0E4,EP
MARINER 77B (7) 1.0E4,EZ
MARINER 77A (7) 1.0E4,EZ
HEOS 2 (2) 1.2E4,EP
EXPLORER 43 (5) 1.2E4,EP
EXPLORER 47 (4) 1.0E4,EP
HEOS 2 (6) 1.0E4,Z
EXPLORER 43 (7) 1.0E4,E
DAUGHTER (8) 1.0E4,P
DAUGHTER (3) 1.0E4,EP
IMP-J (4) 1.0E4,EP
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

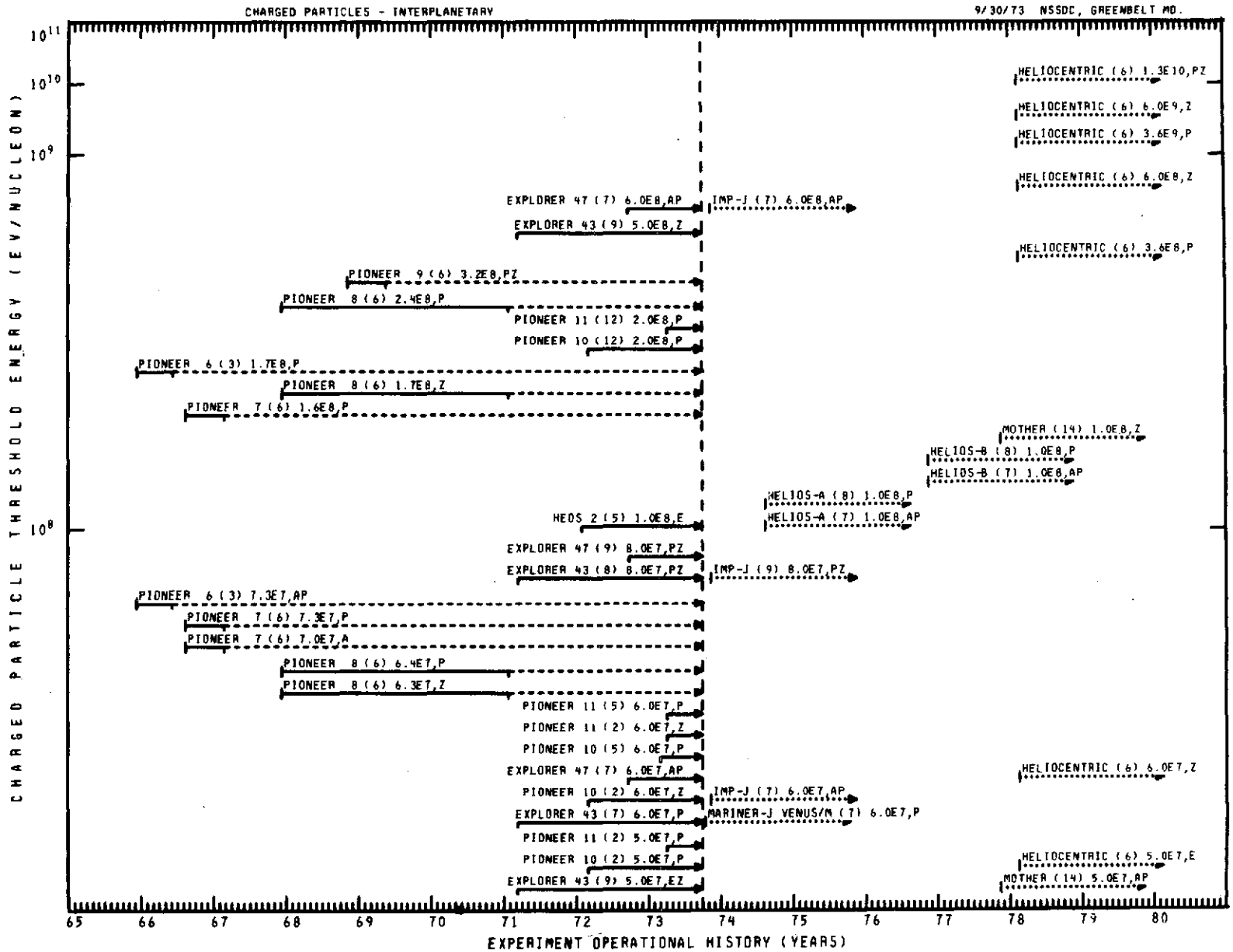

CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
PIONEER 11 (2) 4.5E5,P
PIONEER 10 (2) 4.5E5,P
HEOS 2 (4) 4.5E5,E
EXPLORER 43 (6) 4.0E5,P
HELIOCENTRIC (8) 3.5E5,A
PIONEER 8 (6) 3.4E5,E
PIONEER 9 (6) 3.1E5,E
EXPLORER 47 (5) 3.0E5,P
EXPLORER 47 (7) 3.0E5,E
VELA 6B (3) 3.0E5,P
VELA 6A (3) 3.0E5,P
VELA 5B (3) 3.0E5,P
HELIOCENTRIC (8) 3.0E5,P
HELIOCENTRIC (4) 3.0E5,E
IMP-J (7) 3.0E5,E
EXPLORER 47 (8) 2.5E5,P
IMP-J (5) 3.0E5,P
EXPLORER 43 (6) 2.5E5,P
IMP-J (8) 2.5E5,P
HELIOCENTRIC (9) 2.0E5,E
MOTHER (9) 2.0E5,EP
PIONEER 11 (2) 2.0E5,E
DAUGHTER (7) 2.0E5,EP
PIONEER 10 (2) 2.0E5,E
MARINER-V VENUS/M (7) 2.0E5,E
EXPLORER 43 (7) 2.0E5,P
MARINER 77B (8) 1.5E5,PZ
EXPLORER 43 (6) 1.8E5,E
MARINER 77A (8) 1.5E5,PZ
EXPLORER 47 (9) 1.5E5,E
IMP-J (9) 1.5E5,E
EXPLORER 47 (6) 1.5E5,E
IMP-J (6) 1.5E5,E
IMP-J (5) 1.2E5,A
MOTHER (10) 1.0E5,P
MARINER 77B (7) 1.0E5,EZ
MARINER 77A (7) 1.0E5,EZ
HELIOS-B (10) 1.0E5,E
HELIOS-B (8) 1.0E5,PZ
DAUGHTER (8) 1.0E5,P
EXPLORER 47 (5) 1.2E5,A
PIONEER 11 (5) 1.0E5,E
HELIOS-A (10) 1.0E5,E
PIONEER 10 (5) 1.0E5,E
HELIOS-A (8) 1.0E5,PZ
EXPLORER 47 (3) 1.0E5,Z
IMP-J (3) 1.0E5,Z
10^5
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

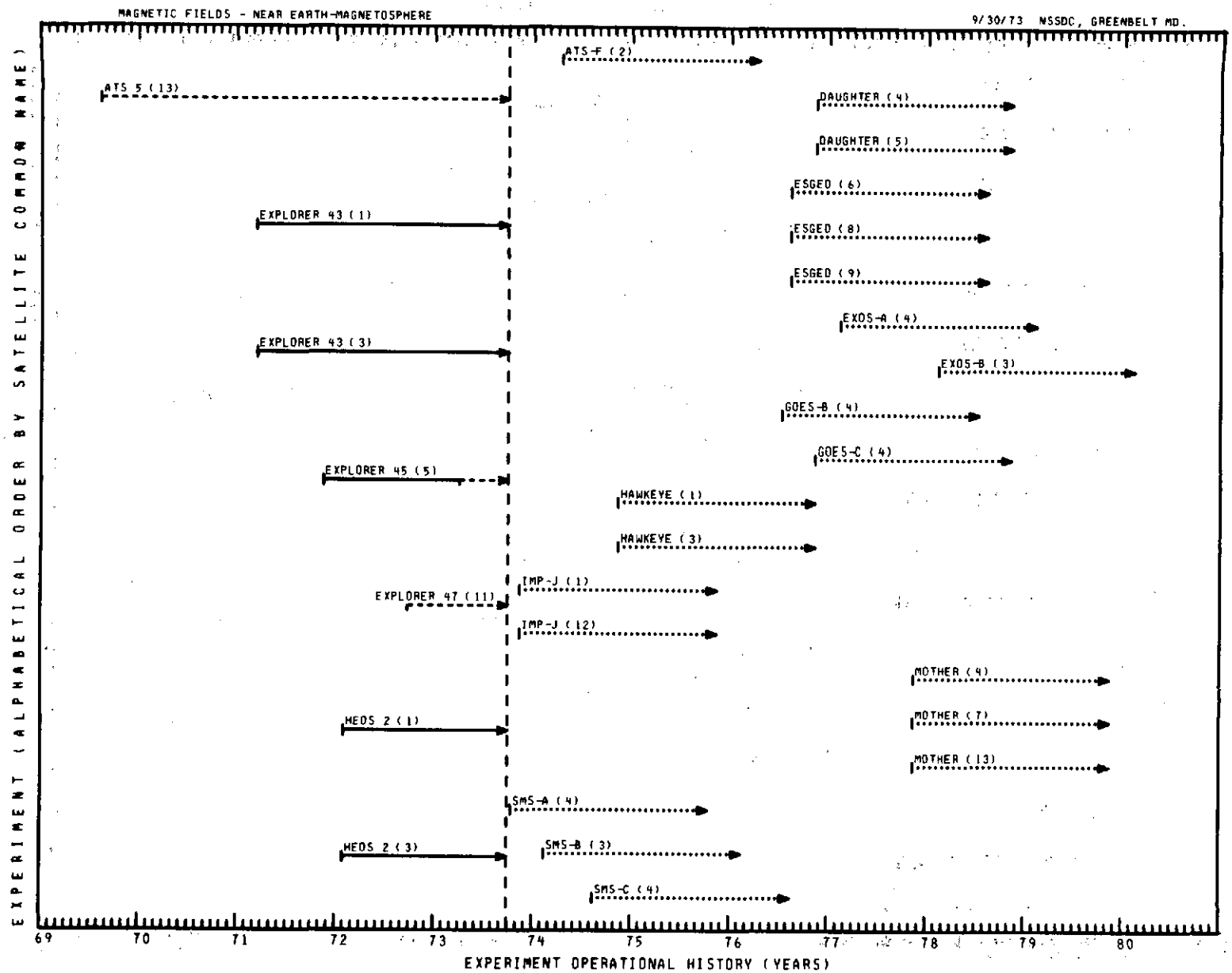

CHARGED PARTICLES - INTERPLANETARY
9/30/73 N550C, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10⁶
PIONEER 11 (5) 8.0E5,P
PIONEER 10 (5) 8.0E5,P
PIONEER 7 (6) 6.0E5,AP
PIONEER 6 (3) 6.0E5,AP
MARINER-J VENUS/M (7) 6.0E5,P
PIONEER 8 (6) 5.2E5,E
EXPLORER 47 (13) 5.0E5,EP
EXPLORER 47 (9) 5.0E5,P
EXPLORER 47 (5) 5.0E5,A
EXPLORER 47 (7) 5.0E5,Z
EXPLORER 47 (6) 5.0E5,AP
EXPLORER 43 (9) 5.0E5,Z
EXPLORER 43 (5) 5.0E5,P
VELA 6B (3) 5.0E5,A
VELA 6A (3) 5.0E5,A
VELA 5B (3) 5.0E5,A
HELIOCENTRIC (4) 5.0E5,APZ
HELIOCENTRIC (3) 5.0E5,Z
MOTHER (14) 5.0E5,AP
MOTHER (5) 5.0E5,Z
MARINER 77B (7) 5.0E5,AP
MARINER 77A (7) 5.0E5,AP
HELIOS-B (8) 5.0E5,E
HELIOS-A (8) 5.0E5,E
IMP-J (9) 5.0E5,P
IMP-J (7) 5.0E5,Z
IMP-J (6) 5.0E5,AP
IMP-J (5) 5.0E5,A
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

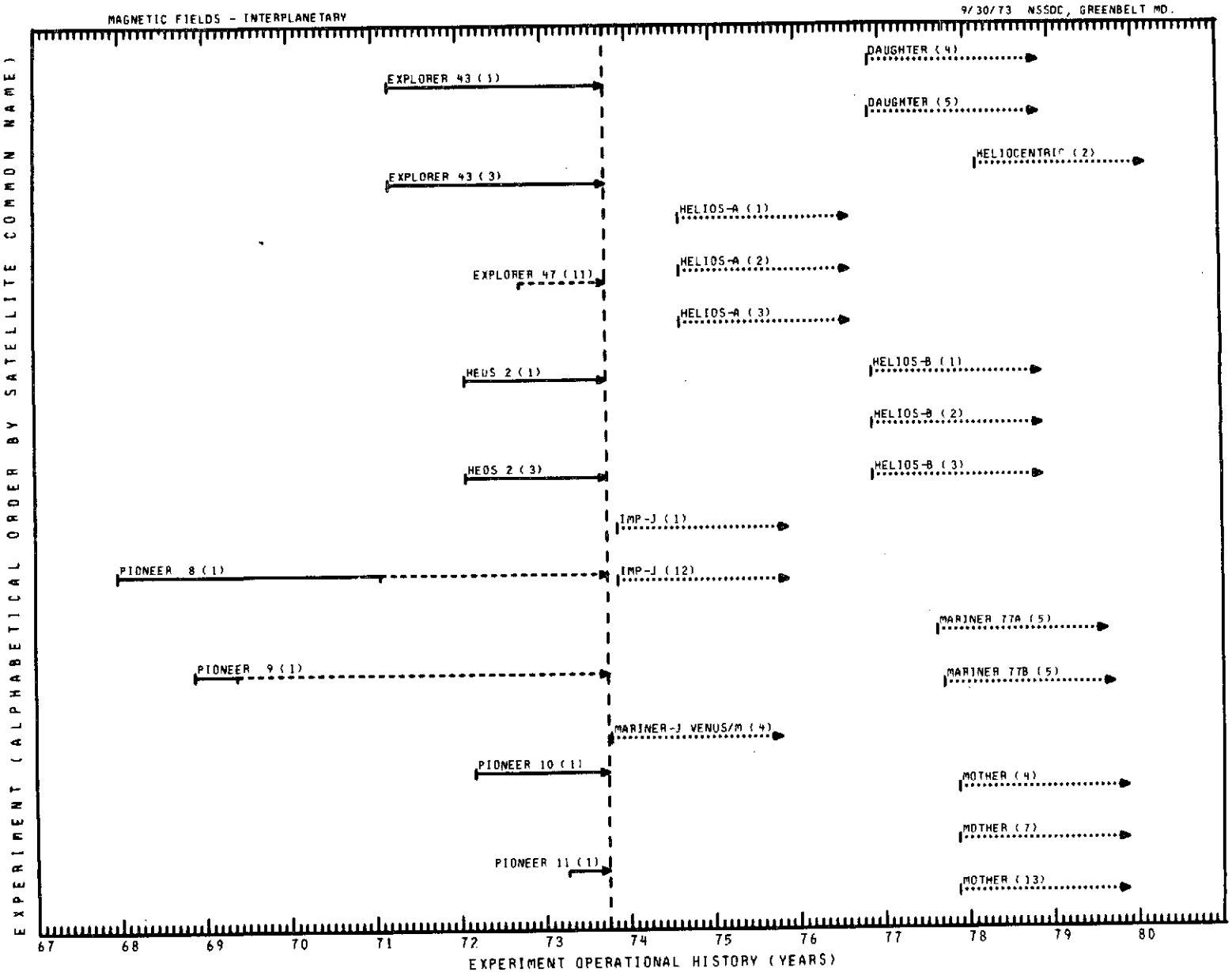

CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
EXPERIMENT OPERATIONAL HISTORY (YEARS)
PIONEER 8 (6) 4.2E6,E
EXPLORER 47 (9) 4.0E6,PZ
PIONEER 9 (5) 4.0E6,A
PIONEER 8 (5) 4.0E6,A
PIONEER 8 (6) 3.5E6,P
IMP-J (9) 4.0E6,PZ
HELIOCENTRIC (4) 4.0E6,DPZ
PIONEER 9 (5) 3.3E6,P
PIONEER 8 (5) 3.3E6,P
PIONEER 11 (12) 3.0E6,PZ
PIONEER 11 (5) 3.0E6,E
PIONEER 10 (5) 3.0E6,E
EXPLORER 47 (7) 3.0E6,E
PIONEER 10 (12) 3.0E6,PZ
VELA 6B (3) 3.0E6,P
VELA 6A (3) 3.0E6,P
VELA 5B (3) 3.0E6,P
EXPLORER 43 (8) 2.7E6,E
VELA 6B (3) 2.5E6,A
VELA 6A (3) 2.5E6,A
MARINER 77B (8) 3.0E6,E
MARINER 77A (8) 3.0E6,E
OV5-6 (3) 2.5E6,A
VELA 5B (3) 2.5E6,A
IMP-J (7) 3.0E6,E
EXPLORER 47 (5) 2.2E6,A
PIONEER 9 (6) 2.2E6,P
PIONEER 11 (11) 2.0E6,E
PIONEER 11 (2) 2.0E6,E
EXPLORER 47 (9) 2.0E6,E
IMP-J (5) 2.2E6,A
EXPLORER 47 (8) 2.0E6,A
HELIOCENTRIC (12) 2.0E6,Z
HELIOCENTRIC (3) 2.0E6,Z
PIONEER 10 (11) 2.0E6,E
MOTHER (5) 2.0E6,Z
PIONEER 10 (2) 2.0E6,E
EXPLORER 43 (7) 2.0E6,AP
IMP-J (9) 2.0E6,E
EXPLORER 43 (9) 2.0E6,E
IMP-J (8) 2.0E6,A
PIONEER 9 (6) 1.9E6,E
MARINER-J VENUS/M (7) 2.0E6,P
EXPLORER 47 (6) 1.5E6,E
IMP-J (6) 1.5E6,E
HELIOS-B (8) 1.0E6,PZ
HELIOS-B (7) 1.0E6,AP
OV5-6 (3) 1.2E6,P
EXPLORER 47 (5) 1.0E6,P
HELIOS-A (8) 1.0E6,PZ
EXPLORER 47 (3) 1.0E6,Z
HELIOS-A (7) 1.0E6,AP
PIONEER 9 (5) 1.0E6,P
IMP-J (5) 1.0E6,P
PIONEER 8 (5) 1.0E6,P
IMP-J (3) 1.0E6,Z
10⁶
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80

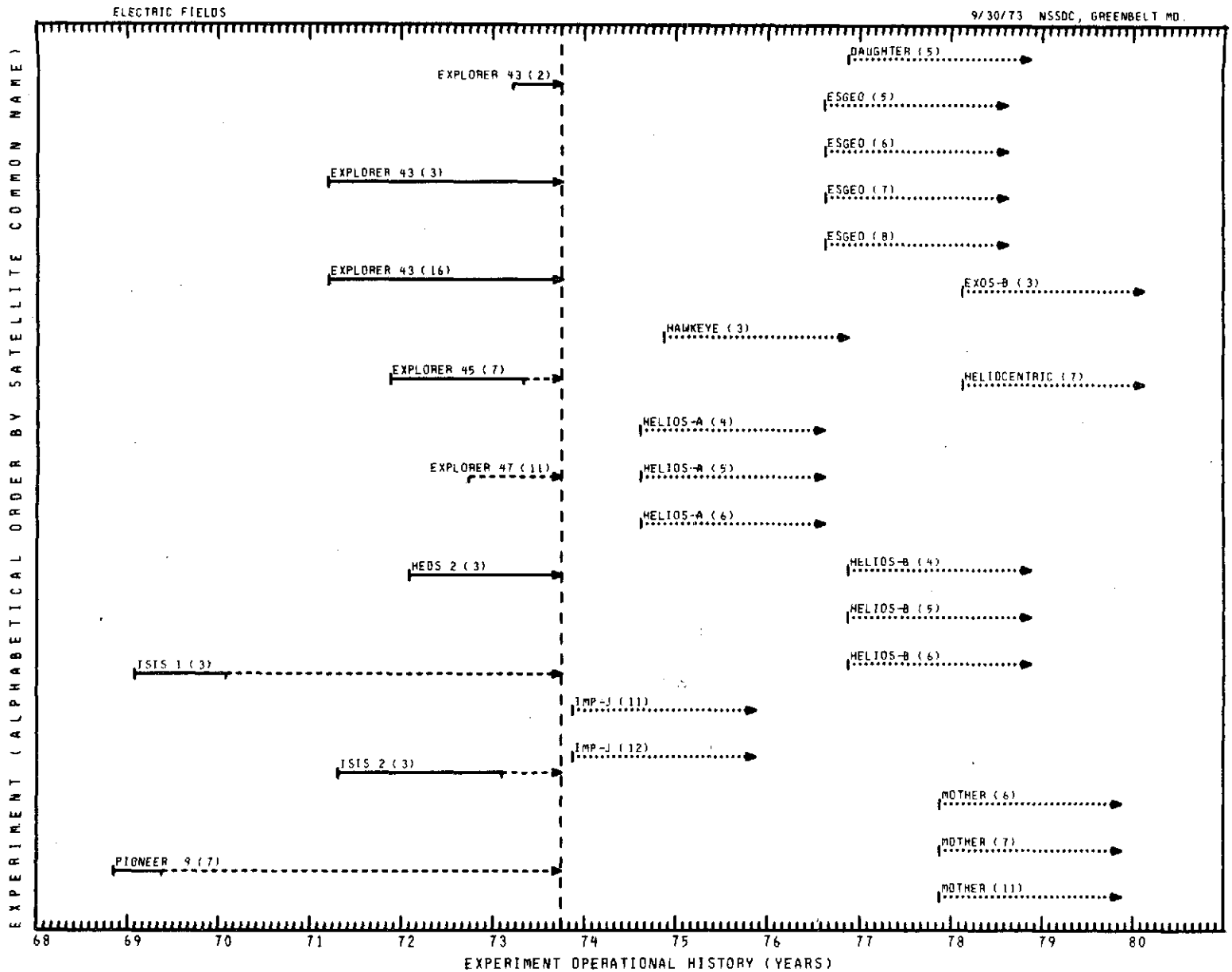

CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^7
PIONEER 11 (2) 9.0E6,E
PIONEER 10 (2) 9.0E6,E
HEOS 2 (4) 9.0E6,A
EXPLORER 47 (8) 8.0E6,Z
IMP-J (8) 8.0E6,Z
PIONEER 9 (5) 7.4E6,P
PIONEER 8 (5) 7.4E6,P
PIONEER 6 (5) 7.4E6,P
PIONEER 7 (5) 7.2E6,P
PIONEER 11 (5) 7.0E6,E
PIONEER 10 (5) 7.0E6,E
PIONEER 8 (6) 6.6E6,A
HEOS 2 (4) 6.2E6,P
PIONEER 11 (2) 6.0E6,Z
EXPLORER 47 (7) 6.0E6,AP
PIONEER 10 (2) 6.0E6,Z
MARINER 77B (8) 6.0E6,PZ
MARINER 77A (8) 6.0E6,PZ
PIONEER 7 (6) 6.0E6,P
PIONEER 6 (3) 6.0E6,AP
IMP-J (7) 6.0E6,AP
PIONEER 9 (6) 5.8E6,A
MARINER-J VENUS/M (7) 6.0E6,P
OVS-6 (3) 5.3E6,P
PIONEER 9 (6) 5.1E6,E
HELIOCENTRIC (6) 5.0E6,E
MOTHER (14) 5.0E6,AP
EXPLORER 47 (5) 5.0E6,Z
EXPLORER 47 (7) 5.0E6,Z
MARINER 77B (7) 5.0E6,AP
EXPLORER 47 (6) 5.0E6,AP
MARINER 77A (7) 5.0E6,AP
EXPLORER 43 (9) 5.0E6,Z
IMP-J (7) 5.0E6,Z
PIONEER 9 (5) 4.5E6,P
IMP-J (6) 5.0E6,AP
PIONEER 8 (5) 4.5E6,P
IMP-J (5) 5.0E6,Z
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)


CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^7
PIONEER 6 (5) 4.4E7,P
PIONEER 9 (6) 4.2E7,PZ
OV5-6 (3) 4.0E7,P
HELIOCENTRIC (6) 3.6E7,P
PIONEER 6 (5) 3.1E7,A
EXPLORER 43 (7) 3.0E7,P
VELA 6B (7) 2.5E7,P
VELA 6A (7) 2.5E7,P
VELA 5B (7) 2.5E7,P
VELA 5A (7) 2.5E7,P
HELIOCENTRIC (5) 3.1E7,DP
HELIOCENTRIC (5) 3.0E7,AZ
MARINER 77B (8) 3.0E7,PZ
MARINER 77A (8) 3.0E7,PZ
PIONEER 11 (12) 2.0E7,PZ
PIONEER 11 (2) 2.0E7,E
EXPLORER 47 (9) 2.0E7,PZ
PIONEER 10 (2) 2.0E7,E
PIONEER 10 (12) 2.0E7,PZ
EXPLORER 43 (8) 1.8E7,PZ
IMP-J (9) 2.0E7,PZ
MARINER-J VENUS/M (7) 2.0E7,P
HELIOCENTRIC (12) 2.0E7,Z
PIONEER 6 (3) 1.3E7,AP
PIONEER 7 (6) 1.3E7,A
PIONEER 7 (6) 1.2E7,P
PIONEER 8 (6) 1.1E7,P
PIONEER 11 (11) 1.0E7,EP
PIONEER 11 (5) 1.0E7,E
PIONEER 10 (5) 1.0E7,E
PIONEER 10 (11) 1.0E7,EP
HEOS 2 (5) 1.0E7,E
EXPLORER 43 (7) 1.0E7,P
PIONEER 9 (6) 1.0E7,P
HELIOCENTRIC (5) 1.0E7,Z
MOTHER (14) 1.0E7,DZ
HELIOS-B (8) 1.0E7,PZ
HELIOS-B (7) 1.0E7,AP
HELIOS-A (8) 1.0E7,PZ
HELIOS-A (7) 1.0E7,AP
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)


CHARGED PARTICLES - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
CHARGED PARTICLE THRESHOLD ENERGY (EV/NUCLEON)
10^{11}
10^{10}
10^{9}
10^{8}
HELIOCENTRIC (6) 1.3E10,PZ
HELIOCENTRIC (6) 6.0E9,Z
HELIOCENTRIC (6) 3.6E9,P
HELIOCENTRIC (6) 6.0E8,Z
EXPLORER 47 (7) 6.0E8,AP
IMP-J (7) 6.0E8,AP
EXPLORER 43 (9) 5.0E8,Z
HELIOCENTRIC (6) 3.6E8,P
PIONEER 9 (6) 3.2E8,PZ
PIONEER 8 (6) 2.4E8,P
PIONEER 11 (12) 2.0E8,P
PIONEER 10 (12) 2.0E8,P
PIONEER 6 (3) 1.7E8,P
PIONEER 8 (6) 1.7E8,Z
PIONEER 7 (6) 1.6E8,P
MOTHER (14) 1.0E8,Z
HELIOS-B (8) 1.0E8,P
HELIOS-B (7) 1.0E8,AP
HELIOS-A (8) 1.0E8,P
HELIOS-A (7) 1.0E8,AP
HEOS 2 (5) 1.0E8,E
EXPLORER 47 (9) 8.0E7,PZ
EXPLORER 43 (8) 8.0E7,PZ
IMP-J (9) 8.0E7,PZ
PIONEER 6 (3) 7.3E7,AP
PIONEER 7 (6) 7.3E7,P
PIONEER 7 (6) 7.0E7,A
PIONEER 8 (6) 6.4E7,P
PIONEER 8 (6) 6.3E7,Z
PIONEER 11 (5) 6.0E7,P
PIONEER 11 (2) 6.0E7,Z
PIONEER 10 (5) 6.0E7,P
EXPLORER 47 (7) 6.0E7,AP
HELIOCENTRIC (6) 6.0E7,Z
PIONEER 10 (2) 6.0E7,Z
IMP-J (7) 6.0E7,AP
EXPLORER 43 (7) 6.0E7,P
MARINER-J VENUS/M (7) 6.0E7,P
PIONEER 11 (2) 5.0E7,P
PIONEER 10 (2) 5.0E7,P
HELIOCENTRIC (6) 5.0E7,E
EXPLORER 43 (9) 5.0E7,EZ
MOTHER (14) 5.0E7,AP
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)


MAGNETIC FIELDS - NEAR EARTH-MAGNETOSPHERE
9/30/73 NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
ATS-F (2)
ATS 5 (13)
DAUGHTER (4)
DAUGHTER (5)
ESGED (6)
EXPLORER 43 (1)
ESGED (8)
ESGED (9)
EXOS-A (4)
EXPLORER 43 (3)
EXOS-B (3)
GOES-B (4)
GOES-C (4)
EXPLORER 45 (5)
HAWKEYE (1)
HAWKEYE (3)
IMP-J (1)
EXPLORER 47 (11)
IMP-J (12)
MOTHER (4)
MEDS 2 (1)
MOTHER (7)
MOTHER (13)
SMS-A (4)
MEDS 2 (3)
SMS-B (3)
SMS-C (4)
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)


MAGNETIC FIELDS - INTERPLANETARY
9/30/73 NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
EXPLORER 43 (1)
EXPLORER 43 (3)
EXPLORER 47 (11)
HEOS 2 (1)
HEOS 2 (3)
PIONEER 8 (1)
PIONEER 9 (1)
PIONEER 10 (1)
PIONEER 11 (1)
IMP-J (1)
IMP-J (12)
MARINER-J VENUS/M (4)
HELIOS-A (1)
HELIOS-A (2)
HELIOS-A (3)
HELIOS-B (1)
HELIOS-B (2)
HELIOS-B (3)
DAUGHTER (4)
DAUGHTER (5)
HELIOCENTRIC (2)
MARINER 77A (5)
MARINER 77B (5)
MOTHER (4)
MOTHER (7)
MOTHER (13)
67
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)


ELECTRIC FIELDS
9/30/73 NSSDC, GREENBELT MD.
EXPERIMENT (ALPHABETICAL ORDER BY SATELLITE COMMON NAME)
EXPLORER 43 (2)
EXPLORER 43 (3)
EXPLORER 43 (16)
EXPLORER 45 (7)
EXPLORER 47 (11)
HEOS 2 (3)
ISIS 1 (3)
ISIS 2 (3)
PIONEER 9 (7)
DAUGHTER (5)
ESGEO (5)
ESGEO (6)
ESGEO (7)
ESGEO (8)
EXOS-B (3)
HAWKEYE (3)
HELIOCENTRIC (7)
HELIOS-A (4)
HELIOS-A (5)
HELIOS-A (6)
HELIOS-B (4)
HELIOS-B (5)
HELIOS-B (6)
IMP-J (11)
IMP-J (12)
MOTHER (6)
MOTHER (7)
MOTHER (11)
68
69
70
71
72
73
74
75
76
77
78
79
80
EXPERIMENT OPERATIONAL HISTORY (YEARS)

Listing of Experiments by Phenomenon Measured

B. Listings of Experiments by Phenomenon Measured

The outline used for listing experiments according to the phenomenon measured is presented below.

Outline

Outline (continued)

The information contained under each of the major headings in the outline is uniquely sorted. For example, under Electromagnetic Radiation Measurements, the units and range of measurement are listed. The first sort is by order of minimum observable value (frequency, wavelength, or proton energy) of the measured phenomenon (one exception is that wavelengths (in outline section 1.3) are sorted from the longest to shortest of the maximum observable values); the second sort is by order of maximum observable value of the measured phenomenon; the last sort is by NSSDC ID Code.

For Charged Particle Measurements, the primary sort is by order of the minimum observable value of the measured phenomenon, then by NSSDC ID Code.

For Microscopic Neutral Measurements, the listing is sorted in order of characteristic, then by NSSDC ID Code. The keywords applicable to define "characteristic" are as follows:

Area (columnar) Density
Energy Flux
Particle Flux
Pressure
Temperature
Volume Density

The listing for Observations of Macroscopic Bodies is sorted alphabetically in order of "characteristic," then alphabetically in order of "technique," and finally by NSSDC ID Code. Keywords applicable to define "characteristic" and "technique" are as follows:

Characteristic	Technique
Atmospheric Feature	Orbit Analysis
Distance	Other Techniques
Feature, Geographic	Photo, High Resolution (< 1 mi)
Gravity Field	Photo, Low Resolution (> 100 mi)
Interior Characteristic	Photo, Med Resolution (1-100 mi)
Particle Flux	Returned Samples
Size	Seismic Technique
Surface Characteristic	Visual Observation
Temperature	

Information is presented in the form of tables with a variety of column headings. It should be noted that the following column headings are common to all the items in the outline.

Principal investigator name
NSSDC experiment title
NSSDC experiment ID Code
Spacecraft common name
Region of observation
Pertinent Report page number where the complete experiment entry is located.

The remaining column headings are self-explanatory except for (1) Planets, (2) Region, (3) *, and (4) RES. Abbreviated explanations of these column headings follow.

1. Planets: these are indicated in numerical order from the sun. The sun is designated as zero (0); numbers 1 through 5 indicate Mercury, Venus, Earth, Mars, and Jupiter, respectively. Letter M indicates the Earth's Moon.

2. Region: for finer specification of location near the Earth, entries under the heading "Region" are used. The two exceptions are designations for Interplanetary (H) and Celestial (I) regions. Letters A through G indicate specific regions as follows:

A = < 65 km altitude
B = > 65 km altitude; < 3000 km, Lat < 65°
C = > 65 km altitude; < 3000 km, Lat 65° to 90°
D = Magnetospheric; L < 2 R_E
E = Magnetospheric; 2 R_E < L < 6 R_E
F = Magnetospheric; 6 R_E < L < 10 R_E
G = Magnetospheric; L > 10 R_E

3. *: this indicates ambient or remote sensor:

A = Ambient
R = Remote

4. RES: this indicates species resolution:

R = Resolved
P = Partially resolved
N = Unresolved
U = Unknown resolution

"Species" here refers to the separation of phenomena at the second level of outline divisions; i.e., "resolved" species would observe the difference between protons (outline section 2.2) and electrons (outline section 2.1).

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN	REGION ABCDEFGHI/012345M	PLANET PAGE
1. ELECTROMAGNETIC RADIATION MEASUREMENTS							
1.1 ELECTRIC FIELD MEASUREMENTS							
EXPLORER 43	(71-019A-02)	AGGSON					
ELECTROSTATIC FIELDS			A 0.000E-39 TO 7.800E-01	HZ		DEFGH	60
MOTHER	(MOTHER -06)	MOZER					
DC TO 12-HZ ELECTRIC FIELD PROBE			A 0.000E-39 TO 1.200E 01	HZ		DEFGH	285
MOTHER	(MOTHER -11)	HEPPNER					
DC ELECTRIC FIELDS			A 0.000E-39 TO 1.200E 01	HZ		DEFGH	287
EXPLORER 43	(71-019A-16)	GURNETT					
ELECTROSTATIC WAVES AND RADIO NOISE			A 1.000E-01 TO 1.000E 02	HZ		DEFGH	66
MOTHER	(MOTHER -11)	HEPPNER					
DC ELECTRIC FIELDS			A 1.000E-01 TO 3.200E 03	HZ		DEFGH	287
IMP-J	(IMP-J -12)	GURNETT					
ELECTROSTATIC WAVES AND RADIO NOISE			A 3.000E-01 TO 2.000E 05	HZ		GH	246
EXPLORER 47	(72-073A-11)	SCARF					
PLASMA WAVE EXPERIMENT			A 1.000E 01 TO 1.000E 02	HZ		GH	114
MOTHER	(MOTHER -07)	GURNETT					
10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES			A 1.000E 01 TO 1.000E 04	HZ		DEFGH	285
EXPLORER 47	(72-073A-11)	SCARF					
PLASMA WAVE EXPERIMENT			A 1.000E 01 TO 1.000E 05	HZ		GH	114
HELIOS-A	(HELIO-A-04)	GURNETT					
COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS			A 1.000E 01 TO 1.000E 05	HZ		H	224
HELIOS-A	(HELIO-A-05)	GURNETT					
FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM ANALYSIS			A 1.000E 01 TO 1.000E 05	HZ		H	225
HELIOS-B	(HELIO-B-04)	GURNETT					
COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS			A 1.000E 01 TO 1.000E 05	HZ		H	230
HELIOS-B	(HELIO-B-05)	GURNETT					
FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM ANALYSIS			A 1.000E 01 TO 1.000E 05	HZ		H	230
HELIOS-A	(HELIO-A-06)	GURNETT					
50KHZ-2MHZ RADIO WAVE			A 1.000E 01 TO 1.000E 05	HZ		H	225
HELIOS-B	(HELIO-B-06)	GURNETT					
50KHZ-2MHZ RADIO WAVE			A 1.000E 01 TO 1.000E 05	HZ		H	230
HAWKEYE	(HAWKEYE-03)	GURNETT					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE	TO MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN	ABCDEFGHI/012345M	PAGE
1. ELECTROMAGNETIC RADIATION MEASUREMENTS									
1.1 ELECTRIC FIELD MEASUREMENTS									
ELF/VLF RECEIVERS			R	1.000E 01	TO 1.780E 05	HZ		DEF	222
DAUGHTER 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD MONOAXIAL PROBES	(DAUGHTR-05)	GURNETT	A	1.000E 01	TO 2.000E 05	HZ		DEFGH	199
MOTHER 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES	(MOTHER -07)	GURNETT	A	1.000E 01	TO 2.000E 05	HZ		DEFGH	285
HEOS 2 SOLAR VLF OBSERVATION	(72-005A-03)	PETERS	A	2.000E 01	TO 5.000E 02	HZ		DEF H	88
HELIOCENTRIC 20-HZ TO 1-KHZ MAGNETIC AND 20-HZ TO 100-KHZ ELECTRIC FIELD DETECTORS	(HELOCTR-07)	SCARF	A	2.000E 01	TO 1.000E 05	HZ		H	237
EXPLORER 43 ELECTROSTATIC WAVES AND RADIO NOISE -- IONA	(71-019A-03)	GURNETT	A	2.000E 01	TO 2.000E 05	HZ		DEFGH	60
EXPLORER 45 AC ELECTRIC FIELD MEASUREMENT	(71-096A-07)	GURNETT	A	2.000E 01	TO 2.000E 05	HZ		DEF	86
ESGEO ELECTROMAGNETIC WAVE FIELDS	(ESGEO -06)	GENDRIN	A	3.000E 01	TO 1.000E 04	HZ		F	207
ISIS 1 VLF RECEIVER	(69-009A-03)	BARRINGTON	R	5.000E 01	TO 3.000E 04	HZ	C		26
ISIS 2 VLF RECEIVER	(71-024A-03)	BARRINGTON	R	5.000E 01	TO 3.000E 06	HZ	C		68
PIONEER 9 PLASMA WAVE DETECTOR	(68-100A-07)	SCARF	A	1.000E 02	TO 1.000E 05	HZ		H	22
PIONEER 9 PLASMA WAVE DETECTOR	(68-100A-07)	SCARF	A	3.850E 02	TO 4.150E 02	HZ		H	22
PIONEER 9 PLASMA WAVE DETECTOR	(68-100A-07)	SCARF	A	2.775E 04	TO 3.225E 04	HZ		H	22
EXOS-B ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS	(EXOS-B -03)	UNKNOWN	A					DE	211
ESGEO VLF FIELD ANTENNA	(ESGEO -05)	PETIT	A					F	207
ESGEO DC FIELDS	(ESGEO -07)	PETERSEN	R					F	208

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E) / MAX VALUE (LAMBDA)	REGION MIN / MAX	PLANET ABCDEFGHI/012345M	PAGE
1. ELECTROMAGNETIC RADIATION MEASUREMENTS						
1.1 ELECTRIC FIELD MEASUREMENTS						
ESGEO	(ESGEO -08) MELZNER					
DC ELECTRIC FIELD AND GRADIENT B						
ELECTRON BEAM DEFLECTION.....		A			F	208
IMP-J	(IMP-J -11) AGGSON					
ELECTROSTATIC FIELDS.....		A			GH	246

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE / * MAX VALUE	(F OR E) / (LAMBDA)	MAX REGION / MIN ABCDEFGHI	PLANET /012345M	PAGE
1.2 MAGNETIC FIELD MEASUREMENTS							
HELIOS-A FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS	(HELIO-A-02)	NESS	A		H		224
HELIOS-B FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS	(HELIO-B-02)	NESS	A		H		229
MARINER 77A TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77A-05)	NESS	A		H		272
MARINER 77B TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77B-05)	NESS	A			5	278
PIONEER 10 MAGNETIC FIELDS	(72-012A-01)	SMITH	A			5	90
PIONEER 11 MAGNETIC FIELDS	(73-019A-01)	SMITH	A			5	131
MARINER 77A TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77A-05)	NESS	A				272
MARINER 77B TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77B-05)	NESS	A				278
MARINER 77A TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77A-05)	NESS	A			5	272
MARINER 77B TRIAXIAL FLUXGATE MAGNETOMETERS	(MARN77B-05)	NESS	A		H		278
HELIOCENTRIC SOLAR AND INTERPLANETARY MAGNETIC FIELDS (CORRELATIVE STUDY)	(HELOCTR-13)	WILCOX	R 0.000E-39 TO 1.000E-02 HZ			0	239
HEOS 2 FLUXGATE MAGNETOMETER	(72-005A-01)	ELLIOTT	A 0.000E-39 TO 1.560E-02 HZ	C	GH		187
PIONEER 11 JOVIAN MAGNETIC FIELD	(73-019A-14)	NESS	A 0.000E-39 TO 3.000E-02 HZ			5	137
ATS 5 MAGNETIC FIELD MONITOR	(69-069A-13)	SUGIURA	A 0.000E-39 TO 9.800E-02 HZ		F		40
HELIOS-A FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS	(HELIO-A-01)	NEUBAUER	A 0.000E-39 TO 2.500E-01 HZ		H		223
HELIOS-B FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS	(HELIO-B-01)	NEUBAUER	A 0.000E-39 TO 2.500E-01 HZ		H		229
PIONEER 6 SINGLE-AXIS MAGNETOMETER	(67-123A-01)	NESS	A 0.000E-39 TO 5.000E-01 HZ		G		11

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	* MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI/012345M	PAGE
1.2 MAGNETIC FIELD MEASUREMENTS						
PIONEER 8	(67-123A-01)	NESS				
SINGLE-AXIS MAGNETOMETER			A 0.000E-39	TO 5.000E-01 HZ	H	11
PIONEER 9	(68-100A-01)	SONETT				
THREE-AXIS MAGNETOMETER			A 0.000E-39	TO 5.000E-01 HZ	H	18
PIONEER 9	(68-100A-01)	SONETT				
THREE-AXIS MAGNETOMETER			A 0.000E-39	TO 1.000E 00 HZ	H	18
HELIOCENTRIC	(HELOCTR-02)	SMITH				
MAGNETIC FIELDS			A 0.000E-39	TO 3.000E 00 HZ	H	234
ESGEO	(ESGEO -09)	MARIANI				
TRIAXIAL FLUXGATE MAGNETOMETER			A 0.000E-39	TO 5.000E 00 HZ	F	208
EXPLORER 43	(71-019A-01)	NESS				
MEASUREMENT OF MAGNETIC FIELDS			A 0.000E-39	TO 6.250E 00 HZ	EFGH	59
DAUGHTER	(DAUGHTR-04)	RUSSELL				
MAGNETIC FIELDS			A 0.000E-39	TO 1.000E 01 HZ	EFGH	198
HAWKEYE	(HAWKEYE-01)	VAN ALLEN				
TRIAXIAL FLUXGATE MAGNETOMETER			A 0.000E-39	TO 1.000E 01 HZ	DEFGH	222
MOTHER	(MOTHER -04)	RUSSELL				
MAGNETIC FIELDS			A 0.000E-39	TO 1.000E 01 HZ	EFGH	284
IMP-J	(IMP-J -01)	NESS				
MAGNETIC FIELD EXPERIMENTS			A 0.000E-39	TO 1.250E 01 HZ	GH	241
PIONEER 11	(73-019A-01)	SMITH				
MAGNETIC FIELDS			A 7.300E-20	TO 7.300E-20 HZ	H	131
PIONEER 10	(72-012A-01)	SMITH				
MAGNETIC FIELDS			A 7.200E-13	TO 7.200E-13 HZ	H	90
HELIOCENTRIC	(HELOCTR-02)	SMITH				
MAGNETIC FIELDS			A 1.000E-01	TO 1.000E 01 HZ	H	234
ESGEO	(ESGEO -06)	GENDRIN				
ELECTROMAGNETIC WAVE FIELDS			A 1.000E-01	TO 3.500E 03 HZ	F	207
EXPLORER 45	(71-096A-05)	CAHILL, JR.				
SEARCH COIL MAGNETOMETER			A 1.000E 00	TO 3.000E 03 HZ	B DE	85
HELIOS-A	(HELIO-A-03)	NEUBAUER				
SEARCH COIL MAGNETOMETER			A 5.000E 00	TO 3.000E 03 HZ	H	224
HELIOS-B	(HELIO-B-03)	NEUBAUER				
SEARCH COIL MAGNETOMETER			A 5.000E 00	TO 3.000E 03 HZ	H	229
EXPLORER 47	(72-073A-11)	SCARF				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS MIN VALUE (F OR E) * MAX VALUE (LAMBDA)	REGION MAX MIN	PLANET ABCDEFGHI/012345M	PAGE
1.2 MAGNETIC FIELD MEASUREMENTS						
PLASMA WAVE EXPERIMENT			A 1.000E 01 TO 1.000E 02 HZ		GH	114
DAUGHTER 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD MONOAXIAL PROBES	(DAUGHTR-05)	GURNETT	A 1.000E 01 TO 1.000E 04 HZ		DEFGH	199
MOTHER 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES	(MOTHER -07)	GURNETT	A 1.000E 01 TO 1.000E 04 HZ		DEFGH	285
EXPLORER 47 PLASMA WAVE EXPERIMENT	(72-073A-11)	SCARF	A 1.000E 01 TO 1.000E 05 HZ		GH	114
HAWKEYE ELF/VLF RECEIVERS	(HAWKEYE-03)	GURNETT	R 1.000E 01 TO 1.780E 05 HZ		DEF	222
HEOS 2 SOLAR VLF OBSERVATION	(72-005A-03)	PETERS	A 2.000E 01 TO 5.000E 02 HZ		DEF H	88
EXPLORER 43 ELECTROSTATIC WAVES AND RADIO NOISE -- IONA	(71-019A-03)	GURNETT	A 2.000E 01 TO 2.000E 05 HZ		DEFGH	60
MOTHER VLF WAVE INJECTION	(MOTHER -13)	HELLIWELL	R 1.000E 03 TO 2.000E 04 HZ		DEFGH	288
ATS-F MAGNETOMETER EXPERIMENT	(ATS-F -02)	COLEMAN, JR.	A		F	191
SMS-B MAGNETIC FIELD MONITOR	(SMS-B -03)	WILLIAMS	A		F	325
EXOS-B ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS	(EXOS-B -03)	UNKNOWN	A		DE	211
EXOS-A MAGNETOMETER	(EXOS-A -04)	UNKNOWN	A		C	210
GOES-B MAGNETIC FIELD MONITOR	(GOES-B -04)	UNKNOWN	A		F	216
GOES-C MAGNETIC FIELD MONITOR	(GOES-C -04)	WILLIAMS	A		F	219
MARINER-J VENUS/MERCURY FLUXGATE MAGNETOMETER	(MARINJ -04)	NESS	A		H	268
SMS-A MAGNETIC FIELD MONITOR	(SMS-A -04)	WILLIAMS	A		F	323
SMS-C MAGNETIC FIELD MONITOR	(SMS-C -04)	UNKNOWN	A		F	329

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX	REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
1.2 MAGNETIC FIELD MEASUREMENTS							
MARINER-J VENUS/MERCURY	(MARINJ -04)	NESS					
FLUXGATE MAGNETOMETER			A			1	268
MARINER-J VENUS/MERCURY	(MARINJ -04)	NESS					
FLUXGATE MAGNETOMETER			A			2	268
ESGEO	(ESGEO -08)	MELZNER					
DC ELECTRIC FIELD AND GRADIENT B							
ELECTRON BEAM DEFLECTION			A		F		208
IMP-J	(IMP-J -12)	GURNETT					
ELECTROSTATIC WAVES AND RADIO NOISE			A		GH		246

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX	MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/012345M	PAGE
1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)							
1.3.1 SENSING SOURCES BELOW 65 KM							
NIMBUS-F	(NIMBS-F-09)	HOUGHTON					
PRESSURE-MODULATED RADIOMETER (PMR)			R			A 3	293
NIMBUS 5	(72-097A-04)	WILHEIT, JR.					
ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR)			R	1.935E 10 TO 1.935E 10 HZ		A 3	129
NIMBUS 5	(72-097A-03)	STAELIN					
NIMBUS-E MICROWAVE SPECTROMETER (NEMS)			R	2.222E 10 TO 6.438E 10 HZ		A 3	129
NIMBUS-F	(NIMBS-F-10)	STAELIN					
SCANNING MICROWAVE SPECTROMETER (SCAMS)			R	2.222E 10 TO 6.522E 10 HZ		A 3	294
NIMBUS-F	(NIMBS-F-03)	WILHEIT, JR.					
ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR)			R	3.700E 10 TO 3.700E 10 HZ		A 3	291
ITOS-H	(ITOS-H -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	5.455E 10 TO 5.455E 10 HZ		A 3	258
ITOS-I	(ITOS-I -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	5.455E 10 TO 5.455E 10 HZ		A 3	261
ITOS-J	(ITOS-J -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	5.455E 10 TO 5.455E 10 HZ		A 3	263
TIROS-N	(TIROS-N-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	5.455E 10 TO 5.455E 10 HZ		A 3	335
NIMBUS-F	(NIMBS-F-05)	SMITH					
EARTH RADIATION BUDGET (ERB)			R	5.000E 01 TO 2.000E-01 MIC		A 3	292
ITOS-H	(ITOS-H -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	3.000E 01 TO 3.800E 00 MIC		A 3	258
ITOS-I	(ITOS-I -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	3.000E 01 TO 3.800E 00 MIC		A 3	261
ITOS-J	(ITOS-J -02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	3.000E 01 TO 3.800E 00 MIC		A 3	263
TIROS-N	(TIROS-N-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)			R	3.000E 01 TO 3.800E 00 MIC		A 3	335

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: * MIN VALUE (F OR E)	* MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI/	PLANET 012345M	PAGE

1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)

1.3.1 SENSING SOURCES BELOW 65 KM

NIMBUS-F LIMB RADIANCE INVERSION RADIOMETER (LRIR)	(NIMBS-F-04)	GILLE	R 2.500E 01	TO 8.800E 00 MIC	A	3	292
NIMBUS 5 INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR)	(72-097A-01)	SMITH	R 2.200E 01	TO 1.100E 01 MIC	A	3	128
NIMBUS 5 SELECTIVE CHOPPER RADIOMETER (SCR)	(72-097A-02)	HOUGHTON	R 2.000E 01	TO 8.000E 00 MIC	A	3	128
NOAA 2 VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(72-082A-04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	119
ITOS-F VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(ITOS-F -04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	253
ITOS-G VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(ITOS-G -04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	256
NIMBUS 4 SELECTIVE CHOPPER RADIOMETER (SCR)	(70-025A-10)	HOUGHTON	R 1.500E 01	TO 1.450E 01 MIC	A	3	46
NIMBUS-F HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS)	(NIMBS-F-02)	MCCULLOCH	R 1.500E 01	TO 6.900E-01 MIC	A	3	291
ERTS-B MULTISPECTRAL SCANNER (MSS)	(ERTS-B -02)	UNKNOWN	R 1.260E 01	TO 1.040E 01 MIC	A	3	204
NOAA 2 SCANNING RADIOMETER (SR)	(72-082A-02)	NESS STAFF	R 1.250E 01	TO 1.050E 01 MIC	A	3	117
NOAA 2 VERY HIGH RESOLUTION RADIOMETER (VHRR)	(72-082A-03)	NESS STAFF	R 1.250E 01	TO 1.050E 01 MIC	A	3	118
ATS-F GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR)	(ATS-F -08)	SHENK	R 1.250E 01	TO 1.050E 01 MIC	A	3	193
ITOS-F SCANNING RADIOMETER (SR)	(ITOS-F -02)	NESS STAFF	R 1.250E 01	TO 1.050E 01 MIC	A	3	252
ITOS-F VERY HIGH RESOLUTION RADIOMETER (VHRR)	(ITOS-F -03)	NESS STAFF	R 1.250E 01	TO 1.050E 01 MIC	A	3	252
ITOS-G	(ITOS-G -02)	NESS STAFF					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) * MAX VALUE (LAMBDA)	REGION: MAX MIN	ABCDEFGHI/012345M	PLANET PAGE
1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)						
1.3.1 SENSING SOURCES BELOW 65 KM						
SCANNING RADIOMETER (SR).....			R 1.250E 01 TO 1.050E 01	MIC A	3	255
ITOS-G VERY HIGH RESOLUTION RADIOMETER (VHRR).....	(ITOS-G -03)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC A	3	256
SMS-A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....	(SMS-A -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC A	3	321
SMS-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....	(SMS-B -04)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC A	3	325
SMS-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....	(SMS-C -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC A	3	327
GOES-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....	(GOES-B -01)	UNKNOWN	R 1.250E 01 TO 1.050E 01	MIC A	3	215
GOES-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....	(GOES-C -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC A	3	218
NIMBUS 5 TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR).....	(72-097A-08)	MCCULLOCH	R 1.250E 01 TO 6.500E 00	MIC A	3	130
ITOS-H ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	(ITOS-H -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01	MIC A	3	258
ITOS-I ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	(ITOS-I -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01	MIC A	3	260
ITOS-J ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	(ITOS-J -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01	MIC A	3	263
TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	(TIROS-N-01)	NESS STAFF	R 1.250E 01 TO 7.500E-01	MIC A	3	334
NIMBUS-F TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR).....	(NIMBS-F-12)	BANDEEN	R 1.200E 01 TO 6.500E 00	MIC A	3	294
ERTS 1 MULTISPECTRAL SCANNER (MSS).....	(72-058A-02)	UNKNOWN	R 1.100E 00 TO 5.000E-01	MIC A	3	104

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / * MAX VALUE (LAMBDA)	MAX REGION / MIN	PLANET ABCDEFGHI/012345M	PAGE

1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)

1.3.1 SENSING SOURCES BELOW 65 KM

ERTS-B MULTISPECTRAL SCANNER (MSS)	(ERTS-B -02)	UNKNOWN	R 1.100E 00 TO 5.000E-01 MIC A		3	204
ERTS 1 RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	(72-058A-01)	WEINSTEIN	R 8.300E-01 TO 4.750E-01 MIC A		3	103
ERTS-B RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	(ERTS-B -01)	WEINSTEIN	R 8.300E-01 TO 4.750E-01 MIC A		3	203
GOES-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(GOES-C -01)	NESS STAFF	R 7.500E-01 TO 5.550E-01 MIC A		3	218
GOES-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(GOES-B -01)	UNKNOWN	R 7.500E-01 TO 5.500E-01 MIC A		3	215
ATS-F GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR)	(ATS-F -08)	SHENK	R 7.500E-01 TO 5.500E-01 MIC A		3	193
SMS-A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-A -01)	NESS STAFF	R 7.500E-01 TO 5.500E-01 MIC A		3	321
SMS-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-B -04)	NESS STAFF	R 7.500E-01 TO 5.500E-01 MIC A		3	325
SMS-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-C -01)	NESS STAFF	R 7.500E-01 TO 5.500E-01 MIC A		3	327
NOAA 2 SCANNING RADIOMETER (SR)	(72-082A-02)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	117
NOAA 2 VERY HIGH RESOLUTION RADIOMETER (VHRR)	(72-082A-03)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	118
ITOS-F SCANNING RADIOMETER (SR)	(ITOS-F -02)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	252
ITOS-F VERY HIGH RESOLUTION RADIOMETER (VHRR)	(ITOS-F -03)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	252
ITOS-G SCANNING RADIOMETER (SR)	(ITOS-G -02)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	255
ITOS-G VERY HIGH RESOLUTION RADIOMETER (VHRR)	(ITOS-G -03)	NESS STAFF	R 7.300E-01 TO 5.200E-01 MIC A		3	256

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN	ABCDEFGHI/	PLANET 012345M	PAGE
1.3 ELECTROMAGNETIC RADIATION (SEE SECTION 4 FOR PHOTOGRAPHY)								
1.3.1 SENSING SOURCES BELOW 65 KM								
ITOS-H ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-H -01)	NESS STAFF	R 7.000E-01 TO 5.000E-01	MIC A			3	258
ITOS-I ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-I -01)	NESS STAFF	R 7.000E-01 TO 5.000E-01	MIC A			3	260
ITOS-J ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-J -01)	NESS STAFF	R 7.000E-01 TO 5.000E-01	MIC A			3	263
TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(TIROS-N-01)	NESS STAFF	R 7.000E-01 TO 5.000E-01	MIC A			3	334
ESSA 8 AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM	(68-114A-01)	NESS STAFF	R 6.500E-01 TO 4.500E-01	MIC A			3	23
NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER	(70-025A-05)	HEATH	R 3.400E-01 TO 2.500E-01	MIC A			3	44
MARINER-J VENUS/MERCURY EUV SPECTROSCOPY	(MARINJ -05)	BROADFOOT	R 1.657E-01 TO 4.750E-02	MIC A		I	123	268
X-4 HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER	(X-4 -01)	UNKNOWN	R				3	355
X-4 EARTH ALBEDO RADIOMETER	(X-4 -02)	UNKNOWN	R				3	355

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
1.3.2 SENSING SOURCES FROM 85 TO 3000 KM								
ISIS 1	(69-009A-01)	WHITTEKER						
SWEEP FREQUENCY SOUNDER			R	1.000E 05 TO	2.000E 07 HZ	C		25
ISIS 2	(71-024A-01)	WHITTEKER						
SWEEP FREQUENCY SOUNDER			R	1.000E 05 TO	2.000E 07 HZ	C		67
ISIS 2	(71-024A-02)	CALVERT						
FIXED FREQUENCY SOUNDER			R	1.200E 05 TO	9.300E 06 HZ	C		68
ISIS 1	(69-009A-02)	CALVERT						
FIXED FREQUENCY SOUNDER			R	2.500E 05 TO	9.300E 06 HZ	C		26
ATS-F	(ATS-F -05)	DAVIES						
RADIO BEACON			R	4.000E 07 TO	3.600E 08 HZ	B	H	193
INTASAT	(INTASAT-01)	UNKNOWN						
IONOSPHERIC BEACON			R	4.001E 07 TO	4.101E 07 HZ	C		248
ISIS 1	(69-009A-09)	FORSYTH						
RADIO BEACON			R	1.360E 08 TO	1.370E 08 HZ	C		29
ISIS 2	(71-024A-09)	FORSYTH						
RADIO BEACON			R	1.360E 08 TO	1.370E 08 HZ	C		72
ATS 5	(69-069A-12)	DAROSA						
RADIO BEACON			R	1.370E 08 TO	4.120E 08 HZ	B		39
DAUGHTER	(DAUGHTR-06)	HARVEY						
RADIO PROPAGATION RECEIVER			R	3.000E 08 TO	3.000E 08 HZ	B	GH	199
ISIS 2	(71-024A-12)	SHEPHERD						
6300-A PHOTOMETER			R	7.500E-01 TO	6.300E-01 MIC	BC		73
AE-C	(AE-C -14)	HAYS						
AIRGLOW PHOTOMETER			R	7.330E-01 TO	3.371E-01 MIC	B		156
AE-D	(AE-D -13)	HAYS						
AIRGLOW PHOTOMETER			R	7.330E-01 TO	3.371E-01 MIC	BC		167
AE-E	(AE-E -11)	HAYS						
AIRGLOW PHOTOMETER			R	7.330E-01 TO	3.371E-01 MIC	B		175
ISIS 2	(71-024A-11)	ANGER						
3914- TO 5577-A PHOTOMETER			R	5.577E-01 TO	3.914E-01 MIC	BC		72
ASTP	(ASTP -03)	DONAHUE						
ULTRAVIOLET ATMOSPHERIC ABSORPTION			R	3.000E-01 TO	1.000E-01 MIC	B		183
EXOS-A	(EXOS-A -03)	UNKNOWN						
X-RAY AND ULTRAVIOLET AURORAL TELESCOPES			R	3.000E-01 TO	1.000E-01 MIC	BC		210
SRATS	(SRATS -06)	TOHMATSU						
EARTH ULTRAVIOLET ALBEDO			R	2.900E-01 TO	2.500E-01 MIC	B		332

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	MAX REGION MIN	ABCDEFGHI/012345M	PAGE
1.3.2 SENSING SOURCES FROM 65 TO 3000 KM						
AE-C	(AE-C -13) BARTH					
NITRIC OXIDE AIRGLOW		R	2.190E-01 TO 2.150E-01 MIC	B		155
AE-D	(AE-D -11) BARTH					
NITRIC OXIDE AIRGLOW		R	2.190E-01 TO 2.150E-01 MIC	BC		165
EXOS-A	(EXOS-A -03) UNKNOWN					
X-RAY AND ULTRAVIOLET AURORAL TELESCOPES		R	1.000E-02 TO 1.000E-04 MIC	BC		210
INDIAN SCIENTIFIC SAT.	(INDASAT-03) UNKNOWN					
IONOSPHERIC ELECTRON TRAP AND UV CHAMBERS		R	1.216E-03 TO 1.216E-03 MIC	B		247
ISS	(ISS -02)					
RADIO NOISE		R		C		250
SRATS	(SRATS -03) TOHMATSU					
GEOCORONAL ULTRAVIOLET GLOW		A		B		331

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX	REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
1.3.3 SENSING MAGNETOSPHERIC SOURCES ABOVE 3000 KM									
EXPLORER 43	(71-019A-12)	KELLOGG							
ELECTROSTATIC WAVES AND RADIO NOISE			A	2.300E 01 TO	2.000E 05 HZ		DEFGH		65
DAUGHTER	(DAUGHTR-0E)	HARVEY							
RADIO PROPAGATION RECEIVER			R	3.000E 08 TO	3.000E 08 HZ	B	GH		199
MOTHER	(MOTHER -0E)	HARVEY							
IMPEDANCE PROBE AND RADIO PROPAGATION TRANSMITTER			R	3.000E 08 TO	3.000E 08 HZ		DEFGH		285

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE	MAX VALUE	(F OR E) (LAMBDA)	REGION MIN	REGION ABCDEFGHI	PLANET /012345M	PAGE
1.3.4 SENSING INTERPLANETARY SPACE										
HELIOCENTRIC	(HELOCTR-07)	SCARF								
20-HZ TO 1-KHZ MAGNETIC AND 20-HZ TO 100-KHZ ELECTRIC FIELD DETECTORS			A	2.000E 01	1.000E 03	HZ		H		237
EXPLORER 43	(71-019A-12)	KELLOGG								
ELECTROSTATIC WAVES AND RADIO NOISE			A	2.300E 01	2.000E 05	HZ		DEFGH		65
ATS-F	(ATS-F -09)	DAVIES								
RADIO BEACON			R	4.000E 07	3.600E 08	HZ	B	H		193
PIONEER 6	(65-105A-04)	ESHLEMAN								
TWO-FREQUENCY RADIO RECEIVER			R	4.980E 07	4.230E 08	HZ		H		5
DAUGHTER	(DAUGHTR-06)	HARVEY								
RADIO PROPAGATION RECEIVER			R	3.000E 08	3.000E 08	HZ	B	GH		199
MOTHER	(MOTHER -08)	HARVEY								
IMPEDANCE PROBE AND RADIO PROPAGATION TRANSMITTER			R	3.000E 08	3.000E 08	HZ		DEFGH		285
PIONEER 10	(72-012A-06)	JUDGE								
ULTRAVIOLET PHOTOMETRY			R	8.000E-02	2.000E-02	MIC		H	5	53
PIONEER 11	(73-019A-06)	JUDGE								
ULTRAVIOLET PHOTOMETRY			R	8.000E-02	2.000E-02	MIC		H	5	134
MARINER-J VENUS/MERCURY	(MARINJ -02)	HOWARD								
S- AND X-BAND RADIO PROPAGATION			R					H	12	267

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS (F OR E) MIN VALUE	* MAX VALUE	(LAMBDA) MIN	MAX	REGION ABCDEFGHI/	PLANET 012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES									
NIMBUS-F	(NIMBS-F-09)	HOUGHTON							
PRESSURE-MODULATED RADIOMETER (PMR).....			R				A	3	293
PIONEER VENUS PROBE A	(PIO78PA-06)	PETTENGILL							
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R					2	302
PIONEER VENUS PROBE B	(PIO78PB-09)	PETTENGILL							
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R					2	306
PIONEER VENUS PROBE C	(PIO78PC-03)	PETTENGILL							
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R					2	308
PIONEER VENUS PROBE D	(PIO78PD-03)	PETTENGILL							
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R					2	310
PIONEER VENUS PROBE E	(PIO78PE-03)	PETTENGILL							
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R					2	312
NIMBUS 5	(72-097A-0A)	WILHEIT, JR.							
ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR).....			R	1.935E 10	TO 1.935E 10	HZ	A	3	129
NIMBUS 5	(72-097A-03)	STAELIN							
NIMBUS-E MICROWAVE SPECTROMETER (NEMS).....			R	2.222E 10	TO 6.438E 10	HZ	A	3	129
NIMBUS-F	(NIMBS-F-10)	STAELIN							
SCANNING MICROWAVE SPECTROMETER (SCAMS).....			R	2.222E 10	TO 6.522E 10	HZ	A	3	294
NIMBUS-F	(NIMBS-F-03)	WILHEIT, JR.							
ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR).....			R	3.700E 10	TO 3.700E 10	HZ	A	3	291
ITOS-H	(ITOS-H -02)	NESS STAFF							
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R	5.455E 10	TO 5.455E 10	HZ	A	3	258
ITOS-I	(ITOS-I -02)	NESS STAFF							
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R	5.455E 10	TO 5.455E 10	HZ	A	3	261
ITOS-J	(ITOS-J -02)	NESS STAFF							
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R	5.455E 10	TO 5.455E 10	HZ	A	3	263
TIROS-N	(TIROS-N-02)	NESS STAFF							
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R	5.455E 10	TO 5.455E 10	HZ	A	3	335

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	* MAX VALUE (LAMBDA)	MAX REGION: MIN ABCDEFGHI/	PLANET: 012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES							
NIMBUS-F EARTH RADIATION BUDGET (ERB)	(NIMBS-F-05)	SMITH	R 5.000E 01	TO 2.000E-01 MIC	A	3	292
MARINER-J VENUS/MERCURY TWO-CHANNEL IR RADIOMETER	(MARINJ -06)	CHASE, JR.	R 3.900E 01	TO 2.200E 01 MIC		12	268
ITOS-H TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	(ITOS-H -02)	NESS STAFF	R 3.000E 01	TO 3.800E 00 MIC	A	3	258
ITOS-I TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	(ITOS-I -02)	NESS STAFF	R 3.000E 01	TO 3.800E 00 MIC	A	3	261
ITOS-J TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	(ITOS-J -02)	NESS STAFF	R 3.000E 01	TO 3.800E 00 MIC	A	3	263
TIROS-N TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)	(TIROS-N-02)	NESS STAFF	R 3.000E 01	TO 3.800E 00 MIC	A	3	335
PIONEER VENUS PROBE E INFRARED RADIOMETER	(P1078PB-05)	SUOMI	A 3.000E 01	TO 2.000E-01 MIC		2	305
NIMBUS-F LIMB RADIANCE INVERSION RADIOMETER (LRIR)	(NIMBS-F-04)	GILLE	R 2.500E 01	TO 8.800E 00 MIC	A	3	292
NIMBUS 5 INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR)	(72-097A-01)	SMITH	R 2.200E 01	TO 1.100E 01 MIC	A	3	128
NIMBUS 5 SELECTIVE CHOPPER RADIOMETER (SCR)	(72-097A-02)	HOUGHTON	R 2.000E 01	TO 8.000E 00 MIC	A	3	128
NOAA 2 VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(72-082A-04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	119
ITOS-F VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(ITOS-F -04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	253
ITOS-G VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR)	(ITOS-G -04)	NESS STAFF	R 1.870E 01	TO 1.200E 01 MIC	A	3	256
MARINER-J VENUS/MERCURY TWO-CHANNEL IR RADIOMETER	(MARINJ -06)	CHASE, JR.	R 1.700E 01	TO 1.000E 01 MIC		12	268
NIMBUS 4 SELECTIVE CHOPPER RADIOMETER (SCR)	(70-025A-10)	HOUGHTON	R 1.500E 01	TO 1.450E 01 MIC	A	3	46

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS MIN VALUE * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN ABCDEFGHI/012345M	PLANET	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES							
NIMBUS-F HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS)	(NIMBS-F-02)	MCCULLOCH	R 1.500E 01 TO 6.900E-01	MIC	A	3	291
ERTS-B MULTISPECTRAL SCANNER (MSS)	(ERTS-B -02)	UNKNOWN	R 1.260E 01 TO 1.040E 01	MIC	A	3	204
NOAA 2 SCANNING RADIOMETER (SR)	(72-082A-02)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	117
NOAA 2 VERY HIGH RESOLUTION RADIOMETER (VHRR)	(72-082A-03)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	118
ATS-F GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR)	(ATS-F -08)	SHENK	R 1.250E 01 TO 1.050E 01	MIC	A	3	193
ITOS-F SCANNING RADIOMETER (SR)	(ITOS-F -02)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	252
ITOS-F VERY HIGH RESOLUTION RADIOMETER (VHRR)	(ITOS-F -03)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	252
ITOS-G SCANNING RADIOMETER (SR)	(ITOS-G -02)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	255
ITOS-G VERY HIGH RESOLUTION RADIOMETER (VHRR)	(ITOS-G -03)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	256
SMS-A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-A -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	321
SMS-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-B -04)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	325
SMS-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(SMS-C -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	327
GOES-B VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(GOES-B -01)	UNKNOWN	R 1.250E 01 TO 1.050E 01	MIC	A	3	215
GOES-C VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)	(GOES-C -01)	NESS STAFF	R 1.250E 01 TO 1.050E 01	MIC	A	3	218
NIMBUS 5 TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)	(72-097A-08)	MCCULLOCH	R 1.250E 01 TO 6.500E 00	MIC	A	3	130

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) * MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI/	PLANET 012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES						
ITOS-H ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-H -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01 MIC	A	3	258
ITOS-I ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-I -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01 MIC	A	3	260
ITOS-J ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(ITOS-J -01)	NESS STAFF	R 1.250E 01 TO 7.500E-01 MIC	A	3	263
TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)	(TIROS-N-01)	NESS STAFF	R 1.250E 01 TO 7.500E-01 MIC	A	3	334
NIMBUS-F TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)	(NIMBS-F-12)	BANDEEN	R 1.200E 01 TO 6.500E 00 MIC	A	3	294
ERTS 1 MULTISPECTRAL SCANNER (MSS)	(72-058A-02)	UNKNOWN	R 1.100E 00 TO 5.000E-01 MIC	A	3	104
ERTS-B MULTISPECTRAL SCANNER (MSS)	(ERTS-B -02)	UNKNOWN	R 1.100E 00 TO 5.000E-01 MIC	A	3	204
PIONEER VENUS PROBE B CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PIO78PB-02)	BLAMONT	A 9.000E-01 TO 9.000E-01 MIC		2	304
PIONEER VENUS PROBE C CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PIO78PC-02)	BLAMONT	A 9.000E-01 TO 9.000E-01 MIC		2	308
PIONEER VENUS PROBE D CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PIO78PD-02)	BLAMONT	A 9.000E-01 TO 9.000E-01 MIC		2	310
PIONEER VENUS PROBE E CLOUD EXTENT, STRUCTURE AND DISTRIBUTION	(PIO78PE-02)	BLAMONT	A 9.000E-01 TO 9.000E-01 MIC		2	311
ERTS 1 RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	(72-058A-01)	WEINSTEIN	R 8.300E-01 TO 4.750E-01 MIC	A	3	103
ERTS-B RETURN BEAM VIDICON (RBV) CAMERA SYSTEM	(ERTS-B -01)	WEINSTEIN	R 8.300E-01 TO 4.750E-01 MIC	A	3	203
PIONEER VENUS PROBE B SOLAR ENERGY PENETRATION INTO THE ATMOSPHERE	(PIO78PB-07)	TOMASKO	R 8.000E-01 TO 3.000E-01 MIC		2	305
PIONEER VENUS PROBE E	(PIO78PB-CE)	WEINMAN				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS MIN VALUE * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES							
SPIN-SCAN PHOTOMETER.....			R 8.000E-01 TO 3.000E-01	MIC		2	306
GOES-C	(GOES-C -C1)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.550E-01	MIC	A	3	218
GOES-B	(GOES-B -01)	UNKNOWN					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01	MIC	A	3	215
ATS-F	(ATS-F -08)	SHENK					
GEOSYNCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR).....			R 7.500E-01 TO 5.500E-01	MIC	A	3	193
SMS-A	(SMS-A -01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01	MIC	A	3	321
SMS-B	(SMS-B -04)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01	MIC	A	3	325
SMS-C	(SMS-C -01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01	MIC	A	3	327
NOAA 2	(72-082A-02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	117
NOAA 2	(72-082A-03)	NESS STAFF					
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	118
ITOS-F	(ITOS-F -02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	252
ITOS-F	(ITOS-F -03)	NESS STAFF					
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	252
ITOS-G	(ITOS-G -02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	255
ITOS-G	(ITOS-G -03)	NESS STAFF					
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R 7.300E-01 TO 5.200E-01	MIC	A	3	256
ITOS-H	(ITOS-H -01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01	MIC	A	3	258
ITOS-I	(ITOS-I -01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01	MIC	A	3	260
ITOS-J	(ITOS-J -01)	NESS STAFF					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / * MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI	PLANET /012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES						
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01 MIC	A	3	263
TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	(TIROS-N-01)	NESS STAFF	R 7.000E-01 TO 5.000E-01 MIC	A	3	334
ESSA 8 AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM.....	(68-114A-01)	NESS STAFF	R 6.500E-01 TO 4.500E-01 MIC	A	3	23
NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER.....	(70-025A-05)	HEATH	R 3.400E-01 TO 2.500E-01 MIC	A	3	44
VIKING-A ULTRAVIOLET PHOTOMETRY.....	(VIKNG-A-12)	BARTH	R 3.400E-01 TO 2.500E-01 MIC		0 4	346
VIKING-B ULTRAVIOLET PHOTOMETRY.....	(VIKNG-B-12)	BARTH	R 3.400E-01 TO 2.500E-01 MIC		0 4	353
PIONEER VENUS PROBE A ULTRAVIOLET SPECTROMETER.....	(PIO78PA-05)	STEWART	A 3.400E-01 TO 1.100E-01 MIC		2	302
MARINER-J VENUS/MERCURY EUV SPECTROSCOPY.....	(MARINJ -05)	BROADFOOT	R 1.657E-01 TO 4.750E-02 MIC	A	I 123	268
VIKING-A IR SPECTROMETER -- WATER VAPOR MAPPING.....	(VIKNG-A-03)	FARMER	R 7.000E-04 TO 3.000E-04 MIC		4	341
VIKING-B IR SPECTROMETER -- WATER VAPOR MAPPING.....	(VIKNG-B-03)	FARMER	R 7.000E-04 TO 3.000E-04 MIC		4	348
MARINER 77A TV PHOTOGRAPHY.....	(MARN77A-01)	SMITH	R 6.100E-04 TO 4.140E-04 MIC		5	270
MARINER 77B TV PHOTOGRAPHY.....	(MARN77B-01)	SMITH	R 6.100E-04 TO 4.140E-04 MIC		5	276
MARINER 77A TV PHOTOGRAPHY.....	(MARN77A-01)	SMITH	R 6.100E-04 TO 4.140E-04 MIC			270
MARINER 77B TV PHOTOGRAPHY.....	(MARN77B-01)	SMITH	R 6.100E-04 TO 4.140E-04 MIC			276
X-4 HIGH-RESOLUTION MULTICHANNEL INFRARED RADIOMETER.....	(X-4 -01)	UNKNOWN	R	A	3	355
MARINER-J VENUS/MERCURY S- AND X-BAND RADIO PROPAGATION.....	(MARINJ -02)	HOWARD	R		H 12	267
X-4	(X-4 -02)	UNKNOWN				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE MAX (F OR E)	MIN VALUE MAX (LAMBDA)	REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES							
EARTH ALBEDO RADIOMETER.....		R			A	3	355

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	* MAX VALUE (LAMBDA)	MAX	REGION MIN ABCDEFGHI	PLANET /012345M	PAGE
1.3.6 SENSING THE SUN								
HELIOS-B	(HELIO-B-08)	TRAINOR						
GALACTIC AND SOLAR COSMIC RAYS			R			0		231
HELIOS-A	(HELIO-A-08)	TRAINOR						
GALACTIC AND SOLAR COSMIC RAYS			R			0		226
HELIOS-A	(HELIO-A-06)	GURNETT						
50KHZ-2MHZ RADIO WAVE			R 1.000E 01	TO 1.000E 05	HZ	0		225
HELIOS-B	(HELIO-B-06)	GURNETT						
50KHZ-2MHZ RADIO WAVE			R 1.000E 01	TO 1.000E 05	HZ	0		230
HELIOCENTRIC	(HELOCTR-10)	STEINBERG						
20-KHZ TO 3-MHZ RADIO MAPPING			R 2.000E 04	TO 3.000E 06	HZ	0		238
EXPLORER 49	(73-039A-02)	STONE						
RAPID-BURST RECEIVERS			R 2.500E 04	TO 1.600E 07	HZ	I 0		141
EXPLORER 49	(73-039A-01)	STONE						
STEP FREQUENCY RADIOMETERS			R 3.000E 04	TO 2.000E 07	HZ	I 0		140
HELIOS-A	(HELIO-A-06)	GURNETT						
50KHZ-2MHZ RADIO WAVE			R 5.000E 04	TO 2.000E 06	HZ	0		225
HELIOS-B	(HELIO-B-06)	GURNETT						
50KHZ-2MHZ RADIO WAVE			R 5.000E 04	TO 2.000E 06	HZ	0		230
EXPLORER 43	(71-019A-13)	HADDOCK						
INTERPLANETARY LONG-WAVELENGTH RADIO ASTRONOMY EXPERIMENT			R 5.000E 04	TO 3.500E 06	HZ	0		65
ISIS 1	(69-009A-10)	HARTZ						
COSMIC RADIO NOISE			R 1.000E 05	TO 2.000E 07	HZ	0		29
ISIS 2	(71-024A-10)	HARTZ						
COSMIC RADIO NOISE			R 1.000E 05	TO 2.000E 07	HZ	0		72
SKYLAB	(73-027A-04)	MACQUEEN						
WHITE LIGHT CORONAGRAPH			R 7.000E 03	TO 3.500E 03	A	0		138
OSO 7	(71-083A-02)	TOUSEY						
WHITE-LIGHT CORONOGRAPH AND EXTREME ULTRAVIOLET CORONOGRAPH			R 6.500E 03	TO 3.900E 03	A	0		81
OSO-I	(OSO-I -02)	LEMAIRE						
CHROMOSPHERE FINE STRUCTURE STUDY			R 4.000E 03	TO 1.000E 03	A	0		296
VIKING-A	(VIKNG-A-12)	BARTH						
ULTRAVIOLET PHOTOMETRY			R 3.400E 03	TO 2.500E 03	A	0	4	346
VIKING-B	(VIKNG-B-12)	BARTH						
ULTRAVIOLET PHOTOMETRY			R 3.400E 03	TO 2.500E 03	A	0	4	353

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) * MAX VALUE (LAMBDA) MAX REGION MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.6 SENSING THE SUN					
NIMBUS 4	(70-025A-01)	HEATH			
SOLAR UV MONITOR			R 3.300E 03 TO 1.150E 03 A	0	44
OSO-I	(OSO-I -01)	BRUNER, JR.			
HIGH-RESOLUTION ULTRAVIOLET SPECTROMETER MEASUREMENTS			R 2.200E 03 TO 1.050E 03 A	0	296
AE-C	(AE-C -06)	HINTEREGGER			
SOLAR EUV SPECTROPHOTOMETER			R 1.850E 03 TO 1.420E 02 A	0	150
AE-D	(AE-D -06)	HINTEREGGER			
SOLAR EUV SPECTROPHOTOMETER			R 1.850E 03 TO 1.420E 02 A	0	161
AE-E	(AE-E -06)	HINTEREGGER			
SOLAR EUV SPECTROPHOTOMETER			R 1.850E 03 TO 1.420E 02 A	0	171
EXPLORER 44	(71-058A-01)	KREPLIN			
SOLAR RADIATION DETECTORS			R 1.600E 03 TO 8.000E-02 A	0	75
EXPLORER 37	(68-017A-01)	KREPLIN			
SOLAR RADIATION DETECTORS			R 1.350E 03 TO 1.080E 03 A	0	16
SKYLAB	(73-027A-06)	GOLDBERG			
UV SCANNING POLYCHROMATOR/SPECTROHELIOMETER			R 1.350E 03 TO 2.960E 02 A	0	139
SKYLAB	(73-027A-06)	GOLDBERG			
UV SCANNING POLYCHROMATOR/SPECTROHELIOMETER			R 1.350E 03 TO 2.960E 02 A	0	139
OSO-I	(OSO-I -06)	WELLER, JR.			
EUV FROM EARTH AND SPACE			R 1.230E 03 TO 1.500E 02 A	0	298
AE-C	(AE-C -05)	HEATH			
SOLAR EUV FILTER PHOTOMETER			R 1.216E 03 TO 4.500E 01 A	0	149
AE-D	(AE-D -05)	HEATH			
SOLAR EUV FILTER PHOTOMETER			R 1.216E 03 TO 4.500E 01 A	0	161
AE-E	(AE-E -05)	HEATH			
SOLAR EUV FILTER PHOTOMETER			R 1.216E 03 TO 4.500E 01 A	0	171
AE-C	(AE-C -05)	HEATH			
SOLAR EUV FILTER PHOTOMETER			R 1.216E 03 TO 4.500E 01 A	0	149
AEROS-B	(AEROS-B-04)	SCHMIDTKE			
FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR			R 1.070E 03 TO 3.000E 02 A	0	179
OSO 7	(71-083A-02)	TOUSEY			
WHITE-LIGHT CORONOGRAPH AND EXTREME ULTRAVIOLET CORONOGRAPH			R 5.500E 02 TO 1.700E 02 A	0	81

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS * MIN VALUE / MAX VALUE	(F OR E) (LAMBDA)	MAX REGION / MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.6 SENSING THE SUN							
AEROS-B	(AEROS-B-04)	SCHMIDTKE					
FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR			R 5.100E 02 TO 1.500E 02	A		0	179
OSO 7	(71-083A-01)	NEUPERT					
X-RAY AND EUV SPECTROHELIOGRAPH (2 TO 400 A)			R 4.000E 02 TO 1.700E 02	A		0	80
SKYLAB	(73-027A-05)	GIACCONI					
X-RAY SPECTROGRAPHIC TELESCOPE			R 6.000E 01 TO 3.500E 00	A		0	139
EXPLORER 37	(68-017A-01)	KREPLIN					
SOLAR RADIATION DETECTORS			R 6.000E 01 TO 5.000E-01	A		0	16
VELA 5B	(69-046E-02)	CHAMBERS					
SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A			R 6.000E 01 TO 5.000E-01	A		0	34
VELA 6A	(70-027A-02)	CHAMBERS					
SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A			R 6.000E 01 TO 5.000E-01	A		0	48
VELA 6B	(70-027B-02)	CHAMBERS					
SOLAR X-RAY DETECTORS, .5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A			R 6.000E 01 TO 5.000E-01	A		0	51
EXPLORER 47	(72-073A-08)	KRIMIGIS					
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS			R 1.650E 01 TO 1.800E 00	A		I 0	112
IMP-J	(IMP-J -08)	KRIMIGIS					
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS			R 1.650E 01 TO 1.800E 00	A		I 0	244
OSO 7	(71-083A-01)	NEUPERT					
X-RAY AND EUV SPECTROHELIOGRAPH (2 TO 400 A)			R 1.500E 01 TO 8.000E 00	A		0	80
OV5-6	(69-046B-01)	YATES					
GEIGER-MUELLER TUBE, SOLAR X-RAY DETECTOR, 2 TO 12 A			R 1.200E 01 TO 2.000E 00	A		0	30
GOES-B	(GOES-B -03)	WILLIAMS					
SOLAR X-RAY MONITOR			R 8.000E 00 TO 5.000E-01	A		0	216
GOES-C	(GOES-C -03)	WILLIAMS					
SOLAR X-RAY MONITOR			R 8.000E 00 TO 5.000E-01	A		0	219
SMS-A	(SMS-A -03)	WILLIAMS					
SOLAR X-RAY MONITOR			R 8.000E 00 TO 5.000E-01	A		0	322
SMS-B	(SMS-B -02)	WILLIAMS					
SOLAR X-RAY MONITOR			R 8.000E 00 TO 5.000E-01	A		0	325

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	*	RANGE OF MEASUREMENTS MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX REGION MIN	ABCDEFGHI/012345M	PAGE
1.3.6 SENSING THE SUN								
SMS-C	(SMS-C -03)	WILLIAMS						
SOLAR X-RAY MONITOR			R	8.000E 00 TO	5.000E-01 A		0	328
OSO-I	(OSO-I -03)	NOVICK						
HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS			R	6.204E 00 TO	1.551E 00 A		I 0	296
OSO-I	(OSO-I -04)	CULHANE						
MAPPING X-RAY HELIOMETER			R	6.204E 00 TO	4.136E-01 A		0	297
OSO 7	(71-083A-05)	PETERSON						
HARD SOLAR X-RAY MONITORING			R	6.204E 00 TO	4.136E-02 A		0	83
OSO 7	(71-083A-01)	NEUPERT						
X-RAY AND EUV SPECTROHELIOGRAPH (2 TO 400 A)			R	2.500E 00 TO	1.700E 00 A		0	80
HELIOCENTRIC	(HELOCTR-09)	ANDERSON						
X-RAYS AND ELECTRONS			R	1.551E 00 TO	1.723E-01 A		0	237
OV5-6	(69-046B-02)	YATES						
SODIUM IODIDE SCINTILLATOR, GAMMA-RAY DETECTOR, 19 TO 1175 KEV			R	6.531E-01 TO	INFINITY		0	30
OSO 7	(71-083A-01)	NEUPERT						
X-RAY AND EUV SPECTROHELIOGRAPH (2 TO 400 A)			R	6.204E-01 TO	3.102E-01 A		0	80
EXPLORER 37	(68-017A-01)	KREPLIN						
SOLAR RADIATION DETECTORS			R	6.204E-01 TO	1.551E-01 A		0	16
TD 1A	(72-014A-06)	DE JAGER						
SOLAR X-RAY MONITOR			R	5.170E-01 TO	1.379E-02 A		0	100
INDIAN SCIENTIFIC SAT.	(INDASAT-02)	UNKNOWN						
SOLAR NEUTRON AND GAMMA RAYS			R	6.204E-02 TO	6.204E-04 A		0	247
TD 1A	(72-014A-07)	LABEYRIE						
GAMMA-RAY MEASUREMENT			R	7.000E 01 TO	3.000E 02 MEV		I 0	100
SRATS	(SRATS -01)	MATSUOKA						
SOLAR X-RAY MONITOR			R				0	330
SRATS	(SRATS -02)	OSHIO						
HYDROGEN LYMAN-ALPHA			R				0	330

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: * MIN VALUE / * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION / MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.7 SENSING HOT (STAR) SOURCES							
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11)	LILLIE	R			5	275
MARINER 77E MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77E-11)	LILLIE	R			5	281
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11)	LILLIE	R			5	275
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11)	LILLIE	R			5	281
MARINER 77A COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77A-02)	ESHLEMAN	R 0.000E-39 TO INFINITY			5	271
OAO 3 STELLAR PHOTOMETRY	(72-065A-02)	BOYD	R 5.000E 02 TO 1.000E 18 HZ		I		108
MARINER 77A SWEEP FREQUENCY (.02 TO 40 MHZ) RADIO RECEIVER	(MARN77A-10)	WARWICK	R 2.000E 04 TO 4.050E 07 HZ			5	275
MARINER 77B SWEEP FREQUENCY (.02 TO 40 MHZ) RADIO RECEIVER	(MARN77B-10)	WARWICK	R 2.000E 04 TO 4.050E 07 HZ			5	281
EXPLORER 49 RAPID-BURST RECEIVERS	(73-039A-02)	STONE	R 2.500E 04 TO 1.600E 07 HZ		I 0		141
EXPLORER 49 STEP FREQUENCY RADIOMETERS	(73-039A-01)	STONE	R 3.000E 04 TO 2.000E 07 HZ		I 0		140
MARINER 77E COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77B-02)	ESHLEMAN	R 1.000E 09 TO 1.000E 10 HZ			5	277
MARINER 77A INFRARED SPECTROSCOPY AND RADIOMETRY	(MARN77A-03)	HANEL	R 5.000E 05 TO 3.000E 04 A			5	271
MARINER 77B INFRARED SPECTROSCOPY AND RADIOMETRY	(MARN77B-03)	HANEL	R 5.000E 05 TO 3.000E 04 A			5	277
ANS UV TELESCOPE	(ANS -01)	VANDUINEN	R 3.295E 03 TO 1.500E 03 A		I		181
TD 1A STELLAR UV RADIATION EXPERIMENT	(72-014A-01)	HOUZIAUX	R 2.750E 03 TO 1.350E 03 A		I		98

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) MAX REGION / * MAX VALUE (LAMBDA) MIN	ABCDEFGHI/012345M	PAGE
1.3.7 SENSING HOT (STAR) SOURCES					
TD 1A UV STELLAR SPECTROMETER	(72-014A-02)		R 2.155E 03 TO 2.060E 03 A	I	98
MARINER 77A ULTRAVIOLET SPECTROSCOPY	(MARN77A-04)	BROADFOOT	R 1.800E 03 TO 4.000E 02 A	5	272
MARINER 77E ULTRAVIOLET SPECTROSCOPY	(MARN77B-04)	BROADFOOT	R 1.800E 03 TO 4.000E 02 A	5	278
MARINER-J VENUS/MERCURY EUV SPECTROSCOPY	(MARINJ -05)	BROADFOOT	R 1.657E 03 TO 4.750E 02 A A	I 123	268
OAO 3 HIGH-RESOLUTION TELESCOPES	(72-065A-01)	SPITZER	R 3.275E 02 TO 7.100E 02 A	I	108
ASTP SKY-EARTH X-RAY OBSERVATIONS	(ASTP -04)	FRIEDMAN	R 1.241E 02 TO 1.241E 01 A	I	184
HELOS LOW-ENERGY COSMIC X-RAY PACKAGE	(HELOS -02)	UNKNOWN	R 1.241E 02 TO 6.204E 00 A	I	240
OSO-I SOFT X-RAY BACKGROUND RADIATION INVESTIGATION	(OSO-I -05)	KRAUSHAAR	R 8.272E 01 TO 2.757E-01 A	I	297
SAS-C X-RAY ABSORPTION CONTOURS OF THE GALAXY	(SAS-C -04)	CLARK	R 6.204E 01 TO 1.241E 00 A	I	315
UK 5 0.3- TO 30-KEV COSMIC X-RAY WITH A ROTATION COLLIMATOR	(UK-5 -01)	BOYD	R 4.136E 01 TO 4.136E-01 A	I	336
SAS-C CONTINUOUS X-RAY FLUCTUATION MONITOR OF SCO X-1	(SAS-C -03)	CLARK	R 3.102E 01 TO 1.551E-01 A	I	314
SAS-C CONTINUOUS X-RAY FLUCTUATION MONITOR OF SCO X-1	(SAS-C -03)	CLARK	R 3.102E 01 TO 1.551E-01 A	I	314
EXPLORER 47 PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(72-073A-08)	KRIMIGIS	R 1.650E 01 TO 1.800E 00 A	I 0	112
IMP-J PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(IMP-J -08)	KRIMIGIS	R 1.650E 01 TO 1.800E 00 A	I 0	244
EXPLORER 42 ALL-SKY X-RAY SURVEY	(70-107A-01)	GIACCONI	R 1.241E 01 TO 1.241E 00 A	I	55
EXPLORER 42 ALL-SKY X-RAY SURVEY	(70-107A-01)	GIACCONI	R 1.241E 01 TO 6.204E-01 A	I	55

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE * MAX VALUE	(F OR E) (LAMBDA)	MAX REGION MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.7 SENSING HOT (STAR) SOURCES							
OSO 7	(71-083A-04)	CLARK					
COSMIC X-RAY SOURCES IN THE RANGE 1.5 TO 9 A			R 1.241E 01 TO 2.068E-01	A		I	82
VELA 5B	(69-046E-06)	CONNER					
COSMIC RAYS			R 1.200E 01 TO 1.200E 01	A		I	36
EXPLORER 44	(71-058A-02)	KREPLIN					
ALL-SKY X-RAY SURVEY			R 1.200E 01 TO 5.000E-01	A		I	76
SAS-C	(SAS-C -01)	CLARK					
ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES			R 8.272E 00 TO 1.241E 00	A		I	313
SAS-C	(SAS-C -01)	CLARK					
ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES			R 8.272E 00 TO 1.241E 00	A		I	313
HELOS	(HELOS -01)	UNKNOWN					
MEDIUM-ENERGY COSMIC X-RAY PACKAGE			R 8.272E 00 TO 6.204E-01	A		I	240
UK 5	(UK-5 -02)	POUNDS					
2- TO 10-KEV SKY SURVEY			R 8.272E 00 TO 6.204E-01	A		I	337
SAS-C	(SAS-C -02)	CLARK					
ANALYSIS OF GALACTIC X-RAY SOURCES			R 6.893E 00 TO 1.551E 00	A		I	314
OSO-I	(OSO-I -03)	NOVICK					
HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS			R 6.204E 00 TO 1.551E 00	A		I 0	296
UK 5	(UK-5 -04)	POUNDS					
POLARIMETER/SPECTROMETER			R 6.204E 00 TO 1.551E 00	A		I	338
UK 5	(UK-5 -03)	BOYD					
HIGH-RESOLUTION SOURCE SPECTRA			R 6.204E 00 TO 4.136E-01	A		I	337
ANS	(ANS -03)	GURSKY					
HIGH ANGULAR AND SPECTRAL RESOLUTION OBSERVATIONS OF COSMIC X-RAY SOURCES			R 6.204E 00 TO 3.102E-01	A		I	182
OSO-I	(OSO-I -06)	BOLDT					
COSMIC X-RAY SPECTROSCOPY			R 6.204E 00 TO 3.102E-01	A		I	298
INDIAN SCIENTIFIC SAT.	(INDASAT-01)	UNKNOWN					
X-RAY ASTRONOMY			R 6.204E 00 TO 1.241E-01	A		I	247
MARINER 77A	(MARN77A-01)	SMITH					
TV PHOTOGRAPHY			R 6.100E 00 TO 4.140E 00	A			270
MARINER 77B	(MARN77B-01)	SMITH					
TV PHOTOGRAPHY			R 6.100E 00 TO 4.140E 00	A			276
UK 5	(UK-5 -06)	HOLT					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	* MAX VALUE (LAMBDA)	MAX REGION / MIN	PLANET ABCDEFGHI/012345M	PAGE
1.3.7 SENSING HOT (STAR) SOURCES							
ALL-SKY MONITOR			R 4.136E 00	TO 2.068E 00 A		I	339
TD 1A	(72-014A-04)	LABEYRIE					
SPECTROMETRY OF EXTRATERRESTRIAL X RAYS			R 4.136E 00	TO 4.136E-01 A		I	99
ANS	(ANS -02)	DE JAGER					
LOW-ENERGY X-RAY EXPERIMENT			R 4.000E 00	TO 2.000E 00 A		I	182
OSO 7	(71-083A-03)	PETERSON					
COSMIC X-RAY EXPERIMENT			R 1.241E 00	TO 4.136E-02 A		I	82
OSO-I	(OSO-I -07)	FROST					
HIGH-ENERGY CELESTIAL X RAYS			R 1.241E 00	TO 1.241E-02 A		I	298
UK 5	(UK-5 -05)	ELLIOTT					
HIGH-ENERGY COSMIC X-RAY SPECTRA			R 6.204E-01	TO 6.204E-03 A		I	338
VELA 5A	(69-046D-08)	KLEBESADEL					
GAMMA-RAY ASTRONOMY			R 6.204E-02	TO 1.241E-02 A		I	33
VELA 6A	(70-027A-08)	KLEBESADEL					
GAMMA-RAY ASTRONOMY			R 4.136E-02	TO 8.272E-03 A		I	50
VELA 6B	(70-027B-08)	KLEBESADEL					
GAMMA-RAY ASTRONOMY			R 4.136E-02	TO 8.272E-03 A		I	53
TD 1A	(72-014A-05)	OCCHIALINI					
SOLAR GAMMA RAYS IN THE 50- TO 500-MEV ENERGY RANGE			R 5.000E 01	TO 5.000E 02 MEV		I	99
TD 1A	(72-014A-07)	LABEYRIE					
GAMMA-RAY MEASUREMENT			R 7.000E 01	TO 3.000E 02 MEV		I 0	100
ASTP	(ASTP -01)	BOWYER					
EXTREME ULTRAVIOLET ASTRONOMY			R			I	183
EXOS-C	(EXOS-C -01)	UNKNOWN					
X-RAY AND GAMMA-RAY ASTRONOMICAL TELESCOPES			R			I	212
ASTP	(ASTP -02)	BOWYER					
HELIUM GLOW			R			I	183
EXOS-C	(EXOS-C -02)	UNKNOWN					
ULTRAVIOLET TELESCOPE			R			I	212
EXOS-C	(EXOS-C -03)	UNKNOWN					
INFRARED TELESCOPE			R			I	213

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI/012345M	PLANET	PAGE
2. CHARGED PARTICLE MEASUREMENTS							
2.1 SENSING ELECTRONS							
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)							
PIONEER 7 ELECTROSTATIC ANALYZER	(66-075A-03)	WOLFE	R	THERMAL ENERGIES	H		8
PIONEER 8 TWO-FREQUENCY BEACON RECEIVER	(67-123A-03)	ESHLEMAN	U	THERMAL ENERGIES	B H		13
PIONEER 9 TWO-FREQUENCY BEACON RECEIVER	(68-100A-03)	ESHLEMAN	U	THERMAL ENERGIES	B H		19
ISIS 1 SWEEP FREQUENCY SOUNDER	(69-009A-01)	WHITTEKER	U	THERMAL ENERGIES	C		25
ISIS 1 FIXED FREQUENCY SOUNDER	(69-009A-02)	CALVERT	U	THERMAL ENERGIES	C		26
ISIS 2 SWEEP FREQUENCY SOUNDER	(71-024A-01)	WHITTEKER	U	THERMAL ENERGIES	C		67
ISIS 2 FIXED FREQUENCY SOUNDER	(71-024A-02)	CALVERT	U	THERMAL ENERGIES	C		68
ISIS 2 CYLINDRICAL ELECTROSTATIC PROBE	(71-024A-07)	BRACE	U	THERMAL ENERGIES	C		71
EXPLORER 49 CAPACITANCE PROBE	(73-039A-03)	STONE	U	THERMAL ENERGIES		M	141
AE-C ELECTRON TEMPERATURE AND CONCENTRATION	(AE-C -01)	BRACE	U	THERMAL ENERGIES	C		148
AE-C ION TEMPERATURE	(AE-C -04)	HANSON	U	THERMAL ENERGIES	C		149
AE-D ION TEMPERATURE	(AE-D -04)	HANSON	U	THERMAL ENERGIES	C		160
AE-E ELECTRON TEMPERATURE AND CONCENTRATION	(AE-E -01)	BRACE	U	THERMAL ENERGIES	B		169
AE-E ION TEMPERATURE	(AE-E -04)	HANSON	U	THERMAL ENERGIES	B		170
AEROS-B ELECTRON CONCENTRATION IN THE IONOSPHERE	(AEROS-B-03)	NESKE	U	THERMAL ENERGIES	C		179
DAUGHTER RADIO PROPAGATION RECEIVER	(DALGHTR-05)	HARVEY	U	THERMAL ENERGIES	B GH		199
ESGEO	(ESGEO -02)	BOYD					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2. CHARGED PARTICLE MEASUREMENTS									
2.1 SENSING ELECTRONS									
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)									
THERMAL PLASMA FLOW			R				F		206
EXOS-A ENERGETIC PARTICLE DETECTORS	(EXOS-A -02)	UNKNOWN	O				B		209
INTASAT IONOSPHERIC BEACON	(INTASAT-01)	UNKNOWN	U	THERMAL ENERGIES			C		248
ISS SWEEP FREQUENCY SOUNDER	(ISS -01)		U	THERMAL ENERGIES			C		249
ISS RETARDING POTENTIAL PROBE	(ISS -03)	MIYAZAKI	U	THERMAL ENERGIES			B		250
MOTHER IMPEDANCE PROBE AND RADIO PROPAGATION TRANSMITTER	(MOTHER -08)	HARVEY	U	THERMAL ENERGIES			DEFGH		285
PIONEER VENUS PROBE A LANGMUIR PROBE	(PIO78PA-01)	NAGY	U	THERMAL ENERGIES			H	2	300
SRATS ELECTRON DENSITY MEASUREMENT	(SRATS -04)	OHYA	U				B		331
SRATS ELECTRON TEMPERATURE	(SRATS -05)	HIRAO	U				B		331
SRATS PLASMA DIAGNOSIS	(SRATS -06)	UNKNOWN	U				B		331
VIKING-A ATMOSPHERIC COMPOSITION	(VIKNG-A-04)	NIER	U	THERMAL ENERGIES	EV			4	341
PIONEER 6 TWO-FREQUENCY RADIO RECEIVER	(65-105A-04)	ESHLEMAN	U	THERMAL ENERGIES			B H	0	5
ISIS 1 RADIO BEACON	(69-009A-09)	FORSYTH	U	THERMAL ENERGIES			C		29
ATS 5 RADIO BEACON	(69-069A-12)	DARCSA	U	THERMAL ENERGIES			AB	3	39
ISIS 2 RADIO BEACON	(71-024A-09)	FORSYTH	U	THERMAL ENERGIES			C		72
ESRO 4 POSITIVE ION SPECTROMETER	(72-092A-01)	BOYD	U	THERMAL ENERGIES			BC		120
AE-D	(AE-D -01)	BRACE							

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / MAX VALUE (LAMBDA)	REGION: MAX / MIN	PLANET: ABCDEFGHI/012345N	PAGE

2. CHARGED PARTICLE MEASUREMENTS

2.1 SENSING ELECTRONS

2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)

ELECTRON TEMPERATURE AND CONCENTRATION			U	THERMAL ENERGIES		C	159
AEROS-B ENERGY DISTRIBUTION OF IONS AND ELECTRONS	(AEROS-B-02)	SPENNER	U	THERMAL ENERGIES		C	178
ATS-F RADIO BEACON	(ATS-F -09)	DAVIES	U	THERMAL ENERGIES		B H	193
INDIAN SCIENTIFIC SAT. IONOSPHERIC ELECTRON TRAP AND UV CHAMBERS	(INDASAT-03)	UNKNOWN	D	THERMAL ENERGIES		B	247
MARINER 77B COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77B-02)	ESHLEMAN	U	THERMAL ENERGIES		5	277
PIONEER VENUS PROBE A RETARDING POTENTIAL ANALYZER	(P1078PA-04)	KNUDSEN	U	THERMAL ENERGIES	2		301
EXOS-A IONOSPHERIC PROBES	(EXOS-A -01)	UNKNOWN	U	THERMAL ENERGIES		C	209
EXOS-B MAGNETOSPHERIC PLASMA PROBE	(EXOS-B -01)	UNKNOWN	R	THERMAL ENERGIES		DE	211
MARINER 77A COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77A-02)	ESHLEMAN	U			5	271
VIKING-B ATMOSPHERIC COMPOSITION	(VIKNG-B-04)	NIER	U	THERMAL ENERGIES		4	349
EXOS-B MAGNETOSPHERIC PLASMA	(EXOS-B -04)	UNKNOWN	U	THERMAL ENERGIES		DE	211
DAUGHTER HOT PLASMA	(DAUGHTR-03)	FRANK	R	THERMAL ENERGIES		GH	198
HAWKEYE LOW-ENERGY PROTONS AND ELECTRONS	(HAWKEYE-02)	FRANK	R	THERMAL ENERGIES		DEFGH	222
MOTHER HOT PLASMA	(MOTHER -03)	FRANK	R	THERMAL ENERGIES		GH	283
MOTHER HOT PLASMA	(MOTHER -03)	FRANK	R	THERMAL ENERGIES		GH	283
EXOS-B	(EXOS-B -02)	UNKNOWN					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
2. CHARGED PARTICLE MEASUREMENTS							
2.1 SENSING ELECTRONS							
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)							
ENERGETIC PARTICLE DETECTORS			0	1.000E 00 TO 1.000E 03 EV	DE		211
AE-C PHOTOELECTRON SPECTROMETER	(AE-C -03)	DOERING	R	2.000E 00 TO 5.000E 02 EV	C		149
AE-D PHOTOELECTRON SPECTROMETER	(AE-D -03)	DOERING	R	2.000E 00 TO 5.000E 02 EV	C		160
AE-E PHOTOELECTRON SPECTROMETER	(AE-E -03)	DOERING	R	2.000E 00 TO 5.000E 02 EV	B		170
MARINER-J VENUS/MERCURY MEASUREMENT OF PLASMA ENVIRONMENT	(MARINJ -03)	BRIDGE	R	4.000E 00 TO 4.000E 02 EV	H		267
EXPLORER 43 MEASUREMENT OF SOLAR PLASMA	(71-019A-11)	BAME	R	4.000E 00 TO 1.000E 03 EV	DEFGH		64
EXPLORER 47 MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(72-073A-04)	FRANK	R	5.000E 00 TO 1.000E 03 EV	GH		110
DAUGHTER 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	(DAUGHTR-01)	PASCHMANN	R	5.000E 00 TO 2.000E 04 EV	GH		197
HELIOCENTRIC 150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE	(HELOCTR-01)	BAME	R	5.000E 00 TO 2.500E 03 EV	GH		234
IMP-J MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(IMP-J -04)	FRANK	R	5.000E 00 TO 5.000E 04 EV	GH		242
IMP-J MEASUREMENT OF SOLAR PLASMA	(IMP-J -10)	BAME	R	5.000E 00 TO 2.000E 04 EV	GH		245
MOTHER 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	(MOTHER -01)	BAME	R	5.000E 00 TO 2.000E 04 EV	GH		282
EXPLORER 47 MEASUREMENT OF SOLAR PLASMA	(72-073A-10)	BAME	R	5.000E 00 TO 2.000E 04 EV	GH		113
MOTHER THREE-DIMENSIONAL (SIX AXIS), 6-EV TO 10-KEV ELECTRON SPECTROMETER	(MOTHER -02)	OGILVIE	R	6.000E 00 TO 1.000E 04 EV	DEFGH		283
APOLLO 12 LM/ALSEP SOLAR WIND SPECTROMETER	(69-099C-02)	SNYDER	R	6.000E 00 TO 1.330E 03 EV	GH	M	41

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS / E MIN VALUE (F OR E) MAX / S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/012345M	PLANET	PAGE

2. CHARGED PARTICLE MEASUREMENTS

2.1 SENSING ELECTRONS

2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS	REGION	PLANET	PAGE
EXPLORER 43 — MEASUREMENT OF SOLAR PLASMA	(71-019A-11)	BAME	R 6.000E 00 TO 2.400E 04 EV	DEFGH		64
VELA 6A — SOLAR WIND EXPERIMENT	(70-027A-05)	BAME	R 7.500E 00 TO 1.850E 04 EV	GH		49
ISIS 2 — SOFT-PARTICLE SPECTROMETER	(71-024A-05)	HEIKKILA	R 1.000E 01 TO 1.000E 04 EV	DEF		70
PIONEER 8 — ELECTROSTATIC ANALYZER	(67-123A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		12
PIONEER 9 — ELECTROSTATIC ANALYZER	(68-100A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		18
PIONEER 8 — ELECTROSTATIC ANALYZER	(67-123A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		12
PIONEER 9 — ELECTROSTATIC ANALYZER	(68-100A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		18
PIONEER 8 — ELECTROSTATIC ANALYZER	(67-123A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		12
PIONEER 8 — ELECTROSTATIC ANALYZER	(67-123A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		12
PIONEER 9 — ELECTROSTATIC ANALYZER	(68-100A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		18
PIONEER 9 — ELECTROSTATIC ANALYZER	(68-100A-02)	WOLFE	R 1.200E 01 TO 1.000E 03 EV	H		18
HELIOS-B — PLASMA DETECTORS	(HELIO-B-09)	ROSENBAUER	R 1.600E 01 TO 1.000E 03 EV	H		232
HELIOS-A — PLASMA DETECTORS	(HELIO-A-09)	ROSENBAUER	R 1.600E 01 TO 1.000E 03 EV	H		226
EXPLORER 47 — MEASUREMENT OF SOLAR PLASMA	(72-073A-02)	BRIDGE	R 1.700E 01 TO 7.000E 03 EV	GH		109
IMP-J — MEASUREMENT OF SOLAR PLASMA	(IMP-J -02)	BRIDGE	R 1.700E 01 TO 7.000E 03 EV	GH		241
VELA 5B — SOLAR WIND EXPERIMENT	(69-046E-05)	BAME	R 2.000E 01 TO 3.300E 04 EV	GH		36

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	REGION: MIN ABCDEFGHI	PLANET: 012345M	PAGE
2. CHARGED PARTICLE MEASUREMENTS								
2.1 SENSING ELECTRONS								
2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)								
VELA 6A SOLAR WIND EXPERIMENT	(70-027A-05)	BAME	R	2.000E 01 TO	3.300E 04 EV	G		49
HEOS 2 ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	(72-005A-02)	PIZZELLA	R	2.400E 01 TO	1.100E 03 EV	C GH		87
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-05)	FRANK	R	2.400E 01 TO	1.100E 03 EV	H		61
DAUGHTER 50-EV TO 25-KEV ION AND 35-EV TO 7-KEV ELECTRON PLASMA PROBES	(DAUGHTR-02)	EGIDI	R	3.500E 01 TO	7.000E 03 EV	GH		197
APOLLO 14 LM/ALSEP CHARGED PARTICLE LUNAR ENVIRONMENT	(71-008C-08)	O'BRIEN	R	4.000E 01 TO	2.000E 03 EV	GH		58
ATS-F AURORAL PARTICLES EXPERIMENT	(ATS-F -05)	MCILWAIN	R	5.000E 01 TO	5.000E 02 EV	F		192
ATS 5 BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	(69-069A-11)	MCILWAIN	R	6.000E 01 TO	6.000E 02 EV	F		39
VELA 5B SOLAR WIND EXPERIMENT	(69-046E-05)	BAME	R	7.500E 01 TO	1.800E 04 EV	GH		36
PIONEER 6 SOLAR WIND PLASMA FARADAY CUP	(65-105A-02)	BRIDGE	R	9.000E 01 TO	1.580E 03 EV	H		4
PIONEER 11 PLASMA EXPERIMENT	(73-019A-13)	WOLFE	R	1.000E 02 TO	1.800E 04 EV	H		137
PIONEER 10 PLASMA EXPERIMENT	(72-012A-13)	WOLFE	R	1.000E 02 TO	1.800E 04 EV	H		96
ESRO 4 AURORAL PARTICLE SPECTROMETER	(72-092A-03)	HULTQUIST		1.000E 02 TO	3.000E 02 EV	C		121
PIONEER 11 PLASMA EXPERIMENT	(73-019A-13)	WOLFE	R	1.000E 02 TO	1.800E 04 EV		5	137
PIONEER 10 PLASMA EXPERIMENT	(72-012A-13)	WOLFE	R	1.000E 02 TO	1.800E 04 EV		5	96
ESRO 4 AURORAL PARTICLE SPECTROMETER	(72-092A-03)	HULTQUIST	O	1.500E 02 TO	1.000E 03 EV	C		121
AE-C	(AE-C -12)	HOFFMAN						

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) S MAX VALUE (LAMBDA)	MAX REGION MIN ABCDEFGHI/012345N	PLANET	PAGE

2. CHARGED PARTICLE MEASUREMENTS

2.1 SENSING ELECTRONS

2.1.1 OF THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)

LOW-ENERGY ELECTRONS			R 2.000E 02 TO 2.500E 04 EV	B		155
AE-D LOW-ENERGY ELECTRONS	(AE-D -12)	HOFFMAN	R 2.000E 02 TO 2.500E 04 EV	B		166
ESGEO LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	(ESGEO -04)	HULTQUIST	R 2.000E 02 TO 2.000E 03 EV	F		207
ATS-F AURORAL PARTICLES EXPERIMENT	(ATS-F -05)	MCILWAIN	R 5.000E 02 TO 5.000E 03 EV	F		192
ATS 5 BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	(69-069A-11)	MCILWAIN	R 6.000E 02 TO 6.000E 03 EV	F		39
EXPLORER 45 CHANNEL ELECTRON MULTIPLIERS WITH ELECTROSTATIC ANALYZERS	(71-096A-01)	HOFFMAN	R 8.000E 02 TO 2.500E 04 EV	DEF		84
DAUGHTER HOT PLASMA	(DAUGHTR-03)	FRANK	R 1.000E 03 TO 1.000E 04 EV	GH		198
HAWKEYE LOW-ENERGY PROTONS AND ELECTRONS	(HAWKEYE-02)	FRANK	R 1.000E 03 TO 1.000E 04 EV	DEFGH		222
EXOS-B ENERGETIC PARTICLE DETECTORS	(EXOS-B -02)	UNKNOWN	O 1.000E 03 TO 1.000E 04 EV	DE		211
IMP-J MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(IMP-J -04)	FRANK	R 1.000E 03 TO 1.000E 04 EV	GH		242
EXPLORER 47 MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(72-073A-04)	FRANK	R 1.000E 03 TO 1.000E 04 EV	GH		110
ESRO 4 AURORAL PARTICLE SPECTROMETER	(72-092A-03)	HULTQUIST	O 1.000E 03 TO 1.500E 04 EV	C		121

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS (F OR E) (LAMBDA)	REGION ABCDEFGHI/012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)					
HEOS 2 ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	(72-005A-02)	PIZZELLA	R 1.100E 03 TO 1.200E 04 EV	C GH	87
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-05)	FRANK	R 1.100E 03 TO 1.200E 04 EV	H	61
EXPLORER 47 PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(72-073A-08)	KRIMIGIS	R 1.500E 03 TO 2.500E 06 EV	GH	112
IMP-J PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(IMP-J -08)	KRIMIGIS	R 1.500E 03 TO 2.500E 06 EV	GH	244
APOLLO 14 LM/ALSEP CHARGED PARTICLE LUNAR ENVIRONMENT	(71-008C-08)	O'BRIEN	R 2.000E 03 TO 2.000E 04 EV	GH M	58
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH	287
ATS-F LOW-ENERGY PROTON/ELECTRON EXPERIMENT	(ATS-F -03)	ARNOLDY	R 2.000E 03 TO 2.500E 04 EV	F	191
ESGEO LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	(ESGEO -04)	HULTQUIST	R 2.000E 03 TO 2.000E 04 EV	F	207
HELIOCENTRIC X-RAYS AND ELECTRONS	(HELOCTR-09)	ANDERSON	R 2.000E 03 TO 2.000E 04 EV	H	237
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH	200
ISIS 2 ENERGETIC PARTICLE DETECTORS	(71-024A-04)	MCDIARMID	R 3.000E 03 TO 2.000E 05 EV	DEF	69
ATS-F AURORAL PARTICLES EXPERIMENT	(ATS-F -05)	MCILWAIN	R 5.000E 03 TO 5.000E 04 EV	F	192
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH	287
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH	200
ATS 5 BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	(69-069A-11)	MCILWAIN	R 6.000E 03 TO 6.000E 04 EV	F	39
ISIS 1 ENERGETIC PARTICLE DETECTORS	(69-009A-04)	MCDIARMID	R 8.000E 03 TO 7.000E 05 EV	DEF	27

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS (F OR E) (LAMBDA)	R E S	MIN VALUE MAX VALUE	MAX REGION MIN	REGION ABCDEFGHI	PLANET /012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)									
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 8.000E 03 TO 8.000E 04 EV				GH		287
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R 8.000E 03 TO 8.000E 04 EV				GH		200
MARINER 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77A-07)	KRIMIGIS	R 1.000E 04 TO 1.000E 05 EV				H	5	273
MARINER 77E LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77B-07)	KRIMIGIS	R 1.000E 04 TO 1.000E 05 EV				H	5	279
EXPLORER 43 MONITORING OF SOLAR PROTONS	(71-019A-07)	BOSTROM	U 1.000E 04 TO INFINITY				FGH		62
DAUGHTER HOT PLASMA	(DAUGHTR-03)	FRANK	R 1.000E 04 TO 5.000E 04 EV				GH		198
HAWKEYE LOW-ENERGY PROTONS AND ELECTRONS	(HAWKEYE-02)	FRANK	R 1.000E 04 TO 5.000E 04 EV				DEFGH		222
MOTHER HOT PLASMA	(MOTHER -03)	FRANK	R 1.000E 04 TO 5.000E 04 EV				GH		283
EXPLORER 47 MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(72-073A-04)	FRANK	R 1.000E 04 TO 5.000E 04 EV				GH		110
IMP-J MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(IMP-J -04)	FRANK	R 1.000E 04 TO 5.000E 04 EV				GH		242
HEOS 2 ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	(72-005A-02)	PIZZELLA	R 1.200E 04 TO 5.000E 04 EV			C	GH		87
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-05)	FRANK	R 1.200E 04 TO 5.000E 04 EV				H		61
EXPLORER 43 MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	(71-019A-06)	ANDERSON	R 1.800E 04 TO 1.800E 05 EV				H		61
EXPLORER 43 MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	(71-019A-06)	ANDERSON	R 2.000E 04 TO INFINITY				H		61
ATS-F PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION	(ATS-F -04)	WINCKLER	R 2.000E 04 TO 1.500E 06 EV				F		191

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGH	PLANET I/012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)						
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-07) WILLIAMS	R	2.000E 04 TO 2.000E 05 EV	DEFGH		199
HELIOCENTRIC X-RAYS AND ELECTRONS	(HELOCTR-09) ANDERSON	R	2.000E 04 TO 2.000E 05 EV	H		237
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -09) WILLIAMS	R	2.000E 04 TO 2.000E 05 EV	DEFGH		286
PIONEER 10 JOVIAN TRAPPED RADIATION	(72-012A-05) FILLIUS	U	2.500E 04 TO 2.500E 05 EV	H	S	92
PIONEER 11 JOVIAN TRAPPED RADIATION	(73-019A-05) FILLIUS	U	2.500E 04 TO 2.500E 05 EV	H	S	133
VELA 5B ELECTRON DETECTORS	(69-046E-04) SINGER	R	3.000E 04 TO 1.500E 05 EV	GH		35
VELA 6A ELECTRON DETECTORS	(70-027A-04) SINGER	R	3.000E 04 TO 1.500E 05 EV	GH		49
VELA 6B ELECTRON DETECTORS	(70-027B-04) SINGER	R	3.000E 04 TO 1.500E 05 EV	GH		52
EXPLORER 47 ENERGETIC ELECTRONS AND PROTONS	(72-073A-05) WILLIAMS	R	3.000E 04 TO 4.000E 05 EV	GH		111
ESGEO ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	(ESGEO -01) PFOTZER	R	3.000E 04 TO 2.000E 05 EV	F		206
IMP-J ENERGETIC ELECTRONS AND PROTONS	(IMP-J -05) WILLIAMS	R	3.000E 04 TO 4.000E 05 EV	GH		243
EXPLORER 45 SOLID-STATE DETECTORS	(71-096A-03) WILLIAMS	R	3.500E 04 TO 4.000E 05 EV	DEF		85
OV5-6 LOW-ENERGY ELECTRON DETECTOR	(69-046B-05) YATES	O	4.000E 04 TO INFINITY	EFGH		31
ATS 5 TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE DETECTOR	(69-069A-04) MOZER	R	4.000E 04 TO 1.200E 05 EV	F		38
HELIOS-A ENERGETIC ELECTRON DETECTOR	(HELIO-A-10) KEPPLER	R	4.000E 04 TO 1.000E 05 EV	H		227
HELIOS-B ENERGETIC ELECTRON DETECTOR	(HELIO-B-10) KEPPLER	R	4.000E 04 TO 1.000E 05 EV	H		232
ESRO 4 AURORAL PARTICLE SPECTROMETER	(72-092A-03) HULTQUIST	U	4.000E 04 TO 1.000E 08 EV	C		121

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / MAX VALUE (LAMBDA)	REGION: MIN ABCDEFGHI / MAX 012345M	PLANET	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)							
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-08)	FRANK	U	4.500E 04 TO INFINITY	H		61
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS	(HELIO-A-08)	TRAINOR	R	5.000E 04 TO 5.000E 05 EV	H		226
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS	(HELIO-B-08)	TRAINOR	R	5.000E 04 TO 5.000E 05 EV	H		231
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-08)	MCDONALD	R	5.000E 04 TO 2.000E 06 EV	FGH		63
EXPLORER 47 STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	(72-073A-13)	CLINE	R	5.000E 04 TO 5.000E 05 EV	GH		115
PIONEER 10 JOVIAN CHARGED PARTICLES EXPERIMENT	(72-012A-11)	VAN ALLEN	U	5.000E 04 TO INFINITY	H		95
ESRO 4 AURORAL PARTICLE SPECTROMETER	(72-092A-03)	HULTQUIST	O	5.000E 04 TO 1.500E 05 EV	C		121
PIONEER 11 JOVIAN CHARGED PARTICLES EXPERIMENT	(73-019A-11)	VAN ALLEN	U	5.000E 04 TO INFINITY	H		136
ATS-F SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	(ATS-F -06)	MASLEY	R	5.000E 04 TO 8.000E 05 EV	F		192
PIONEER 10 JOVIAN CHARGED PARTICLES EXPERIMENT	(72-012A-11)	VAN ALLEN	R	5.000E 04 TO INFINITY		5	95
PIONEER 10 COSMIC-RAY SPECTRA	(72-012A-12)	MCDONALD	R	5.000E 04 TO 1.000E 06 EV	H		96
PIONEER 11 COSMIC-RAY SPECTRA	(73-019A-12)	MCDONALD	R	5.000E 04 TO 1.000E 06 EV	H		136
PIONEER 11 JOVIAN CHARGED PARTICLES EXPERIMENT	(73-019A-11)	VAN ALLEN	U	5.000E 04 TO INFINITY		5	136
PIONEER 10 COSMIC-RAY SPECTRA	(72-012A-12)	MCDONALD	R	5.000E 04 TO 1.000E 06 EV		5	96
PIONEER 11 COSMIC-RAY SPECTRA	(73-019A-12)	MCDONALD	R	5.000E 04 TO 1.000E 06 EV		5	136
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	O	7.000E 04 TO 2.000E 05 EV	H		236
ATS-F OMNIDIRECTIONAL SPECTROMETER	(ATS-F -07)	BLAKE	U	8.000E 04 TO 6.000E 05 EV	F		192

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	MAX REGION MIN ABCDEFGHI/012345M	PLANET	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)							
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R	8.000E 04 TO 2.000E 05 EV	GH		287
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R	8.000E 04 TO 2.000E 05 EV	GH		200
HELIOS-A ENERGETIC ELECTRON DETECTOR	(HELIO-A-10)	KEPPLER	R	1.000E 05 TO 1.000E 06 EV	H		227
HELIOS-B ENERGETIC ELECTRON DETECTOR	(HELIO-B-10)	KEPPLER	R	1.000E 05 TO 1.000E 06 EV	H		232
MARINER 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77A-07)	KRIMIGIS	R	1.000E 05 TO 1.100E 06 EV	H	5	273
MARINER 77B LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77B-07)	KRIMIGIS	R	1.000E 05 TO 1.100E 06 EV	H	5	279
PIONEER 10 JOVIAN TRAPPED RADIATION	(72-012A-05)	FILLIUS	R	1.000E 05 TO 3.000E 06 EV	H	5	92
PIONEER 11 JOVIAN TRAPPED RADIATION	(73-019A-05)	FILLIUS	R	1.000E 05 TO 3.000E 06 EV	H	5	133
ITOS-F SOLAR PROTON MONITOR	(ITOS-F -01)	BOSTROM	U	1.400E 05 TO INFINITY	BC		251
ITOS-G SOLAR PROTON MONITOR	(ITOS-G -01)	BOSTROM	U	1.400E 05 TO INFINITY	BC		254
EXPLORER 47 ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(72-073A-06)	STONE	R	1.500E 05 TO 1.500E 06 EV	GH		111
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R	1.500E 05 TO 2.000E 06 EV	GH		113
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(IMP-J -06)	STONE	R	1.500E 05 TO 1.500E 06 EV	GH		243
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -09)	MCDONALD	R	1.500E 05 TO 2.000E 06 EV	GH		244
EXPLORER 43 MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	(71-019A-06)	ANDERSON	R	1.800E 05 TO 4.500E 05 EV	H		61
EXPLORER 43 MEDIUM-ENERGY SOLAR PROTONS AND	(71-019A-06)	ANDERSON					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION ABCDEFGHI	PLANET /012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)							
ELECTRONS			U	1.800E 05 TO INFINITY	H		61
PIONEER 10	(72-012A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION			R	2.000E 05 TO 2.000E 06 EV	H	5	91
PIONEER 11	(73-019A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION			R	2.000E 05 TO 2.000E 06 EV	H	5	132
MARINER-J VENUS/MERCURY	(MARINJ -07)	SIMPSON					
ENERGETIC PARTICLES			R	2.000E 05 TO 2.000E 06 EV	H	12	269
DAUGHTER	(DAUGHTR-07)	WILLIAMS					
ENERGETIC ELECTRONS AND PROTONS			R	2.000E 05 TO 2.000E 06 EV	DEFGH		199
HELIOCENTRIC	(HELOCTR-09)	ANDERSON					
X-RAYS AND ELECTRONS			R	2.000E 05 TO 1.000E 06 EV	H		237
MOTHER	(MOTHER -09)	WILLIAMS					
ENERGETIC ELECTRONS AND PROTONS			R	2.000E 05 TO 1.000E 06 EV	DEFGH		286
EXPLORER 47	(72-073A-07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R	3.000E 05 TO 3.000E 06 EV	GH		112
IMP-J	(IMP-J -07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS			R	3.000E 05 TO 3.000E 06 EV	GH		244
HELIOCENTRIC	(HELOCTR-04)	VON ROSENVING					
SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES			G	3.000E 05 TO 1.200E 07 EV	H		235
PIONEER 9	(68-100A-06)	WEBBER					
COSMIC-RAY TELESCOPE			R	3.100E 05 TO 1.900E 06 EV	H		21
PIONEER 8	(67-123A-06)	WEBBER					
COSMIC-RAY GRADIENT DETECTOR			U	3.400E 05 TO 5.200E 05 EV	H		15
HEOS 2	(72-005A-04)	PAGE					
PARTICLE COUNTER TELESCOPE			R	4.500E 05 TO 3.200E 06 EV	C GH		88
ATS 5	(69-069A-02)	MCILWAIN					
OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR			R	5.000E 05 TO 5.000E 06 EV	F		38
GOES-B	(GOES-B -02)	WILLIAMS					
ENERGETIC PARTICLE MONITOR			U	5.000E 05 TO INFINITY	F		216
GOES-C	(GOES-C -02)	WILLIAMS					
ENERGETIC PARTICLE MONITOR			U	5.000E 05 TO INFINITY	F		219
SMS-A	(SMS-A -02)	WILLIAMS					
ENERGETIC PARTICLE MONITOR			U	5.000E 05 TO INFINITY	F		322

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R/E/S	RANGE OF MEASUREMENTS: MIN VALUE	(F OR E) / (LAMBDA)	MAX VALUE	REGION MIN ABCDEFGHI	PLANET 012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)									
HELIOS-A	(HELIO-A-08)	TRAINOR							
GALACTIC AND SOLAR COSMIC RAYS			R	5.000E 05	TO	5.000E 06 EV	H		226
HELIOS-B	(HELIO-B-08)	TRAINOR							
GALACTIC AND SOLAR COSMIC RAYS			R	5.000E 05	TO	5.000E 06 EV	H		231
EXPLORER 47	(72-073A-13)	CLINE							
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS			R	5.000E 05	TO	2.000E 06 EV	GH		115
SMS-B	(SMS-B -01)	WILLIAMS							
ENERGETIC PARTICLE MONITOR			U	5.000E 05	TO	INFINITY	F		324
SMS-C	(SMS-C -02)	WILLIAMS							
ENERGETIC PARTICLE MONITOR			U	5.000E 05	TO	INFINITY	F		328
PIONEER 8	(67-123A-06)	WEBBER							
COSMIC-RAY GRADIENT DETECTOR			U	5.200E 05	TO	4.300E 06 EV	H		15
ATS-F	(ATS-F -07)	BLAKE							
OMNIDIRECTIONAL SPECTROMETER			R	6.000E 05	TO	4.000E 06 EV	F		192
EXPLORER 47	(72-073A-06)	STONE							
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES			R	1.500E 06	TO	2.800E 06 EV	GH		111
IMP-J	(IMP-J -06)	STONE							
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES			R	1.500E 06	TO	2.800E 06 EV	GH		243
PIONEER 9	(68-100A-06)	WEBBER							
COSMIC-RAY TELESCOPE			U	1.900E 06	TO	5.100E 06 EV	H		21
PIONEER 10	(72-012A-11)	VAN ALLEN							
JOVIAN CHARGED PARTICLES EXPERIMENT			U	2.000E 06	TO	INFINITY	H		95
PIONEER 11	(73-019A-11)	VAN ALLEN							
JOVIAN CHARGED PARTICLES EXPERIMENT			U	2.000E 06	TO	INFINITY	H		136
EXPLORER 47	(72-073A-09)	MCDONALD							
SOLAR- AND COSMIC-RAY PARTICLES			U	2.000E 06	TO	1.200E 07 EV	GH		113
IMP-J	(IMP-J -09)	MCDONALD							
SOLAR- AND COSMIC-RAY PARTICLES			U	2.000E 06	TO	1.200E 07 EV	GH		244
PIONEER 10	(72-012A-02)	SIMPSON							
CHARGED PARTICLE COMPOSITION			R	2.000E 06	TO	2.000E 07 EV	H		91
PIONEER 11	(73-019A-02)	SIMPSON							
CHARGED PARTICLE COMPOSITION			R	2.000E 06	TO	2.000E 07 EV	H	5	132
EXPLORER 43	(71-019A-09)	SIMPSON							

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION MAX MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)									
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS			R	2.000E 06 TO INFINITY			H		63
PIONEER 11 JOVIAN CHARGED PARTICLES EXPERIMENT	(73-019A-11)	VAN ALLEN	U	2.000E 06 TO INFINITY				5	136
PIONEER 10 JOVIAN CHARGED PARTICLES EXPERIMENT	(72-012A-11)	VAN ALLEN	U	2.000E 06 TO INFINITY				5	95
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-06)	MCDONALD	R	2.700E 06 TO 2.100E 07	EV		FGH		63
PIONEER 11 JOVIAN TRAPPED RADIATION	(73-019A-05)	FILLIUS	U	3.000E 06 TO 1.000E 36	EV		H	5	133
EXPLORER 47 SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	(72-073A-07)	SIMPSON	R	3.000E 06 TO 1.000E 07	EV		GH		112
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	(IMP-J -07)	SIMPSON	R	3.000E 06 TO 1.000E 07	EV		GH		244
MARINER 77A HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77A-08)	VOGT	R	3.000E 06 TO 1.000E 07	EV		H	5	274
MARINER 77B HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77B-08)	VOGT	R	3.000E 06 TO 1.000E 07	EV		H	5	280
PIONEER 10 JOVIAN TRAPPED RADIATION	(72-012A-05)	FILLIUS	U	3.000E 06 TO INFINITY			H	5	92
ATS-F OMNIDIRECTIONAL SPECTROMETER	(ATS-F -07)	BLAKE	U	4.000E 06 TO INFINITY			F		192
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-06)	WEBBER	U	4.200E 06 TO 8.400E 06	EV		H		15
HELIOCENTRIC COSMIC-RAY ELECTRONS AND NUCLEI	(HELOCTR-06)	MEYER	R	5.000E 06 TO 5.000E 07	EV		H		236
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-06)	WEBBER	U	5.100E 06 TO INFINITY			H		21
PIONEER 10 JOVIAN TRAPPED RADIATION	(72-012A-05)	FILLIUS	U	7.000E 06 TO INFINITY			H	5	92
PIONEER 11 JOVIAN TRAPPED RADIATION	(73-019A-05)	FILLIUS	U	7.000E 06 TO 1.000E 36	EV		H	5	133
PIONEER 10	(72-012A-02)	SIMPSON							

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MAX MIN	REGION A B C D E F G H I /	PLANET 0 1 2 3 4 5 M	PAGE
2.1.2 OF ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)								
CHARGED PARTICLE COMPOSITION.....			U	9.000E 06 TO INFINITY		H	5	91
PIONEER 11	(73-019A-02)	SIMPSON						
CHARGED PARTICLE COMPOSITION.....			U	9.000E 06 TO INFINITY		H	5	132
HEOS 2	(72-005A-05)	DILWORTH						
HIGH-ENERGY ELECTRONS.....			R	1.000E 07 TO 1.000E 08 EV	C	GH		88
PIONEER 10	(72-012A-11)	VAN ALLEN						
JOVIAN CHARGED PARTICLES EXPERIMENT.....			U	1.000E 07 TO INFINITY		H		95
PIONEER 11	(73-019A-11)	VAN ALLEN						
JOVIAN CHARGED PARTICLES EXPERIMENT.....			U	1.000E 07 TO INFINITY		H		136
PIONEER 10	(72-012A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION.....			U	1.000E 07 TO INFINITY		H	5	92
PIONEER 10	(72-012A-11)	VAN ALLEN						
JOVIAN CHARGED PARTICLES EXPERIMENT.....			U	1.000E 07 TO INFINITY			5	95
PIONEER 11	(73-019A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION.....			U	1.000E 07 TO 1.000E 36 EV		H	5	133
PIONEER 11	(73-019A-11)	VAN ALLEN						
JOVIAN CHARGED PARTICLES EXPERIMENT.....			U	1.000E 07 TO INFINITY			5	136
PIONEER 10	(72-012A-02)	SIMPSON						
CHARGED PARTICLE COMPOSITION.....			R	2.000E 07 TO 3.000E 07 EV		H		91
PIONEER 11	(73-019A-02)	SIMPSON						
CHARGED PARTICLE COMPOSITION.....			R	2.000E 07 TO 3.000E 07 EV		H	5	132
HELIOCENTRIC	(HELOCTR-06)	MEYER						
COSMIC-RAY ELECTRONS AND NUCLEI.....			R	5.000E 07 TO 4.000E 08 EV		H		236
EXPLORER 43	(71-019A-09)	SIMPSON						
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS.....			R	5.000E 07 TO INFINITY		H		63
HEOS 2	(72-005A-05)	DILWORTH						
HIGH-ENERGY ELECTRONS.....			R	1.000E 08 TO 6.000E 08 EV	C	GH		88

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
ISIS 1	(69-009A-08)	SAGALYN						
SPHERICAL ELECTROSTATIC ANALYZER			U	THERMAL ENERGIES		BC		28
PIONEER VENUS PROBE A	(PI078PA-04)	KNUDSEN						
RETARDING POTENTIAL ANALYZER			U	THERMAL ENERGIES			2	301
ESGEO	(ESGEO -02)	BOYD						
THERMAL PLASMA FLOW			R			F		206
EXOS-A	(EXOS-A -02)	UNKNOWN						
ENERGETIC PARTICLE DETECTORS			O			B		209
EXOS-B	(EXOS-B -01)	UNKNOWN						
MAGNETOSPHERIC PLASMA PROBE			R	THERMAL ENERGIES		DE		211
APOLLO 14 LM/ALSEP	(71-008C-06)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	2.000E-01 TO 4.850E 02 EV		GH		57
APOLLO 15 LM/ALSEP	(71-063C-05)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	2.000E-01 TO 4.860E 01 EV		GH	M	78
EXOS-B	(EXOS-B -02)	UNKNOWN						
ENERGETIC PARTICLE DETECTORS			O	1.000E 00 TO 1.000E 03 EV		DE		211
DAUGHTER	(DAUGHTR-03)	FRANK						
HOT PLASMA			R	1.000E 00 TO 1.000E 03 EV		GH		198
HAWKEYE	(HAWKEYE-02)	FRANK						
LOW-ENERGY PROTONS AND ELECTRONS			R	1.000E 00 TO 1.000E 03 EV		DEFGH		222
MOTHER	(MOTHER -03)	FRANK						
HOT PLASMA			R	1.000E 00 TO 1.000E 03 EV		GH		283
EXPLORER 43	(71-019A-05)	FRANK						
LOW-ENERGY PROTONS AND ELECTRONS			R	1.700E 00 TO 5.500E 02 EV		H		61
EXPLORER 47	(72-073A-04)	FRANK						
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS			R	5.000E 00 TO 1.000E 03 EV		GH		110
IMP-J	(IMP-J -04)	FRANK						
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS			R	5.000E 00 TO 1.000E 03 EV		GH		242
MARINER 77B	(MARN77B-06)	BRIDGE						
PLASMA			R	5.000E 00 TO 1.000E 03 EV		H	5	279
MARINER 77A	(MARN77A-06)	BRIDGE						
PLASMA			R	5.000E 00 TO 1.000E 03 EV		H	5	273
ISIS 2	(71-024A-05)	HEIKKILA						
SOFT-PARTICLE SPECTROMETER			R	1.000E 01 TO 1.000E 04 EV		DEF		70

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	TO	MAX VALUE (LAMBDA)	REGION: MAX / MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS										
APOLLO 15 LM/ALSEP SUPRATHERMAL ION DETECTOR	(71-063C-05)	FREEMAN	R	1.000E 01	TO	3.500E 03 EV		GH	M	78
APOLLO 14 LM/ALSEP SUPRATHERMAL ION DETECTOR	(71-008C-06)	FREEMAN	R	1.000E 01	TO	3.500E 03 EV		GH		57
APOLLO 12 LM/ALSEP SOLAR WIND SPECTROMETER	(69-099C-02)	SNYDER	R	1.800E 01	TO	9.780E 03 EV		GH	M	41
VELA 5B SOLAR WIND EXPERIMENT	(69-046E-05)	BAME	R	2.000E 01	TO	3.300E 04 EV		GH		36
VELA 6A SOLAR WIND EXPERIMENT	(70-027A-05)	BAME	R	2.000E 01	TO	3.300E 04 EV		G		49
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-05)	FRANK	R	2.400E 01	TO	1.100E 03 EV		H		61
HEOS 2 ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	(72-009A-02)	PIZZELLA	R	2.400E 01	TO	1.100E 03 EV	C	GH		87
EXPLORER 43 MEASUREMENT OF SOLAR PLASMA	(71-019A-11)	BAME	R	4.500E 01	TO	3.400E 04 EV		DEFGH		64
ATS-F AURORAL PARTICLES EXPERIMENT	(ATS-F -05)	MCILWAIN	R	5.000E 01	TO	5.000E 02 EV		F		192
DAUGHTER 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	(DAUGHTR-01)	PASCHMANN	R	5.000E 01	TO	4.000E 04 EV		GH		197
MOTHER 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE	(MOTHER -01)	BAME	R	5.000E 01	TO	4.000E 04 EV		GH		282
DAUGHTER 50-EV TO 25-KEV ION AND 35-EV TO 7-KEV ELECTRON PLASMA PROBES	(DAUGHTR-02)	EGIDI	R	5.000E 01	TO	2.500E 04 EV		GH		197
IMP-J MEASUREMENT OF SOLAR PLASMA	(IMP-J -02)	BRIDGE	R	5.000E 01	TO	7.000E 03 EV		GH		241
EXPLORER 47 MEASUREMENT OF SOLAR PLASMA	(72-073A-02)	BRIDGE	R	5.000E 01	TO	7.000E 03 EV		GH		109
ATS 5 BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	(69-069A-11)	MCILWAIN	R	6.000E 01	TO	6.000E 02 EV		F		39
PIONEER 6 SOLAR WIND PLASMA FARADAY CUP	(65-105A-02)	BRIDGE	R	7.500E 01	TO	9.485E 03 EV		H		4

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) S MAX VALUE (LAMBDA)	MAX REGION MIN ABCDEFGHI/012345M	PLANET	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
EXPLORER 43	(71-019A-11)	BAME				
MEASUREMENT OF SOLAR PLASMA			R 1.000E 02 TO 8.000E 03 EV	DEFGH		64
PIONEER 10	(72-012A-13)	WOLFE				
PLASMA EXPERIMENT			R 1.000E 02 TO 1.800E 04 EV	H		96
PIONEER 11	(73-019A-13)	WOLFE				
PLASMA EXPERIMENT			R 1.000E 02 TO 1.800E 04 EV	H		137
PIONEER 10	(72-012A-13)	WOLFE				
PLASMA EXPERIMENT			R 1.000E 02 TO 1.800E 04 EV		5	96
PIONEER 11	(73-019A-13)	WOLFE				
PLASMA EXPERIMENT			R 1.000E 02 TO 1.800E 04 EV		5	137
VELA 6A	(70-027A-05)	BAME				
SOLAR WIND EXPERIMENT			R 1.200E 02 TO 5.000E 03 EV	GH		49
PIONEER 8	(67-123A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		12
PIONEER 9	(68-100A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		18
HELIOCENTRIC	(HELOCTR-01)	BAME				
150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE			R 1.500E 02 TO 7.000E 03 EV	GH		234
PIONEER 8	(67-123A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		12
PIONEER 9	(68-100A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		18
ESRO 4	(72-092A-03)	HULTQUIST				
AURORAL PARTICLE SPECTROMETER			D 1.500E 02 TO 1.000E 03 EV	C		121
PIONEER 8	(67-123A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		12
PIONEER 9	(68-100A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		18
PIONEER 8	(67-123A-02)	WOLFE				
ELECTROSTATIC ANALYZER			R 1.500E 02 TO 1.500E 04 EV	H		12
APOLLO 14 LM/ALSEP	(71-008C-08)	O'BRIEN				
CHARGED PARTICLE LUNAR ENVIRONMENT			R 1.700E 02 TO 2.000E 03 EV	GH	M	58
IMP-J	(IMP-J -1C)	BAME				
MEASUREMENT OF SOLAR PLASMA			R 2.000E 02 TO 2.000E 04 EV	GH		245
PIONEER 7	(66-075A-03)	WOLFE				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MAX MIN ABCDEFGHI/012345M	PLANET PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
ELECTROSTATIC ANALYZER			R	2.000E 02 TO 1.000E 04 EV	H	8
EXPLORER 47	(72-073A-10)	BAME				
MEASUREMENT OF SOLAR PLASMA			R	2.000E 02 TO 2.000E 04 EV	GH	113
ESGEO	(ESGEO -04)	HULTQUIST				
LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION			R	2.000E 02 TO 2.000E 03 EV	F	207
HELIOS-B	(HELIO-B-09)	ROSENBAUER				
PLASMA DETECTORS			R	2.100E 02 TO 1.500E 04 EV	H	232
HELIOS-A	(HELIO-A-09)	ROSENBAUER				
PLASMA DETECTORS			R	2.130E 02 TO 1.500E 04 EV	H	226
ATS-F	(ATS-F -05)	MCILWAIN				
AURORAL PARTICLES EXPERIMENT			R	5.000E 02 TO 5.000E 03 EV	F	192
ATS 5	(69-069A-11)	MCILWAIN				
BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR			R	6.000E 02 TO 6.000E 03 EV	F	39
EXPLORER 45	(71-096A-01)	HOFFMAN				
CHANNEL ELECTRON MULTIPLIERS WITH ELECTROSTATIC ANALYZERS			R	8.000E 02 TO 2.500E 04 EV	DEF	84
MARINER-J VENUS/MERCURY	(MARINJ -03)	BRIDGE				
MEASUREMENT OF PLASMA ENVIRONMENT			R	8.000E 02 TO 8.000E 03 EV	H	267
EXOS-B	(EXOS-B -02)	UNKNOWN				
ENERGETIC PARTICLE DETECTORS			O	1.000E 03 TO 1.000E 04 EV	DE	211
EXPLORER 47	(72-073A-04)	FRANK				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS			R	1.000E 03 TO 1.000E 04 EV	GH	110
IMP-J	(IMP-J -04)	FRANK				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS			R	1.000E 03 TO 1.000E 04 EV	GH	242
HAWKEYE	(HAWKEYE-02)	FRANK				
LOW-ENERGY PROTONS AND ELECTRONS			R	1.000E 03 TO 1.000E 04 EV	DEFGH	222
MOTHER	(MOTHER -03)	FRANK				
HOT PLASMA			R	1.000E 03 TO 1.000E 04 EV	GH	283
ESRO 4	(72-092A-03)	HULTQUIST				
AURORAL PARTICLE SPECTROMETER			O	1.000E 03 TO 1.500E 04 EV	C	121
DAUGHTER	(DAUGHTR-03)	FRANK				
HOT PLASMA			R	1.000E 03 TO 1.000E 04 EV	GH	198
HEOS 2	(72-008A-02)	PIZZELLA				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)			R 1.100E 03 TO 1.200E 04 EV	C GH		87
EXPLORER 43 LOW-ENERGY PROTONS AND ELECTRONS	(71-019A-05)	FRANK	R 1.100E 03 TO 1.200E 04 EV	H		61
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH		200
ESGEO LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	(ESGEO -04)	HULTQUIST	R 2.000E 03 TO 2.000E 04 EV	F		207
APOLLO 14 LM/ALSEP CHARGED PARTICLE LUNAR ENVIRONMENT	(71-008C-08)	O'BRIEN	R 2.000E 03 TO 2.000E 04 EV	GH	M	58
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH		287
ATS-F AURORAL PARTICLES EXPERIMENT	(ATS-F -05)	MCILWAIN	R 5.000E 03 TO 5.000E 04 EV	F		192
DAUGHTER ENERGETIC ELECTRONS AND PROTONS	(DAUGHTR-08)	ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH		200
ATS 5 BI-DIRECTIONAL LOW ENERGY PARTICLE DETECTOR	(69-069A-11)	MCILWAIN	R 6.000E 03 TO 6.000E 04 EV	F		39
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH		287
EXPLORER 47 MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(72-073A-04)	FRANK	R 1.000E 04 TO 5.000E 04 EV	GH		110
DAUGHTER HOT PLASMA	(DAUGHTR-03)	FRANK	R 1.000E 04 TO 5.000E 05 EV	GH		198
IMP-J MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS	(IMP-J -04)	FRANK	R 1.000E 04 TO 5.000E 04 EV	GH		242
MOTHER ENERGETIC ELECTRONS AND PROTONS	(MOTHER -10)	ANDERSON	R 1.000E 04 TO 1.000E 05 EV	GH		287
HAWKEYE LOW-ENERGY PROTONS AND ELECTRONS	(HAWKEYE-02)	FRANK	R 1.000E 04 TO 5.000E 04 EV	DEFGH		222
MOTHER HOT PLASMA	(MOTHER -03)	FRANK	R 1.000E 04 TO 5.000E 04 EV	GH		283
DAUGHTER	(DAUGHTR-02)	ANDERSON				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MAX MIN	REGION ABCDEFGHI	PLANET 012345	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
ENERGETIC ELECTRONS AND PROTONS			R	1.000E 04 TO 1.000E 05 EV		GH		200
HEOS 2	(72-005A-02)	PIZZELLA						
ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)			R	1.200E 04 TO 5.000E 04 EV	C	GH		87
HEOS 2	(72-005A-02)	PIZZELLA						
ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)			R	1.200E 04 TO 5.000E 04 EV	C	GH		87
EXPLORER 43	(71-019A-05)	FRANK						
LOW-ENERGY PROTONS AND ELECTRONS			R	1.200E 04 TO 5.000E 04 EV		H		61
ISIS 2	(71-024A-04)	MCDIARMID						
ENERGETIC PARTICLE DETECTORS			R	2.000E 04 TO 5.000E 07 EV		DEF		69
ATS-F	(ATS-F -01)	KONRADI						
MEASUREMENT OF LOW-ENERGY PROTONS			R	2.000E 04 TO 3.000E 05 EV		F		191
ATS-F	(ATS-F -03)	ARNOLDY						
LOW-ENERGY PROTON/ELECTRON EXPERIMENT			R	2.000E 04 TO 5.000E 05 EV		F		191
MOTHER	(MOTHER -05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			R	2.000E 04 TO 2.000E 05 EV		DEFGH		286
ATS-F	(ATS-F -04)	WINCKLER						
PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION			R	2.000E 04 TO 5.000E 05 EV		F		191
DAUGHTER	(DAUGHTR-07)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			R	2.500E 04 TO 2.000E 05 EV		DEFGH		199
EXPLORER 45	(71-096A-02)	FRITZ						
ZINC SULFIDE THIN-FILM SCINTILLATOR			R	2.500E 04 TO 8.720E 05 EV		DEF		85
HELIOCENTRIC	(HELOCTR-08)	ELLIOTT						
ENERGETIC PROTONS			R	3.000E 04 TO 3.000E 05 EV		H		237
IMP-J	(IMP-J -05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			R	3.000E 04 TO 3.000E 05 EV		GH		243
EXPLORER 47	(72-073A-05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			R	3.000E 04 TO 3.000E 05 EV		GH		111
ESGEO	(ESGEO -01)	PFOTZER						
ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION			R	4.000E 04 TO 4.000E 05 EV		F		206
EXPLORER 43	(71-019A-06)	ANDERSON						
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS			R	4.000E 04 TO 4.000E 05 EV		H		61
ISIS 1	(69-009A-04)	MCDIARMID						

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS				
ENERGETIC PARTICLE DETECTORS			R 5.000E 04 TO 3.000E 07 EV DEF	27
EXPLORER 43	(71-019A-08)	MCDONALD		
SOLAR AND GALACTIC COSMIC-RAY STUDIES			R 5.000E 04 TO 2.000E 06 EV FGH	63
PIONEER 10	(72-012A-12)	MCDONALD		
COSMIC-RAY SPECTRA			R 5.000E 04 TO 2.000E 07 EV H	96
PIONEER 11	(73-019A-12)	MCDONALD		
COSMIC-RAY SPECTRA			R 5.000E 04 TO 2.000E 07 EV H	136
EXPLORER 47	(72-073A-09)	MCDONALD		
SOLAR- AND COSMIC-RAY PARTICLES			R 5.000E 04 TO 5.000E 05 EV GH	113
IMP-J	(IMP-J -09)	MCDONALD		
SOLAR- AND COSMIC-RAY PARTICLES			R 5.000E 04 TO 5.000E 05 EV GH	244
MARINER 77A	(MARN77A-07)	KRIMIGIS		
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R 5.000E 04 TO 5.000E 05 EV H 5	273
MARINER 77B	(MARN77B-07)	KRIMIGIS		
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R 5.000E 04 TO 5.000E 05 EV H 5	279
ESRO 4	(72-092A-03)	HULTQUIST		
AURORAL PARTICLE SPECTROMETER			O 5.000E 04 TO 1.500E 05 EV C	121
PIONEER 10	(72-012A-12)	MCDONALD		
COSMIC-RAY SPECTRA			R 5.000E 04 TO 8.000E 08 EV 5	96
PIONEER 11	(73-019A-12)	MCDONALD		
COSMIC-RAY SPECTRA			R 5.000E 04 TO 8.000E 08 EV 5	136
ATS 5	(69-069A-04)	MOZER		
TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE DETECTOR			R 6.000E 04 TO 1.650E 05 EV F	38
HELIOS-A	(HELIO-A-08)	TRAINOR		
GALACTIC AND SOLAR COSMIC RAYS			R 1.000E 05 TO 1.000E 06 EV H	226
HELIOS-B	(HELIO-B-08)	TRAINOR		
GALACTIC AND SOLAR COSMIC RAYS			R 1.000E 05 TO 1.000E 06 EV H	231
MOTHER	(MOTHER -10)	ANDERSON		
ENERGETIC ELECTRONS AND PROTONS			R 1.000E 05 TO 3.800E 05 EV GH	287
DAUGHTER	(DAUGHTR-08)	ANDERSON		
ENERGETIC ELECTRONS AND PROTONS			R 1.000E 05 TO 3.800E 05 EV GH	200
ITOS-H	(ITOS-H -04)	SHENK		
SPACE ENVIRONMENTAL MONITOR (SEM)			R 1.500E 05 TO 1.500E 06 EV C	259

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE	(F OR E) (LAMBDA)	MAX / MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS									
ITOS-I	(ITOS-I -04)								
SPACE ENVIRONMENTAL MONITOR (SEM).....			R	1.500E 05	TO	1.500E 06 EV	C		262
ITOS-J	(ITOS-J -04)								
SPACE ENVIRONMENTAL MONITOR (SEM).....			R	1.500E 05	TO	1.500E 06 EV	C		265
MARINER 77A	(MARN77A-08)	VOGT							
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R	1.500E 05	TO	6.000E 06 EV	H	5	274
MARINER 77B	(MARN77B-08)	VOGT							
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R	1.500E 05	TO	6.000E 06 EV	H	5	280
ESRO 4	(72-092A-05)	LUST							
NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER.....			R	2.000E 05	TO	2.000E 06 EV	C		122
ATS-F	(ATS-F -06)	MASLEY							
SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION.....			R	2.000E 05	TO	2.000E 06 EV	F		192
DAUGHTER	(DAUGHTR-07)	WILLIAMS							
ENERGETIC ELECTRONS AND PROTONS.....			R	2.000E 05	TO	2.000E 06 EV	DEFGH		199
MOTHER	(MOTHER -09)	WILLIAMS							
ENERGETIC ELECTRONS AND PROTONS.....			R	2.000E 05	TO	2.000E 06 EV	DEFGH		286
EXPLORER 43	(71-019A-07)	BOSTROM							
MONITORING OF SOLAR PROTONS.....			R	2.000E 05	TO	2.000E 06 EV	FGH		62
EXPLORER 47	(72-073A-08)	KRIMIGIS							
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS.....			R	2.500E 05	TO	5.000E 08 EV	GH		112
IMP-J	(IMP-J -06)	KRIMIGIS							
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS.....			R	2.500E 05	TO	5.000E 08 EV	GH		244
EXPLORER 43	(71-019A-06)	ANDERSON							
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....			U	2.500E 05	TO	INFINITY	H		61
NOAA 2	(72-082A-01)	BOSTROM							
SOLAR PROTON MONITOR.....			R	2.700E 05	TO	3.200E 06 EV	BC		117
ITOS-F	(ITOS-F -01)	BOSTROM							
SOLAR PROTON MONITOR.....			R	2.700E 05	TO	3.200E 06 EV	BC		251
ITOS-G	(ITOS-G -01)	BOSTROM							
SOLAR PROTON MONITOR.....			R	2.700E 05	TO	3.200E 06 EV	BC		254
VELA 5B	(69-046E-03)	SINGER							

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MAX MIN	PLANET ABCDEFGHI/012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS							
SOLAR PARTICLE TELESCOPES			R	3.000E 05 TO 3.000E 06 EV		GH	35
VELA 6A SOLAR PARTICLE TELESCOPES	(70-027A-03)	SINGER	R	3.000E 05 TO 3.000E 06 EV		GH	48
VELA 6B SOLAR PARTICLE TELESCOPES	(70-027B-03)	SINGER	R	3.000E 05 TO 3.000E 06 EV		GH	52
HELIOCENTRIC ENERGETIC PROTONS	(HELOCTR-08)	ELLIOTT	R	3.000E 05 TO 1.400E 06 EV		H	237
IMP-J ENERGETIC ELECTRONS AND PROTONS	(IMP-J -05)	WILLIAMS	R	3.000E 05 TO 1.000E 06 EV		GH	243
EXPLORER 47 ENERGETIC ELECTRONS AND PROTONS	(72-073A-05)	WILLIAMS	R	3.000E 05 TO 1.000E 06 EV		GH	111
ESGEO ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION	(ESGEO -01)	PFOTZER	R	4.000E 05 TO 1.400E 06 EV		F	206
EXPLORER 43 MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS	(71-019A-06)	ANDERSON	R	4.000E 05 TO 2.000E 06 EV		H	61
PIONEER 10 CHARGED PARTICLE COMPOSITION	(72-012A-02)	SIMPSON	R	4.500E 05 TO 1.500E 06 EV		H 5	91
PIONEER 11 CHARGED PARTICLE COMPOSITION	(73-019A-02)	SIMPSON	R	4.500E 05 TO 1.500E 06 EV		H 5	132
EXPLORER 47 STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	(72-073A-13)	CLINE	R	5.000E 05 TO 4.000E 06 EV		GH	115
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	D	5.000E 05 TO 4.000E 06 EV		H	235
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R	5.000E 05 TO 5.000E 06 EV		GH	288
EXPLORER 47 ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(72-073A-06)	STONE	R	5.000E 05 TO 5.000E 06 EV		GH	111
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(IMP-J -06)	STONE	R	5.000E 05 TO 5.000E 06 EV		GH	243
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R	5.000E 05 TO 5.000E 06 EV		GH	113

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MAX MIN	REGION ABCDEFGHI	PLANET /012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
IMP-J	(IMP-J -09)	MCDONALD						
SOLAR- AND COSMIC-RAY PARTICLES			R	5.000E 05 TO 5.000E 06 EV		GH		244
MARINER 77A	(MARN77A-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 05 TO 5.000E 06 EV		H	5	273
MARINER 77B	(MARN77B-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 05 TO 5.000E 06 EV		H	5	279
EXPLORER 43	(71-019A-05)	FRANK						
LOW-ENERGY PROTONS AND ELECTRONS			U	5.000E 05 TO INFINITY		H		61
EXPLORER 43	(71-019A-08)	MCDONALD						
SOLAR AND GALACTIC COSMIC-RAY STUDIES			R	5.000E 05 TO 4.000E 06 EV		FGH		63
PIONEER 6	(65-105A-03)	FAN						
COSMIC-RAY TELESCOPE			R	6.000E 05 TO 6.000E 06 EV		H		5
PIONEER 7	(66-075A-06)	SIMPSON						
COSMIC-RAY TELESCOPE			R	6.000E 05 TO 6.000E 06 EV		H		9
MARINER-J VENUS/MERCURY	(MARINJ -07)	SIMPSON						
ENERGETIC PARTICLES			R	6.000E 05 TO 6.000E 06 EV		H	12	269
PIONEER 10	(72-012A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION			U	8.000E 05 TO 2.500E 08 EV		H	5	92
PIONEER 11	(73-019A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION			U	8.000E 05 TO 2.500E 08 EV		H	5	133
HELIOS-A	(HELIO-A-07)	WIBBERENZ						
COSMIC-RAY PARTICLES			R	1.000E 06 TO 1.000E 07 EV		H		226
HELIOS-B	(HELIO-B-07)	WIBBERENZ						
COSMIC-RAY PARTICLES			R	1.000E 06 TO 1.000E 07 EV		H		231
SMS-B	(SMS-B -01)	WILLIAMS						
ENERGETIC PARTICLE MONITOR			R	1.000E 06 TO 1.000E 07 EV		F		324
SMS-C	(SMS-C -02)	WILLIAMS						
ENERGETIC PARTICLE MONITOR			R	1.000E 06 TO 1.000E 07 EV		F		328
PIONEER 9	(68-100A-05)	MCCRACKEN						
COSMIC-RAY ANISOTROPY			R	1.000E 06 TO 8.000E 06 EV		H		20
IMP-J	(IMP-J -05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			R	1.000E 06 TO 8.000E 06 EV		GH		243
PIONEER 8	(67-123A-05)	MCCRACKEN						
COSMIC-RAY ANISOTROPY			R	1.000E 06 TO 8.000E 06 EV		H		14

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/0	PLANET 12345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS	(HELIO-A-08)	TRAINOR	R 1.000E 06 TO 1.000E 07 EV	H		226
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS	(HELIO-B-08)	TRAINOR	R 1.000E 06 TO 1.000E 07 EV	H		231
EXPLORER 47 ENERGETIC ELECTRONS AND PROTONS	(72-073A-05)	WILLIAMS	R 1.000E 06 TO 8.000E 06 EV	GH		111
GOES-B ENERGETIC PARTICLE MONITOR	(GOES-B -02)	WILLIAMS	R 1.000E 06 TO 1.000E 07 EV	F		216
GOES-C ENERGETIC PARTICLE MONITOR	(GOES-C -02)	WILLIAMS	R 1.000E 06 TO 1.000E 07 EV	F		219
SMS-A ENERGETIC PARTICLE MONITOR	(SMS-A -02)	WILLIAMS	R 1.000E 06 TO 1.000E 07 EV	F		322
OV5-6 PROTON ALPHA PARTICLE TELESCOPE	(69-046B-03)	YATES	R 1.250E 06 TO 5.600E 06 EV	EFGH		31
ITOS-H SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-H -04)	SHENK	R 1.500E 06 TO 1.500E 07 EV	C		259
ITOS-I SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-I -04)		R 1.500E 06 TO 1.500E 07 EV	C		262
ITOS-J SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-J -04)		R 1.500E 06 TO 1.500E 07 EV	C		265
ATS-F OMNIDIRECTIONAL SPECTROMETER	(ATS-F -07)	BLAKE	U 2.000E 06 TO 1.000E 07 EV	F		192
ATS-F SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	(ATS-F -06)	MASLEY	R 2.000E 06 TO 2.000E 07 EV	F		192
EXPLORER 43 MONITORING OF SOLAR PROTONS	(71-019A-07)	BOSTROM	U 2.000E 06 TO 7.500E 06 EV	FGH		62
MARINER-J VENUS/MERCURY ENERGETIC PARTICLES	(MARINJ -07)	SIMPSON	R 2.000E 06 TO 2.000E 07 EV	H	12	269
ESRO 4 NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	(72-092A-CE)	LUST	R 2.000E 06 TO 8.000E 06 EV	C		122
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-05)	WEBBER	R 2.200E 06 TO 1.000E 07 EV	H		21
ESRO 4 SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	(72-092A-04)	DE JAGER	R 2.500E 06 TO 2.000E 07 EV	C		122

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI	PLANET /012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS							
VELA 5B SOLAR PARTICLE TELESCOPES	(69-046E-03)	SINGER	R	3.000E 06 TO 5.000E 07 EV	GH		35
VELA 6A SOLAR PARTICLE TELESCOPES	(70-027A-03)	SINGER	R	3.000E 06 TO 5.000E 07 EV	GH		48
VELA 6B SOLAR PARTICLE TELESCOPES	(70-027B-03)	SINGER	R	3.000E 06 TO 5.000E 07 EV	GH		52
PIONEER 10 COSMIC-RAY SPECTRA	(72-012A-12)	MCDONALD	R	3.000E 06 TO 3.000E 07 EV	H		96
PIONEER 11 COSMIC-RAY SPECTRA	(73-019A-12)	MCDONALD	R	3.000E 06 TO 3.000E 07 EV	H		136
NOAA 2 SOLAR PROTON MONITOR	(72-082A-01)	BOSTROM	U	3.200E 06 TO 6.000E 07 EV	BC		117
ITOS-F SOLAR PROTON MONITOR	(ITOS-F -01)	BOSTROM	U	3.200E 06 TO 6.000E 07 EV	BC		251
ITOS-G SOLAR PROTON MONITOR	(ITOS-G -01)	BOSTROM	U	3.200E 06 TO 6.000E 07 EV	BC		254
PIONEER 8 COSMIC-RAY ANISOTROPY	(67-123A-05)	MCCRACKEN	R	3.300E 06 TO 6.700E 06 EV	H		14
PIONEER 9 COSMIC-RAY ANISOTROPY	(68-100A-05)	MCCRACKEN	R	3.300E 06 TO 6.700E 06 EV	H		20
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-06)	WEBBER	R	3.500E 06 TO 1.100E 07 EV	H		15
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	R	4.000E 06 TO 5.000E 08 EV	H		235
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-05)	MCDONALD	R	4.000E 06 TO 2.000E 07 EV	GH		113
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -05)	MCDONALD	R	4.000E 06 TO 2.000E 07 EV	GH		244
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	O	4.000E 06 TO 8.000E 07 EV	H		235
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-05)	MCDONALD	R	4.200E 06 TO 1.910E 07 EV	FGH		63
PIONEER 8 COSMIC-RAY ANISOTROPY	(67-123A-05)	MCCRACKEN	R	4.500E 06 TO 4.000E 07 EV	H		14

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX REGION MIN ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
PIONEER 9	(68-100A-05)	MCCRACKEN						
COSMIC-RAY ANISOTROPY			R	4.500E 06 TO	4.000E 07 EV	H		20
MOTHER	(MOTHER -14)	SIMPSON						
MEDIUM-ENERGY COSMIC RAYS			R	5.000E 06 TO	5.000E 07 EV	GH		288
EXPLORER 47	(72-073A-06)	STONE						
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES			R	5.000E 06 TO	4.000E 07 EV	GH		111
IMP-J	(IMP-J -06)	STONE						
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES			R	5.000E 06 TO	4.000E 07 EV	GH		243
MARINER 77A	(MARN77A-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 06 TO	3.000E 07 EV	H	5	273
MARINER 77B	(MARN77B-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 06 TO	3.000E 07 EV	H	5	279
OV5-6	(69-046B-03)	YATES						
PROTON ALPHA PARTICLE TELESCOPE			R	5.300E 06 TO	4.000E 07 EV	EFGH		31
PIONEER 6	(65-105A-03)	FAN						
COSMIC-RAY TELESCOPE			R	6.000E 06 TO	1.390E 07 EV	H		5
PIONEER 7	(65-079A-06)	SIMPSON						
COSMIC-RAY TELESCOPE			R	6.000E 06 TO	1.270E 07 EV	H		9
MARINER 77A	(MARN77A-06)	VOGT						
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE			R	6.000E 06 TO	3.000E 07 EV	H	5	274
MARINER-J VENUS/MERCURY	(MARINJ -07)	SIMPSON						
ENERGETIC PARTICLES			R	6.000E 06 TO	6.000E 07 EV	H	12	269
EXPLORER 47	(72-073A-07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R	6.000E 06 TO	6.000E 07 EV	GH		112
MARINER 77B	(MARN77B-06)	VOGT						
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE			R	6.000E 06 TO	3.000E 07 EV	H	5	280
IMP-J	(IMP-J -07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS			R	6.000E 06 TO	6.000E 07 EV	GH		244
HEOS 2	(72-066A-04)	PAGE						
PARTICLE COUNTER TELESCOPE			R	6.200E 06 TO	3.300E 07 EV	C GH		88

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI	PLANET /01234SM	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS							
PIONEER 7	(66-075A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY			U	7.200E 06 TO INFINITY	H		9
PIONEER 7	(66-075A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY			U	7.200E 06 TO 4.700E 07 EV	H		9
PIONEER 6	(65-105A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY DETECTION			U	7.400E 06 TO INFINITY	H		6
PIONEER 8	(67-123A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY			R	7.400E 06 TO 6.300E 07 EV	H		14
PIONEER 6	(65-105A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY DETECTION			U	7.400E 06 TO 4.400E 07 EV	H		6
PIONEER 9	(68-100A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY			R	7.400E 06 TO 6.300E 07 EV	H		20
ESRO 4	(72-052A-05)	LUST					
NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER			R	8.000E 06 TO 9.000E 06 EV	C		122
EXPLORER 43	(71-019A-07)	BOSTROM					
MONITORING OF SOLAR PROTONS			U	1.000E 07 TO INFINITY	FGH		62
PIONEER 10	(72-012A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT			U	1.000E 07 TO INFINITY	H		95
PIONEER 11	(73-019A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT			U	1.000E 07 TO INFINITY	H		136
ATS-F	(ATS-F -07)	BLAKE					
OMNIDIRECTIONAL SPECTROMETER			R	1.000E 07 TO 8.000E 07 EV	F		192
HELIOS-A	(HELIO-A-07)	WIBBERENZ					
COSMIC-RAY PARTICLES			R	1.000E 07 TO 1.000E 08 EV	H		226
HELIOS-B	(HELIO-B-07)	WIBBERENZ					
COSMIC-RAY PARTICLES			R	1.000E 07 TO 1.000E 08 EV	H		231
SMS-B	(SMS-B -C1)	WILLIAMS					
ENERGETIC PARTICLE MONITOR			R	1.000E 07 TO 1.000E 08 EV	F		324
SMS-C	(SMS-C -C2)	WILLIAMS					
ENERGETIC PARTICLE MONITOR			R	1.000E 07 TO 1.000E 08 EV	F		328
NOAA 2	(72-082A-C1)	BOSTROM					
SOLAR PROTON MONITOR			R	1.000E 07 TO 6.000E 07 EV	BC		117
MOTHER	(MOTHER -14)	SIMPSON					
MEDIUM-ENERGY COSMIC RAYS			R	1.000E 07 TO 1.500E 08 EV	GH		288

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-06)	WEBBER	R 1.000E 07 TO 4.200E 07 EV	H		21
PIONEER 10 JOVIAN CHARGED PARTICLES EXPERIMENT	(72-012A-11)	VAN ALLEN	U 1.000E 07 TO INFINITY		5	95
GOES-B ENERGETIC PARTICLE MONITOR	(GOES-B -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV	F		216
GOES-C ENERGETIC PARTICLE MONITOR	(GOES-C -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV	F		219
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS	(HELIO-A-08)	TRAINOR	R 1.000E 07 TO 1.000E 08 EV	H		226
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS	(HELIO-B-08)	TRAINOR	R 1.000E 07 TO 1.000E 08 EV	H		231
ITOS-F SOLAR PROTON MONITOR	(ITOS-F -01)	BOSTROM	R 1.000E 07 TO INFINITY	BC		251
ITOS-G SOLAR PROTON MONITOR	(ITOS-G -01)	BOSTROM	R 1.000E 07 TO INFINITY	BC		254
SMS-A ENERGETIC PARTICLE MONITOR	(SMS-A -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV	F		322
PIONEER 11 JOVIAN CHARGED PARTICLES EXPERIMENT	(73-019A-11)	VAN ALLEN	U 1.000E 07 TO INFINITY		5	136
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-06)	WEBBER	R 1.100E 07 TO 6.400E 07 EV	H		15
ATS 5 OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR	(69-069A-03)	MCILWAIN	R 1.200E 07 TO 2.400E 07 EV	F		38
PIONEER 7 COSMIC-RAY TELESCOPE	(66-079A-06)	SIMPSON	R 1.270E 07 TO 7.300E 07 EV	H		9
PIONEER 6 COSMIC-RAY TELESCOPE	(65-105A-03)	FAN	R 1.390E 07 TO 7.320E 07 EV	H		5
ITOS-H SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-H -04)	SHENK	R 1.500E 07 TO 1.500E 08 EV	C		259
ITOS-I SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-I -04)		R 1.500E 07 TO 1.500E 08 EV	C		262
ITOS-J SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-J -04)		R 1.500E 07 TO 1.500E 08 EV	C		265
EXPLORER 43	(71-019A-08)	MCDONALD				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / MAX VALUE (LAMBDA)	MAX / MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
SOLAR AND GALACTIC COSMIC-RAY STUDIES			R	1.870E 07 TO 8.160E 07 EV		FGH		63
PIONEER 10 COSMIC-RAY SPECTRA	(72-012A-12)	MCDONALD	R	2.000E 07 TO 2.000E 08 EV		H		96
ESRO 4 SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	(72-092A-04)	DE JAGER	R	2.000E 07 TO 1.600E 08 EV		C		122
PIONEER 11 COSMIC-RAY SPECTRA	(73-019A-12)	MCDONALD	R	2.000E 07 TO 2.000E 08 EV		H		136
ATS-F SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	(ATS-F -06)	MASLEY	R	2.000E 07 TO 3.000E 08 EV		F		192
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R	2.000E 07 TO 8.000E 07 EV		GH		113
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -09)	MCDONALD	R	2.000E 07 TO 8.000E 07 EV		GH		244
MARINER-J VENUS/MERCURY ENERGETIC PARTICLES	(MARINJ -07)	SIMPSON	R	2.000E 07 TO INFINITY		H	12	269
VELA 5A NEUTRON DETECTOR	(69-046D-07)	BAME	U	2.500E 07 TO INFINITY		GH		33
VELA 5B NEUTRON DETECTOR	(69-046E-07)	BAME	U	2.500E 07 TO INFINITY		GH		37
VELA 6A NEUTRON DETECTOR	(70-027A-07)	BAME	U	2.500E 07 TO INFINITY		GH		50
VELA 6B NEUTRON DETECTOR	(70-027B-07)	BAME	U	2.500E 07 TO INFINITY		GH		53
MARINER 77A HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77A-08)	VOGT	R	3.000E 07 TO 5.000E 08 EV		H	5	274
MARINER 77B HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77B-08)	VOGT	R	3.000E 07 TO 5.000E 08 EV		H	5	280
EXPLORER 43 MONITORING OF SOLAR PROTONS	(71-019A-07)	BOSTROM	U	3.000E 07 TO INFINITY		FGH		62
HELIOCENTRIC HIGH-ENERGY COSMIC RAYS	(HELOCTR-05)	HECKMAN	O	3.100E 07 TO 1.100E 08 EV		H		236
HELIOCENTRIC HIGH-ENERGY COSMIC RAYS	(HELOCTR-05)	HECKMAN	O	3.100E 07 TO 1.100E 08 EV		H		236

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	REGION MAX MIN ABCDEFGHI/	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
HELIOCENTRIC	(HELOCTR-06)	MEYER						
COSMIC-RAY ELECTRONS AND NUCLEI			R	3.600E 07 TO	3.600E 08 EV	H		236
OV5-6	(69-046B-03)	YATES						
PROTON ALPHA PARTICLE TELESCOPE			U	4.000E 07 TO	1.000E 08 EV	EFGH		31
PIONEER 9	(68-100A-06)	WEBBER						
COSMIC-RAY TELESCOPE			R	4.200E 07 TO	3.200E 08 EV	H		21
PIONEER 6	(65-105A-05)	MCCRACKEN						
COSMIC-RAY ANISOTROPY DETECTION			U	4.400E 07 TO	7.700E 07 EV	H		6
PIONEER 7	(66-075A-05)	MCCRACKEN						
COSMIC-RAY ANISOTROPY			U	4.700E 07 TO	6.500E 07 EV	H		9
MOTHER	(MOTHER -14)	SIMPSON						
MEDIUM-ENERGY COSMIC RAYS			R	5.000E 07 TO	1.500E 08 EV	GH		288
PIONEER 10	(72-012A-02)	SIMPSON						
CHARGED PARTICLE COMPOSITION			U	5.000E 07 TO	INFINITY	H	5	91
PIONEER 11	(73-019A-02)	SIMPSON						
CHARGED PARTICLE COMPOSITION			U	5.000E 07 TO	INFINITY	H	5	132
PIONEER 10	(72-012A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION			U	6.000E 07 TO	2.500E 08 EV	H	5	92
PIONEER 11	(73-019A-05)	FILLIUS						
JOVIAN TRAPPED RADIATION			U	6.000E 07 TO	2.500E 08 EV	H	5	133
ITOS-F	(ITOS-F -01)	BOSTROM						
SOLAR PROTON MONITOR			U	6.000E 07 TO	INFINITY	BC		251
ITOS-G	(ITOS-G -01)	BOSTROM						
SOLAR PROTON MONITOR			U	6.000E 07 TO	INFINITY	BC		254
NOAA 2	(72-082A-01)	BOSTROM						
SOLAR PROTON MONITOR			U	6.000E 07 TO	INFINITY	BC		117
MARINER-J VENUS/MERCURY	(MARINJ -07)	SIMPSON						
ENERGETIC PARTICLES			R	6.000E 07 TO	INFINITY	H	12	269
EXPLORER 47	(72-073A-07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R	6.000E 07 TO	6.000E 08 EV	GH		112
EXPLORER 43	(71-019A-07)	BOSTROM						
MONITORING OF SOLAR PROTONS			U	6.000E 07 TO	INFINITY	FGH		62
IMP-J	(IMP-J -07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS			R	6.000E 07 TO	6.000E 08 EV	GH		244

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI	PLANET 012345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS						
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-06)	WEBBER	R 6.400E 07 TO 1.100E 08 EV	H		15
PIONEER 7 COSMIC-RAY ANISOTROPY	(66-075A-05)	MCCRACKEN	U 6.500E 07 TO 8.100E 07 EV	H		9
PIONEER 7 COSMIC-RAY TELESCOPE	(66-075A-06)	SIMPSON	R 7.300E 07 TO 1.600E 08 EV	H		9
PIONEER 6 COSMIC-RAY TELESCOPE	(65-105A-03)	FAN	R 7.320E 07 TO 1.750E 08 EV	H		5
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV	GH		113
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -09)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV	GH		244
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-08)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV	FGH		63
HELIOS-A COSMIC-RAY PARTICLES	(HELIO-A-07)	WIBBERENZ	R 1.000E 08 TO 1.000E 09 EV	H		226
HELIOS-B COSMIC-RAY PARTICLES	(HELIO-B-07)	WIBBERENZ	R 1.000E 08 TO 1.000E 09 EV	H		231
SMS-B ENERGETIC PARTICLE MONITOR	(SMS-B -01)	WILLIAMS	R 1.000E 08 TO 5.000E 08 EV	F		324
SMS-C ENERGETIC PARTICLE MONITOR	(SMS-C -02)	WILLIAMS	R 1.000E 08 TO 5.000E 08 EV	F		328
GOES-B ENERGETIC PARTICLE MONITOR	(GOES-B -02)	WILLIAMS	R 1.000E 08 TO 5.000E 08 EV	F		216
GOES-C ENERGETIC PARTICLE MONITOR	(GOES-C -02)	WILLIAMS	R 1.000E 08 TO 5.000E 08 EV	F		219
SMS-A ENERGETIC PARTICLE MONITOR	(SMS-A -02)	WILLIAMS	R 1.000E 08 TO 5.000E 08 EV	F		322
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS	(HELIO-A-08)	TRAINOR	R 1.000E 08 TO 8.000E 08 EV	H		226
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS	(HELIO-B-08)	TRAINOR	R 1.000E 08 TO 8.000E 08 EV	H		231
ITOS-H SPACE ENVIRONMENTAL MONITOR (SEM)	(ITOS-H -04)	SHENK	R 1.500E 08 TO 1.000E 09 EV	C		259
ITOS-I	(ITOS-I -04)					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION MAX MIN	PLANET ABCDEFGHI/0 12345M	PAGE
2.2 SENSING PROTONS OR HYDROGEN IONS								
SPACE ENVIRONMENTAL MONITOR (SEM)			R	1.500E 08 TO 1.000E 09	EV	C		262
ITOS-J	(ITOS-J -04)							
SPACE ENVIRONMENTAL MONITOR (SEM)			R	1.500E 08 TO 1.000E 09	EV	C		265
PIONEER 7	(66-075A-06)	SIMPSON						
COSMIC-RAY TELESCOPE			R	1.650E 08 TO INFINITY			H	9
PIONEER 6	(65-105A-03)	FAN						
COSMIC-RAY TELESCOPE			R	1.750E 08 TO INFINITY			H	5
PIONEER 10	(72-012A-12)	MCDONALD						
COSMIC-RAY SPECTRA			R	2.000E 08 TO 8.000E 08	EV		H	96
PIONEER 11	(73-019A-12)	MCDONALD						
COSMIC-RAY SPECTRA			R	2.000E 08 TO 8.000E 08	EV		H	136
PIONEER 8	(67-123A-06)	WEBBER						
COSMIC-RAY GRADIENT DETECTOR			R	2.800E 08 TO 2.200E 09	EV		H	15
PIONEER 9	(68-100A-06)	WEBBER						
COSMIC-RAY TELESCOPE			R	3.200E 08 TO 2.200E 09	EV		H	21
HELIOCENTRIC	(HELOCTR-06)	MEYER						
COSMIC-RAY ELECTRONS AND NUCLEI			R	3.600E 08 TO 3.600E 09	EV		H	236
EXPLORER 47	(72-073A-07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R	6.000E 08 TO 1.200E 09	EV		GH	112
IMP-J	(IMP-J -07)	SIMPSON						
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS			R	6.000E 08 TO 1.200E 09	EV		GH	244
HELIOCENTRIC	(HELOCTR-06)	MEYER						
COSMIC-RAY ELECTRONS AND NUCLEI			R	3.600E 09 TO 1.300E 10	EV		H	236
HELIOCENTRIC	(HELOCTR-06)	MEYER						
COSMIC-RAY ELECTRONS AND NUCLEI			U	1.300E 10 TO INFINITY			H	236

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) TO MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI	PLANET /012345M	PAGE
2.3 SENSING HELIUM NUCLEI							
IMP-J	(IMP-J -02)	BRIDGE					
MEASUREMENT OF SOLAR PLASMA			R	2.500E 01 TO 3.500E 03 EV	GH		241
EXPLORER 47	(72-073A-02)	BRIDGE					
MEASUREMENT OF SOLAR PLASMA			R	5.000E 01 TO 7.000E 03 EV	GH		109
PIONEER 11	(73-019A-13)	WOLFE					
PLASMA EXPERIMENT			R	5.000E 01 TO 9.000E 03 EV	H		137
PIONEER 11	(73-019A-13)	WOLFE					
PLASMA EXPERIMENT			R	5.000E 01 TO 9.000E 03 EV		5	137
PIONEER 10	(72-012A-13)	WOLFE					
PLASMA EXPERIMENT			R	1.000E 02 TO 1.800E 04 EV	H		96
EXPLORER 43	(71-019A-11)	BAME					
MEASUREMENT OF SOLAR PLASMA			R	1.000E 02 TO 8.000E 03 EV	DEFGH		64
PIONEER 10	(72-012A-13)	WOLFE					
PLASMA EXPERIMENT			R	1.000E 02 TO 1.800E 04 EV		5	96
VELA 6A	(70-027A-05)	BAME					
SOLAR WIND EXPERIMENT			R	1.200E 02 TO 5.000E 03 EV	H		49
HELIOS-A	(HELIO-A-09)	ROSENBAUER					
PLASMA DETECTORS			R	1.500E 02 TO 8.000E 03 EV	H		226
HELIOS-B	(HELIO-B-09)	ROSENBAUER					
PLASMA DETECTORS			R	1.500E 02 TO 8.000E 03 EV	H		232
EXPLORER 47	(72-073A-10)	BAME					
MEASUREMENT OF SOLAR PLASMA			R	2.000E 02 TO 2.000E 04 EV	GH		113
EXPLORER 47	(72-073A-12)	OGILVIE					
SOLAR WIND ION COMPOSITION			R	3.000E 02 TO 3.750E 03 EV	GH		115
EXPLORER 47	(72-073A-12)	OGILVIE					
SOLAR WIND ION COMPOSITION			R	4.000E 02 TO 3.750E 03 EV	H		115
EXPLORER 45	(71-096A-02)	FRITZ					
ZINC SULFIDE THIN-FILM SCINTILLATOR			R	2.500E 04 TO 8.720E 05 EV	DEF		85
MARINER 77A	(MARN77A-07)	KRIMIGIS					
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 04 TO 5.000E 05 EV	H	5	273
MARINER 77B	(MARN77B-07)	KRIMIGIS					
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	5.000E 04 TO 5.000E 05 EV	H	5	279
IMP-J	(IMP-J -05)	WILLIAMS					
ENERGETIC ELECTRONS AND PROTONS			R	1.200E 05 TO 5.500E 05 EV	GH		243

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RESULTS	RANGE OF MEASUREMENTS (F OR E) (LAMBDA)	REGION ABCDEFGHI/012345M	PLANET	PAGE
2.3 SENSING HELIUM NUCLEI							
EXPLORER 47 ENERGETIC ELECTRONS AND PROTONS	(72-073A-05)	WILLIAMS	R	1.200E 05 TO 5.500E 05 EV	GH		111
ATS-F SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	(ATS-F -06)	MASLEY	R	3.000E 05 TO 3.000E 06 EV	F		192
HELIOCENTRIC ENERGETIC PROTONS	(HELOCTR-08)	ELLIOTT	R	3.500E 05 TO 1.500E 06 EV	H		237
EXPLORER 47 ENERGETIC ELECTRONS AND PROTONS	(72-073A-05)	WILLIAMS	U	5.000E 05 TO 2.200E 06 EV	GH		111
VELA 5B SOLAR PARTICLE TELESCOPES	(69-046E-03)	SINGER	R	5.000E 05 TO 2.500E 06 EV	GH		35
VELA 6A SOLAR PARTICLE TELESCOPES	(70-027A-03)	SINGER	R	5.000E 05 TO 2.500E 06 EV	GH		48
VELA 6B SOLAR PARTICLE TELESCOPES	(70-027B-03)	SINGER	R	5.000E 05 TO 2.500E 06 EV	GH		52
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	R	5.000E 05 TO 5.000E 08 EV	H		235
EXPLORER 47 ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(72-073A-06)	STONE	R	5.000E 05 TO 5.000E 06 EV	GH		111
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(IMP-J -06)	STONE	R	5.000E 05 TO 5.000E 06 EV	GH		243
IMP-J ENERGETIC ELECTRONS AND PROTONS	(IMP-J -05)	WILLIAMS	U	5.000E 05 TO 2.200E 06 EV	GH		243
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R	5.000E 05 TO 5.000E 06 EV	GH		288
MARINER 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77A-07)	KRIMIGIS	R	5.000E 05 TO 5.000E 06 EV	H	5	273
MARINER 77B LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77B-07)	KRIMIGIS	R	5.000E 05 TO 5.000E 06 EV	H	5	279
PIONEER 6 COSMIC-RAY TELESCOPE	(65-105A-03)	FAN	R	6.000E 05 TO 6.000E 06 EV	H		5
PIONEER 7 COSMIC-RAY TELESCOPE	(66-075A-06)	SIMPSON	R	6.000E 05 TO 1.300E 07 EV	H		9

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX / MIN	REGION ABCDEFGH1/012345M	PAGE
2.3 SENSING HELIUM NUCLEI								
HELIOS-A	(HELIO-A-07)	WIBBERENZ						
COSMIC-RAY PARTICLES			R	1.000E 06 TO	1.000E 07	EV	H	226
HELIOS-B	(HELIO-B-07)	WIBBERENZ						
COSMIC-RAY PARTICLES			R	1.000E 06 TO	1.000E 07	EV	H	231
EXPLORER 43	(71-019A-07)	BOSTROM						
MONITORING OF SOLAR PROTONS			U	2.000E 06 TO	5.000E 05	EV	FGH	62
EXPLORER 47	(72-073A-08)	KRIMIGIS						
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS			R	2.000E 06 TO	2.000E 08	EV	GH	112
IMP-J	(IMP-J -08)	KRIMIGIS						
PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS			R	2.000E 06 TO	2.000E 08	EV	GH	244
EXPLORER 47	(72-073A-05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			U	2.200E 06 TO	8.800E 06	EV	GH	111
IMP-J	(IMP-J -05)	WILLIAMS						
ENERGETIC ELECTRONS AND PROTONS			U	2.200E 06 TO	8.800E 06	EV	GH	243
ESRO 4	(72-092A-04)	DE JAGER						
SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER			R	2.500E 06 TO	2.000E 07	EV	C	122
ESRO 4	(72-092A-05)	LUST						
NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER			R	2.500E 06 TO	2.400E 07	EV	C	122
OV5-6	(69-046B-03)	YATES						
PROTON ALPHA PARTICLE TELESCOPE			R	2.500E 06 TO	2.500E 07	EV	EFGH	31
VELA 5B	(69-046E-03)	SINGER						
SOLAR PARTICLE TELESCOPES			R	2.500E 06 TO	2.500E 07	EV	GH	35
VELA 6A	(70-027A-03)	SINGER						
SOLAR PARTICLE TELESCOPES			R	2.500E 06 TO	2.500E 07	EV	GH	48
VELA 6B	(70-027B-03)	SINGER						
SOLAR PARTICLE TELESCOPES			R	2.500E 06 TO	2.500E 07	EV	GH	52
ITOS-G	(ITOS-G -01)	BOSTROM						
SOLAR PROTON MONITOR			U	3.000E 06 TO	8.000E 06	EV	BC	254
ITOS-F	(ITOS-F -01)	BOSTROM						
SOLAR PROTON MONITOR			U	3.000E 06 TO	8.000E 06	EV	BC	251
NOAA 2	(72-082A-01)	BOSTROM						
SOLAR PROTON MONITOR			U	3.000E 06 TO	1.000E 07	EV	BC	117

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI/012345M	PLANET	PAGE
2.3 SENSING HELIUM NUCLEI							
ATS-F SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION	(ATS-F -06)	MASLEY	R	3.000E 06 TO 4.500E 07 EV	F		192
GOES-B ENERGETIC PARTICLE MONITOR	(GOES-B -02)	WILLIAMS	R	4.000E 06 TO 4.000E 07 EV	F		216
GOES-C ENERGETIC PARTICLE MONITOR	(GOES-C -02)	WILLIAMS	R	4.000E 06 TO 4.000E 07 EV	F		219
SMS-A ENERGETIC PARTICLE MONITOR	(SMS-A -02)	WILLIAMS	R	4.000E 06 TO 4.000E 07 EV	F		322
SMS-B ENERGETIC PARTICLE MONITOR	(SMS-B -01)	WILLIAMS	R	4.000E 06 TO 4.000E 07 EV	F		324
SMS-C ENERGETIC PARTICLE MONITOR	(SMS-C -02)	WILLIAMS	R	4.000E 06 TO 4.000E 07 EV	F		328
PIONEER 8 COSMIC-RAY ANISOTROPY	(67-123A-05)	MCCRACKEN	U	4.000E 05 TO 8.000E 06 EV	H		14
PIONEER 9 COSMIC-RAY ANISOTROPY	(68-100A-05)	MCCRACKEN	U	4.000E 06 TO 8.000E 06 EV	H		20
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	D	4.000E 06 TO 8.000E 07 EV	H		235
EXPLORER 47 ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(72-073A-06)	STONE	R	5.000E 06 TO 4.000E 07 EV	GH		111
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES	(IMP-J -06)	STONE	R	5.000E 06 TO 4.000E 07 EV	GH		243
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R	5.000E 06 TO 5.000E 07 EV	GH		288
MARINER 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77A-07)	KRIMIGIS	R	5.000E 06 TO 3.000E 07 EV	H	5	273
MARINER 77B LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77B-07)	KRIMIGIS	R	5.000E 06 TO 3.000E 07 EV	H	5	279
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-06)	WEBBER	R	5.800E 06 TO 4.200E 07 EV	H		21
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z	(IMP-J -07)	SIMPSON					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX REGION PLANET S MAX VALUE (LAMBDA) MIN ABCDEFGHI/012345M	PAGE
2.3 SENSING HELIUM NUCLEI				
EXPERIMENTS			R 6.000E 06 TO 6.000E 07 EV GH	244
PIONEER 6	(65-105A-03)	FAN		
COSMIC-RAY TELESCOPE			R 6.000E 06 TO 1.390E 07 EV H	5
EXPLORER 47	(72-073A-07)	SIMPSON		
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R 6.000E 06 TO 6.000E 07 EV GH	112
PIONEER 8	(67-123A-06)	WEBBER		
COSMIC-RAY GRADIENT DETECTOR			R 6.600E 06 TO 6.400E 07 EV H	15
HEOS 2	(72-005A-04)	PAGE		
PARTICLE COUNTER TELESCOPE			R 9.000E 06 TO 3.600E 07 EV C GH	88
HELIOS-A	(HELIO-A-07)	WIBBERENZ		
COSMIC-RAY PARTICLES			R 1.000E 07 TO 1.000E 08 EV H	226
HELIOS-B	(HELIO-B-07)	WIBBERENZ		
COSMIC-RAY PARTICLES			R 1.000E 07 TO 1.000E 08 EV H	231
MOTHER	(MOTHER -14)	SIMPSON		
MEDIUM-ENERGY COSMIC RAYS			R 1.000E 07 TO 1.500E 08 EV GH	288
PIONEER 7	(66-075A-06)	SIMPSON		
COSMIC-RAY TELESCOPE			R 1.300E 07 TO 7.000E 07 EV H	9
PIONEER 6	(65-105A-03)	FAN		
COSMIC-RAY TELESCOPE			R 1.390E 07 TO 7.320E 07 EV H	5
ESRO 4	(72-092A-04)	DE JAGER		
SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER			R 2.000E 07 TO 1.600E 08 EV C	122
ESRO 4	(72-092A-05)	LUST		
NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER			R 2.400E 07 TO 2.400E 08 EV C	122
HELIOCENTRIC	(HELOCTR-05)	HECKMAN		
HIGH-ENERGY COSMIC RAYS			O 3.000E 07 TO 1.000E 08 EV H	236
HELIOCENTRIC	(HELOCTR-05)	HECKMAN		
HIGH-ENERGY COSMIC RAYS			D 3.000E 07 TO 1.000E 08 EV H	236
PIONEER 6	(65-105A-05)	MCCRACKEN		
COSMIC-RAY ANISOTROPY DETECTION			U 3.100E 07 TO 7.600E 07 EV H	6
GOES-B	(GOES-B -02)	WILLIAMS		
ENERGETIC PARTICLE MONITOR			R 4.000E 07 TO 4.000E 08 EV F	216
GOES-C	(GOES-C -02)	WILLIAMS		
ENERGETIC PARTICLE MONITOR			R 4.000E 07 TO 4.000E 08 EV F	219

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS E MIN VALUE (F OR E) MAX S MAX VALUE (LAMBDA) MIN	REGION ABCDEFGHI/012345M	PAGE
2.3 SENSING HELIUM NUCLEI					
SMS-A ENERGETIC PARTICLE MONITOR	(SMS-A -02)	WILLIAMS	R 4.000E 07 TO 4.000E 08 EV	F	322
SMS-B ENERGETIC PARTICLE MONITOR	(SMS-B -01)	WILLIAMS	R 4.000E 07 TO 4.000E 08 EV	F	324
SMS-C ENERGETIC PARTICLE MONITOR	(SMS-C -02)	WILLIAMS	R 4.000E 07 TO 4.000E 08 EV	F	328
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R 5.000E 07 TO 1.500E 08 EV	GH	288
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	(IMP-J -07)	SIMPSON	R 6.000E 07 TO 6.000E 08 EV	GH	244
EXPLORER 47 SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	(72-073A-07)	SIMPSON	R 6.000E 07 TO 6.000E 08 EV	GH	112
PIONEER 7 COSMIC-RAY TELESCOPE	(66-075A-06)	SIMPSON	R 7.000E 07 TO 1.780E 08 EV	H	9
PIONEER 6 COSMIC-RAY TELESCOPE	(65-105A-03)	FAN	R 7.320E 07 TO 1.750E 08 EV	H	5
HELIOS-A COSMIC-RAY PARTICLES	(HELIO-A-07)	WIBBERENZ	R 1.000E 08 TO 1.000E 09 EV	H	226
HELIOS-B COSMIC-RAY PARTICLES	(HELIO-B-07)	WIBBERENZ	R 1.000E 08 TO 1.000E 09 EV	H	231
ESRO 4 NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	(72-092A-05)	LUST	R 2.400E 08 TO 3.600E 08 EV	C	122
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	(IMP-J -07)	SIMPSON	R 6.000E 08 TO 1.200E 09 EV	GH	244
EXPLORER 47 SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	(72-073A-07)	SIMPSON	R 6.000E 08 TO 1.200E 09 EV	GH	112

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E) / MAX VALUE (LAMBDA) / MAX VALUE / MIN	REGION ABCDEFGHI/	PLANET 012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES							
ISIS 1	(69-009A-07)	BRACE					
CYLINDRICAL ELECTROSTATIC PROBE			U	THERMAL ENERGIES	C		27
ISIS 2	(71-024A-06)	HOFFMAN					
ION MASS SPECTROMETER			U	THERMAL ENERGIES	BC		70
ISIS 2	(71-024A-06)	MAIER					
RETARDING POTENTIAL ANALYZER			U	THERMAL ENERGIES	C		71
APOLLO 15 LM/ALSEP	(71-063C-05)	BATES					
LUNAR DUST DETECTOR			U		H	M	79
PIONEER 10	(72-012A-10)	KLIORE					
S-BAND OCCULTATION			U	THERMAL ENERGIES		5	95
ESRO 4	(72-092A-01)	BOYD					
POSITIVE ION SPECTROMETER			U	THERMAL ENERGIES	BC		120
PIONEER 11	(73-019A-10)	KLIORE					
S-BAND OCCULTATION			U	THERMAL ENERGIES		5	135
AE-D	(AE-D -01)	BRACE					
ELECTRON TEMPERATURE AND CONCENTRATION			U	THERMAL ENERGIES	C		159
AEROS-B	(AEROS-B-01)	KRANKOWSKY					
MASS SPECTROMETER (MS)			U	THERMAL ENERGIES	BC		178
AEROS-B	(AEROS-B-02)	SPENNER					
ENERGY DISTRIBUTION OF IONS AND ELECTRONS			U	THERMAL ENERGIES	C		178
EXOS-A	(EXOS-A -01)	UNKNOWN					
IONOSPHERIC PROBES			U	THERMAL ENERGIES	C		209
EXOS-B	(EXOS-B -01)	UNKNOWN					
MAGNETOSPHERIC PLASMA PROBE			R	THERMAL ENERGIES	DE		211
EXOS-C	(EXOS-C -04)	UNKNOWN					
ENERGETIC PARTICLES			O		B		213
ISS	(ISS -04)	FUGONO					
ION MASS SPECTROMETER			U	THERMAL ENERGIES	BC		250
MARINER 77B	(MARN77B-02)	ESHLEMAN					
COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER			U	THERMAL ENERGIES		S	277
MOTHER	(MOTHER -12)	SHARP					
PLASMA COMPOSITION			R	THERMAL ENERGIES	F H		288
PIONEER VENUS PROBE A	(PIO78PA-02)	TAYLOR, JR.					
ION MASS SPECTROMETER			U	THERMAL ENERGIES		2	301

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	RANGE OF MEASUREMENTS: MIN VALUE / MAX VALUE	(F OR E) / (LAMBDA)	MAX REGION / MIN	PLANET ABCDEFGHI/012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES						
SRATS IONIC COMPOSITION	(SRATS -07) FUGONO	U	THERMAL ENERGIES	B		332
VIKING-B ATMOSPHERIC COMPOSITION	(VIKNG-B-04) NIER	U	THERMAL ENERGIES		4	349
ISIS 1 SPHERICAL ELECTROSTATIC ANALYZER	(69-009A-08) SAGALYN	U	THERMAL ENERGIES	BC		28
ISIS 2 CYLINDRICAL ELECTROSTATIC PROBE	(71-024A-07) BRACE	U	THERMAL ENERGIES	C		71
AE-C ELECTRON TEMPERATURE AND CONCENTRATION	(AE-C -01) BRACE	U	THERMAL ENERGIES	C		148
AE-C ION TEMPERATURE	(AE-C -04) HANSON	U	THERMAL ENERGIES	C		149
AE-C MAGNETIC ION-MASS SPECTROMETER	(AE-C -10) HOFFMAN	U	THERMAL ENERGIES	B		153
AE-C BENNETT ION-MASS SPECTROMETER	(AE-C -11) BRINTON	U	THERMAL ENERGIES	B		154
AE-D ION TEMPERATURE	(AE-D -04) HANSON	U	THERMAL ENERGIES	C		160
AE-D ION COMPOSITION AND CONCENTRATION	(AE-D -10) HOFFMAN	U	THERMAL ENERGIES	BC		164
AE-E ELECTRON TEMPERATURE AND CONCENTRATION	(AE-E -01) BRACE	U	THERMAL ENERGIES	B		169
AE-E ION TEMPERATURE	(AE-E -04) HANSON	U	THERMAL ENERGIES	B		170
AE-E ION COMPOSITION AND CONCENTRATION	(AE-E -10) BRINTON	U	THERMAL ENERGIES	B		174
EXOS-A IONOSPHERIC PROBES	(EXOS-A -01) UNKNOWN	U	THERMAL ENERGIES	C		209
ISS RETARDING POTENTIAL PROBE	(ISS -03) MIYAZAKI	U	THERMAL ENERGIES	B		250
SRATS PLASMA DIAGNOSIS	(SRATS -06) UNKNOWN	U		B		331
VIKING-A ATMOSPHERIC COMPOSITION	(VIKNG-A-04) NIER	U	THERMAL ENERGIES		4	341
VIKING-A RADIO COMMUNICATION AND RADAR LANDING	(VIKNG-A-14) MICHAEL, JR.					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / E / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	MAX REGION / MIN ABCDEFGHI	PLANET /012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES								
SYSTEMS PLUS X BAND			U			H	4	346
VIKING-B	(VIKNG-B-14)	MICHAEL, JR.						
RADIO COMMUNICATION AND RADAR LANDING SYSTEMS PLUS X BAND			U			H	4	353
MARINER 77 A	(MARN77A-02)	ESHLEMAN						
COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER			U				5	271
EXOS-B	(EXOS-B -04)	UNKNOWN						
MAGNETOSPHERIC PLASMA			U	1.000E-01 TO 1.000E 00 EV		DE		211
APOLLO 12 LM/ALSEP	(69-099C-05)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	2.000E-01 TO 4.860E 01 EV		GH		42
APOLLO 14 LM/ALSEP	(71-008C-06)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	2.000E-01 TO 4.860E 01 EV		GH		57
APOLLO 15 LM/ALSEP	(71-063C-05)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	2.000E-01 TO 4.850E 01 EV		GH	M	78
HELIOCENTRIC	(HELOCTR-11)	OGILVIE						
MASS SPECTROMETER FOR 470 TO 10.500 EV PER CHARGE AND 1 TO 5.6 AMU PER CHARGE			R	4.700E-01 TO 1.050E 04 EV		H		238
ESGEO	(ESGEO -03)	GEISS						
LOW-ENERGY ION COMPOSITION			D	1.000E 00 TO 1.720E 04 EV		F		206
MARINER 77A	(MARN77A-06)	BRIDGE						
PLASMA			R	5.000E 00 TO 1.000E 03 EV		H	5	273
MARINER 77B	(MARN77B-06)	BRIDGE						
PLASMA			R	5.000E 00 TO 1.000E 03 EV		H	5	279
APOLLO 12 LM/ALSEP	(69-099C-05)	FREEMAN						
SUPRATHERMAL ION DETECTOR			R	1.000E 01 TO 3.500E 03 EV		GH		42
IMP-J	(IMP-J -10)	BAME						
MEASUREMENT OF SOLAR PLASMA			R	1.000E 02 TO 2.500E 03 EV		GH		245
APOLLO 14 LM/ALSEP	(71-008C-06)	O'BRIEN						
CHARGED PARTICLE LUNAR ENVIRONMENT			R	1.700E 02 TO 2.000E 03 EV		GH	M	58
EXPLORER 47	(72-073A-10)	BAME						
MEASUREMENT OF SOLAR PLASMA			R	2.000E 02 TO 2.000E 04 EV		GH		113
HEOS 2	(72-005A-06)	ROSENBAUER						
SOLAR WIND MEASUREMENTS (230 EV-16 KEV)			R	2.300E 02 TO 1.000E 03 EV		C GH		89
EXPLORER 47	(72-073A-12)	OGILVIE						
SOLAR WIND ION COMPOSITION			R	3.000E 02 TO 3.750E 03 EV		H		115

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI	PLANET /012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES								
EXPLORER 43	(71-019A-11)	BAME						
MEASUREMENT OF SOLAR PLASMA			R	9.000E 02 TO	8.000E 03 EV	DEFGH		64
VELA 6A	(70-027A-05)	BAME						
SOLAR WIND EXPERIMENT			R	1.000E 03 TO	8.300E 03 EV	H		49
HEOS 2	(72-005A-06)	ROSENBAUER						
SOLAR WIND MEASUREMENTS (230 EV-16 KEV)			R	1.000E 03 TO	1.000E 04 EV	C GH		89
APOLLO 14 LM/ALSEP	(71-00EC-CE)	O'BRIEN						
CHARGED PARTICLE LUNAR ENVIRONMENT			R	2.000E 03 TO	2.000E 04 EV	GH	M	58
HELIOCENTRIC	(HELOCTR-03)	HOVESTADT						
LOW-ENERGY COSMIC-RAY COMPOSITION			R	5.000E 03 TO	5.000E 04 EV	H		235
MOTHER	(MOTHER -CE)	HOVESTADT						
LOW-ENERGY COSMIC-RAY COMPOSITION			R	5.000E 03 TO	5.000E 04 EV	GH		284
HEOS 2	(72-005A-06)	ROSENBAUER						
SOLAR WIND MEASUREMENTS (230 EV-16 KEV)			R	1.000E 04 TO	5.000E 04 EV	C GH		89
MARINER 77A	(MARN77A-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	1.000E 04 TO	1.000E 05 EV	H	S	273
MARINER 77E	(MARN77B-07)	KRIMIGIS						
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	1.000E 04 TO	1.000E 05 EV	H	S	279
HELIOCENTRIC	(HELOCTR-03)	HOVESTADT						
LOW-ENERGY COSMIC-RAY COMPOSITION			R	5.000E 04 TO	5.000E 05 EV	H		235
MOTHER	(MOTHER -05)	HOVESTADT						
LOW-ENERGY COSMIC-RAY COMPOSITION			R	5.000E 04 TO	5.000E 05 EV	GH		284
EXPLORER 47	(72-073A-13)	CLINE						
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS			R	5.000E 04 TO	5.000E 05 EV	GH		115
EXPLORER 47	(72-073A-03)	GLOECKLER						
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV			R	1.000E 05 TO	1.000E 06 EV	GH		110
IMP-J	(IMP-J -03)	GLOECKLER						
SOLID-STATE DETECTORS			R	1.000E 05 TO	1.000E 06 EV	GH		242
HELIOS-A	(HELIO-A-08)	TRAINOR						
GALACTIC AND SOLAR COSMIC RAYS			R	1.000E 05 TO	1.000E 06 EV	H		226
HELIOS-B	(HELIO-B-08)	TRAINOR						
GALACTIC AND SOLAR COSMIC RAYS			R	1.000E 05 TO	1.000E 06 EV	H		231
MARINER 77A	(MARN77A-07)	KRIMIGIS						

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION MAX MIN	ABCDEFGHI/012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES								
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE			R	1.000E 05 TO 3.000E 07	EV	H	5	273
MARINER 77E LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE	(MARN77B-07)	KRIMIGIS	R	1.000E 05 TO 3.000E 07	EV	H	5	279
MARINER 77B HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77B-08)	VOGT	R	1.500E 05 TO 6.000E 06	EV	H	5	280
MARINER 77A HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77A-06)	VOGT	R	1.500E 05 TO 6.000E 06	EV	H	5	274
EXPLORER 43 NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	(71-019A-09)	SIMPSON	R	5.000E 05 TO 5.000E 06	EV	H		63
EXPLORER 47 SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT	(72-073A-07)	SIMPSON	R	5.000E 05 TO 5.000E 06	EV	GH		112
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS	(IMP-J -07)	SIMPSON	R	5.000E 05 TO 5.000E 06	EV	GH		244
HELIOCENTRIC LOW-ENERGY COSMIC-RAY COMPOSITION	(HELOCTR-03)	HOVESTADT	R	5.000E 05 TO 2.000E 06	EV	H		235
MOTHER LOW-ENERGY COSMIC-RAY COMPOSITION	(MOTHER -05)	HOVESTADT	R	5.000E 05 TO 2.000E 06	EV	GH		284
HELIOCENTRIC SOLAR, GALACTIC, AND MAGNETOSPHERIC ENERGETIC PARTICLES	(HELOCTR-04)	VON ROSENVING	R	5.000E 05 TO 5.000E 08	EV	H		235
EXPLORER 47 STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS	(72-073A-13)	CLINE	R	5.000E 05 TO 2.000E 06	EV	GH		115
EXPLORER 43 NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	(71-019A-09)	SIMPSON	R	5.000E 05 TO 8.000E 08	EV	H		63
TD 1A SPECTROMETRY OF PRIMARY CHARGED PARTICLES	(72-016A-03)	LABEYRIE	O	1.000E 06 TO INFINITY		CD		99
EXPLORER 47 IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV	(72-073A-03)	GLOECKLER	R	1.000E 06 TO 2.000E 06	EV	GH		110

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE	MAX VALUE	(F OR E) (LAMBDA)	REGION MIN	REGION MAX	PLANET ABCDEFGHI/012345N	PAGE
2.4 SENSING OTHER PARTICLE SPECIES										
IMP-J	(IMP-J -03)	GLOECKLER								
SOLID-STATE DETECTORS			R	1.000E 06	TO 2.000E 06	EV		GH		242
HELIOS-A	(HELIO-A-08)	TRAINOR								
GALACTIC AND SOLAR COSMIC RAYS			R	1.000E 06	TO 1.000E 07	EV		H		226
HELIOS-B	(HELIO-B-08)	TRAINOR								
GALACTIC AND SOLAR COSMIC RAYS			R	1.000E 06	TO 1.000E 07	EV		H		231
HELIOCENTRIC	(HELOCTR-12)	STONE								
COSMIC-RAY COMPOSITION			R	2.000E 06	TO 2.000E 07	EV		H		239
HELIOCENTRIC	(HELOCTR-03)	HOVESTADT								
LOW-ENERGY COSMIC-RAY COMPOSITION			R	2.000E 06	TO 2.000E 07	EV		H		235
MOTHER	(MOTHER -08)	HOVESTADT								
LOW-ENERGY COSMIC-RAY COMPOSITION			R	2.000E 06	TO 2.000E 07	EV		GH		284
PIONEER 10	(72-012A-12)	MCDONALD								
COSMIC-RAY SPECTRA			R	3.000E 06	TO 3.000E 07	EV		H		96
PIONEER 11	(73-019A-12)	MCDONALD								
COSMIC-RAY SPECTRA			R	3.000E 06	TO 3.000E 07	EV		H		136
PIONEER 10	(72-012A-12)	MCDONALD								
COSMIC-RAY SPECTRA			R	3.000E 06	TO 2.000E 08	EV			5	96
PIONEER 11	(73-019A-12)	MCDONALD								
COSMIC-RAY SPECTRA			R	3.000E 06	TO 2.000E 08	EV			5	136
EXPLORER 47	(72-073A-09)	MCDONALD								
SOLAR- AND COSMIC-RAY PARTICLES			R	4.000E 06	TO 2.000E 07	EV		GH		113
IMP-J	(IMP-J -09)	MCDONALD								
SOLAR- AND COSMIC-RAY PARTICLES			R	4.000E 06	TO 2.000E 07	EV		GH		244
EXPLORER 43	(71-019A-08)	MCDONALD								
SOLAR AND GALACTIC COSMIC-RAY STUDIES			R	4.200E 06	TO 1.910E 07	EV		FGH		63
EXPLORER 43	(71-019A-09)	SIMPSON								
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS			R	5.000E 06	TO 5.000E 07	EV		H		63
EXPLORER 47	(72-073A-07)	SIMPSON								
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT			R	5.000E 06	TO 5.000E 07	EV		GH		112
IMP-J	(IMP-J -07)	SIMPSON								
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS			R	5.000E 06	TO 5.000E 07	EV		GH		244
EXPLORER 47	(72-073A-05)	WILLIAMS								
ENERGETIC ELECTRONS AND PROTONS			U	5.000E 06	TO INFINITY			GH		111

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R / S	RANGE OF MEASUREMENTS: MIN VALUE (F OR E)	MAX VALUE (LAMBDA)	REGION: MAX / MIN	ABCDEFGHI/012345M	PLANET	PAGE
2.4 SENSING OTHER PARTICLE SPECIES									
IMP-J ENERGETIC ELECTRONS AND PROTONS	(IMP-J -05)	WILLIAMS	U	5.000E 06	TO INFINITY		GH		243
MARINER 77E HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77B-08)	VOGT	R	6.000E 06	TO 3.000E 07 EV		H	S	280
PIONEER 10 CHARGED PARTICLE COMPOSITION	(72-012A-02)	SIMPSON	R	6.000E 06	TO 6.000E 07 EV		H	S	91
PIONEER 11 CHARGED PARTICLE COMPOSITION	(73-019A-02)	SIMPSON	R	6.000E 06	TO 6.000E 07 EV		H	S	132
MARINER 77A HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77A-08)	VOGT	R	6.000E 06	TO 3.000E 07 EV		H	S	274
EXPLORER 47 PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(72-073A-08)	KRIMIGIS	R	8.000E 06	TO 1.350E 08 EV		GH		112
IMP-J PROPAGATION CHARACTERISTICS OF SOLAR PROTONS AND ELECTRONS	(IMP-J -08)	KRIMIGIS	R	8.000E 06	TO INFINITY		GH		244
HELIOCENTRIC HIGH-ENERGY COSMIC RAYS	(HELOCTR-05)	HECKMAN	D	1.000E 07	TO 1.000E 08 EV		H		236
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS	(HELIO-B-08)	TRAINOR	R	1.000E 07	TO 8.000E 08 EV		H		231
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS	(HELIO-A-08)	TRAINOR	R	1.000E 07	TO 8.000E 08 EV		H		226
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R	1.000E 07	TO 1.000E 08 EV		GH		288
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-05)	MCDONALD	R	1.870E 07	TO 8.150E 07 EV		FGH		63
HELIOCENTRIC COSMIC-RAY COMPOSITION	(HELOCTR-12)	STONE	R	2.000E 07	TO 2.000E 08 EV		H		239
PIONEER 10 COSMIC-RAY SPECTRA	(72-012A-12)	MCDONALD	R	2.000E 07	TO 2.000E 08 EV		H		96
PIONEER 11 COSMIC-RAY SPECTRA	(73-019A-12)	MCDONALD	R	2.000E 07	TO 2.000E 08 EV		H		136
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R	2.000E 07	TO 8.000E 07 EV		GH		113

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE (F OR E) MAX VALUE (LAMBDA)	REGION MIN ABCDEFGHI/	PLANET 012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES							
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -09)	MCDONALD	R	2.000E 07 TO 8.000E 07 EV	GH		244
MARINER 77B HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77B-08)	VOGT	R	3.000E 07 TO 5.000E 08 EV	H	5	280
MARINER 77A HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE	(MARN77A-08)	VOGT	R	3.000E 07 TO 5.000E 08 EV	H	5	274
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-08)	WEBBER	R	4.200E 07 TO 3.200E 08 EV	H		21
EXPLORER 43 NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	(71-019A-09)	SIMPSON	R	5.000E 07 TO 5.000E 08 EV	H		63
PIONEER 10 CHARGED PARTICLE COMPOSITION	(72-012A-02)	SIMPSON	R	6.000E 07 TO 1.500E 08 EV	H	5	91
PIONEER 11 CHARGED PARTICLE COMPOSITION	(73-019A-02)	SIMPSON	R	6.000E 07 TO 1.500E 08 EV	H	5	132
HELIOCENTRIC COSMIC-RAY ELECTRONS AND NUCLEI	(HELOCTR-08)	MEYER	R	6.000E 07 TO 6.000E 08 EV	H		236
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-08)	WEBBER	R	6.300E 07 TO 1.700E 08 EV	H		15
EXPLORER 43 SOLAR AND GALACTIC COSMIC-RAY STUDIES	(71-019A-08)	MCDONALD	R	8.000E 07 TO 5.000E 08 EV	FGH		63
EXPLORER 47 SOLAR- AND COSMIC-RAY PARTICLES	(72-073A-09)	MCDONALD	R	8.000E 07 TO 5.000E 08 EV	GH		113
IMP-J SOLAR- AND COSMIC-RAY PARTICLES	(IMP-J -09)	MCDONALD	R	8.000E 07 TO 5.000E 08 EV	GH		244
MOTHER MEDIUM-ENERGY COSMIC RAYS	(MOTHER -14)	SIMPSON	R	1.000E 08 TO 7.000E 08 EV	GH		288
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR	(67-123A-08)	WEBBER	R	1.700E 08 TO 1.500E 09 EV	H		15
PIONEER 9 COSMIC-RAY TELESCOPE	(68-100A-08)	WEBBER	R	3.200E 08 TO 2.200E 09 EV	H		21
EXPLORER 43 NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS	(71-019A-09)	SIMPSON	R	5.000E 08 TO 5.000E 08 EV	H		63
EXPLORER 43	(71-019A-09)	SIMPSON					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	RANGE OF MEASUREMENTS MIN VALUE MAX VALUE	(F OR E) (LAMBDA)	REGION MIN MAX	PLANET ABCDEFGHI/012345M	PAGE
2.4 SENSING OTHER PARTICLE SPECIES								
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS.....			R	5.000E 08 TO 2.000E 09	EV		H	63
HELIOCENTRIC COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	R	6.000E 08 TO 6.000E 09	EV		H	236
HELIOCENTRIC COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	R	6.000E 09 TO 1.300E 10	EV		H	236
HELIOCENTRIC COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	U	1.300E 10 TO INFINITY			H	236

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	MEASURED CHARACTERISTIC	REGION ABCDEFGHI	PLANET /012345M	PAGE
3. MICROSCOPIC NEUTRAL MEASUREMENTS							
3.1 SENSING NEUTRONS							
VELA 5A NEUTRON DETECTOR	(69-046D-07)	BAME	P	ENERGY FLUX	GH		33
VELA 5B NEUTRON DETECTOR	(69-046E-07)	BAME	P	ENERGY FLUX	GH		37
VELA 6A NEUTRON DETECTOR	(70-027A-07)	BAME	P	ENERGY FLUX	GH		50
VELA 6B NEUTRON DETECTOR	(70-027B-07)	BAME	P	ENERGY FLUX	GH		53
INDIAN SCIENTIFIC SAT. SOLAR NEUTRON AND GAMMA RAYS	(INDASAT-02)	UNKNOWN	R	ENERGY FLUX		0	247

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	MEASURED CHARACTERISTIC	REGION ABCDEFGHI/	PLANET 012345M	PAGE
3.2 SENSING ATOMS AND/OR MOLECULES							
VIKING-A MOLECULAR ANALYSIS	(VIKNG-A-07)	BIEMANN	D	DENSITY		4	343
VIKING-B MOLECULAR ANALYSIS	(VIKNG-B-07)	BIEMANN	D	DENSITY		4	350
PIONEER VENUS PROBE B INFRARED RADIOMETER	(PI078PB-05)	SUOMI	U	DENSITY		2	305
PIONEER VENUS PROBE E GAS CHROMATOGRAPH	(PI078PB-04)	OYAMA	R	ENERGY FLUX		2	304
ESRO 4 NEUTRAL MASS SPECTOMETER	(72-092A-02)	VON ZAHN	R	ENERGY FLUX	BC		121
AE-C OPEN SOURCE NEUTRAL MASS SPECTROMETER	(AE-C -07)	NIER	R	ENERGY FLUX	B		150
AE-C CLOSED SOURCE NEUTRAL MASS SPECTROMETER	(AE-C -08)	PELZ	R	ENERGY FLUX	B		151
AE-D OPEN SOURCE NEUTRAL MASS SPECTROMETER	(AE-D -07)	NIER	R	ENERGY FLUX	BC		162
AE-D CLOSED SOURCE NEUTRAL MASS SPECTROMETER	(AE-D -08)	PELZ	R	ENERGY FLUX	BC		163
AE-E OPEN SOURCE NEUTRAL MASS SPECTROMETER	(AE-E -07)	NIER	R	ENERGY FLUX	B		172
AE-E CLOSED SOURCE NEUTRAL MASS SPECTROMETER	(AE-E -08)	PELZ	R	ENERGY FLUX	B		173
AE-C ATMOSPHERIC DRAG	(AE-C -02)	CHAMPION	U	PARTICLE FLUX	B		148
AE-C COLD CATHODE ION GAUGE	(AE-C -15)	CARTER	P	PARTICLE FLUX	B		157
AE-C CAPACITANCE MANOMETER	(AE-C -16)	CARTER	P	PARTICLE FLUX	B		158
AE-D ATMOSPHERIC DRAG	(AE-D -02)	CHAMPION	U	PARTICLE FLUX	B		160
AE-D CAPACITANCE MANOMETER	(AE-D -14)	CARTER	P	PARTICLE FLUX	C		167
AE-D COLD CATHODE ION GAUGE	(AE-D -15)	CARTER	P	PARTICLE FLUX	C		168
AE-E ATMOSPHERIC DRAG	(AE-E -02)	CHAMPION	U	PARTICLE FLUX	B		169

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	MEASURED CHARACTERISTIC	REGION ABCDEFGHI	PLANET 012345M	PAGE
3.2 SENSING ATOMS AND/OR MOLECULES							
AE-E CAPACITANCE MANOMETER	(AE-E -12)	CARTER	P	PARTICLE FLUX	B		176
AE-E COLD CATHODE ION GAUGE	(AE-E -13)	CARTER	P	PARTICLE FLUX	B		177
VIKING-A METEOROLOGY EXPERIMENT	(VIKNG-A-10)	HESS	U	PARTICLE FLUX		4	345
VIKING-B ATMOSPHERIC STRUCTURE	(VIKNG-B-05)	NIER	U	PARTICLE FLUX		4	349
VIKING-B METEOROLOGY EXPERIMENT	(VIKNG-B-10)	HESS	U	PARTICLE FLUX		4	352
VIKING-A ATMOSPHERIC STRUCTURE	(VIKNG-A-05)	NIER	U	PARTICLE FLUX		4	342
PIONEER VENUS PROBE E ATMOSPHERE STRUCTURE	(PIO78PE-01)	SEIFF	U	PARTICLE FLUX		2	303
VIKING-B ATMOSPHERIC STRUCTURE	(VIKNG-B-05)	NIER	U	PARTICLE FLUX		4	349
SAN MARCO C-2 NEUTRAL ATMOSPHERE TEMPERATURE	(SMAR-C2-03)	SPENCER	R	PRESSURE	B		320
VIKING-A ATMOSPHERIC STRUCTURE	(VIKNG-A-05)	NIER	U	PRESSURE		4	342
AE-C NEUTRAL GAS TEMPERATURE AND CONCENTRATION	(AE-C -09)	SPENCER	R	PRESSURE	B		152
AE-D NEUTRAL GAS TEMPERATURE AND CONCENTRATION	(AE-D -09)	SPENCER	R	PRESSURE	BC		164
AE-E NEUTRAL GAS TEMPERATURE AND CONCENTRATION	(AE-E -09)	SPENCER	R	PRESSURE	B		174
MARINER 77A COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77A-02)	ESHLEMAN	R	PRESSURE		5	271
PIONEER VENUS PROBE C ATMOSPHERE STRUCTURE	(PIO78PC-01)	SEIFF	U	PRESSURE		2	307
PIONEER VENUS PROBE D ATMOSPHERE STRUCTURE	(PIO78PD-01)	SEIFF	U	PRESSURE		2	309

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENTER ID / EXPERIMENTER	R E S	MEASURED CHARACTERISTIC	REGION ABCDEFGHI	PLANET 012345M	PAGE
3.2 SENSING ATOMS AND/OR MOLECULES						
PIONEER VENUS PROBE E ATMOSPHERE STRUCTURE	(PI078PE-01) SEIFF	U	PRESSURE		2	311
VIKING-A METEOROLOGY EXPERIMENT	(VIKNG-A-10) HESS	U	PRESSURE		4	345
VIKING-B ATMOSPHERIC STRUCTURE	(VIKNG-B-05) NIER	U	PRESSURE		4	349
VIKING-B METEOROLOGY EXPERIMENT	(VIKNG-B-10) HESS	U	PRESSURE		4	352
MARINER 77 E COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77B-02) ESHLEMAN	R	PRESSURE		5	277
PIONEER VENUS PROBE B ATMOSPHERE STRUCTURE	(PI078PB-01) SEIFF	U	PRESSURE		2	303
APOLLO 14 LM/ALSEP COLD CATHODE ION GAUGE EXPERIMENT	(71-008C-07) JOHNSON	U	TEMPERATURE		M	57
APOLLO 15 LM/ALSEP COLD CATHODE ION GAUGE EXPERIMENT	(71-063C-07) JOHNSON	U	TEMPERATURE		M	79
ESRO 4 NEUTRAL MASS SPECTOMETER	(72-092A-02) VON ZAHN	R	TEMPERATURE	BC		121
APOLLO 17 LM/ALSEP ATMOSPHERIC COMPOSITION	(72-096C-08) HOFFMAN	R	TEMPERATURE		M	125
AC-A ATMOSPHERIC DRAG DENSITY	(AC-A -01) KEATING	U	TEMPERATURE	C		145
AC-A ATMOSPHERIC COMPOSITION MASS SPECTROMETER	(AC-A -02) NIER	O	TEMPERATURE	C		145
AD-B ATMOSPHERIC DRAG DENSITY	(AD-B -01) KEATING	U	TEMPERATURE	C		146
AD-B ATMOSPHERIC COMPOSITION MASS SPECTROMETER	(AD-B -02) NIER	O	TEMPERATURE	C		147
AE-C OPEN SOURCE NEUTRAL MASS SPECTROMETER	(AE-C -07) NIER	R	TEMPERATURE	B		150
AE-C CLOSED SOURCE NEUTRAL MASS SPECTROMETER	(AE-C -08) PELZ	R	TEMPERATURE	B		151
AE-C NEUTRAL GAS TEMPERATURE AND	(AE-C -09) SPENCER					

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R E S	MEASURED CHARACTERISTIC	REGION ABCDEFGHI	PLANET 012345M	PAGE
3.2 SENSING ATOMS AND/OR MOLECULES							
CONCENTRATION			R	TEMPERATURE	B		152
AE-D	(AE-D -07)	NIER					
OPEN SOURCE NEUTRAL MASS SPECTROMETER			R	TEMPERATURE	BC		162
AE-D	(AE-D -08)	PELZ					
CLOSED SOURCE NEUTRAL MASS SPECTROMETER			R	TEMPERATURE	BC		163
AE-D	(AE-D -09)	SPENCER					
NEUTRAL GAS TEMPERATURE AND CONCENTRATION			R	TEMPERATURE	BC		164
AE-E	(AE-E -07)	NIER					
OPEN SOURCE NEUTRAL MASS SPECTROMETER			R	TEMPERATURE	B		172
AE-E	(AE-E -08)	PELZ					
CLOSED SOURCE NEUTRAL MASS SPECTROMETER			R	TEMPERATURE	B		173
AE-E	(AE-E -09)	SPENCER					
NEUTRAL GAS TEMPERATURE AND CONCENTRATION			R	TEMPERATURE	B		174
AEROS-B	(AEROS-B-05)	SPENCER					
NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT			R	TEMPERATURE	BC		179
AEROS-B	(AEROS-B-06)	ROEMER					
ATMOSPHERIC DRAG ANALYSIS			U	TEMPERATURE	C		180
PIONEER VENUS PROBE A	(PI078PA-03)	VON ZAHN					
NEUTRAL PARTICLE MASS SPECTROMETER			R	TEMPERATURE		2	301
PIONEER VENUS PROBE B	(PI078PB-06)	SPENCER					
NEUTRAL PARTICLE MASS SPECTROMETER			R	TEMPERATURE		2	305
SAN MARCO C-2	(SMAR-C2-01)	BROGLIO					
ATMOSPHERIC DRAG DENSITY ACCELEROMETER			U	TEMPERATURE	C		319
SAN MARCO C-2	(SMAR-C2-02)	NEWTON					
NEUTRAL ATMOSPHERE COMPOSITION			R	TEMPERATURE	B		320
AEROS-B	(AEROS-B-01)	KRANKOWSKY					
MASS SPECTROMETER (MS)			R	TEMPERATURE	BC		178
ASTP	(ASTP -03)	DONAHUE					
ULTRAVIOLET ATMOSPHERIC ABSORPTION			R	TEMPERATURE	B		183
PIONEER VENUS PROBE A	(PI078PA-05)	STEWART					
ULTRAVIOLET SPECTROMETER			R	TEMPERATURE		2	302
PIONEER VENUS PROBE B	(PI078PB-01)	SEIFF					
ATMOSPHERE STRUCTURE			U	TEMPERATURE		2	303

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RES	MEASURED CHARACTERISTIC	REGION ABCDEFGHI/	PLANET 012345M	PAGE
3.2 SENSING ATOMS AND/OR MOLECULES							
VIKING-B ATMOSPHERIC COMPOSITION.....	(VIKNG-B-04)	NIER	R	TEMPERATURE		4	349
VIKING-A ATMOSPHERIC COMPOSITION.....	(VIKNG-A-04)	NIER	R	TEMPERATURE		4	341
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....	(MARN77A-11)	LILLIE	D	TEMPERATURE		5	275
MARINER 77E MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....	(MARN77B-11)	LILLIE	D	TEMPERATURE		5	281

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4. OBSERVATIONS OF MACROSCOPIC BODIES						
4.1 SENSING MERCURY						
MARINER-J VENUS/MERCURY (MARINJ -02) S- AND X-BAND RADIO PROPAGATION.....		HOWARD	GRAVITY FIELD	ORBIT ANALYSIS	12	267
MARINER-J VENUS/MERCURY (MARINJ -01) PHOTOGRAPHS OF MERCURY AND VENUS.....		MURRAY	SURFACE CHAR	PHOTO, LOW RES	1	266

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.2 SENSING VENUS						
PIONEER VENUS PROBE E ATMOSPHERE STRUCTURE	(PI078PE-01)	SEIFF	ATMOS FEATURE	OTHER TECHNIQUES	2	303
PIONEER VENUS PROBE C ATMOSPHERE STRUCTURE	(PI078PC-01)	SEIFF	ATMOS FEATURE	OTHER TECHNIQUES	2	307
PIONEER VENUS PROBE D ATMOSPHERE STRUCTURE	(PI078PD-01)	SEIFF	ATMOS FEATURE	OTHER TECHNIQUES	2	309
PIONEER VENUS PROBE D DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	(PI078PD-03)	PETTENGILL	ATMOS FEATURE	OTHER TECHNIQUES	2	310
PIONEER VENUS PROBE E ATMOSPHERE STRUCTURE	(PI078PE-01)	SEIFF	ATMOS FEATURE	OTHER TECHNIQUES	2	311
PIONEER VENUS PROBE E DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	(PI078PE-03)	PETTENGILL	ATMOS FEATURE	OTHER TECHNIQUES	2	312
PIONEER VENUS PROBE A DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	(PI078PA-06)	PETTENGILL	ATMOS FEATURE	OTHER TECHNIQUES	2	302
PIONEER VENUS PROBE E CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PI078PB-02)	BLAMONT	ATMOS FEATURE	OTHER TECHNIQUES	2	304
PIONEER VENUS PROBE E DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	(PI078PB-09)	PETTENGILL	ATMOS FEATURE	OTHER TECHNIQUES	2	306
PIONEER VENUS PROBE C CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PI078PC-02)	BLAMONT	ATMOS FEATURE	OTHER TECHNIQUES	2	308
PIONEER VENUS PROBE C DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING	(PI078PC-03)	PETTENGILL	ATMOS FEATURE	OTHER TECHNIQUES	2	308
PIONEER VENUS PROBE D CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION	(PI078PD-02)	BLAMONT	ATMOS FEATURE	OTHER TECHNIQUES	2	310
PIONEER VENUS PROBE E CLOUD EXTENT, STRUCTURE AND DISTRIBUTION	(PI078PE-02)	BLAMONT	ATMOS FEATURE	OTHER TECHNIQUES	2	311
PIONEER VENUS PROBE E INFRARED RADIOMETER	(PI078PB-05)	SUOMI	ATMOS FEATURE	OTHER TECHNIQUES	2	305
MARINER-J VENUS/MERCURY S- AND X-BAND RADIO PROPAGATION	(MARINJ -02)	HOWARD	GRAVITY FIELD	ORBIT ANALYSIS	12	267
PIONEER VENUS PROBE E	(PI078PB-03)	KNOLLENBERG				

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.2 SENSING VENUS					
CLOUD PARTICLE SIZE SPECTROMETER.....		SIZE	VISUAL OBSERVATION	2	304
MARINER-J VENUS/MERCURY (MARINJ -01) MURRAY PHOTOGRAPHS OF MERCURY AND VENUS.....		SURFACE CHAR	PHOTO. LOW RES	2	266

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.3 SENSING EARTH						
NIMBUS-F	(NIMBS-F-01)	KELLOGG				
TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE).....			ATMOS FEATURE	OTHER TECHNIQUES	3	290

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.4 SENSING EARTH'S MOON						
4.4.2 NON-GEOGRAPHIC CHARACTERISTICS						
APOLLO 17 LM/ALSEP LUNAR SURFACE GRAVIMETER	(72-096C-09)	WEBER	GRAVITY FIELD	OTHER TECHNIQUES	M	126
APOLLO 15 LM/ALSEP HEAT FLOW	(71-063C-06)	LANGSETH	INTERIOR CHAR	OTHER TECHNIQUES	M	78
APOLLO 12 LM/ALSEP PASSIVE SEISMIC	(69-099C-03)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	41
APOLLO 14 LM/ALSEP PASSIVE SEISMIC	(71-008C-04)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	56
APOLLO 14 LM/ALSEP ACTIVE SEISMIC	(71-008C-05)	KOVACH	INTERIOR CHAR	SEISMIC TECH	M	56
APOLLO 15 LM/ALSEP PASSIVE SEISMIC	(71-063C-01)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	77
APOLLO 16 LM/ALSEP PASSIVE SEISMIC	(72-031C-01)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	101
APOLLO 16 LM/ALSEP ACTIVE SEISMIC	(72-031C-02)	KOVACH	INTERIOR CHAR	SEISMIC TECH	M	102
APOLLO 17 LM/ALSEP LUNAR SEISMIC PROFILING EXPERIMENT	(72-096C-06)	KOVACH	INTERIOR CHAR	SEISMIC TECH	M	125
APOLLO 15 LM/ALSEP PASSIVE SEISMIC	(71-063C-01)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	77
APOLLO 16 LM/ALSEP PASSIVE SEISMIC	(72-031C-01)	LATHAM	INTERIOR CHAR	SEISMIC TECH	M	101
APOLLO 16 LM/ALSEP ACTIVE SEISMIC	(72-031C-02)	KOVACH	INTERIOR CHAR	SEISMIC TECH	M	102
APOLLO 17 LM/ALSEP LUNAR EJECTA AND METEORITES	(72-096C-05)	BERG	PARTICLE FLUX	OTHER TECHNIQUES	M	124
APOLLO 17 LM/ALSEP HEAT FLOW	(72-096C-01)	LANGSETH	TEMPERATURE	OTHER TECHNIQUES	M	124
APOLLO 15 LM/ALSEP HEAT FLOW	(71-063C-06)	LANGSETH	TEMPERATURE	OTHER TECHNIQUES	M	78
APOLLO 17 LM/ALSEP HEAT FLOW	(72-096C-01)	LANGSETH	TEMPERATURE	OTHER TECHNIQUES	M	124
APOLLO 15 LM/ALSEP HEAT FLOW	(71-063C-06)	LANGSETH	TEMPERATURE	OTHER TECHNIQUES	M	78

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.5 SENSING MARS					
VIKING-A ATMOSPHERIC STRUCTURE	(VIKNG-A-05) NIER	ATMOS FEATURE	OTHER TECHNIQUES	4	342
VIKING-A RADIO COMMUNICATION AND RADAR LANDING SYSTEMS PLUS X BAND	(VIKNG-A-14) MICHAEL, JR.	GRAVITY FIELD	ORBIT ANALYSIS	4	346
VIKING-B RADIO COMMUNICATION AND RADAR LANDING SYSTEMS PLUS X BAND	(VIKNG-B-14) MICHAEL, JR.	GRAVITY FIELD	ORBIT ANALYSIS	4	353
VIKING-A MAGNETIC PROPERTIES	(VIKNG-A-13) HARGRAVES	INTERIOR CHAR	OTHER TECHNIQUES	4	346
VIKING-B MAGNETIC PROPERTIES	(VIKNG-B-13) HARGRAVES	INTERIOR CHAR	OTHER TECHNIQUES	4	353
VIKING-A SEISMOLOGY	(VIKNG-A-11) ANDERSON	INTERIOR CHAR	SEISMIC TECH	4	345
VIKING-B SEISMOLOGY	(VIKNG-B-11) ANDERSON	INTERIOR CHAR	SEISMIC TECH	4	352
VIKING-A IR SPECTROMETER -- WATER VAPOR MAPPING	(VIKNG-A-03) FARMER	SURFACE CHAR	OTHER TECHNIQUES	4	341
VIKING-A SOIL WATER	(VIKNG-A-08) SHORTHILL	SURFACE CHAR	OTHER TECHNIQUES	4	344
VIKING-B IR SPECTROMETER -- WATER VAPOR MAPPING	(VIKNG-B-03) FARMER	SURFACE CHAR	OTHER TECHNIQUES	4	348
VIKING-B SOIL WATER	(VIKNG-B-08) SHORTHILL	SURFACE CHAR	OTHER TECHNIQUES	4	351
VIKING-A FACSIMILE CAMERA	(VIKNG-A-09) MUTCH	SURFACE CHAR	PHOTO, HIGH RES	4	344
VIKING-B FACSIMILE CAMERA	(VIKNG-B-09) MUTCH	SURFACE CHAR	PHOTO, HIGH RES	4	351
VIKING-A IMAGERY ORBITER	(VIKNG-A-01) CARR	SURFACE CHAR	PHOTO, MED RES	4	340
VIKING-B IMAGERY ORBITER	(VIKNG-B-01) CARR	SURFACE CHAR	PHOTO, MED RES	4	347
VIKING-A IR RADIOMETRY -- THERMAL MAPPING	(VIKNG-A-02) KIEFFER	TEMPERATURE	OTHER TECHNIQUES	4	340
VIKING-B IR RADIOMETRY -- THERMAL MAPPING	(VIKNG-B-02) KIEFFER	TEMPERATURE	OTHER TECHNIQUES	4	348

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID / EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.6 SENSING JUPITER					
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11) LILLIE	ATMOS FEATURE	OTHER TECHNIQUES	5	275
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11) LILLIE	ATMOS FEATURE	OTHER TECHNIQUES	5	281
PIONEER 10 CELESTIAL MECHANICS	(72-012A-09) ANDERSON	GRAVITY FIELD	ORBIT ANALYSIS	0 5	94
PIONEER 11 CELESTIAL MECHANICS	(73-019A-09) ANDERSON	GRAVITY FIELD	ORBIT ANALYSIS	0 5	135
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11) LILLIE	SIZE	OTHER TECHNIQUES	5	275
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11) LILLIE	SIZE	OTHER TECHNIQUES	5	281
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11) LILLIE	SURFACE CHAR	OTHER TECHNIQUES	5	281
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11) LILLIE	SURFACE CHAR	OTHER TECHNIQUES	5	275
MARINER 77A COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77A-02) ESHLEMAN	SURFACE CHAR	OTHER TECHNIQUES	5	271
MARINER 77B COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77B-02) ESHLEMAN	SURFACE CHAR	OTHER TECHNIQUES	5	277
PIONEER 10 IMAGING PHOTO POLARIMETER	(72-012A-07) GEHRELS	SURFACE CHAR	PHOTO, MED RES	5	93
PIONEER 11 IMAGING PHOTOPOLARIMETER	(73-019A-07) GEHRELS	SURFACE CHAR	PHOTO, MED RES	5	134
MARINER 77A TV PHOTOGRAPHY	(MARN77A-01) SMITH	SURFACE CHAR	PHOTO, LOW RES	5	270
MARINER 77B TV PHOTOGRAPHY	(MARN77B-01) SMITH	SURFACE CHAR	PHOTO, LOW RES	5	276

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.9 SENSING MICROMETEORITES, METEORS, ETC.						
PIONEER 8	(67-123A-04)	BERG				
COSMIC DUST DETECTOR			PARTICLE FLUX	OTHER TECHNIQUES		13
PIONEER 9	(68-100A-04)	BERG				
COSMIC DUST DETECTOR			PARTICLE FLUX	OTHER TECHNIQUES		20
PIONEER 10	(72-012A-04)	KINARD				
METEOROID DETECTORS			PARTICLE FLUX	OTHER TECHNIQUES		92
PIONEER 11	(73-019A-04)	KINARD				
METEOROID DETECTOR			PARTICLE FLUX	OTHER TECHNIQUES		133
MARINER 77B	(MARN77B-09)	SOBERMAN				
INTERPLANETARY DUST PARTICLE MEASUREMENT			PARTICLE FLUX	OTHER TECHNIQUES		280
MARINER 77A	(MARN77A-09)	SOBERMAN				
INTERPLANETARY DUST PARTICLE MEASUREMENT			PARTICLE FLUX	OTHER TECHNIQUES		274
PIONEER 10	(72-012A-03)	SOBERMAN				
ASTEROID/METEOROID ASTRONOMY			PARTICLE FLUX	VISUAL OBSERVATION		91
PIONEER 11	(73-019A-03)	SOBERMAN				
ASTEROID/METEOROID ASTRONOMY			PARTICLE FLUX	VISUAL OBSERVATION		132
PIONEER 10	(72-012A-07)	GEHRELS				
IMAGING PHOTO POLARIMETER			PARTICLE FLUX	VISUAL OBSERVATION		93
PIONEER 11	(73-019A-07)	GEHRELS				
IMAGING PHOTOPOLARIMETER			PARTICLE FLUX	VISUAL OBSERVATION		134

SATELLITE NAME / DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	MEASURED CHARACTERISTIC	MEASURING TECHNIQUE	PLANET 012345M	PAGE
4.10 SENSING OTHER BODIES						
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11)	LILLIE	ATMOS FEATURE	OTHER TECHNIQUES	5	275
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11)	LILLIE	ATMOS FEATURE	OTHER TECHNIQUES	5	281
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11)	LILLIE	SIZE	OTHER TECHNIQUES	5	275
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11)	LILLIE	SIZE	OTHER TECHNIQUES	5	281
MARINER 77B MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77B-11)	LILLIE	SURFACE CHAR	OTHER TECHNIQUES	5	281
MARINER 77A MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A	(MARN77A-11)	LILLIE	SURFACE CHAR	OTHER TECHNIQUES	5	275
MARINER 77A COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77A-02)	ESHLEMAN	SURFACE CHAR	OTHER TECHNIQUES	5	271
MARINER 77B COHERENT S- AND X-BAND TRANSMITTER AND S-BAND RECEIVER	(MARN77B-02)	ESHLEMAN	SURFACE CHAR	OTHER TECHNIQUES	5	277
MARINER 77A TV PHOTOGRAPHY	(MARN77A-01)	SMITH	SURFACE CHAR	PHOTO, LOW RES		270
MARINER 77B TV PHOTOGRAPHY	(MARN77B-01)	SMITH	SURFACE CHAR	PHOTO, LOW RES		276

Spacecraft and Experiment Status Changes Between
October 1, 1972, and September 30, 1973

SECTION 4 - SPACECRAFT AND EXPERIMENT STATUS CHANGES BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

Listings

Spacecraft Launched

The following table of spacecraft successfully launched between October 1, 1972, and September 30, 1973, consists of active spacecraft from Section 1 of this Report, as well as other spacecraft for which little is known beyond the fact that they have been launched with the indicated initial orbit parameters. This second group is included here to make the spacecraft visible to the scientific community on the chance that these spacecraft contain experiments which may be relevant to studies performed by the users of this document. Some information concerning these lesser known spacecraft is available through the SPACEWARN Bulletin (described in the Introduction to this Report).

The table is ordered chronologically by NSSDC ID Code (corresponding to spacecraft launch date). The spacecraft common name appears alongside its NSSDC ID Code. The spacecraft funding country, the launch date, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, period, and inclination), rounded off to one decimal place, are also included for each spacecraft entry listed in the table.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.

Page intentionally left blank

SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
STP 72-1	72-076A	UNITED STATES	10/02/72						
1972-076B	72-076B	UNITED STATES	10/02/72	10/05/72	GEOCENTRIC	753.0	732.0	98.4	99.7
COSMOS 522	72-077A	U.S.S.R.	10/04/72	10/05/72	GEOCENTRIC	342.0	214.0	72.9	89.8
COSMOS 523	72-078A	U.S.S.R.	10/05/72	10/06/72	GEOCENTRIC	307.0	283.0	71.0	92.0
1972-079A	72-079A	UNITED STATES	10/10/72	10/10/72	GEOCENTRIC	271.0	158.0	96.5	88.8
COSMOS 524	72-080A	U.S.S.R.	10/11/72	10/12/72	GEOCENTRIC	537.0	277.0	71.0	92.3
MOLNIYA 1W	72-081A	U.S.S.R.	10/14/72	10/15/72	GEOCENTRIC	39300.0	480.0	65.3	705.0
NOAA 2	72-082A	UNITED STATES	10/15/72	09/07/73	GEOCENTRIC	1453.7	1448.4	101.7	114.9
OSCAR 6	72-082B	UNITED STATES	10/15/72	10/15/72	GEOCENTRIC	1452.0	1443.0	101.7	114.9
COSMOS 525	72-083A	U.S.S.R.	10/18/72	10/19/72	GEOCENTRIC	292.0	208.0	65.4	89.3
COSMOS 526	72-084A	U.S.S.R.	10/25/72	10/26/72	GEOCENTRIC	511.0	282.0	71.0	92.0
METEOR 13	72-085A	U.S.S.R.	10/27/72	10/28/72	GEOCENTRIC	904.0	893.0	81.2	102.6
COSMOS 527	72-086A	U.S.S.R.	10/31/72	11/01/72	GEOCENTRIC	330.0	214.0	65.4	89.7
COSMOS 528	72-087A	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 529	72-087B	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 530	72-087C	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 531	72-087D	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 532	72-087E	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 533	72-087F	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 534	72-087G	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 535	72-087H	U.S.S.R.	11/01/72	11/02/72	GEOCENTRIC	1495.0	1375.0	74.0	114.0
COSMOS 536	72-088A	U.S.S.R.	11/03/72	11/04/72	GEOCENTRIC	555.0	514.0	74.0	95.2
USAF OPERATIONAL METSAT	72-089A	UNITED STATES	11/09/72	11/09/72	GEOCENTRIC	877.0	796.0	98.6	101.7
ANIK 1	72-090A	CANADA	11/10/72	11/10/72	GEOCENTRIC	1680.2	204.8	63.9	103.9
EXPLORER 48	72-091A	UNITED STATES	11/15/72	11/16/72	GEOCENTRIC	630.7	445.5	1.9	95.4
ESRO 4	72-092A	INTERNATIONAL	11/22/72	09/07/73	GEOCENTRIC	833.7	230.8	91.1	95.3
COSMOS 537	72-093A	U.S.S.R.	11/25/72	11/26/72	GEOCENTRIC	324.0	207.0	65.0	89.6
INTERCOSMOS 8	72-094A	U.S.S.R.	11/30/72	12/01/73	GEOCENTRIC	679.0	214.0	71.0	93.2

SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
MOLNIYA 1X	72-095A	U.S.S.R.	12/02/72	12/03/72	GEOCENTRIC	39100.0	500.0	65.0	703.0
APOLLO 17 CSM	72-096A	UNITED STATES	12/07/72	12/12/72	SELENOCENTRIC	1864.4	1833.6	159.9	118.8
APOLLO 17 BOOSTER	72-096B	UNITED STATES	12/07/72	12/07/72	GEOCENTRIC	572080.0	200.0	33.2	26320.0
APOLLO 17 LM/ALSEP	72-096C	UNITED STATES	12/07/72						
NIMBUS 5	72-097A	UNITED STATES	12/11/72	09/07/73	GEOCENTRIC	1101.3	1089.4	99.9	107.2
MOLNIYA 2D	72-098A	U.S.S.R.	12/12/72	12/13/72	GEOCENTRIC	13184.0	158.0	65.3	705.0
COSMOS 538	72-099A	U.S.S.R.	12/14/72	12/15/72	GEOCENTRIC	305.0	212.0	65.4	89.4
AEROS	72-100A	FED. REP. OF GERMANY	12/16/72	12/16/72	GEOCENTRIC	864.7	218.0	96.9	95.5
1972-101A	72-101A	UNITED STATES	12/20/72	12/20/72	GEOCENTRIC	14000.0	14000.0	98.0	480.0
COSMOS 539	72-102A	U.S.S.R.	12/21/72	12/22/72	GEOCENTRIC	1392.0	1353.0	74.0	113.0
1972-103A	72-103A	UNITED STATES	12/21/72	12/25/72	GEOCENTRIC	398.0	132.0	110.4	89.8
COSMOS 540	72-104A	U.S.S.R.	12/26/72	12/27/72	GEOCENTRIC	823.0	779.0	74.0	100.8
COSMOS 541	72-105A	U.S.S.R.	12/27/72	12/28/72	GEOCENTRIC	371.0	242.0	81.4	90.3
COSMOS 542	72-106A	U.S.S.R.	12/28/72	12/29/72	GEOCENTRIC	653.0		81.2	96.4
LUNA 21	73-001A	U.S.S.R.	01/08/73		LUNAR LANDER				
COSMOS 543	73-002A	U.S.S.R.	01/11/73	01/13/73	GEOCENTRIC	314.0	175.0	65.0	89.3
COSMOS 544	73-003A	U.S.S.R.	01/20/73	01/21/73	GEOCENTRIC	561.0	513.0	74.0	95.3
COSMOS 545	73-004A	U.S.S.R.	01/24/73	01/25/73	GEOCENTRIC	521.0	279.0	71.0	92.2
COSMOS 546	73-005A	U.S.S.R.	01/26/73	01/27/73	GEOCENTRIC	639.0	585.0	51.7	96.6
COSMOS 547	73-006A	U.S.S.R.	02/01/73	02/02/73	GEOCENTRIC	330.0	208.0	65.0	89.7
MOLNIYA 1Y	73-007A	U.S.S.R.	02/03/73	02/08/73	GEOCENTRIC	39164.0	470.0	65.0	703.2
COSMOS 548	73-008A	U.S.S.R.	02/08/73	02/09/73	GEOCENTRIC	322.0	214.0	65.4	89.6
PROGNOZ 3	73-009A	U.S.S.R.	02/16/73	02/16/73	GEOCENTRIC	200000.0	590.0	65.0	5783.0
COSMOS 549	73-010A	U.S.S.R.	02/28/73	03/01/73	GEOCENTRIC	556.0	513.0	74.0	95.2
COSMOS 550	73-011A	U.S.S.R.	03/01/73	03/02/73	GEOCENTRIC	325.0	217.0	65.4	89.6
COSMOS 551	73-012A	U.S.S.R.	03/06/73	03/06/73	GEOCENTRIC	316.0	210.0	65.0	89.5
1973-013A	73-013A	UNITED STATES	03/06/73	03/06/73	GEOCENTRIC	35901.0	35533.0	0.5	1431.9

SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
1973-014A	73-014A	UNITED STATES	03/09/73	03/10/73	GEOCENTRIC	270.0	152.0	95.7	88.8
METEOR 14	73-015A	U.S.S.R.	03/20/73	03/21/73	GEOCENTRIC	903.0	882.0	81.2	102.6
COSMOS 552	73-016A	U.S.S.R.	03/22/73	03/23/73	GEOCENTRIC	312.0	204.0	72.8	89.7
SALUTE 2	73-017A	U.S.S.R.	04/04/73	04/04/73	GEOCENTRIC	260.0	215.0	51.6	89.0
MOLNIYA 2E	73-018A	U.S.S.R.	04/05/73	04/06/73	GEOCENTRIC	39100.0	500.0	65.0	11.4
PIONEER 11	73-019A	UNITED STATES	04/06/73		JUPITER FLYBY				
COSMOS 553	73-020A	U.S.S.R.	04/12/73	04/13/73	GEOCENTRIC	519.0	282.0	71.0	92.2
COSMOS 554	73-021A	U.S.S.R.	04/19/73	04/20/73	GEOCENTRIC	308.0	212.0	72.9	89.5
INTERCOSM COPERNICUS 500	73-022A	U.S.S.R.	04/19/73	04/20/73	GEOCENTRIC	1552.0	202.0	48.5	102.2
ANIK 2	73-023A	CANADA	04/19/73	05/01/73	GEOCENTRIC	35786.0	35781.0	0.1	1436.0
COSMOS 555	73-024A	U.S.S.R.	04/25/73	04/26/73	GEOCENTRIC	253.0	216.0	81.3	89.0
COSMOS 556	73-025A	U.S.S.R.	05/05/73	05/06/73	GEOCENTRIC	252.0	209.0	81.3	89.0
COSMOS 557	73-026A	U.S.S.R.	05/11/73	05/12/73	GEOCENTRIC	266.0	218.0	51.6	89.1
SKYLAB	73-027A	UNITED STATES	05/14/73	05/14/73	GEOCENTRIC	442.0	434.0	50.0	93.4
1973-028A	73-028A	UNITED STATES	05/16/73	05/17/73	GEOCENTRIC	399.0	139.0	110.5	89.9
COSMOS 558	73-029A	U.S.S.R.	05/17/73	05/17/73	GEOCENTRIC	501.0	269.0	71.0	92.3
COSMOS 559	73-030A	U.S.S.R.	05/18/73	05/19/73	GEOCENTRIC	345.0	217.0	65.4	89.8
COSMOS 560	73-031A	U.S.S.R.	05/23/73	05/24/73	GEOCENTRIC	336.0	211.0	72.9	89.7
SKYLAB CSM-1	73-032A	UNITED STATES	05/25/73	05/25/73	GEOCENTRIC	438.0	428.0	50.0	93.2
COSMOS 561	73-033A	U.S.S.R.	05/25/73	05/26/73	GEOCENTRIC	317.0	215.0	65.4	89.5
METEOR 15	73-034A	U.S.S.R.	05/29/73	05/30/73	GEOCENTRIC	909.0	867.0	81.2	102.5
COSMOS 562	73-035A	U.S.S.R.	06/05/73	06/06/73	GEOCENTRIC	510.0	282.0	71.0	92.1
COSMOS 563	73-036A	U.S.S.R.	06/06/73	06/07/73	GEOCENTRIC	320.0	312.0	65.4	89.8
COSMOS 564	73-037A	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 565	73-037B	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 566	73-037C	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 567	73-037D	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 568	73-037E	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5

SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
COSMOS 569	73-037F	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 570	73-037G	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 571	73-037H	U.S.S.R.	06/08/73	06/09/73	GEOCENTRIC	1507.0	1392.0	74.0	114.5
COSMOS 572	73-038A	U.S.S.R.	06/10/73	06/11/73	GEOCENTRIC	294.0	211.0	51.7	89.3
EXPLORER 49	73-039A	UNITED STATES	06/10/73	09/07/73	GEOCENTRIC	1070.3	1059.1	38.7	221.9
1973-040A	73-040A	UNITED STATES	06/12/73	07/01/73	GEOCENTRIC	35901.0	35533.0	0.5	1431.9
COSMOS 573	73-041A	U.S.S.R.	06/15/73	06/16/73	GEOCENTRIC	329.2	196.2	51.6	89.5
COSMOS 574	73-042A	U.S.S.R.	06/20/73	06/21/73	GEOCENTRIC	1026.0	996.0	83.0	105.0
COSMOS 575	73-043A	U.S.S.R.	06/21/73	06/22/73	GEOCENTRIC	299.0	208.0	65.4	89.3
COSMOS 576	73-044A	U.S.S.R.	06/27/73	06/28/73	GEOCENTRIC	356.0	212.0	72.9	89.9
MOLNIYA 2F	73-045A	U.S.S.R.	07/11/73	07/12/73	GEOCENTRIC	39280.0	480.0	65.3	705.9
1973-046A	73-046A	UNITED STATES	07/13/73	07/15/73	GEOCENTRIC	269.0	156.0	96.2	88.8
MARS 4	73-047A	U.S.S.R.	07/21/73						
COSMOS 577	73-048A	U.S.S.R.	07/25/73	07/26/73	GEOCENTRIC	312.0	209.0	65.4	89.5
MARS 5	73-049A	U.S.S.R.	07/25/73						
SKYLAB CSM-2	73-050A	UNITED STATES	07/28/73	07/28/73	GEOCENTRIC	441.0	423.0	50.0	93.2
COSMOS 578	73-051A	U.S.S.R.	08/01/73	08/02/73	GEOCENTRIC	308.0	207.0	65.4	89.4
MARS 6	73-052A	U.S.S.R.	08/05/73						
MARS 7	73-053A	U.S.S.R.	08/09/73						
1973-054A	73-054A	UNITED STATES	08/17/73						
COSMOS 579	73-055A	U.S.S.R.	08/21/73	08/22/73	GEOCENTRIC	315.0	209.0	65.4	89.5
1973-056A	73-056A	UNITED STATES	08/21/73						
COSMOS 580	73-057A	U.S.S.R.	08/22/73	08/23/73	GEOCENTRIC	518.0	283.0	71.0	98.2
INTELSAT 4 F-7	73-058A	UNITED STATES	08/23/73						
COSMOS 581	73-059A	U.S.S.R.	08/24/73	08/25/73	GEOCENTRIC	303.0	211.0	51.6	89.4
COSMOS 582	73-060A	U.S.S.R.	08/28/73	08/29/73	GEOCENTRIC	559.0	521.0	74.0	95.3
MOLNIYA 1Z	73-061A	U.S.S.R.	08/30/73	08/31/73	GEOCENTRIC	37970.0	480.0	65.3	719.9

SPACECRAFT LAUNCHED BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
COSMOS 583	73-062A	U.S.S.R.	08/30/73	08/31/73	GEOCENTRIC	316.0	208.0	65.0	89.5
COSMOS 584	73-063A	U.S.S.R.	09/06/73	09/07/73	GEOCENTRIC	360.0	213.0	72.9	89.9
COSMOS 585	73-064A	U.S.S.R.	08/08/73	09/09/73	GEOCENTRIC	1416.0	1385.0	74.0	113.6
COSMOS 586	73-065A	U.S.S.R.	09/14/73	09/15/73	GEOCENTRIC	1020.0	986.0	83.0	105.0
COSMOS 587	73-066A	U.S.S.R.	09/21/73	09/22/73	GEOCENTRIC	330.0	215.0	65.4	89.6
SOYUZ 12	73-067A	U.S.S.R.	09/27/73	09/28/73	GEOCENTRIC	249.0	194.0	51.6	88.6
1973-068A	73-068A	UNITED STATES	09/27/73						

Spacecraft and Experiments Which Became Operational Off

The following table identifies spacecraft and/or experiments placed in an operational off status between October 1, 1972, and September 30, 1973. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the NSSDC ID Code, the spacecraft funding country, the launch date, the date the spacecraft was placed in an operational off mode, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period) rounded off to one decimal place. This additional information is included on the same line as the spacecraft common name.

Associated operational off experiments are listed for each spacecraft entry. The experiment NSSDC ID Code, the principal investigator's last name, the affiliation, the experiment name, and the date the experiment was placed in an operational off mode are given for each experiment. To determine when an experiment has been placed in an operational off mode and the spacecraft has not, observe (in the table) the column in which the spacecraft operational off date should appear; that column will be blank.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.

SPACECRAFT AND EXPERIMENTS WHICH BECAME OPERATIONAL OFF
BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED OP OFF	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD
		EXPERIMENTER	EXPERIMENT NAME				DATE EXP PLACED OP OFF			
ALOUETTE 2	65-098A	CANADA UNITED STATES	11/29/65	/ /	01/24/72	GEOCENTRIC	2935.0	510.0	79.8	120.9
	65-098A-01	WARREN	SWEEP FREQUENCY SOUNDER				06/03/73			
	65-098A-02	BELROSE	VLF RECEIVER				06/03/73			
	65-098A-03	HARTZ	COSMIC RADIO NOISE				06/03/73			
	65-098A-04	MCDIARMID	ENERGETIC PARTICLES DETECTORS				06/03/73			
	65-098A-05	BRACE	CYLINDRICAL ELECTROSTATIC PROBE				06/03/73			
ATS 5	69-069A	UNITED STATES	08/12/69	/ /	08/23/69	GEOCENTRIC	36894.0	35760.0	2.6	1463.0
	69-069A-02	STONE	COSMIC RADIO NOISE, SOLAR RADIO BURSTS				06/01/73			
	69-069A-05	SHARP	PROTON ELECTRON DETECTOR				01/01/73			
	69-069A-06	IPPOLITO	MILLIMETER WAVE PROPAGATION EXPERIMENT				01/01/73			
EOLE	71-071A	FRANCE UNITED STATES	08/16/71	/ /	06/24/72	GEOCENTRIC	904.0	676.4	50.2	100.7
	71-071A-01	BANDEEN	UPPER ATMOSPHERE WINDS AND WEATHER DATA RELAY SYSTEM				12/31/72			
ESSA 9	69-016A	UNITED STATES	02/26/69	11/24/72	02/26/69	GEOCENTRIC	1504.0	1423.0	101.8	115.2
	69-016A-01	NESS STAFF	ADVANCED VIDICON CAMERA SYSTEM (AVCS)				11/24/72			
EXPLORER 38	68-055A	UNITED STATES	07/04/68	/ /	07/06/68	GEOCENTRIC	5862.0	642.0	120.6	156.7
	68-055A-01	STONE	STEP FREQUENCY RADIOMETERS				12/31/72			
	68-055A-02	STONE	RADIO BURSTS RECEIVERS				12/31/72			
	68-055A-03	STONE	CAPACITANCE PROBE				12/31/72			
	68-055A-04	STONE	IMPEDANCE PROBE				12/31/72			
	68-055A-05	STONE	PLANAR ELECTRON TRAP				12/31/72			
NIMBUS 4	70-025A	UNITED STATES	04/08/70	/ /	09/07/73	GEOCENTRIC	1099.3	1087.5	99.8	107.1
	70-025A-04	WARK	SATELLITE INFRARED SPECTROMETER (SIRS)				03/06/73			
OSO 5	69-006A	UNITED STATES	01/22/69	/ /	01/22/69	GEOCENTRIC	570.0	532.0	33.0	95.8
	69-006A-01	BOYD	X RAY SPECTROHELIOGRAPH				12/31/72			
	69-006A-02	PURCELL	EXTREME UV SPECTROHELIOGRAPH				12/31/72			
	69-006A-05	FROST	LOW ENERGY GAMMA RAY EXPERIMENT				12/31/72			
	69-006A-06	BLAMONT	MEASUREMENT OF THE SELF REVERSAL OF THE SOLAR LYMAN ALPHA LINE				12/31/72			
	69-006A-07	NEY	ZODIACAL LIGHT MONITOR				12/31/72			
PIONEER 11	73-019A	UNITED STATES	04/06/73	/ /		JUPITER FLY				
	73-019A-08	MUNCH	INFRARED RADIOMETER				04/06/73			
SKYLAB	73-027A	UNITED STATES	05/14/73	/ /	05/14/73	GEOCENTRIC	442.0	434.0	50.0	93.4
	73-027A-01	SHAPIRO	NUCLEAR EMULSION				09/25/73			
	73-027A-02	HENIZE	ULTRAVIOLET STELLAR ASTRONOMY				09/25/73			

SPACECRAFT AND EXPERIMENTS WHICH BECAME OPERATIONAL OFF
BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED OP OFF	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD

EXPERIMENTER	EXPERIMENT NAME	DATE EXP PLACED OP OFF
TOUSEY	UV/X-RAY SOLAR PHOTOGRAPHY	09/25/73
MILLIGAN	DUAL X-RAY TELESCOPE	09/25/73
PACKER	UV AIRGLOW HORIZON PHOTOGRAPHY	09/25/73
WEINBERG	GEGENSCHEIN/ZODIACAL LIGHT	09/25/73
TOUSEY	UV CORONAL SPECTROHELIOGRAPH	09/25/73
TOUSEY	EUV SPECTROGRAPH	09/25/73
HEMENWAY	PARTICLE COLLECTION	09/25/73
COURTES	ULTRAVIOLET PANORAMA	09/25/73
REEVES	HYDROGEN ALPHA TELESCOPE NUMBER 1	09/25/73
UNKNOWN	HYDROGEN ALPHA TELESCOPE NUMBER 2	09/25/73
DEMEL	MULTISPECTRAL PHOTOGRAPHY FACILITY	09/25/73
BARNETT	INFRARED SPECTROMETER	09/25/73
KORB	MULTISPECTRAL SCANNER	09/25/73
EVANS	MICROWAVE RADIOMETER/SCATTEROMETER/ ALTIMETER	09/25/73
EVANS	L-BAND MICROWAVE RADIOMETER	09/25/73
FORBES	EXPANDABLE AIRLOCK MECHANISM	09/25/73
LEHN	THERMAL COATINGS	09/25/73
WHEDON	MINERAL BALANCE	09/25/73
LEACH	BIO-ASSAY OF BODY FLUIDS	09/25/73
ORD	SPECIMEN MASS MEASUREMENT	09/25/73
ALLEBACH	VECTOR CARDIOGRAM	09/25/73
GRAYBIEL	HUMAN VESTIBULAR FUNCTION	09/25/73
FROST	SLEEP MONITOR	09/25/73
KUBIS	TIME AND MOTION STUDY	09/25/73
MICHEL	METABOLIC ACTIVITY	09/25/73
THORNTON	BODY MASS MEASUREMENT	09/25/73
MC KANNAN	THERMAL CONTROL COATINGS	09/25/73
KIMZEY	ZERO GRAVITY FLAMMABILITY	09/25/73
JOHNSON, JR.	HABITABILITY/CREW QUARTERS	09/25/73
RENDALL	GRAVITY WORKBENCH	09/25/73
JACKSON	EVA/IVA HARDWARE EVALUATION	09/25/73
WHITSETT, JR.	ASTRONAUT MANEUVERING EQUIPMENT	09/25/73
POORMAN	MATERIALS PROCESSING FACILITY EXPERIMENTS	09/25/73
RANDLE	MANUAL NAVIGATION SIGHTINGS	09/25/73
LEAVITT	IN-FLIGHT EXPERIMENT AEROSOL ANALYSIS	09/25/73
CONWAY	CREW/VEHICLE DISTURBANCES	09/25/73
GOULD	PRECISION OPTICAL TRACKING	09/25/73
HEWES	FOOT-CONTROLLED MANEUVERING UNIT	09/25/73
GREENBERG	CORONOGRAPH CONTAMINATION MEASUREMENTS	09/25/73
MUSCARI	CONTAMINATION MEASUREMENTS	09/25/73
EDWARDS	PILOT DESCRIPTION	09/25/73
PRICE	TRANSURANIC COSMIC RAYS	09/25/73
GEISS	FOIL HEAVY NUCLEI ABUNDANCE EXPERIMENT	09/25/73
VOGEL	BONE MINERAL MEASUREMENT	09/25/73

SPACECRAFT AND EXPERIMENTS WHICH BECAME OPERATIONAL OFF
BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED OP OFF	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD

	EXPERIMENTER	EXPERIMENT NAME	DATE EXP PLACED OP OFF
73-027A-51	JOHNSON	LOWER BODY NEGATIVE PRESSURE	09/25/73
73-027A-52	LOCKHART	CYTOGENETIC STUDIES OF THE BLOOD	09/25/73
73-027A-53	RITZMANN	MAN'S IMMUNITY - IN VITRO ASPECTS	09/25/73
73-027A-54	JOHNSON	BLOOD VOLUME AND RED CELL LIFE SPAN	09/25/73
73-027A-55	MENGEL	RED BLOOD CELL METABOLISM	09/25/73
73-027A-56	KIMZEY	SPECIAL HEMATOLOGIC EFFECT	09/25/73
73-027A-57	WIEDEMEIER	MULTIPURPOSE ELECTRIC FURNACE	09/25/73
73-027A-58	BOND	CREW ACTIVITIES/MAINTENANCE	09/25/73
73-027A-59	ZMOLEK	ATMOSPHERIC HEAT ABSORPTION	09/25/73
73-027A-60	CRITES	VOLCANIC STUDY	09/25/73
73-027A-61	HOPFIELD	LIBRATION CLOUDS	09/25/73
73-027A-62	BOCHSLER	OBJECTS WITHIN MERCURY'S ORBIT	09/25/73
73-027A-63	HAMILTON	ULTRAVIOLET FROM QUASARS	09/25/73
73-027A-64	REIHS	X-RAY STELLAR CLASSES	09/25/73
73-027A-65	LEVENTHAL	X-RAYS FROM JUPITER	09/25/73
73-027A-66	SHANNON	ULTRAVIOLET FROM PULSARS	09/25/73
73-027A-67	STAEHLE	BACTERIA AND SPORES	09/25/73
73-027A-68	MEISTER	IN VITRO IMMUNOLOGY	09/25/73
73-027A-69	JACKSON	MOTOR SENSORY PERFORMANCE	09/25/73
73-027A-70	MILES	WEB FORMATION	09/25/73
73-027A-71	WORDEKEMPER	PLANT GROWTH AND PLANT PHOTOTROPISM	09/25/73
73-027A-72	PELTZ	CYTOPLASMIC STREAMING	09/25/73
73-027A-73	JOHNSTON	CAPILLARY STUDY	09/25/73
73-027A-74	CONVERSE	MASS MEASUREMENT	09/25/73
73-027A-75	QUIST	NEUTRON ANALYSIS	09/25/73
73-027A-76	DUNLAP	LIQUID MOTION IN ZERO GRAVITY	09/25/73

Spacecraft and Experiments Which Became Inoperable

The following table identifies spacecraft and/or experiments that became inoperable during the time interval October 1, 1972, through September 30, 1973. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the NSSDC ID Code, the spacecraft funding country, the launch date, the date the spacecraft became inoperable, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period). This additional information is included on the same line as the spacecraft common name.

For each spacecraft common name entry is listed its associated experiments that have become inoperable. The experiment NSSDC ID Code, the principal investigator's last name, the affiliation, the experiment name, and the date the experiment became inoperable are given for each experiment. To determine when an experiment has become inoperable and the spacecraft has not become inoperable, observe (in the table) the column in which the spacecraft inoperable date should appear; that column will be blank.

In cases where a prelaunch ID appears where one would expect to find an NSSDC postlaunch ID, the particular spacecraft failed to launch or failed to orbit, and was therefore not assigned an international designation.

Note that alternate names for spacecraft are cross-indexed in the Spacecraft Name Index.

SPACECRAFT AND EXPERIMENTS WHICH BECAME INOPERABLE
BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED INOP	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD
	EXPERIMENTER	EXPERIMENT NAME					DATE EXP PLACED INOP			
1972-079A	72-079A	UNITED STATES	10/10/72	01/08/73	10/10/72	GEOCENTRIC	271.0	158.0	96.5	88.8
AEROS	72-100A	FED. REP. OF GERMANY	12/16/72	08/22/73	12/16/72	GEOCENTRIC	864.7	218.0	96.9	95.5
	72-100A-01 KRANKOWSKY	DENSITY AND COMPOSITION OF UPPER ATMOSPHERE (2-44AMU)					08/22/73			
	72-100A-02 SPENNER	ENERGY DISTRIBUTION OF IONS AND ELECTRONS					08/22/73			
	72-100A-03 NESKE	ELECTRON CONCENTRATION IN THE IONOSPHERE					08/22/73			
	72-100A-04 SCHMIDTKE	FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR					08/22/73			
	72-100A-05 SPENCER	NEUTRAL GAS TEMPERATURE IN THE THERMOSPHERE					08/22/73			
	72-100A-06 ROEMER	ATMOSPHERIC DRAG ANALYSIS					08/22/73			
APOLLO 15 SUBSATELLITE	71-063D	UNITED STATES	08/04/71	08/23/73	08/04/71	SELENOCEN	141.3	102.0	28.7	119.8
	71-063D-03 SJOGREN	S-BAND TRANSPONDER					08/23/73			
APOLLO 16 LM/ALSEP	72-031C	UNITED STATES	04/16/72	/ /		LUNAR LANDER				
	72-031C-03 SONETT	LUNAR SURFACE MAGNETOMETER					02/15/73			
APOLLO 17 CSM	72-096A	UNITED STATES	12/07/72	12/19/72	12/12/72	SELENOCEN	1864.4	1833.6	159.9	118.8
	72-096A-01 SJOGREN	S-BAND TRANSPONDER					12/16/72			
	72-096A-02 FASTIE	FAR ULTRAVIOLET SPECTROMETER					12/19/72			
	72-096A-03 LOW	INFRARED SCANNING RADIOMETER					12/19/72			
	72-096A-04 PHILLIPS	LUNAR SOUNDER EXPERIMENT					12/16/72			
	72-096A-05 DOYLE	HANDHELD PHOTOGRAPHY					12/19/72			
	72-096A-06 DOYLE	PANORAMIC PHOTOGRAPHY					12/16/72			
	72-096A-07 DOYLE	METRIC PHOTOGRAPHY					12/16/72			
	72-096A-08 DOYLE	MAPPING CAMERA ASPECT STELLAR PHOTOGRAPHY					12/16/72			
	72-096A-09 KAULA	LASER ALTIMETER					12/16/72			
	72-096A-10 COUR-PALAIS	WINDOW METEOROID DETECTOR					12/19/72			
	72-096A-11 UNKNOWN	TELEVISION COVERAGE OF EVA'S					12/14/72			
APOLLO 17 LM/ALSEP	72-096C	UNITED STATES	12/07/72	/ /						
	72-096C-02 SWANN	LUNAR FIELD GEOLOGY					12/13/72			
	72-096C-03 TALWANI	LUNAR TRAVERSE GRAVIMETER					12/13/72			
	72-096C-04 MITCHELL	SOIL MECHANICS					12/13/72			
	72-096C-07 SIMMONS	SURFACE ELECTRICAL PROPERTIES					12/13/72			
	72-096C-12 WALKER	LUNAR SURFACE COSMIC RAY					12/13/72			
	72-096C-13 BURNETTE	NEUTRON PROBE					12/13/72			
	72-096C-14 SJOGREN	S-BAND TRANSPONDER					12/16/72			
ATS 1	66-110A	UNITED STATES	12/07/66	/ /	12/07/66	GEOCENTRIC	36887.0	35852.0	0.2	1466.0
	66-110A-09 SUOMI	SPIN-SCAN CLOUDCOVER CAMERA (SSCC)					10/16/72			

SPACECRAFT AND EXPERIMENTS WHICH BECAME INOPERABLE
BETWEEN OCTOBER 1, 1972 AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY / EXPERIMENTER	LAUNCH DATE / EXPERIMENT NAME	DATE S/C PLACED INOP / DATE EXP PLACED INOP	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD
COSMOS 200	68-006A	U.S.S.R.	01/20/68	02/24/73	01/20/68	GEOCENTRIC	537.0	523.0	74.0	95.2
D5-A	D5-A	FRANCE UNITED STATES	04/27/73	04/27/73						
D5-B	D5-B	FRANCE UNITED STATES	04/27/73	04/27/73						
EXPLORER 35	67-070A	UNITED STATES	07/19/67	06/24/73	07/22/67	SELENOCEN	9388.0	2568.0	169.0	691.8
	67-070A-01	VAN ALLEN	ELECTRON AND PROTON DETECTORS	06/24/73						
	67-070A-02	ANDERSON	ENERGETIC PARTICLE	06/24/73						
	67-070A-03	SONETT	AMES MAGNETIC FIELDS	06/24/73						
	67-070A-04	NESS	GSFC MAGNETOMETER	06/24/73						
	67-070A-05	ALEXANDER	MICROMETEORITE FLUX	06/24/73						
	67-070A-07	SERBU	LOW-ENERGY INTEGRAL SPECTRUM MEASUREMENT EXPERIMENT	06/24/73						
	67-070A-08	PETERSON	BISTATIC RADAR OBSERVATIONS OF THE LUNAR SURFACE	06/24/73						
	67-070A-09	KAULA	SELENODETIC STUDIES	06/24/73						
	67-070A-10	SLIFER, JR.	SOLAR CELL DAMAGE	06/24/73						
EXPLORER 41	69-053A	UNITED STATES	06/21/69	12/23/72	06/21/69	GEOCENTRIC	176434.0	378.0	86.8	4843.0
	69-053A-01	BROWN	LOW-ENERGY SOLID-STATE TELESCOPE	12/23/72						
	69-053A-02	ANDERSON	ION CHAMBER	12/23/72						
	69-053A-03	SIMPSON	COSMIC-RAY PROTON (R VS DE/DX)	12/23/72						
	69-053A-04	FRANK	LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA)	12/23/72						
	69-053A-05	MCCRACKEN	COSMIC-RAY ANISOTROPY	12/23/72						
	69-053A-07	BOSTROM	SOLAR PROTON MONITORING EXPERIMENT	12/23/72						
	69-053A-09	MCDONALD	LOW-ENERGY PROTON AND ALPHA DETECTOR	12/23/72						
	69-053A-10	MCDONALD	COSMIC-RAY ENERGY VS ENERGY LOSS	12/23/72						
	69-053A-11	NESS	MAGNETIC FIELD EXPERIMENT	12/23/72						
EXPLORER 43	71-019A	UNITED STATES	03/13/71 / /	09/05/73		GEOCENTRIC	195513.0	9864.9	37.7	5974.5
	71-019A-15	ERICKSON	INTERPLANETARY LONG WAVELENGTH RADIO ASTRONOMY EXPERIMENT	10/10/72						
EXPLORER 45	71-096A	UNITED STATES	11/15/71 / /	09/06/73		GEOCENTRIC	25175.8	281.3	3.5	438.1
	71-096A-04	CAHILL, JR.	FLUXGATE MAGNETOMETERS	04/01/73						
	71-096A-06	MAYNARD	D.C. ELECTRIC FIELD MEASUREMENT	05/01/73						
EXPLORER 47	72-073A	UNITED STATES	09/23/72 / /	08/23/73		GEOCENTRIC	233231.0	202306.0	8.6	17602.0
	72-073A-01	NESS	MAGNETIC FIELDS EXPERIMENT	04/10/73						
EXPLORER 48	72-091A	UNITED STATES	11/15/72	06/08/73	11/16/72	GEOCENTRIC	630.7	445.5	1.9	95.4

SPACECRAFT AND EXPERIMENTS WHICH BECAME INOPERABLE
BETWEEN OCTOBER 1, 1972, AND SEPTEMBER 30, 1973

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED INOP	EPOCH DATE	ORBIT TYPE	APO-APSIS	PERI-APSIS	INCLI-NATION	PERIOD
	EXPERIMENTER	EXPERIMENT NAME					DATE EXP PLACED INOP			
	72-091A-01	FICHTEL	GAMMA RAY TELESCOPE				06/08/73			
ITOS-E	ITOS-E	UNITED STATES	07/16/73	07/16/73						
MARINER 9	71-051A	UNITED STATES	05/30/71	10/27/72	11/16/71	MARSCENTRIC	17168.0	1455.0	64.4	719.0
	71-051A-01 NEUGEBAUER	INFRARED RADIOMETER (IRR)					10/27/72			
	71-051A-02 BARTH	ULTRAVIOLET SPECTROMETER (UVS)					10/27/72			
	71-051A-03 HANEL	INFRARED INTERFEROMETER SPECTROMETER (IRIS)					10/27/72			
	71-051A-04 MASURSKY	TELEVISION PHOTOGRAPHY					10/27/72			
	71-051A-07 LOWELL	CELESTIAL MECHANICS					10/27/72			
	71-051A-08 KLIORE	S BAND OCCULTATION EXPERIMENT					10/27/72			
OAO 2	68-110A	UNITED STATES	12/07/68	02/14/73	12/10/68	GEOCENTRIC	778.0	765.0	35.0	100.0
	68-110A-02 CODE	WISCONSIN EXPERIMENT PACKAGE					02/01/73			
OSO 5	69-006A	UNITED STATES	01/22/69	/ /	01/22/69	GEOCENTRIC	570.0	532.0	33.0	95.8
	69-006A-03 NEUPERT	SOLAR SPECTRUM STUDIES					12/00/72			
	69-006A-04 CHUBB	SOLAR X-RAY RADIATION ION CHAMBER PHOTOMETER					12/31/72			
	69-006A-08 RENSE	SOLAR EXTREME ULTRAVIOLET MONITOR					12/31/72			
OSO 7	71-083A	UNITED STATES	09/29/71	/ /	09/04/73	GEOCENTRIC	424.7	297.9	33.1	91.8
	71-083A-06 CHUPP	SOLAR GAMMA-RAY MONITOR					12/25/72			
PIONEER 7	66-075A	UNITED STATES	08/17/66	/ /	08/17/66	HELIOCENTRIC	1.1	1.0	0.1	402.9
	66-075A-02 BRIDGE	SOLAR WIND PLASMA FARADAY CUP					11/00/72			