Report on Active and Planned Spacecraft
and Experiments

September 1977
REPORT ON ACTIVE AND PLANNED
SPACECRAFT AND EXPERIMENTS

Edited by
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and
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National Space Science Data Center

September 1977

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
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Goddard Space Flight Center
Greenbelt, Maryland 20771
PREFACE

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. Spacecraft that were active sometime in the time period January 1, 1975, to June 30, 1977, are included, as well as those planned missions that have progressed beyond the experiment or investigation selection stage. 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 June 30, 1977. The National Space Science Data Center (NSSDC) has attempted to update all performance information to that date.

We would like to acknowledge the cooperation of the acquisition scientists and others at NSSDC in obtaining information and offering suggestions for this report. The cooperation of the project offices and experimenters in supplying current documentation of their spacecraft and experiments is gratefully acknowledged. We are particularly pleased with the many constructive comments and corrections we have received from interested users of this report.

James I. Vette
Robert W. Vostreys

September 1977

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* For a complete listing of the spacecraft and experiments described in these sections, please refer to the Index of Active and Planned Spacecraft and Experiments (Section 4).
1

INTRODUCTION
1. INTRODUCTION

1.1 Purpose

This Report on Active and Planned Spacecraft and Experiments provides the professional community with information on current and planned spacecraft activity for 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 utilizing this report is the International Magnetospheric Study (IMS).

1.2 Contents

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

Descriptions of navigational and communications satellites are specifically not included in this report. Also not included are descriptions of spacecraft that contain only continuous radio beacons used for ionospheric studies. Many of these spacecraft are listed in the SPACEWARN Bulletin*. No attempt has been made to include information regarding classified spacecraft or experiments.

*The SPACEWARN Bulletin is prepared 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 (IUDWS), a permanent service of the International Scientific Radio Union in association with the International Astronomical Union and the International Union for Geodesy and Geophysics.
The personnel at NSSDC have collected the information contained in this document from a variety of sources during the past several years; e.g., program offices, project offices, principal investigators and their staffs, publications, etc. The performance information of the spacecraft and experiments for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through June 30, 1977. NSSDC has attempted to update all performance information to that date. A few changes subsequent to this date may appear, depending on time availability.

1.3 Organization

This report includes four major sections with descriptive material introducing each section.

Section 2, "Descriptions of Active Spacecraft and Experiments," is a listing of descriptions of the spacecraft and experiments that were active sometime during the time period January 1, 1975, to June 30, 1977. The listing is arranged by spacecraft common name and the last name of the principal investigator or team leader.

Section 3, "Descriptions of Planned Spacecraft and Experiments," is a listing of descriptions of the spacecraft and experiments that were planned missions as of June 30, 1977, for which experiments or investigations have been selected and NSSDC has at least minimal documentation.

Sections 4 and 5 are two indexes to the information presented in Sections 2 and 3. Section 4, "Index of Active and Planned Spacecraft and Experiments," is an alphabetical listing by spacecraft name, including both common and alternate names, of all active and planned spacecraft and experiments. (This listing serves as an index to the location of spacecraft and experiment descriptions and includes launch dates and current status-of-operation data.) Section 5, "Investigator Name Index," is a listing, ordered by last name, of the investigators or team members associated with the experiments and their current affiliations.

These major sections were generated from NSSDC automated files. Other relevant spacecraft without brief descriptions are given in Appendix A. Special investigators for some new missions that could not conveniently be presented in Section 2 appear in Appendix B. Several words and phrases used in this document are defined in Appendix C. A more comprehensive list of the abbreviations and acronyms used in this document are included in Appendix D.
1.4 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. The same services are available to persons outside the United States through the World Data Center A for Rockets and Satellites (WDC-A-R&S). The official addresses for requests are printed on the inside front cover of this report.

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 collocated in the same organization to share this document.

1.5 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. This 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. It should be noted that the information concerning the planned spacecraft and experiments is frequently 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 experimenters and project offices will cooperate in bringing such matters to NSSDC's attention.

*Note added in press: ESA is planning to launch the backup spacecraft, ESA-GEOS 2, carrying the same experiments. See the ESA-GEOS experiments. This is planned to be launched in the second quarter of 1978 into an equatorial, geostationary orbit.*
DESCRIPTIONS OF ACTIVE SPACECRAFT
AND EXPERIMENTS
2. DESCRIPTIONS OF ACTIVE SPACECRAFT AND EXPERIMENTS

This section contains descriptions of spacecraft and experiments pertinent to this report that were active sometime during the period January 1, 1975, to June 30, 1977. A few changes subsequent to this date may appear, depending on time availability. The descriptions are sorted first by spacecraft common name. Within each spacecraft listing, experiments are ordered by the principal investigator's or team leader's last name. Explorer spacecraft prelaunch generic names are used as common names; e.g., IMP-H instead of Explorer 47. If the common name, as used by NSSDC, is not known, it can be found by referring to an alternate name found in the Index of Active and Planned Spacecraft and Experiments (Section 4).

Each spacecraft or experiment entry in this section is composed of two parts -- a heading and a brief description. The headings list characteristics of satellites and experiments. Definitions of many of the terms used in this section are included in Appendix C.

2.1 Contents of Spacecraft Entries

The heading for each spacecraft description in this section includes a set of initial or planned orbit parameters. These parameters consist of orbit type, epoch date, orbit period, apoapsis, periapsis, and inclination for the spacecraft. No orbit parameters are listed for lander and flyby missions. In addition, the heading contains the spacecraft weight, launch date, launch site, launch vehicle, spacecraft common and alternate names, NSSDC ID code, sponsoring country and agency, and spacecraft personnel -- project manager (PM), project scientist (PS), program manager (MG), program scientist (SC), technical director (TD), and program director (PD). The spacecraft brief description is immediately below each heading. This terminology is standard for NASA missions; the equivalent functions for the missions of other countries and/or agencies have been given the same position names.

2.2 Contents of Experiment Entries

Each experiment entry heading includes the experiment name, the NSSDC TD code, the investigative program, the investigation discipline, and the name and affiliation or location of the principal investigator (PI) or team leader (TL) for the experiment as well as other investigators (OI) or team members (TM) associated with the experiment. The experiment brief description is immediately below each heading.
2.3 Active Spacecraft and Experiment Descriptions

A spacecraft is included in the active section of this report if it had a status of "normal" or "partial" and a data acquisition rate of "standard" or "substandard" for any length of time since January 1, 1975. Experiments that meet this same criteria are included.
SPACECRAFT COMMON NAME- EXPLORER 39
ALTERNATE NAMES- EXPLORER 19, D0714
NSDC ID- 66-055A
LAUNCH DATE- 12/17/63
LAUNCH SITE- Van Allen AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT
SPONSORING COUNTRY/AGENCY
UNITED STATES
NASA-555

Orbit Parameters
Orbit Type- Geocentric
Orbit Period- 116.6 min
Perigee- 104.5 km
Apogee- 684 km

Personnel
P - J.R. HOLTZ NASA HEADQUARTERS
S - I.W. SCHNEIDING NASA HEADQUARTERS
PM - C.W. COFFEE, JR. NASA-LARC
PS - G.M. FELLOWS (RETIRED) NASA HEADQUARTERS

Brief Description

--- AB-A JACCHIA ---

INVESTIGATION NAME- NONSYSTEMATIC CHANGES OF AERIAL DENSITY
NSDC ID- 66-0553A-01
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINES- ATMOSPHERES

Personnel
P - J.R. JACCHIA NASA HEADQUARTERS

Brief Description
This experiment was designed to determine non-systematic changes of upper atmospheric density by using spacecraft position data from the 39.6-m diameter LOW-DENSITY SPHERE CAUSED BY SHORT-TERM VARIATIONS IN SOLAR ACTIVITY. VALUES DERIVED FROM SUBSEQUENT OBSERVATIONS OF THE SPACECRAFT POSITION USING OPTICAL TRACING DEACON AND RADIO TRACKING TECHNIQUES. GENERAL TECHNIQUES USED TO DEDUCE DENSITY VALUES FROM SATELLITE DRAG DATA CAN BE FOUND IN SMITHSONIAN ATMOSPHERIC OBSERVATORY SPECIAL REPORT NO. 100 BY JACCHIA AND SCHNEIDING.

--- AB-A KEATING ---

INVESTIGATION NAME- SYSTEMATIC CHANGES OF AERIAL DENSITY
NSDC ID- 66-0553A-02
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINES- ATMOSPHERES

Personnel
P - C.W. KEATING NASA-LARC
S - I.W. SCHNEIDING NASA-LARC
GI - C.W. COFFEE, JR. NASA-LARC
GS - G.M. FELLOWS NASA-LARC

Brief Description
The objective of this experiment was to determine atmospheric density as a function of altitude, latitude, and time by measuring atmospheric density on a low mass-to-area ratio (0.7680 KG PER SQUARE METER) SPHERICAL SATELLITE. THE OBJECT WAS SUN SYNCHRONIZED SO THAT HIGH-POLAR SENSITIES WOULD ALWAYS BE OBTAINED ALONG NOON AND MIDNIGHT MERIDIANS.

--- CC-E ---

SPACECRAFT COMMON NAME- EXPLORER 39
ALTERNATE NAMES- EXPLORER 51

LAUNCH DATE- 02/05/66
LAUNCH SITE- Vandenberg AFB, UNITED STATES
LAUNCH VEHICLE- STREET
SPONSORING COUNTRY/AGENCY
UNITED STATES
NASA-555

Orbit Parameters
Orbit Type- Geocentric
Orbit Period- 114.6 min
Inclination- 86.6 deg
Apogee- 2715 km

Personnel
MS - J.R. HOLTZ NASA HEADQUARTERS
SC - I.W. SCHNEIDING NASA HEADQUARTERS
PM - C.W. COFFEE, JR. NASA-LARC
PS - G.M. FELLOWS NASA HEADQUARTERS

Brief Description
EXPLORER 51 WAS AN INFLATABLE SPHERE, 3.06 M IN DIAMETER. IT WAS ORBITED TO MAKE DENSITY ATMOSPHERE DETERMINATIONS. IT WAS SUCCESSFULLY QUICLED INTO A NEARLY POLAR, HIGHLY ELLIPTICAL ORBIT. IT WAS FOLDED AND CARRIED INTO ORBIT. TOGETHER WITH ELECTRICITY AND INERTIAL EQUIPMENT, IN THE PAYLOAD OF EXPLORER 40 (NSDC ID- 66-0508). TWO ORBITAL EXPERIMENTS WERE PERFORMED. ONE INVOLVED THE STUDY OF SYSTEMATIC DENSITY VARIATION IN THE THERMAL ATMOSPHERE. THE OTHER WAS CONCERNED WITH NONSYSTEMATIC DENSITY CHANGES. THE UPPER ATMOSPHERIC DENSITIES WERE DERIVED FROM SUBSEQUENT RESERVATIONS OF THE SPHERE SIZE BY MEANS OF AN ATTACHED 136.620-Hz RADIO TRACING DEACON AND BY OPTICAL TRACKING. THE RADAR DEACON CEASED TRANSMISSION IN JUNE 1973, SINCE THAT TIME IT HAS BEEN NECESSARY TO RELY SOLELY ON THE $0$1 LOW-MASS/RADAR CAMERA NETWORK FOR TRACKING. EXPLORER 51 HAS AN EXPECTED ORBITAL LIFETIME OF 70 YEARS.

--- AB-C JACCHIA ---

INVESTIGATION NAME- NONSYSTEMATIC CHANGES OF AERIAL DENSITY
NSDC ID- 66-0566A-01
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINES- ATMOSPHERES

Personnel
P - J.R. JACCHIA NASA HEADQUARTERS

Brief Description
This experiment was designed to determine non-systematic changes of upper atmospheric density. The data were derived from studies of the drag on a 3.6-meter diameter low-density sphere caused by short-term variations in solar activity. Values were derived from sequential observations of the spacecraft position using optical spacecraft tracking and radar tracking techniques. The general technique used to deduce density values from spacecraft drag data can be found in SMITHSONIAN ATMOSPHERIC OBSERVATORY SPECIAL REPORT NO. 100 BY JACCHIA AND SCHNEIDING.

--- AB-C KEATING ---

INVESTIGATION NAME- SYSTEMATIC CHANGES OF AERIAL DENSITY
NSDC ID- 66-0566A-02
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINES- ATMOSPHERES

Personnel
P - C.W. KEATING NASA-LARC
S - I.W. SCHNEIDING NASA-LARC
GI - C.W. COFFEE, JR. NASA-LARC
GS - G.M. FELLOWS NASA-LARC

Brief Description
This experiment was designed to determine systematic changes of aerial density as a function of altitude, latitude, and time by measuring the drag on a 3.6-meter diameter low-density sphere with ground tracking.

--- CC-E ---

SPACECRAFT COMMON NAME- AE-C
ALTERNATE NAMES- 5 AC, PL-721 EXPLORER 51 EXPLORER 51 EARTH EXPLORER-C, EXPLORER 51

LAUNCH DATE- 02/05/66
LAUNCH SITE- Vandenberg AFB, UNITED STATES
LAUNCH VEHICLE- STREET
SPONSORING COUNTRY/AGENCY
UNITED STATES
NASA-555

Orbit Parameters
Orbit Type- Geocentric
Orbit Period- 864 min
Inclination- 86.6 deg
Apogee- 2715 km

Personnel
MS - J.R. HOLTZ NASA HEADQUARTERS
SC - I.W. SCHNEIDING NASA HEADQUARTERS
PM - C.W. COFFEE, JR. NASA-LARC
PS - G.M. FELLOWS NASA HEADQUARTERS

Brief Description
EXPLORER 51 WAS AN INFLATABLE SPHERE, 3.06 M IN DIAMETER. IT WAS ORBITED TO MAKE DENSITY ATMOSPHERE DETERMINATIONS. IT WOULD BE SUCCESSFULLY QUICLED INTO A NEARLY POLAR, HIGHLY ELLIPTICAL ORBIT. IT WOULD BE FOLDED AND CARRIED INTO ORBIT. TOGETHER WITH ELECTRICITY AND INERTIAL EQUIPMENT, IN THE PAYLOAD OF EXPLORER 40 (NSDC ID- 66-0508). TWO ORBITAL EXPERIMENTS WERE PERFORMED. ONE INVOLVED THE STUDY OF SYSTEMATIC DENSITY VARIATION IN THE THERMAL ATMOSPHERE. THE OTHER WAS CONCERNED WITH NONSYSTEMATIC DENSITY CHANGES. THE UPPER ATMOSPHERIC DENSITIES WERE DERIVED FROM SUBSEQUENT RESERVATIONS OF THE SPHERE SIZE BY MEANS OF AN ATTACHED 136.620-Hz RADIO TRACING DEACON AND BY OPTICAL TRACKING. THE RADAR DEACON CEASED TRANSMISSION IN JUNE 1973, SINCE THAT TIME IT HAS BEEN NECESSARY TO RELY SOLELY ON THE $0$1 LOW-MASS/RADAR CAMERA NETWORK FOR TRACKING. EXPLORER 51 HAS AN EXPECTED ORBITAL LIFETIME OF 70 YEARS.
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INVEStIGATION 0'5CIPLINECSl
IONO$PHERES
PLANETARY ATMOSPHERES
ATMOSPHERIC PHYSICS

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BlllEf DESCRIPTION
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INVESTIGATIVE PROGRAM
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INVESTIGATION NAME: ATMOSPHERIC DENSITY ACCELEROMETER (MDA)

NSSEC 10- 73-107A-02 INVESTIGATORY PROGRAM CODE ET

INVESTIGATORY DISCIPLINE(S) PHYSIOLOGICAL

PHYSIOLOGICAL

PERSONNEL

PI - R.W. CHAMBER
O. - J.A. MARCOS
USA GEOPHYS LAB
USA GEOPHYS LAB

BRIEF DESCRIPTION

PATIENT OBTAINED DATA ON THE RELATIVE DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE OF 120 KM TO 400 KM BY THE MEASUREMENTS OF SATellite DECCELERATION DUE TO AERODYNAMIC DRAG. THE INSTRUMENT CONSISTED OF THREE SINGLEAXIS ACCELEROMETERS, MOUNTED MUTUALLY AT RIGHT ANGLES, TWO IN THE SPACECRAFT XY PLANE, AND THE OTHER ON THE Z AXIS. THE INSTRUMENT DETERMINED THE APPLIED ACCELERATION FROM THE ELECTROSTATIC FORCE REQUIRED TO ACCELERATE THE PROPERLY FORCED OUTPUT OF THE DEVICE WAS A DIGITAL RATE PROPORTIONAL TO THE APPLIED ACCELERATION. THE ACCURACY OF THE INSTRUMENT HAD DEPENDS ON THE DENSITY OF THE NEUTRAL ATMOSPHERE, MONITORED THE DISTANCE OF THE OBLIQUE FIELD, AND DETERMINED THE SAME REFERENCE ALTITUDE MEASURED SPACECRAFT ROLL, AND PROVIDED SOME ATTITUDE-SCANNING INFORMATIONS, SPACESTACKS. MEASUREMENTS LESS THAN 0.01 DEGREES WERE MONITORED. THE INSTRUMENT WERE THREE SENSITIVE AXES, THE 0.6 X 0.45 X 0.6 CM SOLID STATE DEVICES, 100 TO 250 KM (PLUS OR MINUS 10 PERCENT) AND 250 KM (PLUS OR MINUS 10 PERCENT) AND 250 KM (PLUS OR MINUS 10 PERCENT), RESPECTIVELY. DEGREES IN PARHETROUS REPRESENT EXISTING IN ABOUT 29. THERE MAY BE A SYSTEMATIC ERROR UP TO PLUS OR MINUS 5 PERCENT DUE TO DRAG COEFFICIENT UNCERTAINTY. THE HIGHEST ALTITUDE WAS DETERMINED BY THE INSTRUMENT COULD SENSE TO 0.2 PERCENT OF FULL SCALE.

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INVESTIGATION NAME: PHOTONETRON SPECTROMETER (PS)

NSSEC 10- 73-107A-03 INVESTIGATORY PROGRAM CODE ET

INVESTIGATORY DISCIPLINE(S) PHYSIOLOGICAL

PHYSIOLOGICAL

PERSONNEL

PI - J.A. DOERING
O. - C.O. NORTHON
APPLIED PHYSICS LAB
O. - J.C. ARMSTRONG
UNKNOWN

BRIEF DESCRIPTION

THE EXPERIMENT WAS DESIGNED TO PROVIDE INFORMATION ON THE INTENSITY, DIRECTION, DISTRIBUTION, ENERGY SPECTRUM AND KEV LEVELS ALONG FIELD LINES OF ELECTRONS IN THE ATMOSPHERE WITH ENERGIES BETWEEN 2 AND 5000 E. THE INSTRUMENT CONSISTED OF TWO ELECTRON SENSORS, ONE DISPERSED DIFFERENTIALLY, HEMISPHERICAL, ELECTROSTATIC ANALYZERS. EACH SPECTROMETER HAD A RELATIVE ENERGY RESOLUTION OF 1%-4% OR MINUS 2.5 PERCENT AND A GEOMETRIC FACTOR ON THE VEIL OF 0.104 CM2 STER. INDEPENDENT OF ELECTRON ENERGY, THREE DIFFERENT ENERGY RANGES COULD BE SELECTED TO 0 TO 250, 0 TO 1000, AND 0 TO 5000. DATA FROM THESE INTERVALS COULD BE SELECTED TO DIFFERENT WAVES. DATA COULD BE TAKEN FROM BOTH SENSORS SEPARATELY OR AT THE SAME TIME WITH RESOLUTION VARYING FROM 0.25 TO 1.5. THERE WERE TWO DEFLECTION VOLTAGE SCANS, A COMMON PROBLEM SPACECRAFT CLOCK, THE FIELD VOLTAGE WAS CHANGED IN 20-50 steps, AND WAS DONE AT 5 OR 10 steps PER HOUR. WITH 16 FRAMES, THIS ALLOWED A CHOICE OF EITHER ONE 16-POINT SPECTRUM, OR FOUR 16-POINT SPECTRA IN ONE CYCLE. THE EFFECT OF OBSERVATIONS USING INCREASING VOLTAGE STAGE FOR THE LOWEST, HIGHEST-THEN LOWEST ENERGIES RANGES IN THAT ORDER FOR 5-10 EACH. IT IS REPEATED FOR DECREASING VOLTAGE STAGE COMPLETE THE CYCLE. A MORE DETAIL DESCRIPTION OF THE EXPERIMENT MAY BE FOUND IN "RAPID SCIENCE" 2, 387-392, APRIL 1973.

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INVESTIGATION NAME: RETARDING POTENTIAL ANALYZER/INCLINE METER (RP)

NSSEC 10- 73-107A-04 INVESTIGATORY PROGRAM CODE ET

INVESTIGATORY DISCIPLINE(S) PHYSIOLOGICAL

PHYSIOLOGICAL

PERSONNEL

PI - W.K. HANSON
O. - H. KUCERAD
U. OF TEXAS, DALLAS
O. - H. KUCERAD
U. OF TEXAS, DALLAS

BRIEF DESCRIPTION


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INVESTIGATION NAME:-visible AIRBLOW PHOTOGRAPHER (VAP)

NSSEC 10- 73-107A-14 INVESTIGATORY PROGRAM CODE ET

INVESTIGATORY DISCIPLINE(S) PHYSIOLOGICAL

PHYSIOLOGICAL

PERSONNEL

PI - P.B. HAYES
O. - G.G. SHEPHERD
YORK U
O. - G.G. SHEPHERD
O. - G.G. SHEPHERD
YORK U

BRIEF DESCRIPTION

WITH NO APPARENT ENHANCEMENT IN BACKGROUND WITHIN 120 MS AFTER A DIRECT VIEW OF THE SUN, PHOTOS REACHING THE CATHODE WERE REGISTERED IN THE INTEGRATION TIME. THE INTEGRATION TIME WAS 33 MS FOR CHANNEL 1 AND 132 MS FOR CHANNEL 2. PRIMARY COMMAND AND TELECOMMUNICATION SYSTEMS WERE MONITORED WITH THE TWO CHANNELS. THE EXPERIMENT WAS COMBINED INTO ANY ONE OF SEVERAL OPERATING MODOES depending on the science requirements and spacecraft attitude. FOR MORE DETAIL DETAILS, SEE 'THE VISIBLE-LIMNO-BAND EXPERIMENT ON ATMOSPHERIC EXPLORER.' P. 9, HAYE ET AL., RADIO SCIENCE, 8, 4, 1973.

INVESTIGATION NAME: EXTREME SOLAR UV MONITOR (ESEM)

INVESTIGATIVE PROGRAM CODE ST

INVESTIGATIVE DISCIPLINE(S)
PHYSICAL SOLAR PHYSICS

PERSONNEL
PI - D. HEATH NASA-GSFC
DI - J. SOISAKOWSKI NASA-GSFC

BRIEF DESCRIPTION
BRIEF DESCRIPTION

The objective of this experiment was to contribute to a study of the energetic particle fluxes at high latitudes. It was performed in a region where atmospheric constituents are present in the range from 1 to 200 MeV. A basic feature of the experiment is the use of a magnetic deflection mass spectrometer with an impact ion source and a target area. The experiment was to be performed in a region where the neutral mass spectrometer, which was part of the AE-E payload, was to be measured. The experiment was designed to measure the mass of the PSD beam and to determine the mass of the PSD beam. The experiment was also to determine the mass of the PSD beam and to determine the mass of the PSD beam.

INVESTIGATION NAME: COLD CATHODE ION GAUGE

NSSDC 10- 73-101A-15

INVESTIGATION DISCIPLINES: PLASMASPHERE

PLASMASPHERE / PLANETARY ATMOSPHERES

PERSONNEL

PI - C. J. RICE

AEROSPACE CORP

BRIEF DESCRIPTION

The cold cathode ion gauge flown on AE-E was primarily an engineering experiment to provide data on spacecraft operation. However, data from this experiment was correlated with accelerometer and magnetometer data to determine the plasma density between 120 and 370 km above the earth's surface for particles between 1.3-3 to 3.3-4 MeV. The space craft was used to study the effect of the ion source on the plasma density. The ion source was a cold cathode and the plasma density was determined by measuring the ion current. The ion source was a cold cathode and the plasma density was determined by measuring the ion current. The ion source was a cold cathode and the plasma density was determined by measuring the ion current. The ion source was a cold cathode and the plasma density was determined by measuring the ion current.
This experiment measured 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 were obtained from comparisons of these measurements with other onboard experiments namely: open-source spectrometer (75-056A-07). Solar EUV spectrometer (75-056A-08), and density-accelerometer (75-056A-09). The mass spectrometer section included a grid-plated stainless steel thermalizing chamber and ion source. A hyperbolic rod quadrupole analyzer, and an electron multiplier. Five different sequences of mass selection were available and expressed in atomic mass units (u), were -- (1) physical, (2) theoretical, (3) ideal select, select. (4) automated select, select. (5) continuous. The five operational formats used can be selected by ground command. The chamber and each of the five selection of the five mass selection sequences listed above, when operated in the "normal" mode, were measured in all mass in the range 1 to 66 with emphasis on hydrogen-alkane mixtures. The mode, and, another mode, was optimized for minor constituent studies of any individual gas species. The mass selectivity of the principal atmospheric species was obtained at 12-keV intervals (1.5 to 7.5) along the satellite track. While the instrument was facing forward, using "normal" mode, all measurements were made at 12-keV intervals when the spacecraft was despin. In order to resemble spectroscopy and determine the atmospheric constituents passed through a knife-edge aperture into the thermalization chamber and ion source. Ions left the quadrupole analyzer through a weak focusing lens and were accelerated into a 14-stage electron multiplier. Where were they were tuned 90 deg to strike the first dynode. For each incrementing 12-keV, the pressed spectrometer was scanned. The atmospheric concentrations of these densities were converted to absolute concentrations. The analyzer normally operated a real time. Mass list for the various species. The NET for the adjacent peak of one of the many peaks during the 0.15 s integration intervals were accumulated in a 104-channel counter. This was assigned to each measurement for less dense atmospheric species, automatically selected. The density of the currents were used. The overall range of the measurements was greater than 1e7. Then, the instrument net dose to be covered during spacecraft thruster operations. More experiment details can be found in "A Neutral-Atmosphere Composition Experiment" by K. 9, 1. Pelt et al, Radio Science, 1973.
MEASURED THE ARGLOW IN THE (1, 0) GAMMA RAY IN A 12.5° RESONANCE INTERVAL AND THE ALPHABET RESOLUTION OF THE NITRIC-OXIDE MEASUREMENT AE-O. BARBER

NSSDC J.D-

SLITS. THE SPECTROMETER FIELD OF VIEW WAS 0 DEG 5 MIN BY 4 DEG 0 MINALNEO.

CHAPMAN

EITOTHER HALF OF THE EBERL IONIZATION AND FOCUSED IT ON THE SATELLITE TELEMETRY.

BARTJ


E-O. DOER

INVESTIGATION NAME: ULTRAVIOLET NITRIC-OXIDE EXPERIMENT

INVESTIGATIVE PROGRAM

NSSC ID- 75-096A-11 INVESTIGATIVE PROGRAM

PERSONNEL

MEASUREMENTS ELECTRON TEMPERATURE BETWEEN 300 AND 10,000 DEG K. 10 PERCENT ACCURACY IN DENSITY BETWEEN 10,000 AND 1000 PER CURB CM. 10-20 PERCENT ACCURATE ELECTRON DENSITY BETWEEN 50 AND 1000 PER CURB CM AND ION DENSITIES AVERAGE 10-20 PER CURB CM. THE COLLECTOR ELECTRODE, EXTENDING FROM THE CENTRAL AXES OF A CYLINDRICAL G能够在 0.25-CH BBOX, AND THE COLLECTOR EXTENDED ANOTHER 7.5 CM BEYOND THE GRID RING. THE GRID BBOX AND COLLECTOR WERE IN A 0.2 CH BAL

CHARACTER DENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WERE MEASURED "LONG TRACK" OF THE SATELLITE AT TIMES WHEN ALTITUDE PROFILES WERE PROVIDED THROUGH THE TWO CHIMINEES OPTICALLY AND ELECTRICALLY INDEPENDENT. BETWEEN PLUS AND MINUS 2 PERCENT) AND 50 KM (PLUS OR MINUS 10 PERCENT). DAD-7 BAND CUBIC (PLUS OR MINUS 1 PERCENT) AND 2.5-5 BETWEEN 100 KM (PLUS OR MINUS 2 PERCENT) AND 400 KM (PLUS OR MINUS 10 PERCENT). HURDERS IN THE INSTRUMENT HAD THREE SEVERITY RANGES -- BETWEEN 100 KM (PLUS OR MINUS 2 PERCENT) AND 1000 KM (PLUS OR MINUS 1 PERCENT) -- OR 0.001 SQ CM ST!E!, INDEPENDENT OF TIME.

BARRETT

E-O. BARTJ

INVESTIGATION NAME: EYEWITNESS ELECTROSTATIC PROBE (SEP)

INVESTIGATIVE PROGRAM

NSSC ID- 75-096A-01 INVESTIGATIVE PROGRAM

PERSONNEL

THE CE-8 CONSISTS OF THE IDENTICAL INSTRUMENTS DESIGNED TO MEASURE ELECTRIC CHARGE, ELECTROCHEMICAL AND CURRENT DENSITIES, ION AND ELECTRON CONCENTRATIONS, ION MAGS AND SPACECRAFT ELECTROPOTENTIAL. ONE PROBE WOULD BE PLACED ON THE SPIN AXIS OF THE SPACECRAFT (VERTICALLY PARALLEL TO THE ORBIT). THE OTHER PROBE WOULD BE PLACED ON THE SPIN AXIS OF THE SPACECRAFT (VERTICALLY PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER RADIALLY TO THE ORBIT. THE TWO PROBES WOULD BE OPERATED SEPARATELY ONCE EACH 15-5 SPIN PERIOD. EACH INSTRUMENT WOULD RESTRICT POTENTIAL MEASUREMENTS TO THE POTENTIAL RANGE WHERE THE CURRENT VERSUS VOLTAGE CURVE FOR A KNOWN VOLTAGE PATTERN POSITIONED ON THE CIRCUMFERENCE IS KNOWN. TO MEASURE CURRENT, THERE WERE TWO SYSTEMS OF OPERATION (ONE WITH TWO NODES AND ANOTHER WITH THREE NODES) USING COLLECTOR VOLTAGE PATTERN ANTIMAGS WHICH WERE AUTO-MAGS OR FIXED MAGS. THE SELF-SPIN NUCLEI WERE AUTOMATIC OR FIXED ADJUSTMENT OF COLLECTOR VOLTAGE LIMITS ANTI-MAGS. A MAGS RATING IS KNOWN TO BE THE QUANTITY OF CURRENT AT THE 1-4 PROFILE PROVIDED HIGH RESOLUTION. EACH SYSTEM WAS NEEDED TO USE ONLY ONE OF THE PROBES WHICH COULD BE INTERCHANGED TO PROVIDE BACKUP GUARDIAN. THE BEST MEASUREMENTS IN THE MOST FAVORABLE MAGS PROVIDED ONE SECOND
AUTOMATICALLY STEP SCAN THROUGH THESE POSITIONS. THE OTHER 12 MONOCHROMATORS OPERATED AT FIXED WAVELENGTHS WITH FIELDS OF VIEW VARIED FROM 6 X 6 ARC MIN DOWN TO 3 X 3 ARC MIN. ALL 24 MONOCHROMATORS WERE CONSTRUCTIONALLY PARALLEL. ONE POINT OF VIEW COULD BE SELECTED TO 256 DIFFERENT POSITIONS. EXECUTE A 16-STEP ONE-DIMENSIONAL SCAN OR A FULL 256-STEP MASTER. THE TWO MASS RANGES COVERED 16-STEP ONE-DIMENSIONAL SCAN OR A FULL 156-STEP RASTEII. 0.2 AE-D. HOFFMAN -----------------------------

INVESTIGATION NAME--MAGNETIC ION-MASS SPECTROMETER (MIMS)

NSDC ID- 75-GSD-0A-10 INVESTIGATIVE PROGRAM SOLAR-TERRESTRIAL PHYSICS

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES ATMOSPHERIC PHYSICS

PERSONNEL
PI  J. H. HOFFMAN  U OF TEXAS, DALLAS
OI  J. H. HOFFMAN  U OF TEXAS, DALLAS
OI  H. C. RAIMONDI  U OF TEXAS, DALLAS
OI  J. H. HOFFMAN  U OF TEXAS, DALLAS

BRIEF DESCRIPTION
THE MASS SPECTROMETER WAS FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT POSITIVE ION SPECIES IN THE MASS RANGE FROM 1 TO 90 AMU. THE IONS PRODUCED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXES. THE ENTRANCE SYSTEM FLOWN IN THE DESIRED MASS RANGE, THE ELECTRIC AND MAGNETIC FIELDS WERE ARRANGED TO FOCUS THE IONS INTO THE MAGNETIC ANALYZER. THE ELECTRON ENERGY WAS CHANGED BY A SEQUENCE OF "ASSED OF PARTicular INTEREST SUCH AS. E.G.,"...
INVESTIGATION NAME- COLD CATHODE ION GAGE

NSSDC ID- 75-056A-15
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES
PERSONNEL
PI - C.J. RICE
AEROSPACE CORP
BRIEF DESCRIPTION
THE COLD CATHODE ION GAUGE FLOWN ON AE-9 WAS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WERE CORRELATED WITH ACCELEROMETER DATA AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE ALSO REFLECTED THE LEVEL OF ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3E-5 TO 1.3E-7 MB. THE ION GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINSPERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WAS TYPICALLY OPERATING AT ABOUT 1.0 DEGREES DEVIATION FROM THE SPINS PERIOD. THE ION CURRENT WAS FLOWN AT THE CATHODE. THE GAGE WAS MOUNTED ON THE SPACECRAFT WITH THE CRITICAL PERPENDICULAR TO THE SPACECRAFT SPIN AX
DRAFT DESCRIPTION

This experiment was flown to measure the ORBITAL DECELERATION AND DENSITY OF THE ELECTRONIC SPACECRAFT using the BENNETT ION-MASS-SPECTROMETER. The experiment was designed to measure the desired densities of electrons, ions, and neutral species within the呼ばれ空間の密度と電荷密度を計測する目的で設計された実験が宇宙船に搭載されていました。実験はベンネットイオン質量スペクトロメーターを使用していました。

INVESTIGATION NAME - ATMOSPHERIC DENSITY ACCELEROMETER (MDA)

NSSDC 10- 75-T07A-02 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S) PHYSICAL ATMOSPHERES

INVESTIGATION PERSONNEL

PI - J.J. DOERING
01 - J.C. WALKER

BRIEF DESCRIPTION

This experiment was designed to provide information on the ion density and mass distribution in the atmospheric environment. The ion density was measured using a BENNETT ion mass spectrometer mounted on the spacecraft. The spectrometer was used to measure the ion density at various altitudes and locations within the Earth's atmosphere. The measurements were made by launching projectiles into the atmosphere and measuring the resulting ion current.

INVESTIGATION NAME - PHOTOELECTRON SPECTROMETER

NSSDC 10- 75-T07A-03 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S) PHYSICAL ATMOSPHERES

INVESTIGATION PERSONNEL

PI - J.C. WALKER
01 - J.C. ARMSTRONG

BRIEF DESCRIPTION

This experiment was designed to provide information on the ion density and mass distribution in the atmospheric environment. The ion density was measured using a BENNETT ion mass spectrometer mounted on the spacecraft. The spectrometer was used to measure the ion density at various altitudes and locations within the Earth's atmosphere. The measurements were made by launching projectiles into the atmosphere and measuring the resulting ion current.

INVESTIGATION NAME - RETARDING POTENTIAL ANALYZER/DRIFT METER (RPAD)

NSSDC 10- 75-T07A-04 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S) PHYSICAL ATMOSPHERES

INVESTIGATION PERSONNEL

PI - J.B. HANSON
01 - D.R. ZUCCHI
02 - D.R. ZUCCHI
03 - C.R. FISCHER

BRIEF DESCRIPTION

This experiment was designed to determine the ion drift velocities and ion concentrations in the atmosphere. The ion drift velocities were measured using a BENNETT ion mass spectrometer mounted on the spacecraft. The measurements were made by launching projectiles into the atmosphere and measuring the resulting ion current.

INVESTIGATION NAME - VISIBLE AIRGLOW PHOTOMETER (VAP)

NSSDC 10- 75-T07A-11 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S) PHYSICAL ATMOSPHERES

INVESTIGATION PERSONNEL

PI - P.B. HAYES
01 - C.R. ELSON
02 - C.R. ELSON
03 - J.C. WALKER

BRIEF DESCRIPTION

This experiment was designed to provide information on the ion density and mass distribution in the atmospheric environment. The ion density was measured using a BENNETT ion mass spectrometer mounted on the spacecraft. The spectrometer was used to measure the ion density at various altitudes and locations within the Earth's atmosphere. The measurements were made by launching projectiles into the atmosphere and measuring the resulting ion current.

--- AE.-HEATHER---

INVESTIGATION NAME: EXTREME SOLAR UV MONITOR (ESUM)  
NSDC 10- 75-107A-05  INVESTIGATIVE PROGRAM CODE ST  
INVESTIGATION DISCIPLINE(S)  
SOLAR PHYSICS

PERSONNEL  
PI - A.E. HEATHER  NASA-GSFC  
OI - J.F. SANTOSKI  NASA-GSFC

BRIEF DESCRIPTION  

--- AE.-HEATHER---

INVESTIGATION NAME: BACKSCATTER UV SPECTROPHOTOMETER (BMV)  
NSDC 10- 75-107A-16  INVESTIGATIVE PROGRAM CODE ST  
INVESTIGATION DISCIPLINE(S)  
PLANTARY ATMOSPHERES

PERSONNEL  
PI - A.E. HEATHER  NASA-GSFC  
OI - L.A. REDER  NASA-GSFC  
OI - C.M. CHARGON  U OF MICHIGAN

BRIEF DESCRIPTION  

--- AE.-HEATHER---

INVESTIGATION NAME: NEUTRAL ATMOSPHERE COMPOSITION EXPERIMENT (NEAC)  
NSDC 10- 75-107A-08  INVESTIGATIVE PROGRAM CODE ST  
INVESTIGATION DISCIPLINE(S)  
PLANETARY ATMOSPHERES  
IONOSPHERE  
ATMOSPHERIC PHYSICS

PERSONNEL  
PI - A.E. HEATHER  NASA-GSFC  
OI - L.A. REDER  NASA-GSFC  
OI - C.M. CHARGON  U OF MICHIGAN

BRIEF DESCRIPTION  

BRIEF DESCRIPTION

This experiment was designed to measure the kinetic temperature of the neutral atmosphere by determining the instantaneous density of neutral nitrogen in a spherical chamber, which was coupled to the atmosphere through a knife-edge orifice. Analysis of the measured molecular nitrogen density in the spherical chamber was performed over a spin cycle, with a knowledge of the satellite's orientation and location. The idea was to count the ions and electrons from the source, which entered the spherical chamber, and then to use the ion current to determine the atmospheric pressure. The ion current and the electron current were then used to determine the kinetic temperature of the neutral atmosphere.

INVESTIGATION NAME: CAPACITANCE MANOMETER

NADIS ID: 75-1074-12
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

PI - C.J. RICE
AEROSPACE CORP

BRIEF DESCRIPTION

The capacitance manometer flown on AE-E was primarily an engineering experiment to provide data on space satellite. The capacitance manometer is a device that measures the pressure in a chamber by using a capacitance sensor. The capacitance sensor is a device that measures the capacitance of a capacitor, which is a function of the pressure in the chamber. The capacitance manometer was operated in two modes: spinning and despun. In the spinning mode, the satellite was in a spinning mode. In the despun mode, the satellite was in a despun mode. The capacitance manometer was designed to provide data on the neutral gas kinetic temperature.

INVESTIGATION NAME: COLD CATHODE ION GAUGE

NADIS ID: 75-1074-13
INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

PI - C.J. RICE
AEROSPACE CORP

BRIEF DESCRIPTION

The cold cathode ion gauge was primarily an engineering experiment to provide data on space satellite. The cold cathode ion gauge is a device that measures the ion current in a chamber. The cold cathode ion gauge was operated in two modes: spinning and despun. In the spinning mode, the satellite was in a spinning mode. In the despun mode, the satellite was in a despun mode. The cold cathode ion gauge was designed to provide data on the ion current and the electron current from the source, which entered the spherical chamber.
ELECTRON MULTIPLIER OUTPUT CURRENT WAS RECORDED BY A LOG ELECTRONOMETER WITH 0.1% TO 5.0% AMP. APPROXIMATELY ONE-HALF OF THE ION BEAM TO THE MULTIPLIER WAS SHIELDED BY A LOW COUNTER UNIT AND CORD BEARING A LINEAR ELECTROMETER. THE PULL RANGE SENSITIVITY OF THIS ELECTRONOMETER CHANGED POSITIONAL FROM 5.0 TO 10.0 AMP. NEGLIGIBLE THE HAM CONTRIBUTION. THE BASIC SENSITIVITY OF THE INSTRUMENT WAS 0.02 AMP/UNIT. IN THE ION NOSE FOR SMALL ANGLES OF ATTACK, THE SENSITIVITY WAS 0.1-1 AMP. TO THE MINUS 0.001, OVERALL SENSITIVITY WAS ADJUSTABLE BY COMMAND. MORE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER BY B. M. CHAMBERLAIN ET AL. JOURNAL OF GEOPHYSICS, 40, 5, 607, 1974.

--- AEROS 2. NESKE ---

INVESTIGATION NAME- ELECTRON CONCENTRATION IN THE IONOSPHERE
NSDC ID- 74-DSSA-03 INVESTIGATIVE PROGRAM CODE STICO-OP
INVESTIGATION DISCIPLINE(S) IONOSPHERES
PERSONNEL
PI - E. NESKE INST FOR PHYS WELTRAUM
OI - K. HIEN INST FOR PHYS WELTRAUM

BRIEF DESCRIPTION
THE IMPEDANCE PROBE AND VEHICLE BODY COMPRISED TWO PLATES OF A CONDUCTIVE IMPEDANCE CHANGES DUE TO THE CHANGE IN DIELECTRIC CONSTANT CHARACTERS OF THE CONDUCTIVE WERE OBSERVED BY MEASURING RESONANCE FREQUENCY BETWEEN THE CAPACITOR AND VARIABLE DRIVING FREQUENCY. THE ELECTRON DENSITY WAS COMPUTED FROM THE OBSERVED RESONANCE FREQUENCY, FREQUENCY RANDED FROM 0.0 TO 1.0, WHICH CORRESPONDED TO ELECTRON DENSITIES FROM 0.0 TO 1.0 ELECTRONS/CM CUBED.

--- AEROS 2. ROEGER ---

INVESTIGATION NAME- ATMOSPHERIC DRAG ANALYSIS
NSDC ID- 74-DSSA-06 INVESTIGATIVE PROGRAM CODE STICO-OP
INVESTIGATION DISCIPLINE(S) ATMOSPHERES
PERSONNEL
PI - R. ROEGER G OF BONN
OI - C. HULLE-MATHIES G OF BONN

BRIEF DESCRIPTION
THIS EXPERIMENT PROVIDED INDIRECT MEASUREMENTS OF UPPER ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE. THE DENSITY VALUES WERE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATTELLITE'S POSITION. THE SATELLITE TRACKING YIELDED SYSTEMATIC CHANGES IN DENSITY AS A FUNCTION OF ALTITUDE, LATITUDE, AND TIME. THE DATA OBTAINED WAS CORRULATED WITH DENSITY VALUES SIMULTANEOUSLY HOOZED BY DIRECT MEASUREMENTS USING AN ORANGED NEUTRAL DENSITY GAUGE.

--- AEROS 2. SCHRIDTKE ---

INVESTIGATION NAME- SOLAR EUV RADIATION
NSDC ID- 74-DSSA-04 INVESTIGATIVE PROGRAM CODE STICO-OP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - G. SCHRIDTKE INST FOR PHYS WELTRAUM
OI - W. SCHNEIDER INST FOR PHYS WELTRAUM

BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A RAYING SPECTROMETER, A SOLAR COLLIMATOR, AND A PHOTOMULTIPLIER. IT OPERATES IN THE RANGE OF 0 TO 300 A AND 300 TO 700 A AND MEASURES THE FLUX AND DIRECTION OF THE SOLAR EUV RADIATION AND ITS TEMPORAL AND SPATIAL VARIATIONS.

--- AEROS 2. SPENCER ---

INVESTIGATION NAME- NEUTRAL ATMOSPHERIC TEMPERATURE
NSDC ID- 74-DSSA-05 INVESTIGATIVE PROGRAM CODE STICO-OP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS
PERSONNEL
PI - M. SPENCER NASA-GSFC
OI - H. PELT NASA-GSFC
OI - J. THOMPSON NASA-GSFC
OI - G. CARRE U OF MICHIGAN
OI - H. KRAMER NASA-GSFC

BRIEF DESCRIPTION

--- AEROS 2. SPENCER ---

INVESTIGATION NAME- ENERGY DISTRIBUTION OF IONS AND ELECTRONS
NSDC ID- 74-DSSA-02 INVESTIGATIVE PROGRAM CODE STICO-OP
INVESTIGATION DISCIPLINE(S) IONOSPHERES
PERSONNEL
PI - R. SPENCER INST FOR PHYS WELTRAUM
OI - A. SPENCER INST FOR PHYS WELTRAUM

BRIEF DESCRIPTION
A RETARDING POTENTIAL ANALYZER MEASURED THE ENERGY DISTRIBUTION OF ELECTRONS AND IONS. THE TOTAL GASES DENSITY WERE DERIVED FROM THESE DISTRIBUTIONS. THE EXPERIMENT OPERATED IN AN ELECTRON MODE AND IN AN ION MODE. THE INSTRUMENT WAS ESSENTIALLY A COLLECTOR SHIELDED BY PARALLEL PLANE GRID. BY SCANNING THE RETARDING POTENTIAL OF THE COLLECTOR, THE TOTAL GASES DENSITY WAS OBTAINED. THE PARTICLES ONLY PASSED THROUGH THE GRID AND RETAINED IF THEIR KINETIC ENERGY EXCEEDED THE RETARDING POTENTIAL.

------ ALOUETTE 2 ------

SPACECRAFT COMMON NAME- ALOUETTE 2 ALTERNATE NAMES- ALOUETTE 2-1 1964-11-12-01
WEIGHT- 155 KG LAUNCH SITE- WENAARD AFB, UNITED STATES LAUNCH VEHICLE- THOR SPONSORING COUNTRY/AGENCY
CDSAPA NASA-GSFC UNITED STATES NASA-GSFC

ORBIT PARAMETERS
ORBIT TYPE- ECCENTRIC EPOCH DATE- 02/28/75
ORBIT PERIOD- 120.5 MIN INCLINATION- 79.1 DEG PERIAPSIS- 505.0 KM APOAPSIS- 292.2 KI

PERSONNEL

BRIEF DESCRIPTION
AFRICA.

------------- ALOUETTE 2, BELDOS -------------

INVESTIGATION NAME- VLF RECEIVER
NSSDC ID- 65-088A-02 INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS
PERSONNEL
PI - J.B. BELDOSE COMMON RESEARCH CENTRE
Co-I - J.M. BELDOSE COMMON RESEARCH CENTRE
BRIEF DESCRIPTION
THE VLF EXPERIMENT WAS A WIDEBAND HIGH-GAIN RECEIVER WITH
A PASSBAND FROM 0.52 TO 30 KHz THAT USED THE LONG SOUNDER
ANTENNA. THE INSTRUMENT WAS A CONSIDERABLY PRAYED VERSION
OF THE ALOUETTE 1 RECEIVER. THE STANDARD VLF DATA FORM WAS A
SONGROM (GRAPH) THAT SHOWN SIGNAL AS A FUNCTION OF TIME AND
FREQUENCY. WESTLINGS, IONOSPHERIC NOISE, VLF NOISE, ETC. WERE
OBSERVED IN THIS VERY LOW REGION OF THE RADIO FREQUENCY
SPECTRUM.

------------- ALOUETTE 2, B. ROOE -------------

INVESTIGATION NAME- CYLINDRICAL ELECTROSTATIC PROBE
NSSDC ID- 65-088A-36 INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S)
IONOSPHERES
PERSONNEL
PI - L.E. ROOE NASA-GSC
BRIEF DESCRIPTION
THE CYLINDRICAL ELECTROSTATIC PROBE OBSERVED ELECTRON
SPEED IN THE IONOSPHERE. IT WAS A TYPE OF LANGMUIR PROBE
CONSISTING OF A COLLECTOR ELECTRODE EXTENDING FROM THE
CENTRAL AXIS OF A CYLINDRICAL GROUND RING. THE GROUND RING EXTENDED
23 CM FROM THE SPACECRAFT, AND THE COLLECTOR ELECTRODE EXTENDED 46 CM.
TWO SENSORS WERE MOUNTED ON OPPOSITE SIDES OF THE LOWER PORTION
OF THE SATELLITE AND BOTH EXTENDED DOWNWARD AT AN ANGLE OF 45
DEG TO THE SPACECRAFT SPIN AXIS, WHICH WAS OBTAINED IN A NORTHWARD
DIRECTION IN THE ORBITAL PLANE. THE SENSORS WERE OPERATED SEQUENTIALLY.

------------- ALOUETTE 2, HARTZ -------------

INVESTIGATION NAME- COSMIC RADIO NOISE
NSSDC ID- 65-088A-03 INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S)
ASTRONOMY
PERSONNEL
PI - T.R. HARTZ NASA-GSC
BRIEF DESCRIPTION
THIS EXPERIMENT USED THE IONOSOUND RECEIVER AUTOMATIC
GAIN CONTROL (AGC) VOLTAGE TO MEASURE BACKGROUND RADIO NOISE
FROM THE IONOSPHERE, GALAXY, AND SUN. THE ANTENNAS WERE DIPOLES
23 AND 75 M LONG. THE RECEIVER SWIFT THE RANGE 0.1 TO 150
EVERY 32 S. THE RECEIVER SENSITIVITY WERE GALACTIC
RADAR WEAK ON OBSERVATIONS AT FREQUENCIES GREATER THAN 0.6
Mhz. THE EXPERIMENT FUNCTIONED SATISFACTORILY, PROVIDING GOOD
FREQUENCY RESOLUTION WITH RELATIVELY POOR FLUX RESOLUTION.

------------- ALOUETTE 2, J. MCLEAN -------------

INVESTIGATION NAME- ELECTRIC PARTICLE DETECTORS
NSSDC ID- 65-088A-04 INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
PERSONNEL
PI - J.A. MCLEAN NATL. RES COUNCIL OF CAN
BRIEF DESCRIPTION
THE ALOUETTE 2 COSMIC PARTICLE DETECTION EXPERIMENT WAS
COMPOSED OF SEVEN DETECTORS. FOUR OF THESE WERE SEIGER-MULLER
TUBES. THE FIRST RESPONDED TO ELECTRONS GREATER THAN 3.9
MEV AND PROTONS GREATER THAN 40 MEV. THE SECOND HAD A MAGNETIC
BOOM AND RESPONDED TO ELECTRONS GREATER THAN 500 KV AND
PROTONS GREATER THAN 500 KV. THE THIRD RESPONDED TO ELECTRONS
GREATER THAN 40 KV AND PROTONS GREATER THAN 500 KV. THESE
THREE OR TUBES WERE PERPENDICULAR TO THE SPIN AXIS. THE FOURTH
OR TUBE WAS TO DEG FROM THE SPIN AXIS AND RESPONSED TO
ELECTRONS GREATER THAN 40 KV AND PROTONS GREATER THAN 500 KV.
THE FIFTH WAS A 4 S FUNCTION THAT DETECTED PROTONS AND ALPHA
PARTICLES WITH MINIMUM ENERGIES OF 1 AND 5 MEV.
RESPECTIVELY. THE SIXTH DETECTOR WAS A GEIGER TELESCOPE
DETECTED PROTONS GREATER THAN 100 MEV. THE SEVENTH DETECTOR WAS
A PLASTIC SCINTILLATOR THAT DETERMINED THE SPECTRA IN THE
ENERGY RANGE FROM 10 TO 120 KV. NO PARTICLES ASSOCIATED
WITH AURORAL AND SOLAR EVENTS WERE STUDIED. NO ALPHA PARTICLE DATA
WERE OBTAINED FROM THIS EXPERIMENT.
SOURCES REQUIRED AN INSTRUMENT POINTING ACCURACY OF 0.1 DEG.

--------- ANS. VANNINI ---------

INVESTIGATION NAME: UV TELESCOPE
NSDC 10 - 74-070A-03 INVESTIGATIVE PROGRAM
CODE SA/CFD-0P
INVESTIGATION DISCIPLINE(S): ASTRONOMY

PERSONNEL
PI - H. VANNINI
U OF GROENINGEN
Co - J. DODRUP
U OF GROENINGEN

BRIEF DESCRIPTION
This investigation required a pointing accuracy of 1 arc-min. The telescope was a 2-meter wide-aperture. The supplied spectra covered five wavelength bands between 2500 and 3700 A. The fluxes and integrated counts in the 1.5- to 7-keV bands were used to observe stars up to the 10th magnitude.

--------- APOLLO 11 LM/ALSEP ALLEY ---------

INVESTIGATION NAME: LASER RANGING RETROREFLECTOR
NSDC 10 - 69-059C-04 INVESTIGATIVE PROGRAM
CODE SA/CFD-0P
INVESTIGATION DISCIPLINE(S): CELESTIAL MECHANICS, GEODESY AND CARTOGRAPHY

PERSONNEL
PI - C.O. ALLEY
U OF MARYLAND

BRIEF DESCRIPTION
The laser ranging retroreflector (LRR) was a retroreflector array with a folding support structure for aiming and aligning the array towards Earth. The array was built of cubes of fused silica. Laser ranging beams from Earth were reflected back to their point of origin for precise measurement of Earth-Moon distances. Motion of the Moon's center of mass, Lunar mass, and Earth geophysical information were measured.

--------- APOLLO 12 LM/ALSEP ALLEY ---------

INVESTIGATION NAME: APOLLO 12 LM/ALSEP
ALTENATE NAMES: 0-424L, ALSEP 12
LOM 12, APOLLO 12C
NSDC 10 - 69-089C
LAUNCH DATE: 11/14/69
WEIGHT: 4700 KG
LAUNCH SITE: CANAVERAL, UNITED STATES
LAUNCH VEHICLE: SATURN

SPONSORING COUNTRIES/AGENCIES
UNITED STATES - NASA-OMS
UNITED STATES - NASA-OMF
UNITED STATES - NASA-

INITIAL ORBIT PARAMETERS
ORBIT TYPE: LUNAR LANDER

PERSONNEL
MG - F.J. ROBERSON
NASA HEADQUARTERS
SC - J.D. HANLEY
NASA HEADQUARTERS
PM - W.F. GHEHMAN
NASA-JSC
PS - NONE ASSIGNED

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 6.0 M wide cross-sectionally 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 early Apollo scientific spacecraft package (SSP), experiments which were self-contained. Also carried on the LM were the Lunar Surface Solar Wind Collection, the Soil Mechanics, and the Sample Collection Experiments. The ALSEP experiments included the passive seismograph, the hot detector, and the Laser Ranging Retroreflector. The LM was on the lunar surface July 20-21, 1969.

--------- APOLLO 11 LM/ALSEP ALLEY ---------

INVESTIGATION NAME: LASER RANGING RETROREFLECTOR
NSDC 10 - 69-059C-04 INVESTIGATIVE PROGRAM
CODE SA/CFD-0P
INVESTIGATION DISCIPLINE(S): CELESTIAL MECHANICS, GEODESY AND CARTOGRAPHY

PERSONNEL
PI - C.O. ALLEY
U OF MARYLAND

BRIEF DESCRIPTION
The laser ranging retroreflector (LRR) was a retroreflector array with a folding support structure for aiming and aligning the array towards Earth. The array was built of cubes of fused silica. Laser ranging beams from Earth were reflected back to their point of origin for precise measurement of Earth-Moon distances. Motion of the Moon's center of mass, Lunar mass, and Earth geophysical information were measured.
ASSIGNED UP TO 1000 A. ANOTHER ANALYZER (TOTAL ION STUDY OF THE 100NH ENERGIES OF THE DION BY OUTLINES OF DESCRIPTION PERSONNEL A VELOCITY FILTER OF CROSSED ATMOSPHERE. A LOW-ENERGY CURVED-PLATE MASS ANALYZER, WHICH CONTAINED A CLAY ACTIVITY OF THE DION AND OBTAINED INFORMATION ON THE DION PACKAGE LEFT ON THE LUNAR SURFACE. IT CONSISTED OF SEVEN SPACECRAFT COVERS APOLLO 14 LUNAR MODULES, AND FIVE ORBIT IMPACTS. IT WAS NUCLEAR POWERED SHIELD.


**APOLLO 14 L/M/ALSEP, Latham**

**INVESTIGATION NAME:** Passive Seismic (PSE)

**NSSC ID:** 71-036-04

**INVESTIGATIVE PROGRAM CODE:** SL

**INVESTIGATION DISCIPLINE(S):** PLANETOLOGY

**PERSONNEL:**
- PI: G.V. Latham
  - U of Texas, Galveston
- PI: W.M. Swango (deceased)
  - MAST Inst of Tech
- PI: G.H. Sutton
  - U of Hawaii

**BRIEF DESCRIPTION**

The Surface Tilt Produced by Tidal Deformations, Freakquakes, and Passive Seismic Events was designed to operate continuously the ALSEP. It was located and deployed 911 ft from the LM. The experiment was intermittent for the rest of the mission. The ALSEP was placed on the lunar surface as part of the ALSEP package. A corner reflector for laser ranging made a fixed base for the entire mission. The ALSEP was used to measure the temperature of the lunar surface, the main part of the instrumentation was two electrostatic analyzers. One of these pointed towards a local vertical. The other was a point to 60° from vertical towards lunar west. As a first approximation, both detectors could be considered to point in the ecliptic plane. Each analyzer was used as a set of direction-defining slits, deflection plates, five small-aperture, C-shaped channel electron multipliers, and pressure-contacted active area of the window. For a given applied deflection voltage, the five multipliers were arranged to count particles with differing energies. While the large-aperture multiplier made a wide-band measurement of particles of all polarities. During each 19.2-sec interval, the automatic analysis of the experiment, deflection voltages of zero (twice) and plus and minus 550, 350, and 350 eV were applied to the deflection plates of the other analyzers for 2.4 eV 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, 1.2-2 accumulated counts of ions in 12 energy windows between 0.17 and 20 keV. The experiment worked normally from February through April 1971, when the analyzer pointing away from the lunar vertical failed. The other analyzer was pointed to the function normally until June 6, 1971, when a partial failure occurred. Operations of the other analyzer were intermittent for the rest of 1971. During most of 1972, operation was continuous during months. By July 1972, the experiment was functioning. By which time the high-voltage problems occurred again. For further details, see Burke and Reasoner, Planet. Space Sci., 20, 429, 1972.

***Apollo 15 LM/ALSEP, Bates***

**INVESTIGATION NAME:** Charged Particle Lunar Environment

**NSSC ID:** 71-063C-08

**INVESTIGATIVE PROGRAM CODE:** SL

**INVESTIGATION DISCIPLINE(S):** PARTICLES AND FIELDS

**PERSONNEL:**
- PI: J.A. Bates
  - NASA-JSC
- CoI: L.D. Roosen
  - NASA-MSC

**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 towards a local vertical, and the other to a point 60° from vertical towards lunar west. As a first approximation, both detectors could be considered to point in the ecliptic plane. Each analyzer was used as a set of direction-defining slits, deflection plates, five small-aperture, C-shaped channel electron multipliers, and pressure-contacted active area of the window. For a given applied deflection voltage, the five multipliers were arranged to count particles with differing energies. While the large-aperture multiplier made a wide-band measurement of particles of all polarities. During each 19.2-sec interval, the automatic analysis of the experiment, deflection voltages of zero (twice) and plus and minus 550, 350, and 350 eV were applied to the deflection plates of the other analyzers for 2.4 eV 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, 1.2-2 accumulated counts of ions in 12 energy windows between 0.17 and 20 keV. The experiment worked normally from February through April 1971, when the analyzer pointing away from the lunar vertical failed. The other analyzer was pointed to the function normally until June 6, 1971, when a partial failure occurred. Operations of the other analyzer were intermittent for the rest of 1971. During most of 1972, operation was continuous during months. By July 1972, the experiment was functioning. By which time the high-voltage problems occurred again. For further details, see Burke and Reasoner, Planet. Space Sci., 20, 429, 1972.

**APOLLO 15 L/M/ALSEP, Freeman***

**INVESTIGATION NAME:** Suprathermal Ion Detector

**NSSC ID:** 71-063C-08

**INVESTIGATIVE PROGRAM CODE:** SL

**INVESTIGATION DISCIPLINE(S):** PARTICLES AND FIELDS

**PERSONNEL:**
- PI: J.W. Freeman
  - Rice U
- CoI: F.C. Michel
  - Rice U
- CoI: H.K. Mills
  - Rice U

**BRIEF DESCRIPTION**

The laser ranging retroreflector experiment (LRR) was a corner reflection for laser ranging from Earth. The ranging data obtained included information on lunar motion, lunar librations, and Earth rotation. The LRR experiment consisted of a folded panel structure incorporating 350 individual fused-silica optical corner reflectors. A simple all-aluminum housing device and an aim-hand mechanism. The lunar riving vehicle (LRR) was used to carry the LRR to the lunar site. The LRR became passive after deployment. A camera (200-M lens) was used to photograph the experiment. The LRR could be used experimentally by use of enhanced data that were previously available. The LRR is providing greater quantities of more accurate data.

**APOLLO 15 L/M/ALSEP, Fall**

**INVESTIGATION NAME:** Surface Thermal Ion Detector

**NSSC ID:** 71-063C-08

**INVESTIGATIVE PROGRAM CODE:** SL

**INVESTIGATION DISCIPLINE(S):** PARTICLES AND FIELDS

**PERSONNEL:**
- PI: J. Fall
  - U of Colorado

**BRIEF DESCRIPTION**

The laser ranging retroreflector experiment (LRR) was a corner reflection for laser ranging from Earth. The ranging data obtained included information on lunar motion, lunar librations, and Earth rotation. The LRR experiment consisted of a folded panel structure incorporating 350 individual fused-silica optical corner reflectors. A simple all-aluminum housing device and an aim-hand mechanism. The lunar riving vehicle (LRR) was used to carry the LRR to the lunar site. The LRR became passive after deployment. A camera (200-M lens) was used to photograph the experiment. The LRR could be used experimentally by use of enhanced data that were previously available. The LRR is providing greater quantities of more accurate data.

**APOLLO 15 LMALSEP**

**INVESTIGATION NAME** - LUNAR SURFACE MAGNETORESISTANCE

**NSSEC 19** - 71-032C-02

**INVESTIGATION DISCIPLINE(S)**

PARTICLES AND FIELDS

**PERSONNEL**

PI - P. D. BURIS
PI - C. W. WILLKIN
PI - C. P. SUNSHINE

U OF ARIZONA

**INVESTIGATION NAME** - PASSIVE SEISMIC

**NSSEC 19** - 71-032C-07

**INVESTIGATION DISCIPLINE(S)**

PLANETOLOGY

**PERSONNEL**

PI - C. W. LATHAM
PI - G. W. WILLKIN
PI - G. W. SUTTON

U OF TEXAS, AUSTIN

**INVESTIGATION NAME** - APOLLO 15 LMALSEP

**NSSEC 19** - 71-032C-01

**INVESTIGATION DISCIPLINE(S)**

PARTICLES AND RAYS
BRIEF DESCRIPTION

This experiment consisted of a triaxial fluxgate magnetometer and was part of a three-station network (Apollo 12, 15, 16) intended to yield information on the internal electromagnetic characteristics of the moon. Receiver sensors were located 73 cm above the lunar surface at the ends of three legs, each leg being mounted on the ALSEP. The orientation was initially determined by the astronauts using a "bubble" level and a "shadograph", with an accuracy of ±0.2 degrees by gravity-level sensors. Each sensor could be operated in the range from minus 1.0 to plus 3.0 mGauss, with 0.1-mGauss resolution. Frequency response was from 0 to 1 Hz.

INVESTIGATION NAME: ACTIVE SEISMIC

INVESTIGATIVE PROGRAM: CODE SL

INVESTIGATION DISCIPLINE(S): PLANETOLOGY

PERSONNEL

PI: L.C. KOYACH
SI: C.W. HATIN
U: OF TEXAS, GALVESTON

BRIEF DESCRIPTION

The purpose of the (5-03) Active Seismic Experiment was to ascertain data to determine the phyisical response of the lunar surface and subsurface materials. Both natural and artificially produced seismic waves were produced by shotgun-like charges fired by astronauts in the module. A "thumper" device and explosive charges were used to simulate each other. The equipment consisted of a thumper/geophone assembly, a mortar package, an interconnecting cable, and electronics assemblies, each housed in the central station. The station generated and monitored seismic waves. The equipment was connected to the central station via a frequency of 5.0 to 75.0 Hz with a frequency response of plus or minus 3 dB in the frequency range of 5 to 100 Hz. The station was monitored with a geophone located in the central station via a frequency of 5.0 to 75.0 Hz. The central station was operated in the ASE module, the data-transmitted to the central station, and was fired at intervals of 5.0 Hz. The thumper contained a thumper plate, which was selected and fired by an astronaut. The thumper was cable-connected to the central station. The mortar package was fired at intervals of 5.0 Hz. 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 3.4, 9.3, and 19.5 m from the central station. The mortar box contained approximately 120, 500, and 1000 m of the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. They were impacted at distances of 3.4, 9.3, and 19.5 m from the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. They were impacted at distances of 3.4, 9.3, and 19.5 m from the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. They were impacted at distances of 3.4, 9.3, and 19.5 m from the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. They were impacted at distances of 3.4, 9.3, and 19.5 m from the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. They were impacted at distances of 3.4, 9.3, and 19.5 m from the deployed mortar box assembly, which were impacted at distances of 3.4, 9.3, and 19.5 m from the central station. The mortar box was impacted at intervals of 5.0 Hz. 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PERSONNEL

PI - B. W. KOWCH
01 - J. S. WATKINS
STANFORD U
U OF TEXAS, GALVESTON

BRIEF DESCRIPTION


APOLLO 17 LM/ALSEP DESCRIPTION

INVESTIGATION NAME - HEAT FLOW

NSSDC ID- 79-034 - 01
INVESTIGATION DISCIPLINE(S)

PLANETOLOGY

PERSONNEL

PI - J. S. LANGLEY
STANFORD U
U OF CALIFORNIA, BERKELEY

BRIEF DESCRIPTION

THE PURPOSE OF THE HEAT FLOW EXPERIMENT (S-037) WAS TO DETERMINE THE RATE OF HEAT FLOW FROM THE LUNAR INTERIOR. THIS WAS ACCOMPLISHED BY MEASURING THE TEMPERATURE (A) OF THE LUNAR SUBSURFACE AT A CENTER LOCATION; (B) OF THE LUNAR SUBSURFACE MATERIAL; AND (C) MEASUREMENT OF THE HEAT FLOW THROUGH THE UPPER 2.4 M OF THE SURFACE MATERIAL. THE LUNAR SURFACE CELL, THERMAL CONDUCTIVITY, CONTRIBUTED TO THE RESOLUTION OF ISSUES CONCERNING LUNAR INTERNAL HEATING. THE EXPERIMENT WAS CONDUCTED BY MEASURING THE TEMPERATURE OF TWO PROBES (SIX) IN EACH HOLE, AND DETERMINING THE DEPTH OF THE PROBE. THE DEPTHS WERE REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT COLLAPSE. ONE PROBE WAS INSERTED INTO EACH HOLE, AND THE DEPTHS OF THE PROBE WERE RECORDED.

APOLLO 17 LM/ALSEP, WEBER

INVESTIGATION NAME - LUNAR SURFACE GRAVITATION

NSSDC ID- 79-029 - 09
INVESTIGATION DISCIPLINE(S)

PLANETOLOGY

PERSONNEL

PI - J. V. WEBER
01 - J. W. LARSON
U OF MARYLAND
U OF MARYLAND

BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR SURFACE GRAVITATION EXPERIMENT (S-209) WAS TO MEASURE THE GRAVITATIONAL ACCELERATION AND ITS VERTICAL VARIATIONS AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES INCLUDED MEASURING THE VALUE OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000), THE SIZE OF THE LUNAR SURFACE GRAVITATIONAL DEVIATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR GRAVITY, AND MONITORING OF FREE OSCILLATIONS OF THE LUNAR SURFACE DUE TO METEORIC IMPACTS. THE EQUIPMENT CONSISTED OF A HIGH-SENSITIVITY GRADUALITY SENSORS (MAGNETIC SUSPENSION CAPACITOR PLATE), A SUNSHIELD, AND A SUNSHIELD INTERMEDIATE SPACE CABLE TO ELECTRONICS. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION.


NSSDC ID- 75-034 - 03
INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS

PERSONNEL

PI - J. P. DAY
01 - F. C. LAYARKER
02 - L. V. DINGLE
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DATA INST OF FUND RES

BRIEF DESCRIPTION

THE PURPOSE OF THE SOLAR NEUTRON EXPEDITION (S-300) WAS TO MEASURE THE TOTAL AND ABSOLUTE VALUES OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000). THE EXPERIMENT WAS CONDUCTED AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES INCLUDED MEASURING THE VALUE OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000), THE SIZE OF THE LUNAR SURFACE GRAVITATIONAL DEVIATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR GRAVITY, AND MONITORING OF FREE OSCILLATIONS OF THE LUNAR SURFACE DUE TO METEORIC IMPACTS. THE EQUIPMENT CONSISTED OF A HIGH-SENSITIVITY GRADUALITY SENSORS (MAGNETIC SUSPENSION CAPACITOR PLATE), A SUNSHIELD, AND A SUNSHIELD INTERMEDIATE SPACE CABLE TO ELECTRONICS. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION.

INVESTIGATION NAME - SOLAR NEUTRON AND GAMMA RAYS

NSSDC ID- 79-034 - 02
INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS

PERSONNEL

PI - J. P. DAY
01 - F. C. LAYARKER
02 - L. V. DINGLE
DATA INST OF FUND RES
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BRIEF DESCRIPTION

THE PURPOSE OF THE SOLAR NEUTRON EXPEDITION (S-300) WAS TO MEASURE THE TOTAL AND ABSOLUTE VALUES OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000). THE EXPERIMENT WAS CONDUCTED AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES INCLUDED MEASURING THE VALUE OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000), THE SIZE OF THE LUNAR SURFACE GRAVITATIONAL DEVIATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR GRAVITY, AND MONITORING OF FREE OSCILLATIONS OF THE LUNAR SURFACE DUE TO METEORIC IMPACTS. THE EQUIPMENT CONSISTED OF A HIGH-SENSITIVITY GRADUALITY SENSORS (MAGNETIC SUSPENSION CAPACITOR PLATE), A SUNSHIELD, AND A SUNSHIELD INTERMEDIATE SPACE CABLE TO ELECTRONICS. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION.

SPACECRAFT COMMON NAME - ARYABHATA

ALTERNATE NAMES - ARYABHATA INDIAN SCIENTIFIC SAT.

NSSDC ID- 75-034 - 03
INVESTIGATION DISCIPLINE(S)

IONOSPHERIC PHYSICS

PERSONNEL

PI - J. P. DAY
01 - F. C. LAYARKER
02 - L. V. DINGLE
DATA INST OF FUND RES
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BRIEF DESCRIPTION

THE PURPOSE OF THE SOLAR NEUTRON EXPEDITION (S-300) WAS TO MEASURE THE TOTAL AND ABSOLUTE VALUES OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000). THE EXPERIMENT WAS CONDUCTED AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES INCLUDED MEASURING THE VALUE OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000), THE SIZE OF THE LUNAR SURFACE GRAVITATIONAL DEVIATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR GRAVITY, AND MONITORING OF FREE OSCILLATIONS OF THE LUNAR SURFACE DUE TO METEORIC IMPACTS. THE EQUIPMENT CONSISTED OF A HIGH-SENSITIVITY GRADUALITY SENSORS (MAGNETIC SUSPENSION CAPACITOR PLATE), A SUNSHIELD, AND A SUNSHIELD INTERMEDIATE SPACE CABLE TO ELECTRONICS. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION.

INVESTIGATION NAME - ARYABHATA INDIAN SCIENTIFIC SAT.

NSSDC ID- 75-034 - 03
INVESTIGATION DISCIPLINE(S)

IONOSPHERIC PHYSICS

PERSONNEL

PI - J. P. DAY
01 - F. C. LAYARKER
02 - L. V. DINGLE
DATA INST OF FUND RES
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BRIEF DESCRIPTION

THE PURPOSE OF THE SOLAR NEUTRON EXPEDITION (S-300) WAS TO MEASURE THE TOTAL AND ABSOLUTE VALUES OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000). THE EXPERIMENT WAS CONDUCTED AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES INCLUDED MEASURING THE VALUE OF THE LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 5 PART IN 1,000), THE SIZE OF THE LUNAR SURFACE GRAVITATIONAL DEVIATION DUE TO TIDAL FORCES. MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR GRAVITY, AND MONITORING OF FREE OSCILLATIONS OF THE LUNAR SURFACE DUE TO METEORIC IMPACTS. THE EQUIPMENT CONSISTED OF A HIGH-SENSITIVITY GRADUALITY SENSORS (MAGNETIC SUSPENSION CAPACITOR PLATE), A SUNSHIELD, AND A SUNSHIELD INTERMEDIATE SPACE CABLE TO ELECTRONICS. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION. THE EXPERIMENT WAS CONDUCTED AT A DISTANCE OF 8 M FROM THE ALSEP CENTRAL STATION.
PERSONNEL
PI: PRakash Subara
01 - K. Kasatuegan
01 - R. Palani

BRIEF DESCRIPTION
The objective of this experiment was to use an EMI "Iron Trap" to measure electron energies up to 100 keV, and 15-20 UV cameras to monitor the scattered Lyman-Alpha Halpha/ON and oxygen emissions in the night sky.

SOURCE: NSSDC 10-75-066A

INVESTIGATION NAME: X-RAY ASTRONOMY
INVESTIGATION PROGRAM: SCIENCE
INVESTIGATION DISCIPLINE(S): X-RAY ASTRONOMY

INVESTIGATION NAME: 2.6-AMAX-01
INVESTIGATION PROGRAM: SCIENCE
INVESTIGATION DISCIPLINE(S): X-RAY ASTRONOMY

PERSONNEL
1 - R. Palani
1 - K. Kasatuegan

INVESTIGATION NAME: X-RAY ASTRONOMY
INVESTIGATION PROGRAM: SCIENCE
INVESTIGATION DISCIPLINE(S): X-RAY ASTRONOMY

INVESTIGATION NAME: ELECTROPHORESIS TECHNOLOGY
INVESTIGATION PROGRAM: CODE 8
INVESTIGATION DISCIPLINE(S): SPACE BIOLOGY

PERSONNEL
PI: R. B. Allen

BRIEF DESCRIPTION
The objective of this experiment was to determine the influence of weightlessness on the immiscibility of monolithic alloy systems.

SOURCE: NSSDC 10-75-066A-06

INVESTIGATION NAME: INFLUENCE OF WEIGHTLESSNESS ON THE IMMISCIBILITY OF MONOLITHIC ALLOY SYSTEMS
INVESTIGATION PROGRAM: CODE 8
INVESTIGATION DISCIPLINE(S): SPACE BIOLOGY

PERSONNEL
PI: C. T. Ang
01 - L. L. Lacy

BRIEF DESCRIPTION
The objective of this experiment was to investigate the effect of space flight conditions on the rhythms of vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R. and was used in the primary test specimen for this experiment. The cultural characteristics of this organism were studied in situ before, during, and after flight conditions on the rhythms on vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R.

SOURCE: NSSDC 10-75-066A-24

INVESTIGATION NAME: INFLUENCE OF WEIGHTLESSNESS ON THE IMMISCIBILITY OF MONOLITHIC ALLOY SYSTEMS
INVESTIGATION PROGRAM: CODE 8
INVESTIGATION DISCIPLINE(S): SPACE BIOLOGY

PERSONNEL
PI: R. B. Allen

BRIEF DESCRIPTION
The objective of this experiment was to investigate the effect of space flight conditions on the rhythms of vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R. and was used in the primary test specimen for this experiment. The cultural characteristics of this organism were studied in situ before, during, and after flight conditions on the rhythms on vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R.

SOURCE: NSSDC 10-75-066A-06

INVESTIGATION NAME: INFLUENCE OF WEIGHTLESSNESS ON THE IMMISCIBILITY OF MONOLITHIC ALLOY SYSTEMS
INVESTIGATION PROGRAM: CODE 8
INVESTIGATION DISCIPLINE(S): SPACE BIOLOGY

PERSONNEL
PI: C. T. Ang
01 - L. L. Lacy

BRIEF DESCRIPTION
The objective of this experiment was to investigate the effect of space flight conditions on the rhythms of vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R. and was used in the primary test specimen for this experiment. The cultural characteristics of this organism were studied in situ before, during, and after flight conditions on the rhythms on vegetative and spore phase characteristics of streptomycetes levoriniosis. This species was isolated, made, and provided by the U.S.S.R.
INVESTIGATION NAME: ULTRAVIOLET ATMOSPHERIC ABSORPTION

NSSDC ID: 75-Q664-03

INVESTIGATIVE PROGRAM(S): ATMOSPHERIC PHYSICS

PERSONNEL

PI: T. R. DONAHUE
U OF MICHIGAN

DRAFT DESCRIPTION

This ultraviolet absorption experiment (UVA) was performed to measure the concentration of atomic oxygen and nitrogen in the atmosphere by use of ultraviolet absorption and resonance-scattering spectrometers. A beam of atomic oxygen and atomic nitrogen resonance radiation (130.4 and 145.0 A), unobservable oxygen and nitrogen radiation (135.6 and 149.3 A), and visible radiation struck the retropeller assembly on the Apollo and were focused on the entrance slit of a 0.75-m double-pass fast scanning spectrometer. The density of atomic oxygen and atomic nitrogen, between the two spacecrafts, was measured when the line joining Apollo and Soyuz was perpendicular to the velocity of the spacecrafts. By obtaining the amount of radiation absorbed by allowing the Apollo spacecraft to pass through the line joining Apollo and Soyuz, the Doppler effect was determined. Details of the experiment are described in Reference 1.

The document contains a mix of different sections and topics, including:

1. An investigation on Earth observations and photography, with personnel listed as P. F. Fitschoton, Inst.
2. A brief description of personnel involved in the Earth resources survey, with a list of names and their respective institutions.
3. A brief description of personnel involved in the Apollo-Soyuz test project, with names and positions.
4. A brief description of personnel involved in the space biology project, with names and positions.
5. A brief description of personnel involved in the Apollo-Gats test project, with information about the experiment.
6. A brief description of personnel involved in the Apollo-Gats test project, with information about the experiment.
7. A brief description of personnel involved in the Apollo-Dar test project, with information about the experiment.

The text appears to be a collection of reports and descriptions related to various NASA Apollo programs and experiments, including Earth observations, personnel, and specific test project details.
INVESTIGATION NAME - CRYSTAL GROWTH
NSSDC 10-75-066A-18 INVESTIGATIVE PROGRAM CODE ES
INVESTIGATION DISCIPLINE(S) TECHNOLOGY SPACE PROCESSING
PERSONNEL PI - R.R. MARTIN ROCKWELL INTL CORP

BRIEF DESCRIPTION

The crystal growth experiment involves a novel process for growing single crystals of insoluble substances by allowing two or more reactant solutions to diffuse towards each other through a region of pure solvent in zero gravity. The approach used took advantage of a diffusion-driven mechanism. The experiment was conducted using a crystallization apparatus designed to create a gradient in the concentration of reactants. The reactant solutions were placed in the outer compartments of the reactor, and the central compartment was filled with water, beginning at time of activation and at intervals for 10 to 16 hours of flight. An astronaut took photographs of the crystal growth process. The reaction times varied. The reactor cover was flat and transparent to permit photography. The crystals were then examined and photographed upon retrieval.

INVESTIGATION NAME - POLYPOPMORPHONUCLEAR LEUKOCYTE RESPONSE TO INFECTION
NSSDC 10-75-066A-15 INVESTIGATIVE PROGRAM CODE SB
INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY
PERSONNEL PI - R.R. MARTIN BAYLOR U

BRIEF DESCRIPTION

The object of this ASTP POLYPOPMORPHONUCLEAR LEUKOCYTE (PMN) RESPONSE TO INFECTION experiment was to study the possible effects of spaceflight on the leukocyte functions of astronauts. The investigation was designed to observe the leukocyte function changes in the PMN population under the effects of the flight. A series of studies was performed at intervals from 24 hours before to 16 hours after recovery. Blood samples were obtained from the astronauts and additional samples were obtained on the day following recovery. Tests were performed on board the recovery ship D.S.S. New Orleans and on the day following recovery. Data were obtained during the course of the experiment. The reactor was used to study the effects of spaceflight on the leukocyte function changes. Further details can be found in the EFFECTS OF SPACEFLIGHT ON POLYPOPMORPHONUCLEAR LEUKOCYTE RESPONSE TO INFECTION EXPERIMENT PROJECT PRELIMINARY SCIENCE REPORT.

INVESTIGATION NAME - KILLIFISH HATCHING-ORIENTATION
NSSDC 10-75-066A-23 INVESTIGATIVE PROGRAM CODE SB
INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY
PERSONNEL PI - H.W. SCHLIER NASA-25C

BRIEF DESCRIPTION

The objective of this experiment was to study possible surface-tension-induced convection in en enclosed liquid metal in zero gravity. The experiment was conducted using a crystallization apparatus designed to create a gradient in the concentration of reactants. The reactant solutions were placed in the outer compartments of the reactor, and the central compartment was filled with water, beginning at time of activation and at intervals for 10 to 16 hours of flight. An astronaut took photographs of the crystal growth process. The reaction times varied. The reactor cover was flat and transparent to permit photography. The crystals were then examined and photographed upon retrieval.

INVESTIGATION NAME - STRATOSPHERIC AEROSOL MEASUREMENT
NSSDC 10-75-066A-10 INVESTIGATIVE PROGRAM CODE ES
INVESTIGATION DISCIPLINE(S) UPPER ATMOSPHERE RESEARCH
PERSONNEL PI - D.J. PEVIN UN OF WYOMING

BRIEF DESCRIPTION

The stratospheric aerosol measurement (SAM) experiment was flown to demonstrate that solar occultation measurements of stratospheric aerosol loading can be used to determine the distribution of stratospheric aerosols. The instrument used for making these measurements consists of a spectrophotometer and associated electronics that provided a signal to the command and control system. Data were recorded with the accompanying camera. The experiment was designed to measure the stratospheric aerosol distribution and to determine the vertical profile of aerosol loading. The measurements were used to evaluate the effectiveness of the recovery system and to provide data for evaluating the stratospheric aerosol distribution. The experiment was flown on July 7, 1976, and the data were analyzed for the first time in August 1976.

INVESTIGATION NAME - SURFACE-TENSION-INDUCED CONVECTION IN ENCLOSED LIQUID METALS
NSSDC 10-75-066A-16 INVESTIGATIVE PROGRAM CODE ES
INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY
PERSONNEL PI - J.C. BURLE OAK RIDGE NATION LAB

BRIEF DESCRIPTION

The object of this experiment was to study possible surface-tension-induced convection caused by a stepwise compositional variation in a liquid metal diffusion couple. The experiment was designed to study the effects of surface tension on convection in a liquid metal diffusion couple. The liquid metal diffusion couple was composed of two different diffusion temperatures. The experiment was flown on July 7, 1976, and the data were analyzed for the first time in August 1976.

INVESTIGATION NAME - KILLIFISH HATCHING-ORIENTATION
NSSDC 10-75-066A-23 INVESTIGATIVE PROGRAM CODE SB
INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY
PERSONNEL PI - H.W. SCHLIER NASA-25C

BRIEF DESCRIPTION

The object of this experiment was to study possible surface-tension-induced convection caused by a stepwise compositional variation in a liquid metal diffusion couple. The experiment was designed to study the effects of surface tension on convection in a liquid metal diffusion couple. The liquid metal diffusion couple was composed of two different diffusion temperatures. The experiment was flown on July 7, 1976, and the data were analyzed for the first time in August 1976.
INVESTIGATION NAME: CRYSTAL ACTIVATION
NSSLG ID: 75-0064-22
INVESTIGATIVE PROGRAM
CODE ES
INVESTIGATION DISCIPLINE(S)
TECHNOLOGY
PERSONNEL
PI - J.I. Trombka
NASA-GSFC

BRIEF DESCRIPTION
The objective of the crystal activation experiment was to
define the background caused by gamma activation. The results
were obtained by measuring the ground and space gamma
activation measurements and theoretical calculations. The
experiment consisted of two sample packages that were flown in the command
module, and were returned to NASA. The kinetics of the decay
processes were observed during the flight. The results obtained should
be used to determine the background level for future flight experiments.

INVESTIGATION NAME: GEOGRAPHS
NSSLG ID: 75-0064-17
INVESTIGATIVE PROGRAM
CODE ES
INVESTIGATION DISCIPLINE(S)
GEODESY
PERSONNEL
PI - F. Vonbun
NASA-GSFC

BRIEF DESCRIPTION
The objective of the crystal activation experiment was to
define the background caused by gamma activation. The results
were obtained by measuring the ground and space gamma
activation measurements and theoretical calculations. The
experiment consisted of two sample packages that were flown in the command
module, and were returned to NASA. The kinetics of the decay
processes were observed during the flight. The results obtained should
be used to determine the background level for future flight experiments.

INVESTIGATION NAME: SPACECRAFT-TO-SPACECRAFT DOPPLER TRACKING
NSSLG ID: 75-0064-32
INVESTIGATIVE PROGRAM
CODE ES
INVESTIGATION DISCIPLINE(S)
GEODESY
PERSONNEL
PI - G.C. Weiffenbach
U.S. NAVAL OBSERVATORY
The objective of this experiment was to determine the degree of improvement of gravity-induced confinement, convective entrainment during solidification and segregation in the melt due to gravity-corrected test casts and structural imperfections in materials when processed on Earth. The whole onboard multi-purpose system was used. Three different material systems were used. In the high-temperature region, a sample of aluminium with thistle spheres was melted and solidified. A germanium rod containing $2\%$ of silicon was partially melted and solidified in the gradient region. A region was created in the gradient zone to process an amount of powdered aluminium.

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INVESTIGATION NAME: ARTIFICIAL SOLAR ECLIPSE

INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINES

SOLAR PHYSICS

PERSONNEL

- E.G. B图片来源: commons.wikimedia.org/wikipedia/commons/5/53/SPACEx5.jpg

BRIEF DESCRIPTION

The objective of this artificial solar eclipse experiment was to detect the total solar eclipse by photographing it from the Soyuz spacecraft against the black space background, while the disc of the sun was obscured by the Apollo spacecraft. The Soyuz crew was responsible for photographing the corona, and the Apollo crew was responsible for determining the results of the biological and physical experiment. The experiment was designed to monitor quantitatively the solar load of all crew members and of the lower boundary surfaces of both the Apollo and Soyuz spacecraft. The normal autolysis and immunity of each crew member was determined before flight through repeated sampling and analysis. Selected microorganisms recovered from the crew and spacecraft were examined to determine changes in the artificial multi-purpose system to prevent pathogenic, infective. Total time: Certain immunological parameters of the blood and saliva of each crew member were studied to detect changes in the ability of the blood to resist infection. Deluxe collection from the 5 prime and 5 backup crew members and from 3 areas on the inner surfaces of each spacecraft at specific times before, during, and after the flight. For integration samples, a specially developed sample collection device was used that consisted of a cotton tip that was placed on the inner surfaces of each spacecraft at specific times before, during, and after the flight. For integration samples, a specially developed sample collection device was used that consisted of a cotton tip that was placed on the inner surfaces of each spacecraft at specific times before, during, and after the flight.
INVESTIGATIVE PROGRAM NAME- RADIO BEACON
INVESTIGATION DISCIPLINE(S)- IDEOSYPHES AND RADIO PHYSICS
PERSONNEL
PI - A.V. DAROSA
SC - D.E. GARNIOTT
NASA-JSC

INVESTIGATION NAME- OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR
INVESTIGATION DISCIPLINE(S)- PARTICLES AND FIELDS
PERSONNEL
PI - J.E. MCLAIN
U OF CALIF, SAN DIEGO

INVESTIGATIVE PROGRAM NAME- TRI-DIRECTIONAL MEDIUM-ENERGY PARTICLE DETECTOR
INVESTIGATION DISCIPLINE(S)- PARTICLES AND FIELDS
PERSONNEL
PI - J.E. MCLAIN
U OF CALIF, SAN DIEGO
IN HARMONIC FREQUENCY BANDS AND PROPAGATION CHARACTERISTICS OF MILLIMETER WAVES, (2) PERFORMING SPACECRAFT-TO-SPACECRAFT COMMUNICATION AND TRACKING EXPERIMENTS, AND (3) MAKING PARTICLE AND FIELD OBSERVATIONS AND RADIATION ENVIRONMENTS OF THE SPACECRAFT CONFIGURED SOMEWHERE LIKE AN OPEN PARASOL, THE ATS 6 SPACECRAFT CONSISTED OF FOUR MAJOR ASSEMBLIES - (1) A 15.5-METER DIAMETER PAYLOAD ANTENNA, (2) TWO SOLAR CELLS MOUNTED AT RIGHT ANGLES TO EACH OTHER ON ONE SIDE OF AN OPEN PARASOL SHAPED PAYLOAD MODULE, AN EARTH-VIEWING EQUIPMENT MODULE (EVEM) LOCATED BY A SOLAR MODULE, AND (3) AN ATTITUDE CONTROL AND STABILIZATION SYSTEM. THE EVEM, IN ADDITION TO HOSTING THE MAGNETIC FIELD EXPERIMENT, PROVIDES SUPPORT FOR THE PROPULSION SYSTEM AND TANKS, BATTERIES, A MULTIFREQUENCY TRANSMITTER AND RECEIVER, AND THE ATTITUDE, COMMAND, AND CONTROL SYSTEMS. THE UPPER ENVIRONMENT EXPERIMENT, CONFIGURED SOMETHING LIKE A GEMINI TYPE SPACECRAFT, PROVIDES SUPPORT FOR THE NECESSARY ROBUSTNESS FOR THE UNMOUNTED EVEM. THE EVEM WAS ESTABLISHED TO BE 20 TIMES THE ENVIRONMENT MEASUREMENT PERFORMANCE BY CONTAINING A MAGNETOMETER AND SEVERAL PARTICLE EXPERIMENTS.

INVESTIGATION NAME - MAGNETOMETER EXPERIMENT
NSSDC ID- 74-039A-02 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATIVE DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - P.J. COLEMAN, JR.
01 - W.J. CUMMINS GRANBURY COLLEGE

BRIEF DESCRIPTION

INVESTIGATION NAME - RADIO SEACO
NSSDC ID- 74-039A-09 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATIVE DISCIPLINE(S) IDEOMETERS AND RADIO PHYSICS
PERSONNEL
PI - R. DAVIES
01 - J.R. FRIED NOAAC-DEL

BRIEF DESCRIPTION
INVESTIGATION NAME: GEODIC RADIO INTERFERENCE
NSSEC ID: 74-039A-20
INVESTIGATIVE PROGRAM CODE EC
INVESTIGATION DISCIPLINE(S) COMMUNICATIONS
PERSONNEL
PI: W.C. KIRKPATRICK NASA-GSFC

BRIEF DESCRIPTION
The measurement of low-level radio interference in the 20 to 30 MHz frequency band was used to determine the operational feasibility of a new spacecraft-remote sensor system. The objective was to determine the feasibility of using the remote sensor system to monitor the frequency bands of interest to the geodetic community. The experiment was conducted in a controlled environment to minimize the effects of interferences from other sources. The results were used to evaluate the performance of the geodetic communication system and to assess its potential for use in geodetic applications.
PERSONNEL
PI - M. KIRKPATRICK NASA-MRC

BRIEF DESCRIPTION
THE OBJECTIVES OF THE ADVANCED THERMAL CONTROL FLIGHT EXPERIMENT WERE TO EVALUATE IN SPACE THE PERFORMANCE OF AN ACTIVE, FEEDBACK-CONTROLLED, VARIOUS-CONDUCTANCE HEAT PIPE, A THERMAL RIGID CONE-WAY HEAT PIPE, AND A PHASE-CHANGE HEAT RESERVOIR ON THERMAL ACCUMULATION. (2) TO DEMONSTRATE THE EFFECTIVENESS OF THESE RECENTLY DEVELOPED THERMAL CONTROL DEVICES IN STABILIZING THE TEMPERATURE OF SPACECRAFT COMPONENTS WHICH UNDERGO MARKED CHANGES IN POWER DISSIPATION AND THERMAL ENVIRONMENT.

THE SOLAR ASSEMBLY WAS ORIENTED SO. IN SYNCHRONOUS ORBIT, IT WILL BE EXPOSED TO ONE FULL DAILY RANGE OF ILLUMINATION.

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INVESTIGATOR NAME- SATELLITE INSTRUMENTATION TV
NSIDC 10- 74-094-09 INVESTIGATIVE PROGRAM CODE ET

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - C.E. MILIEN
01 - R.W. MILLER
02 - J.E. MILLER

BRIEF DESCRIPTION
THE OBJECTIVES OF THIS EXPERIMENT WERE TO DETERMINE THE PROCESSES THAT ACCUMULATE CHARGED PARTICLES NEAR THE EARTH, WITH PARTICULAR EMPHASES ON PROCESS ASSOCIATED WITH THE FORMATION OF AURORAS AND SUBSTORMS. FIVE ELECTROSTATIC ANALYZERS WERE CAPABLE OF MEASURING PARTICLES OF ENERGY LESS THAN 100 V TO 10 KEV IN 64 CHANNELS WITH AN ENERGY RESOLUTION OF ABOUT 1 PERCENT. THE EXPERIMENT WAS DESIGNED TO OPERATE IN PARALLEL TO THE LOCAL MAGNETIC FIELD DIRECTION. MEASURED PROFILES FROM 0 TO 3000 KV IN 12 ENERGY INTERVALS AND ALPHAS PARTICLES FROM 10 TO 1000 MEV IN 64 CHANNELS. TWO ELECTRON SPECTROMETERS, ORIENTED PARALLEL TO THE TWO TELESCOPES, MEASURED ELECTRONS FROM 50 TO 600 KV IN FOUR ENERGY INTERVALS.

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INVESTIGATOR NAME- SATELLITE INSTRUMENTATION TV
NSIDC 10- 74-094-09 INVESTIGATIVE PROGRAM CODE ET

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - C.E. MILIEN
01 - R.W. MILLER
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INVESTIGATOR NAME- SATELLITE INSTRUMENTATION TV
NSIDC 10- 74-094-09 INVESTIGATIVE PROGRAM CODE ET

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
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INVESTIGATOR NAME- SATELLITE INSTRUMENTATION TV
NSIDC 10- 74-094-09 INVESTIGATIVE PROGRAM CODE ET

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - C.E. MILIEN
01 - R.W. MILLER
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BRIEF DESCRIPTION
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INVESTIGATOR NAME- SATELLITE INSTRUMENTATION TV
NSIDC 10- 74-094-09 INVESTIGATIVE PROGRAM CODE ET

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - C.E. MILIEN
01 - R.W. MILLER
02 - J.E. MILLER

BRIEF DESCRIPTION
THE OBJECTIVES OF THIS EXPERIMENT WERE TO DETERMINE THE PROCESSES THAT ACCUMULATE CHARGED PARTICLES NEAR THE EARTH, WITH PARTICULAR EMPHASES ON PROCESS ASSOCIATED WITH THE FORMATION OF AURORAS AND SUBSTORMS. FIVE ELECTROSTATIC ANALYZERS WERE CAPABLE OF MEASURING PARTICLES OF ENERGY LESS THAN 100 V TO 10 KEV IN 64 CHANNELS WITH AN ENERGY RESOLUTION OF ABOUT 1 PERCENT. THE EXPERIMENT W
**ELECTRONS**

**BRIEF DESCRIPTION**

NSSOC 19- 71-03910-04

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**PERSONNEL**

PI - J.F. ROGERS
NASA-GSFC

**INVESTIGATION NAME** - QUARTZ CRYSTAL MICROBALANCE
**INVESTIGATIVE PROGRAM CODE** EC

**INVESTIGATION DISCIPLINE(S)** TECHNOLOGY

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**SPACECRAFT COMMON NAME** - AE-C
**ALTERNATE NAMES** - EXPLORER 27. S 66C
**CODE** 0328

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**PERSONNEL**

PI - A.A. WHALEN
NASA-GSFC

**INVESTIGATION NAME** - HEALTH AND EDUCATION TELECOMMUNICATIONS
**INVESTIGATIVE PROGRAM CODE** EC

**INVESTIGATION DISCIPLINE(S)** COMMUNICATIONS

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**SPACECRAFT COMMON NAME** - DE-C
**ALTERNATE NAMES** - Explorer 27. S 66C
**CODE** 0328

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**PERSONNEL**

PI - J.H. BERBERT
NASA-GSFC

**INVESTIGATION NAME** - LASER TRACKING REFLECTOR
**INVESTIGATIVE PROGRAM CODE** EC

**INVESTIGATION DISCIPLINE(S)** GEODESY

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**SPACECRAFT COMMON NAME** - CGS-0
**ALTERNATE NAMES** - COS-B
**CODE** 7410

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**PERSONNEL**

PI - J.M. WINCKLER
U OF MINNESOTA

**INVESTIGATION DISCIPLINE(S)** PARTICLES AND FIELDS

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**SPACECRAFT COMMON NAME** - COS-B
**ALTERNATE NAMES** - COS-B
**CODE** 7410

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**PERSONNEL**

PI - J.H. WINCKLER
U OF MINNESOTA

**INVESTIGATION DISCIPLINE(S)** PARTICLES AND FIELDS

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The document contains detailed descriptions of various scientific experiments and spacecraft components, including details on spacecraft codes, launch dates, personnel, and investigations. It also includes descriptions of investigations such as health and education telecommunication, laser tracking reflector, and particle acceleration mechanisms, along with spacecraft information like codes, common names, and alternate names.
**SPACECRAFT COMMON NAME:** 3D8

**SPONSORING COUNTRY/AGENCY:** CNES

**INVESTIGATION NAME:** SOLAR FLUX MONITOR - FLARE EVOLUTION

**PERSONNEL:** P - P. CRUVELIER

**INVESTIGATION DISCIPLINE(S):** ASTRONOMY

**NEAREST ENTRANCE:** 3D8

**EPOCH DATE:** 06/23/75

**APOLLOAPSE:** 707.1 deg

**PERSONNEL:** MG - unknown

**EC - unknown

**NW - unknown

**FC - unknown

**BRIEF DESCRIPTION:**

This spacecraft carried an EUV experiment for solar and stellar studies. The satellite was integrated into the planetary encounter and included a series of UV experiments for making stellar observations. The stabilization system was spinning at about 0.7 rpm about an axis that was directed toward the Sun. The data transmission rate was 256 Kbps. The spacecraft was terminated on December 28, 1976, thereby terminating operation of the spacecraft.

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**INVESTIGATION NAME:** GAMMA-RAY ASTRONOMY SATELLITE

**SPONSORING COUNTRY/AGENCY:** CNES

**INVESTIGATION NAME:** GAMMA-RAY ASTRONNOMY SATELLITE

**PERSONNEL:** MG - CARAVANE COLLARD

**INVESTIGATION DISCIPLINE(S):** GAMMA-RAY ASTRONOMY

**NEAREST ENTRANCE:** 3D8

**EPOCH DATE:** 08/12/75

**APOLLOAPSE:** 59.5 deg

**PERSONNEL:** MG - V. KLEER

**PM - G. ALTRANN

**EC - ESTEC

**BRIEF DESCRIPTION:**

The COS-B scientific satellite was developed by the European Space Agency (ESA) to study extraterrestrial gamma-ray radiation in the 25- to 9-GeV energy range from a 323-04 apogee. The satellite was designed to measure the number of charged particles and inhibit the triggering of the spacecraft. The spacecraft had 16 decks, each composed of a gamma-ray astronomy experiment consisting of a 4-m thick and 4-m high cylinder surrounded by tungsten plates and a 4-m thick and 4-m high cylinder. The energy of the incident gamma-ray was measured by detecting the number of charged particles and inhibiting the firing of the spacecraft.

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**INVESTIGATION NAME:** GAMMA-RAY ASTRONOMY SATELLITE

**SPONSORING COUNTRY/AGENCY:** CNES

**INVESTIGATION NAME:** GAMMA-RAY ASTRONNOMY SATELLITE

**PERSONNEL:** MG - CARAVANE COLLARD

**INVESTIGATION DISCIPLINE(S):** GAMMA-RAY ASTRONOMY

**NEAREST ENTRANCE:** 3D8

**EPOCH DATE:** 08/12/75

**APOLLOAPSE:** 59.5 deg

**PERSONNEL:** MG - V. KLEER

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**INVESTIGATION NAME:** SOLAR FLUX MONITOR - FLARE EVOLUTION

**SPONSORING COUNTRY/AGENCY:** CNES

**INVESTIGATION NAME:** SOLAR FLUX MONITOR - FLARE EVOLUTION

**PERSONNEL:** P - P. CRUVELIER

**INVESTIGATION DISCIPLINE(S):** ASTRONOMY

**NEAREST ENTRANCE:** 3D8

**EPOCH DATE:** 06/23/75

**APOLLOAPSE:** 707.1 deg

**PERSONNEL:** MG - unknown

**EC - unknown

**NW - unknown

**FC - unknown

**BRIEF DESCRIPTION:**

This experiment measured the stellar UV radiation in the 174- to 1216-A wavelength range from 1250 to 5100 Å with a resolution of 2.75 Å. The instrument measured the integrated light due to the background at 0.0 deg to the satellite-sun direction. The field of view was 0.1 deg.

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**INVESTIGATION NAME:** SOLAR ACTIVITY STUDY

**SPONSORING COUNTRY/AGENCY:** CNES

**INVESTIGATION NAME:** SOLAR ACTIVITY STUDY

**PERSONNEL:** P - P. CRUVELIER

**INVESTIGATION DISCIPLINE(S):** ASTRONOMY

**NEAREST ENTRANCE:** 3D8

**EPOCH DATE:** 08/12/75

**APOLLOAPSE:** 59.5 deg

**PERSONNEL:** MG - unknown

**EC - unknown

**NW - unknown

**FC - unknown

**BRIEF DESCRIPTION:**

This experiment measured the stellar UV radiation in the 174- to 1216-A wavelength range from 1250 to 5100 Å with a resolution of 2.75 Å. The instrument measured the integrated light due to the background at 0.0 deg to the satellite-sun direction. The field of view was 0.1 deg.
INVESTIGATIVE PROGRAM PHYSICS AND ASTRONOMY

PERSONNEL
PI - F.E. BAILLIERE
CNS-LMP

GRIEF DESCRIPTION
This experiment uses two spectrometers to observe the solar disk at 17 different discrete wave numbers between 0.1 and 100. The absorption measurements yielded information on the composition of the atmosphere as a function of solar EUV output. The spatial resolution was of 1 arc minute of arc.

SPACECRAFT COMMON NAME: D5-B
ALTERNATE NAME: CASTOR 07B02

INVESTIGATION NAME: GRAVITY FIELD PERTURBATIONS STUDY
NSIDC 10- 73-0599-00

PERSONNEL
PI - J.P. BE LOUVENIERE
CNS-LMP

INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS

GRIEF DESCRIPTION
This experiment uses two spectrometers to observe the solar disk at 17 different discrete wave numbers between 0.1 and 100. The absorption measurements yielded information on the composition of the atmosphere as a function of solar EUV output. The spatial resolution was of 1 arc minute of arc.

BRIEF DESCRIPTION
The objective of this experiment was to study gravity field perturbations using accurate laser tracking and eliminating the atmospheric Bragg perturbation from the orbit calculations.

INVESTIGATION NAME- MICROMETEORITE STUDY
NSIDC 10- 73-0599-03

PERSONNEL
PI - F.E. BAILLIERE
CERGA

BRIEF DESCRIPTION
The objective of this experiment was to study micrometeorite impacts.

INVESTIGATION NAME- SCANNING RADIOMETER
NSIDC 10- 74-0631-00

PERSONNEL
PI - F.E. BAILLIERE
CERGA

BRIEF DESCRIPTION
This French spacecraft had a 26-faced polyhedron shape with a diameter of 51 cm. The primary mission objective was to study the upper atmosphere density variations. Secondly, a study of micrometeorite impacts was performed. The spacecraft contained a solar reflector, and the data were transmitted via a tape recorder and sent directly to telemetry. Operations were conducted at the operations center in Toulouse using the CERGA network of telemetry and telecommand stations.

INVESTIGATION NAME- SATELLITE STABILIZATION
NSIDC 10- 74-0631-01

PERSONNEL
PI - F.E. BAILLIERE
CERGA

BRIEF DESCRIPTION
This French spacecraft had a 26-faced polyhedron shape with a diameter of 51 cm. The primary mission objective was to study the upper atmosphere density variations. Secondly, a study of micrometeorite impacts was performed. The spacecraft contained a solar reflector, and the data were transmitted via a tape recorder and sent directly to telemetry. Operations were conducted at the operations center in Toulouse using the CERGA network of telemetry and telecommand stations.

INVESTIGATION NAME- GRAVITY FIELD PERTURBATIONS STUDY
NSIDC 10- 73-0599-02

PERSONNEL
PI - F.E. BAILLIERE
CERGA

BRIEF DESCRIPTION
This experiment uses two spectrometers to observe the solar disk at 17 different discrete wave numbers between 0.1 and 100. The absorption measurements yielded information on the composition of the atmosphere as a function of solar EUV output. The spatial resolution was of 1 arc minute of arc.

INVESTIGATION NAME- SCANNING RADIOMETER
NSIDC 10- 74-0631-00

PERSONNEL
PI - F.E. BAILLIERE
CERGA

BRIEF DESCRIPTION
This French spacecraft had a 26-faced polyhedron shape with a diameter of 51 cm. The primary mission objective was to study the upper atmosphere density variations. Secondly, a study of micrometeorite impacts was performed. The spacecraft contained a solar reflector, and the data were transmitted via a tape recorder and sent directly to telemetry. Operations were conducted at the operations center in Toulouse using the CERGA network of telemetry and telecommand stations.
The four-channel radiometer was essentially two scanning radiometers driven by a single motor. The sensor had micrometer pitch and high micrometer pitch in the visible and infrared (IR) data with high micrometer pitch of 3.7 and 4.4 km, respectively. In addition, the sensor converted the sensed infrared energy directly into equivalent blackbody temperature data. The HR channel included a zero-resolution sensor which measured solar input and was used to control a cold channel. Therefore, during an output signal that represents scene albedo. This feature also made it possible to provide usable data through the experimental telescope. Experimental data were flown on all DMSP blocks 5 spacecraft.

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**INVESTIGATION NAME:** Vertical Temperature Profile Radiometer (VTPR)

**NSSDC ID:** 76-0934-01

**INVESTIGATIVE PROGRAM:** Earth Observations

**INVESTIGATION DISCIPLINE(S):** Atmospheric Physics

**PERSONNEL PI:** AFSC Staff

**GRADIENT:** Global Weather CTR

**BRIEF DESCRIPTION:**

Supplementary Sensor - The objective of this experiment was to obtain vertical temperature and water vapor profiles of the atmosphere. The objective of this experiment was to determine vertical temperature and water vapor profiles of the atmosphere. The objective of this experiment was to determine vertical temperature and water vapor profiles of the atmosphere. The objective of this experiment was to determine vertical temperature and water vapor profiles of the atmosphere.
**INVESTIGATION NAME: RADIATION DOSEMETER**

**NSSC ID: 77-0473**

**INVESTIGATIVE PROGRAM**

SOLAR-TERRESTRIAL PHYSICS

**INVESTIGATION DISCIPLINE(S):** PARTICLES AND FIELDS

**PERSONNEL**

- J.J. Gable
- W.D. Blake
- Aerospace Corp
- U.S. Navy
- Aerospace Corp
- NASA

**BRIEF DESCRIPTION**

The purpose of the GFE-25 dosimeter was to measure the radiation dose in silicon under conditions of four thicknesses representative of block 50 DMSP spacecraft. The instrument was built at the Aerospace Corporation Space Science Laboratory, consisted of four separate single-detector units. Each dosimeter contained four sensors, which were small lithium-drifted silicon detectors centered under hemispherical shields. The shields over the sensors were 0.005 inches thick. The dosimeter, which is about 0.5 inches in diameter, was calibrated for the detection of energetic cosmic-ray electrons and protons encountered in the DMSP orbital environment. The functional dose response of the dosimeter with respect to energy and mass was determined by a fixed source of radiation in the laboratory. The instrument was calibrated for the detection of energetic cosmic-ray electrons and protons encountered in the DMSP orbital environment. The functional dose response of the dosimeter with respect to energy and mass was determined by a fixed source of radiation in the laboratory. The instrument was calibrated for the detection of energetic cosmic-ray electrons and protons encountered in the DMSP orbital environment. The functional dose response of the dosimeter with respect to energy and mass was determined by a fixed source of radiation in the laboratory.

**SPACECRAFT COMMON NAME:** DMSP-F2

**ALTERNATE NAME(S):**

- DMSP-F2

**LAUNCH DATE:** 10/27/1977

**WEIGHT:** 450.0 kg

**LAUNCH SITE:** Vandenberg AF
- United States

**LAUNCH VEHICLE:** Thor

**SPONSORING COUNTRY:** United States

**U.S. or USAF:** 900-77-053

**INITIAL DETECT PARAMETERS**

- DETECT TYPE: GEOMETRIC
- DETECT PERIOD: 101.7 min
- INCLINATION: 99.0 deg
- PERF. NAME: B. B. Myer
- USAF-SAND

**BRIEF DESCRIPTION**

DMSP-F2 is a series of meteorological satellites developed and operated by the Air Force under the Meteorological Space Program (MSP). This program was initiated by the Air Force, Department of Defense, and the National Oceanic and Atmospheric Administration (NOAA).

The DMSP satellites provide comprehensive data on the earth's atmosphere and are the primary source of data for operational and research purposes. The satellites are equipped with a variety of instruments for measuring temperature, pressure, humidity, and wind speed.

The DMSP-F2 satellite was launched on October 27, 1977, from Vandenberg Air Force Base, California, aboard a Thor Delta launch vehicle. The satellite's primary mission was to provide data for operational and research purposes.

**INVESTIGATION NAME: INTEGRAL DISCRIMINATORS**

**NSSC ID: 77-0474**

**INVESTIGATIVE PROGRAM**

OPERATIONAL MET SYSTEM

**INVESTIGATION DISCIPLINE(S):** METEOROLOGY

**PERSONNEL**

- J.J. Gable
- AFSC

**BRIEF DESCRIPTION**

The purpose of the integral discriminators was to provide data for operational and research purposes. The discriminators were designed to measure the temperature, pressure, humidity, and wind speed of the earth's atmosphere. The data was transmitted to the ground for analysis and interpretation.

**INVESTIGATION NAME: VERTICAL TEMPERATURE PROFILE RADIODIA**

**NSSC ID: 77-0475**

**INVESTIGATIVE PROGRAM**

OPERATIONAL MET SYSTEM

**INVESTIGATION DISCIPLINE(S):** METEOROLOGY

**PERSONNEL**

- J.J. Gable
- AFSC

**BRIEF DESCRIPTION**

The purpose of the vertical temperature profile radiometer was to provide data for operational and research purposes. The radiometer was designed to measure the temperature, pressure, humidity, and wind speed of the earth's atmosphere. The data was transmitted to the ground for analysis and interpretation.
**PERSONNEL**

**BRIEF DESCRIPTION**

This instrument was part of ESA experiment no. 32-174. The experiment had an orbit period of 720.06 minutes with an average inclination of 26.25 degrees.

**INVESTIGATION NAME**

Low-energy ion composition

**INVESTIGATIVE PROGRAM**

Science

**INVESTIGATION DISCIPLINE(s)**

Particles and fields

**MAGNETOSPHERIC PHYSICS**

**INVESTIGATIVE PROGRAM SCIENCE**

**INVESTIGATION DISCIPLINE(s)**

Particles and fields

**MAGNETOSPHERIC PHYSICS**

**INVESTIGATION NAME**

Magnetic field vectors

**INVESTIGATIVE PROGRAM**

Science

**INVESTIGATION DISCIPLINE(s)**

Particles and fields

**MAGNETOSPHERIC PHYSICS**

**INVESTIGATION NAME**

Magnetic field anomalies

**INVESTIGATIVE PROGRAM**

Science

**INVESTIGATION DISCIPLINE(s)**

Particles and fields

**MAGNETOSPHERIC PHYSICS**
Sensors and some associated electronics consisting of (i) a large number of channel-selection switches, (ii) a number of channel-readout amplifiers, (iii) a steady-frequency analyzers for studying the angular dependence of the angular distribution, and (iv) a digital correlator, and (v) a stepping-amplifier, complete the basic equipment. The data were transmitted via a 60/30 kps telemetry system, and also via a dual-track tape-recorder. The data were then transferred from the tape to punched paper tape for further analysis.

In the course of the experiment, the satellite's orientation was chosen to maximize the signals observed by the experiment, consistent with the requirements of the experiment. In the event, the satellite's orientation was chosen to maximize the signal observed by the experiment, consistent with the requirements of the experiment. The satellite's orientation was chosen to maximize the signal observed by the experiment, consistent with the requirements of the experiment.

In 4 kV, where the field is higher and not modulated by the satellite orientation, a single sensing device on the satellite is used to observe the signal. The signal is kept within range by superimposing positive and negative bias levels of 60 mm amplitude, ensuring that the satellite's orientation is maximized. The constant quantization error of plus or minus 0.125 using a 12-bit digital circuit is within the acceptable range for the experiment.

The instrument was designed for operation at geocentric distances less than about 4.3 Earth radii.

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**Investigation Name:** DC Electric field and Gradient 6 Electron Beam Selection

**NSCC ID:** 77-029A-06

**Investigative Program:** Science

**Investigation Discipline(s):** Particles and Fields, Magnetospheric Physics

**Personnel:**
- PI: F. Mepher
- PI: T. Mepher
- PI: T. Mepher

**Brief Description:** The prime objective of this experiment (ESA Experiment No. 4-292) was the measurement of the DC electric field in the plane perpendicular to the local magnetic field. The experiment also measured the spatial gradient of in the vicinity of the spacecraft. With this data, a mapping of the electric field component in the plane perpendicular to the spacecraft's plane was performed. The results were used to infer the presence or absence of electric fields and their orientation.

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**Investigation Name:** Geos. PI-Magnetometer

**NSCC ID:** 77-029A-09

**Investigative Program:** Science

**Investigation Discipline(s):** Particles and Fields, Magnetospheric Physics

**Personnel:**
- PI: J. Marbin
- PI: J. Marbin
- PI: J. Marbin

**Brief Description:** This instrument consists of two identical Geos. PI magnetometers mounted at the 90° angles of the 180° wide-angle magnets. The magnets are oriented in the plane perpendicular to the spacecraft's motion. The data were then transferred to a digital format for further analysis. The instrument was designed for operation at geocentric distances less than about 4.3 Earth radii.
FILTERS. THESE FILTERED SIGNALS WERE DIFFERENCED AND ALL THREE SIGNALS WERE AVAILABLE FOR ANALYSIS BY THE SWEPT-FREQUENCY ANALYZERS. DIGITAL CORRELATION OF PART O7 NSDC 01-0294-05, 0102, 01 CLASSIFICATION, 01 TUNED MATCHED FILTERS, 01 A MONOPOLAR ANTENNA IN THE 22 CHANNEL, PULSE-HEIGHT SPECTRUM OF PROTONS COULD BE USED FOR ANY ONE OF THE FOUR FRONT DETECTORS, PROVIDED A FRONT-END-HIGH PASS FILTER WAS SELECTED, AND A 15 CHANNEL PHA COULD BE USED FOR ANY ONE OF THE 15 ELECTRON DETECTORS. THE PEAK MULTIPLIER AND THE CORRELATION RATE FROM ONE OF THE FOUR FRONT TELESCOPES COULD BE SELECTED FOR DATA SELECTION — MORE Q, INTEGRAL COUNT RATES AND SPECTRAL MEASUREMENTS FOR ALL 15 DETECTORS, MORE N, INTEGRAL COUNT RATES AND SPECTRAL MEASUREMENTS FOR FOUR DETECTORS — GOOD TIME RESOLUTION ON INTER-MODAL RATES AND MODULATION SPECTRAL MEASUREMENT — GOOD TIME RESOLUTION FOR ENERGY SPECTRA. THE MINIMUM TIME FOR A COMPLETE SPECTRUM WAS 66 MS; THE MINIMUM TIME FOR INTEGRATION HAS A RESOLUTION OF DELTA E/F = 0.35.

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INVESTIGATION NAME: WLF PLASMA RESONANCES
NSDC ID- 77-0294-05

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS

PERSONNEL
PI - H. PEITF
CO - C. PETE

BRIEF DESCRIPTION
THIS INVESTIGATION (PART OF ESA EXPERIMENT NO. 5-100) UTILIZED THE 20 MM MOUTH (NORMAL TO THE SPACECRAFT SPIN AXI) AS A SWEPT-FREQUENCY, THE SPECTRUM OF ELECTRONS (PART OF 77-0294-02, PEETSEON) AS THE RECEIVING ELEMENT. FREQUENCIES FROM 0.5 TO 7.5 KHZ WERE TRANSMITTED BY A WIP SIGNAL OF LIMITED DURATION. A TRANSIENT SIGNAL WAS OBSERVED FOR A MUCH LONGER PERIOD THAN THE PULSE LENGTH, PROVIDE THE SPECTRUM OF THE TRANSMITTED SIGNAL INCLUDES THE MEAN FREQUENCIES OF 0.5 TO 3.2 KHZ. THE RESONANCE DENSITY COULD BE INFERR FROM THE DETERMINATION OF THE RESONANT FREQUENCIES, RECEIVED FREQUENCY UP TO 500 Hz WERE TELESCOPED DIRECTLY, AND 52 SKEPTIC FILTERS AND A DIGITAL CORRELATOR PROVIDED AUTO AND CROSS-CORRELATIONS UP TO 77 KHZ. DAMNERT'SS OF 2.5 X 108 OR 1.0 X 108 ARE CONSIDERED FOR THE DETECTOR.

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INVESTIGATION NAME: ELECTROMAGNETIC WAVE FIELDS
NSDC ID- 77-0294-10

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS

PERSONNEL
PI - T. UNDSTRUP
CO - D. DANISH SPACE RES INST

BRIEF DESCRIPTION
THIS INVESTIGATION WAS PART OF THE ESA NO. 5-250 SPACECRAFT UTILIZED THE FOUR MESH S doMEOENTS MOUNTED AT THE END OF THE 2.5 MM RACH HANDS. ONE OF THESE DOORS ONLY EXTENDED TO 1.95 M, BUT THIS DID NOT AFFECT THE INSTRUMENT EXCEPT TO REQUIRE A RECALIBRATION. DIFFERENTIAL MEASUREMENTS FROM THESE SENSORS PROVIDING THE THREE VECTORS OF THE ELECTRIC FIELD. FREQUENCIES FROM 50 Hz TO 77 KHZ COULD BE MEASURED WITH THE SPECTRUM OF THE DIGITAL CORRELATOR. FREQUENCY UP TO 450 Hz COULD BE TELESCOPED DIRECTLY, AND 52 SKEPTIC FILTERS AND A DIGITAL CORRELATOR PROVIDED AUTO AND CROSS-CORRELATIONS UP TO 77 KHZ. THE MEAN FREQUENCY COULD BE INFERR FROM THE DETERMINATION OF THE RESONANT FREQUENCIES, RECEIVED FREQUENCY UP TO 500 Hz WERE TELESCOPED DIRECTLY, AND 52 SKEPTIC FILTERS AND A DIGITAL CORRELATOR PROVIDED AUTO AND CROSS-CORRELATIONS UP TO 77 KHZ. DAMNERT'SS OF 2.5 X 108 OR 1.0 X 108 ARE CONSIDERED FOR THE DETECTOR.

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INVESTIGATION NAME: ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION
NSDC ID- 77-0294-01

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS

PERSONNEL
PI - B. WILCHEN
CO - G. PFISTER (HETZER)
CO - T. KEPPLER
CO - A. KORTH
CO - M. PEDERSEN

BRIEF DESCRIPTION
THIS INVESTIGATION (ESA EXPERIMENT NO. 5-321) MEASURED THE ENERGY, AND THE AMPLITUDE DISTRIBUTION OF ELECTRONS AND PROTONS AT 321 DIFFERENT POINTS, THERO (77-0294-01), AND WAS COMPLEMENTARY TO THAT INVESTIGATION. THE DETECTOR SYSTEM CONSISTED OF TWO SEPARATE MAGNETIC SPECTROMETERS FOR ELECTRONS AND PROTONS. TWO PHOTON TELESCOPES WERE ASSOCIATED WITH EACH OF THE MAGNETS. THE FOUR ELECTRON TELESCOPES MOUNTED ALONG THE ELEVATION AXI AELESE "E" AND THE PROTON TELESCOPES MOUNTED ALONG THE ELEVATION AXI AELESE "P." THE PHOTON TELESCOPES WERE USED TO MEASURE THE ELECTRONS. EACH SPECTROMETER COVERED AN ANGULAR APERTURE IN ELEVATION ANGLE (relative to the spinaxis) OF 45 DEG, AND THE PHOTON TELESCOPES WERE COVERED FOR ELECTRONS, GIVING ELEVATION ANGLES OF 0.5, 1.5, 2.5, 3.5, 4.5, AND 5.5 DEG FOR THE ELECTRON TELESCOPES. THESE TELESCOPES CONSIST OF A FRONT, SURFACE-BARREL DETECTOR, AND A FRONT, SURFACE-BARREL DETECTOR, ELECTRON ENERGIES FROM 30 TO 200 KEV AND PHOTON ENERGIES FROM 0.3 TO 1.4 MW WERE COVERED, THE

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INVESTIGATION NAME: THERMAL PLASMA FLOW
NSDC ID- 77-0294-02

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS

PERSONNEL
PI - G. WENN
CO - H. W. GARDNER
CO - U. LONDON
CO - K. W. WERNER
CO - U. LONDON

BRIEF DESCRIPTION
THE INSTRUMENT (ESA EXPERIMENT NO. 5-102) EMPLOYED TWO HEMISPHERICAL ELECTROSTATIC ANALYZERS MOUNTED ON ONE OF THE COVERINGS FOR THE MEASUREMENT OF ELECTRONS OR PROTONS OVER THE RANGE FROM 0.5 TO 200 EV AND ARRIVING CLOSE TO PARALLEL AND CLOSE TO PERPENDICULAR TO THE MAGNETIC FIELD. THE ENERGY RANGE WAS COVERED IN 50 STEPS WITH A RELATIVE ENERGY RESOLUTION OF 0.35. ONE ANALYZER HAD ITS APERTURE POINTING ALONG THE NEGATIVE 30 SPIN AXI WITH AN OPENING ANGLE OF 90 DEG AND PROVIDING A GEOMETRICAL FACTOR (G) OF 0.15. THE OTHER ANALYZER MADE AN ANGLE OF 2 DEG WITH RESPECT TO THE SPIN AXI AND PROVIDING A GEOMETRICAL FACTOR (G) OF 0.15. THE SPECTRUM OF THE PARTICLES AT THE SAME TIME. THE COLLECTORS OF THESE INSTRUMENTS COULD BE SET AT ANY VOLTAGE FROM 208 TO 1328 V IN STEPS OF 0.1 V TO COMPENSATE FOR THE POTENTIAL DIFFERENCES BETWEEN THE INSTRUMENT AND THE UNDISTURBED PLASMA ENVIRONMENT. THIS VOLTAGE DETERMINES THE SPECIFICATION POTENTIAL.
INVESTIGATION NAME- AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM

INVESTIGATIVE PROGRAM
OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)
Meteorology

PERSONNEL
Pl - NSS Staff
NOAA-NES

BRIEF DESCRIPTION
The ESSA 8 automatic picture transmission (APT) subsystem was a camera and transmitter combination designed to transmit real-time, daylight, day/night, color television pictures of cloud coverages to any properly equipped ground receiving stations. The camera system consisted of two redundant APT cameras with 2.54-cm (1 in.) lenses. Each camera had a 100-degree wide-angle field of view. The APT video picture was transmitted at 5 MHz. The APT transmitter was located at NOAA-NES Suitland, Maryland.

INVESTIGATION NAME- GEOS 2

ALTERNATE NAME(S)- GEOS-2, EXPLORER 36

INVESTIGATIVE PROGRAM
NONE ASSIGNED

INVESTIGATION DISCIPLINE(S)
Geodesy

PERSONNEL
Pl - H.A. ROSENBURG
NOAA HEADQUARTERS

BRIEF DESCRIPTION
The ESSA 8 automatic picture transmission (APT) subsystem was a camera and transmitter combination designed to transmit real-time, daylight, day/night, color television pictures of cloud coverages to any properly equipped ground receiving stations. The camera system consisted of two redundant APT cameras with 2.54-cm (1 in.) lenses. Each camera had a 100-degree wide-angle field of view. The APT video picture was transmitted at 5 MHz. The APT transmitter was located at NOAA-NES Suitland, Maryland.

INVESTIGATION NAME- GEOS-C

ALTERNATE NAME(S)- GEOCENTRIC SATELLITE-GEOS-C

INVESTIGATIVE PROGRAM
NONE ASSIGNED

INVESTIGATION DISCIPLINE(S)
Geodesy

PERSONNEL
Pl - H.N. PLOTKIN
NASA-GSFC

BRIEF DESCRIPTION
The GEOS-C geodetic radar reflector was a geocentric satellite designed to provide precise measurements of the Earth's gravity field. The reflector was deployed on a geosynchronous orbit and transmitted precise pulse waves that were received by ground-based radars. This data was used to determine the satellite's position and to refine the Earth's gravity field model. The GEOS-C mission was a collaborative effort involving multiple agencies and organizations.

INVESTIGATION NAME- GEOS 3

ALTERNATE NAME(S)- GEOS-3

INVESTIGATIVE PROGRAM
NONE ASSIGNED

INVESTIGATION DISCIPLINE(S)
Geodesy

PERSONNEL
Pl - H.A. ANDERLE
US NAVY SATELLITE CENTER

BRIEF DESCRIPTION
The GEOS 3 mission involved the deployment of a geodetic satellite designed to provide precise measurements of the Earth's surface. The satellite was placed in a geosynchronous orbit and transmitted precise pulse waves that were received by ground-based radars. This data was used to determine the satellite's position and to refine the Earth's gravity field model. The GEOS 3 mission was a collaborative effort involving multiple agencies and organizations.

INVESTIGATION NAME- GEOS 4

ALTERNATE NAME(S)- GEOS-4

INVESTIGATIVE PROGRAM
NONE ASSIGNED

INVESTIGATION DISCIPLINE(S)
Geodesy

PERSONNEL
Pl - H.A. ANDERLE
US NAVY SATELLITE CENTER

BRIEF DESCRIPTION
The GEOS 4 mission involved the deployment of a geodetic satellite designed to provide precise measurements of the Earth's surface. The satellite was placed in a geosynchronous orbit and transmitted precise pulse waves that were received by ground-based radars. This data was used to determine the satellite's position and to refine the Earth's gravity field model. The GEOS 4 mission was a collaborative effort involving multiple agencies and organizations.

INVESTIGATION NAME- GEOS 5

ALTERNATE NAME(S)- GEOS-5

INVESTIGATIVE PROGRAM
NONE ASSIGNED

INVESTIGATION DISCIPLINE(S)
Geodesy

PERSONNEL
Pl - H.A. ANDERLE
US NAVY SATELLITE CENTER

BRIEF DESCRIPTION
The GEOS 5 mission involved the deployment of a geodetic satellite designed to provide precise measurements of the Earth's surface. The satellite was placed in a geosynchronous orbit and transmitted precise pulse waves that were received by ground-based radars. This data was used to determine the satellite's position and to refine the Earth's gravity field model. The GEOS 5 mission was a collaborative effort involving multiple agencies and organizations.
SATELLITE RANGE-RATE DATA. THE DUAL FREQUENCIES WERE GENERATED BY A HIGHLY STABLE OSCILLATION DRIVING TWO FREQUENCY MODULATION FREQUENCY SOURCES. THE FREQUENCY SOURCES WERE USED SIMULTANEOUSLY TO PROVIDE COMPARISON DATA OF THE EFFECT OF THE IDIOSYNCRASIES ON THE SIGNALS TRAVELING TO THE GROUND STATION. ELEVEN OR MORE FIXED GROUND RECEIVING STATIONS OPERATED BY THE U.S. NAVY (USN), U.S. ARMY. U.S. NAVY, AND U.S. AIR FORCE, WHEN THE DIRECT RADIATION RECEIVING設備 (DOA) ARE EXPECTED TO BE IN OPERATION. OBSERVATIONS MADE FROM THREE OR MORE KNOW STATIONS ALLOWED REDUCTION OF ORIGIctal PARAMETERS, RANG RATE DATA FROM EITHER THE FIXED STATIONS OR THE RECEIVERS WERE ESTIMATED TO BE ACCURATE IN 0.5 CM/JS.

INVESTIGATION NAME: SATELLITE-TO-SATELLITE TRACKING

NSDC ID: 75-O27A-60 INVESTIGATIVE PROGRAM CODE E3
INVESTIGATION DISCIPLINE(S) NAVIGATION
PERSONNEL PI - T. GALICIANI NASA-GSFC
BRIEF DESCRIPTION THE SATELLITE-TO-SATELLITE TRACKING (SST) SYSTEM USES THE FOLLOWING THREE MODES: (1) THE GROUND-BASED APPLICATION TECHNOLOGY SATELLITE RANGING (ATSR) SYSTEM (MODIFIED FOR SATELLITE-TO-SATELLITE TRACKING) (2) THE MARKING/GOOGULAR COMMUNICATION TRANSPONDER ON THE ATS 6 GEO SYNCHRONOUS SPACECRAFT, AND (3) THE RANGING TRANSPONDER ON THE LOW-ORBITING SATELLITE... GEOES 3, STEPHAN P.

INVESTIGATION NAME: C-BAND SYSTEM

NSDC ID: 75-O27A-03 INVESTIGATIVE PROGRAM CODE E3
INVESTIGATION DISCIPLINE(S) NAVIGATION
PERSONNEL PI - E.R. JACKSON NASA-GSFC
BRIEF DESCRIPTION THE C-BAND TRANSPONDER SUBSYSTEM CONSISTED OF TWO TRANSPONDERS. ONE THE GEOES 2 NONCOHERENT TYPE AND THE OTHER A COHERENT C-BAND TRANSPONDER. THE NONCOHERENT TRANSPONDER PROVIDED FOR RANGE AND ANGLE MEASUREMENTS, WHILE THE COHERENT TRANSPONDER PROVIDED FOR BOTH RANGE, RANGE-RATE, AND ANGLE MEASUREMENTS. WHEN COHERENT RECEIVED SIGNALS AT GOOD AUG, THE COHERENT TRANSPONDER TRANSMITTED AT 6800 MHZ WHILE THE NONCOHERENT TRANSMITTED AT 850 MHZ. EACH C-BAND TRANSPONDER TRANSMITTED ONE PULSE FOR EACH CODED GROUP OF PULSES TRANSMITTED BY A GROUND TRACKING C-BAND RADAR. THE INTERACTION BETWEEN THE RECEIVED GROUND TRANSMITTED PULSE CODES AND THE TRANSPONDER TRANSMITTED PULSE WAS CALIBRATED PRIOR TO LAUNCH. EACH TRANSPONDER WAS CapABLE OF TRANSMITTING SIMULTANEOUSLY OPERATED IN EITHER STANDBY OR OVERRIDE MODE. IN TRANSITIONAL OPERATIONAL APP, EACH CHIRP WAS 60 S OF INTERROGATION OR ENOUGH FOR THE OUTPUT TO BE TRANSMITTED. THE PULSES CONV. TO AN ELECTRICAL SIGNAL, A DIGITAL COUNTER... GEOES 3, STEPHAN P.

INVESTIGATION NAME: RADAR ALTIMETER SYSTEM

NSDC ID: 75-O27A-01 INVESTIGATIVE PROGRAM CODE E3
INVESTIGATION DISCIPLINE(S) NAVIGATION GEOLOGY
PERSONNEL PI - C.L. PURDITCH NASA-GSFC
BRIEF DESCRIPTION THE ALTIMETER EXPERIMENT HAS THE HIGHEST PRIORITY EXPERIMENT ON GEOES 3. THE OBJECTIVES WERE TO 1. DETERMINE THE DEPTH OF THE OCEANIC SURFACE WITHIN 0.5 M OR LESS, AND WITH A RELATIVE ACCURACY OF 0.9 M. THE ALTIMETER MEASUREMENTS WILL BE HELD TO A FUTURE OPERATIONAL ALTIMETER-SATELLITE SYSTEM USING A 1-CM MEASUREMENT CAPABILITY. THE increases in the accuracy of the measurements and the future potential of the satellite system will be enhanced. THE ALTIMETER USED ON THE SKYLAB SATELLITE, BUT HAS ADVANTAGES OVER THE SKYLAB ALTIMETER... GEOES 3, STEPHAN P.

INVESTIGATION NAME: LIMB-CURVE LMMER

NSDC ID: 75-O27A-04 INVESTIGATIVE PROGRAM CODE E3
INVESTIGATION DISCIPLINE(S) NAVIGATION GEOLOGY
PERSONNEL PI - C.L. PURDITCH NASA-GSFC
BRIEF DESCRIPTION LAYER CORNER REFLECTORS, COMPOSED OF 270 MINIMUM 35-MM CUBES, AND GROUND-BASED LASER SYSTEMS WERE USED TO DETERMINE PRECISE SATELLITE TRACKING INFORMATION. THE APPLIED PHYSICS LABORATORY PROVIDED THE LASER CUBE REFLECTOR PANELS. EACH REFLECTOR PANEL WAS CONFIGURED ON THE LATERAL SURFACE OF THE FRUSTUM ADJACENT TO THE BASE, 90°-ORIENTED SPACECRAFT... GEOES 3, STEPHAN P.
**NSSOC 10-77-065**

**SPACERACFT COMMON NAME:** GOES

**ALTERNATE NAME(S):** Geostationary Meteorol. Sat.

**LAUNCH DATE:** 07/14/77

**LAUNCH SITE:** Cape Canaveral, United States

**LAUNCH VEHICLE:** Delta

**SPONSORING COUNTRY/AGENCY:**
- **JAPAN:** NASA
- **JAPANESE METEORLOGICAL AGENCY**

**PERSONNEL**
- **PM:** R.J. GOSS, NASA-GSFC
- **PS:** W.K. SATANASE
- **PS:** UNKNOWN

**BRIEF DESCRIPTION**

Geostationary meteorological satellite (GOES) is Japan's contribution to the International GARP (Global Atmospheric Research Program). In this program, Japan, USA, USSR, and NASA provide geostationary satellites for this program, and the USA and USSR provide polar, sun-synchronous satellites. The major objective of GOES is to obtain synoptic global meteorological data sets over a two-month duration. The satellite has a normal latitude of 78.5 degrees, and its orbit period is 1412.0 minutes. The spacecraft is spin-stabilized by a despun Earth-pointing antenna. The satellite is positioned near 140 degrees east and is designed to operate for 3 years.

**INVESTIGATIVE PROGRAM**

**INVESTIGATIVE DISCIPLINE(S):** Meteorology

**INVESTIGATION DESCRIPTION:**

Visible-infrared spin-scan radiometer (VISSR) and solar sensors. GOES-1 (SMS-Cl) is a NASA-developed, USA-operated spacecraft. The spacecraft's main objective is to provide high-quality day and night cloud cover data and to facilitate meteorological research and applications. The spacecraft is equipped with a visible-infrared spin-scan radiometer (VISSR) to collect data from central and peripheral regions of the Earth. The VISSR measures cloud cover and temperature, providing valuable data for meteorological research and applications.

**INVESTIGATION DISCIPLINE(S):** Meteorology

**INVESTIGATION DESCRIPTION:**

Visible-infrared spin-scan radiometer (VISSR) and solar sensors. GOES-1 (SMS-Cl) is a NASA-developed, USA-operated spacecraft. The spacecraft's main objective is to provide high-quality day and night cloud cover data and to facilitate meteorological research and applications. The spacecraft is equipped with a visible-infrared spin-scan radiometer (VISSR) to collect data from central and peripheral regions of the Earth. The VISSR measures cloud cover and temperature, providing valuable data for meteorological research and applications.

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**INVESTIGATION DESCRIPTION:**

Visible-infrared spin-scan radiometer (VISSR) and solar sensors. GOES-1 (SMS-Cl) is a NASA-developed, USA-operated spacecraft. The spacecraft's main objective is to provide high-quality day and night cloud cover data and to facilitate meteorological research and applications. The spacecraft is equipped with a visible-infrared spin-scan radiometer (VISSR) to collect data from central and peripheral regions of the Earth. The VISSR measures cloud cover and temperature, providing valuable data for meteorological research and applications.
COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, THE FIELD OF VIEW ON THE EARTH WAS CAPPED BY A LINEAR ARRAY OF EIGHT VISIBLE-SPECTRUM DETECTORS, EACH WITH A SPREAD-RESOLUTION OF 0.5 KM AT ITS MAXIMUM ANGLE ANGLE (HORIZONTAL). THE ARRAY MEASURED RADAR BACKSCATTER FROM THE EARTH AND THE SERVICE WAS MONITORED BY THE SATELLITE TO DETERMINE THE DATE AND TIME OF THE SCAN. THE DATA WERE THEN TRANSMITTED TO THE SATELLITE VIA THE INFRARED DETECTOR SEND TO THE NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION (NOAA) ORAL DATA ACQUISITION STATION (ODAS), WALLOPS ISLANDS, VA, WHERE THE SIGNAL WAS RECEIVED AND TRANSMITTED TO THE LOCAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION (NOAA) ORAL DATA ACQUISITION STATION (ODAS), WALLOPS ISLANDS, VA.

--- GOES 1 --- WATSON

INVESTIGATION NAME: METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

PERSONNEL
PI - J.J. WILLIAMS NOAA-NESS

BRIEF DESCRIPTION
DOUBT FULL AND PARTIAL PICTURES OF THE EARTH'S DISK. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.65 TO 0.75 MICRONS) USE A COMMON PHYSICAL SYSTEM. INCOMING RADIATION IS RECEIVED BY AN ELLIPSOIDALLY-SHAPED SCAN MIRROR AND COLLECTED BY A NICKEL-CRYSTAL OPTICAL SYSTEM. THE SCAN MIRROR IS ST AT A NOMINAL ANGLE OF 42 DEG TO THE VISIBLE AXES OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) PROVIDES A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXES OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXES. THE LATITUDE SCAN IS ACCOMPLISHED BY SEQUENTIALLY TILLING THE SCANNING DISK NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE TAKES 18.3 MIN TO COMPLETE AND ABOUT 2 MIN TO READ OUT. EACH VISIBLE-SPACE DETECTOR SLEEPS THE EARTH, WITH A BASELINE TEMPERATURE OF 180 AND 315 DEG K WITH A PROPOSED ECLIPSE TIME THAT BLOCKS THE SUN. A ROOFTOP DETECTOR SENSORS THE INFRARED PORTION OF THE SPACECRAFT, WITH A RESOLUTION OF APPROXIMATELY 5 MIN AT I S.3. THE COMMUNICATIONS SYSTEM IS DESIGNED TO RECEIVE AND TRANSMIT THE PROJECT'S DATA ACQUISITION SYSTEM DATA FROM UP TO 10,000 SCP STATIONS (SATELLITE COMMUNICATION PLATFORMS, SCP). ALL THE SCP DATA ARE HANDLED BY THE PROJECT'S DATA ACQUISITION SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM. THIS COMMUNICATIONS SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM.

INVESTIGATION NAME- METEROLOGICAL DATA COLLECTION AND PROCESSING SYSTEM

PERSONNEL

PI - B.J. WILLIAMS

BRIEF DESCRIPTION

THE METEROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED AT EARTHBASED DATA COLLECTION (SCAPE) PLATFORMS (SCP). THE COLLECTED DATA ARE STORED IN A COMPUTER-SUPPORTED DATABASE. THIS DATABASE IS USED TO SUPPORT THE OPERATIONS OF THE PROJECT'S PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM.

INVESTIGATION NAME- ENERGETIC PARTICLE MONITOR

PERSONNEL

PI - D. W. WILLIAMS

BRIEF DESCRIPTION

THE SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAPERED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR EACH, ARE USED TO MEASURE TOTAL ENERGY AND TOTAL CHARGE OF HEAVILY CHARGED PARTICLES WITH ENERGY MEASUREMENT DISCERNMENT. THE DETECTORS ARE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENT DISCERNMENT.

INVESTIGATION NAME- SOLAR X-RAY MONITOR

PERSONNEL

PI - D. W. WILLIAMS

BRIEF DESCRIPTION

THE SOLAR XS-RAY MONITOR WAS DESIGNED TO DETECT SOLAR X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 50 MEV.

INVESTIGATION NAME- LOW-ENERGY PROTONS AND ELECTRONS

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE PROJECT'S UNIVERSAL MONITORING SYSTEM DESIGNED TO RECEIVE AND PROCESS THE PROJECT'S DATA ACQUISITION SYSTEM DATA FROM UP TO 10,000 SCP STATIONS (SATELLITE COMMUNICATION PLATFORMS, SCP). ALL THE SCP DATA ARE HANDLED BY THE PROJECT'S DATA ACQUISITION SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM. THIS COMMUNICATIONS SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM.

INVESTIGATION NAME- INFRARED MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE PROJECT'S UNIVERSAL MONITORING SYSTEM DESIGNED TO RECEIVE AND PROCESS THE PROJECT'S DATA ACQUISITION SYSTEM DATA FROM UP TO 10,000 SCP STATIONS (SATELLITE COMMUNICATION PLATFORMS, SCP). ALL THE SCP DATA ARE HANDLED BY THE PROJECT'S DATA ACQUISITION SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM. THIS COMMUNICATIONS SYSTEM OPERATES ON 5-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SCP STATION IS A PROJECT-POWERED EARTHBASED DATA COLLECTION UNIT AND A COMMUNICATIONS PLATFORM.

INVESTIGATION NAME- SOLAR X-RAY MONITOR

PERSONNEL

PI - D. W. WILLIAMS

BRIEF DESCRIPTION

THE INFRARED MONITOR WAS DESIGNED TO DETECT INFRARED EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT INFRARED EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- CORONAL MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE CORONAL MONITOR WAS DESIGNED TO DETECT CORONAL EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT CORONAL EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- SOFT X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE SOFT X-RAY MONITOR WAS DESIGNED TO DETECT SOFT X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT SOFT X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- HARD X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE HARD X-RAY MONITOR WAS DESIGNED TO DETECT HARD X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT HARD X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- SOLAR PROTON MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE SOFT X-RAY MONITOR WAS DESIGNED TO DETECT SOFT X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT SOFT X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- CORONAL MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE CORONAL MONITOR WAS DESIGNED TO DETECT CORONAL EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT CORONAL EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- SOFT X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE SOFT X-RAY MONITOR WAS DESIGNED TO DETECT SOFT X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT SOFT X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- HARD X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE HARD X-RAY MONITOR WAS DESIGNED TO DETECT HARD X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT HARD X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- SOFT X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE SOFT X-RAY MONITOR WAS DESIGNED TO DETECT SOFT X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT SOFT X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.

INVESTIGATION NAME- HARD X-RAY MONITOR

PERSONNEL

PI - D. J. WILLIAMS

BRIEF DESCRIPTION

THE HARD X-RAY MONITOR WAS DESIGNED TO DETECT HARD X-RAY EMISSIONS FROM THE SOLAR CORONA. THE INSTRUMENT IS DESIGNED TO DETECT HARD X-RAY EMISSIONS IN THE RANGE OF 0.5 TO 20 MEV.
PROTONS above 600 keV and electrons below 45 keV. The electron description and operation here used -- one instrument cycle of 156 sector resolutions of 500 deg for analyzer voltage steps. Ultimately, a GM tube was an additional detector sensitive to protons above 600 keV and electrons above 45 keV. The gain was mounted normal to the spacecraft spin axis, and the instrument cycle of 156 intensity measurements every 60 sec on one cycle of 312 intensity measurements was used. The sensitivity of the LEPEDA instrument is 2.2, GEV to 10 keV, established to evaluate and correct for energy responses from 15 keV to 10 keV.

The three axes were sampled sequentially three times every 5.72 sec (60.1 sec) to observe the characteristic, sector by sector, sensitivity changes between the sectors. The sensitivity was switched by ground command.

The instrument noise level, in-flight calibration was performed once every 5 minutes.

Spacecraft common name: HEAD 1
Alternate names: High Energy Astron OBS-A, HEAD-A
Launch date: 12/21/77
Launch site: Cape Canaveral, United States
Launch vehicle: Atlas

INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE

MAGNETIC PHYSICS

PERSONNEL

PI - L. A. Frank
OI - I. O. Craven
OII - E. H. Yeager

BRIEF DESCRIPTION

This particle spectrometer (LEPEDA) employed two electrostatic analyzers to measure protons and electrons simultaneously. A GM tube was an additional detector sensitive to protons above 600 keV and electrons above 45 keV.

The gain was mounted normal to the spacecraft spin axis, and the instrument cycle of 156 intensity measurements every 60 sec on one cycle of 312 intensity measurements was used. The sensitivity of the LEPEDA instrument is 2.2, GEV to 10 keV.

The three axes were sampled sequentially three times every 5.72 sec (60.1 sec) to observe the characteristic, sector by sector, sensitivity changes between the sectors. The sensitivity was switched by ground command.

The instrument noise level, in-flight calibration was performed once every 5 minutes.

SPACECRAFT COMMON NAME: HEAD 1
ALTERNATE NAMES: HIGH ENERGY ASTRON OBS-A, HEAD-A

INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE

MAGNETIC PHYSICS

PERSONNEL

PI - W. L. Buset
OI - R. S. Olle
OII - I. G. C. Smith
OIII - J. B. Bolot

BRIEF DESCRIPTION

This experiment measured electric and magnetic fields using a 42.7-m electric dipole and a search coil. The electric dipole was measured at a 20 keV target and 30 keV target.

The electric dipole field spectrum measurements were made in a logarithmically-spaced way between 1.78 keV and 178 keV. The electric dipole field spectrum was measured on the dipole with two selectable bandwidths: 0.15 to 10 keV and 5 to 15 keV. The bandwidth of the channels varied from 2.7 to 20 percent. The frequency of the signal was between 100 Hz and 1.7 Hz. The instrument noise level was 100 Hz and 0.1 Hz at 0.0078 Hz and 0.001 Hz.

The experiment was performed once every 5 minutes.
INVESTIGATION NAME: LARGE AREA COSMIC GAMMA-RAY SURVEY

INVESTIGATIVE PROGRAM
ASTROPHYSICS

INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY

PERSONNEL
PI - H. D. FREEMAN
01 - T. A. HUNN
02 - R. A. PRIZE
04 - G. W. CLARK
04 - J. F. SCHULMAN
04 - J. W. RAPPAPORT

BRIEF DESCRIPTION

THIS INSTRUMENT WAS A MODULAR ASSEMBLY OF SEVEN LARGE-AREA PONTIOMINAL PROPORTIONAL COUNTER SENSOR MODULES TO RECORD INCIDENT X-RAY Fluxes. THE OBJECTIVES WERE TO MAP THE CELESTIAL SPHERE IN THE ENERGY RANGE FROM 10 TO 20 KEV. THE SENSORS PROVIDE GREATER SENSITIVITY THAN ACHIEVED HEREFORE AND TO MEASURE THE SPECIFIC LOCATION AND THE INTENSITIES OF X-RAY SOURCES WITH A 0.1 TO 1 DEG ANGULAR RESOLUTION. EACH OF THE SENSOR MODULES COMPRISING THE 0.5 INCH X 0.5 INCH PROPORTIONAL COUNTER EXTRAD FRAME ON WHICH WAS MOUNTED A WINDOW SUPPORT STRUCTURE, COUNTER BACK STRUCTURE WITH INTEGRAL CONTROL, COUNTER, COLLIMATION ASSEMBLY, AND ELECTRONIC SUBASSEMBLIES. A DESCRIPTION OF THE CONSTRUCTION FOR THE BASIC COUNTER PROVIDED X-RAY COLLIMATION OF 80 DEG BY 4 DEG DW, A 4 DEG BY 4 DEG DW Collaboration PROVIDED ANTI-COINCIDENCE PROTECTION AGAINST CHARGED PARTICLE EVENTS. THE FRONT LAYER WAS THE MAIN X-RAY SENSOR FOR MOST ENERGY RANGES. THE THREE LAYERS PROVIDED A SENSITIVE DETECTION. THE SENSORS INCLUDED VARIOUS SENSITIVE DETECTORS TO PROVIDE A CHECK ON COUNTER OPERATION AND CHANNEL POSITION. THERE WAS ALSO A LOW-ENERGY SENSITIVE DETECTORS, THE CONTROL COUNTER WAS A SMALL COUNTER AT THE BACK OF THE ASSEMBLY THAT SHARED THE COUNTING SIGNAL FROM THE MAIN COUNTER. THIS WAS MODIFIED BY AN FC-55 SOURCE AND SERVES TO GENERATE THE PROPER OPERATIVE VOLTAGE ON THE ELECTRODE TO COMPENSATE FOR GAS DENSITY CHANGES AND HIGH VOLTAGE DRIFTS.

INVESTIGATION NAME: X-RAY SCANNING MODULATION COLLIMATOR

INVESTIGATIVE PROGRAM
ASTROPHYSICS

INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY

PERSONNEL
PI - I. G. SQUERRY
01 - G. W. CLARK
01 - J. W. RAPPAPORT
04 - R. D. OKESSEY
04 - J. W. RAPPAPORT
04 - J. W. RAPPAPORT
04 - J. W. RAPPAPORT
04 - D. SCHWARTZ

BRIEF DESCRIPTION

A LARGE SPACECRAFT WITH A SCANNING MODULATION COLLIMATOR (SMC) INSTRUMENT TO DETECT TOIC FOR SELECTED X-RAY SOURCES. THE PONTIOMINAL SENSOR MODULES WERE MOUNTED IN A SCANNING MODULATION COLLIMATOR. THE SCANNING MODULATION COLLIMATOR PROVIDED A PONTIOMINAL ANGULAR SIZE MEASUREMENT IN ONE DIRECTION. AN ADDITIONAL COLLIMATOR LOCATED FORWARD TO THE INSTRUMENT PROVIDED AN OVERLAP BETWEEN THE FIELD OF VIEW TO THE X-RAY SOURCE. THE PONTIOMINAL VIEW DIRECTION IS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS (2-AXIS) AND THE INSTRUMENT SCANNED A GREAT CIRCLE BAND ON THE SPACECRAFT IN A TWO-STEP PROCESS. EACH STEP PROVIDED A ZONE OF TRANSMISSION INCLUDED +-10 DEG AND -10 DEG TO THE SCANNING MODULATION COLLIMATOR. THE SENSORS WERE MODIFIED TO DETECT X-RAY SOURCES WITH AN INTENSITY OF 1 X-SEC TO 5 X-SEC. THE INSTRUMENT WAS MODIFIED TO PROVIDE THE DATA TO THE PONTIOMINAL VIEW DIRECTION AND THE SPACECRAFT SOLELY TO THE PONTIOMINAL VIEW DIRECTION. THE INSTRUMENT WAS MODIFIED TO PROVIDE DATA TO THE PONTIOMINAL VIEW DIRECTION AND THE SPACECRAFT SOLELY TO THE PONTIOMINAL VIEW DIRECTION.
FAILED TO EXTEND PROPERLY AND WAS SHORT CIRCUITED TO THE SPACECRAFT GROUND. THE RESULTANT CONFIGURATION WAS THAT OF A MONOPOLE WHICH WAS CALCULATED TO HAVE AN EFFECTIVE LENGTH OF ABOUT 8 M. THE PRIMARY BENTENMENTAL EFFECTS WERE THE LOSS OF 40 PERCENT OF THE SPACECRAFT VOLTAGE IN THE 30 KHZ CHANNEL. THE SPD SIGNALS EXTREMELY EFFECTIVE AND CAUSED THE SPACECRAFT CONTROLLER TO DIVIDE THE NUMBER OF CHANNELS WHICH WERE LESS SEVERE WITH INCREASING CHANNEL FREQUENCY.

--- HELIO-S. GURNETT ---

INVESTIGATION NAME - FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM 30-90 KHZ

NSSDC 19- 74-O97A-05 INVESTIGATIVE PROGRAM

INVESTIGATING DISCIPLINE(S) - ISDOPHYSICS AND RADIO PHYSICS

PARTICLES AND FIELDS

PERSONNEL

PI - D.A. GURNETT
OU - IOWA

PI - P.J. KELLOGG
OU - U OF MINNESOTA

PI - D.W. STONE
NASA-GSFC

BRIEF DESCRIPTION


--- HELIO-S. GURNETT ---

INVESTIGATION NAME - 50 KHZ TO 2-MHZ WAVE RADIUS

NSSDC 19- 74-O97A-06 INVESTIGATIVE PROGRAM

INVESTIGATING DISCIPLINE(S) - ISDOPHYSICS AND RADIO PHYSICS

PARTICLES AND FIELDS

SOLAR PHYSICS

PERSONNEL

PI - D.A. GURNETT
OU - IOWA

PI - P.J. KELLOGG
OU - MINNESOTA

PI - B.Y. WEBER
NASA-GSFC

BRIEF DESCRIPTION

THIS EXPERIMENT SHARED THE 32-M BANDWIDTH ELECTRIC DIPOLE ANTENNA WITH EXPERIMENTS -03 AND -05. DURING THE EXPERIMENT PERIOD, THE EXPERIMENTAL FREQUENCY RANGE WAS 50 KHZ TO 2 MHZ. THE INSTRUMENT WAS DESIGNED TO MEASURE THE Effect OF THE SPACECRAFT MOTION ON THE receipt OF WAVEFORMS FROM THE CRAFT. THE EXPERIMENTAL FREQUENCY RANGE WAS DIVIDED INTO 32 SECTIONS. THE SPACECRAFT'S MOTION WAVELENGTHS WERE COVERED BY THE SPACECRAFT BAND, THE MOST RAPID SAMPLING POSSIBLE WAS 2.5 SECONDS. THE EXPERTIMENTAL FREQUENCY RANGE WAS 50 KHZ TO 2 Mhz. THE SPACECRAFT CONTROLLER TO DIVIDE THE NUMBER OF CHANNELS WHICH WERE LESS SEVERE WITH INCREASING CHANNEL FREQUENCY. THIS RESULTED IN A SMALL LOSS IN SENSITIVITY, AND AN INCREASED RECEIVER NOISE LEVEL.

--- HELIO-S. GURNETT ---

INVESTIGATION NAME - INTERPLANETARY DUST PHYSICS

NSSDC 19- 74-O97A-12 INVESTIGATIVE PROGRAM

INVESTIGATING DISCIPLINE(S) - INTERPLANETARY PHYSICS

PARTICLES AND FIELDS

SPECTRUM ANALYSIS

PERSONNEL

PI - H. FECHTG
MPI-NUCLEAR PHYSICS

PI - J. MEINHARD
MPI-NUCLEAR PHYSICS

BRIEF DESCRIPTION

THIS EXPERIMENT WAS TO INVESTIGATE SOME THEORIES ABOUT THE INTERPLANETARY DUST INCLUDING WHETHER:
(1) THE NUMBER DENSITY OF PARTICLES CHANGES NEAR THE ORBITAL PLANE OF JUPITER, AND (2) THE NUMBER DENSITY OF PARTICLES CHANGES NEAR THE ORBITAL PLANE OF SATURN.


THE RETURN CURRENT FOR DETECTION OF A PARTICLE WAS ABOUT 1.0-15 g/cm2.


HELIO-S A. KEPLER

INVESTIGATION NAME: ENERGETIC ELECTRON DETECTOR

NSSDC 19- 74-007A-10  INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL

BRIEF DESCRIPTION

HELIO-S A. KUNDT

INVESTIGATION NAME: CELESTIAL MECHANICS

NSSDC 19- 74-007A-14  INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S) CELESTIAL MECHANICS

PERSONNEL
PI - W. KUNDT U OF HAMBURG G  - H. MELBOURNE NASA-SDL

BRIEF DESCRIPTION
THIS EXPERIMENT USED THE TRACKING DATA TO OBTAIN A RELATIVE SPACECRAFT ORBIT AND IMPROVED KNOWLEDGE OF THE ORBITAL ELEMENTS OF THE EARTH-MOON SYSTEM AND GENERAL RELATIVITY PARAMETERS.

HELIO-S A. NEUBAUER

INVESTIGATION NAME: COSMIC-RAY PARTICLES

NSSDC 19- 74-007A-07  INVESTIGATIVE PROGRAM CODE STICO-0P
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL

BRIEF DESCRIPTION
THE OBJECTIVE OF THE EXPERIMENT WAS TO STUDY HIGH-ENERGY CHARGED COSMIC-RAY PARTICLES OF SOLAR, PLANETARY, AND GALACTIC ORIGIN IN INTERPLANETARY SPACE. THE MEASUREMENTS WERE MADE WITH TWO PARTICLE DETECTORS, ONE AT THE ELECTRON AND THE OTHER AT THE PROTON DETECTOR. THE ELECTRON DETECTOR MEASURED PARTICLES BETWEEN 0.5 TO 1.0 AU WITH AN ENERGY OF 0.5 TO 1.0 MEV. THE PROTON DETECTOR MEASURED PARTICLES BETWEEN 0.5 TO 1.0 MEV WITH AN ENERGY OF 0.5 TO 1.0 MEV. THE EXPERIMENT WAS DESIGNED TO STUDY THE VARIATIONS OF THE MAGNETIC FIELD IN THE SOLAR WIND. FOR FURTHER INFORMATION SEE P 231-232 OF "RAUMFAHRTFORSCHUNG." 1975.
BRIEF DESCRIPTION
The spacecraft was designed to investigate the magnetic component of electromagnetic waves in the solar wind from 0.3 to 0.5 AU. By means of its waveforms channel, the rapid variations of the magnetic field were measured and a number of magnetic field components in the ecliptic plane and perpendicular to it. To obtain the power spectral density, a channel was selected for each channel number. A logarithmically spaced channel in the range from 0.7 to 2000 Hz was used to detect large amounts of data. The data obtained by this experiment is a variable number of data reduction was applied. For analysis of the data, the upper limit was set at 8.0 per cent of the power for each channel. The results of this experiment. The spacecraft was designed to observe a number of events detected by the spacecraft. The spacecraft was designed to observe a number of events detected by the spacecraft.
BRIEF DESCRIPTION
This experiment shared the 32-M Hz-to-Hz dipole antenna with experiments -05 and -06, the instrument consisted of 15-channel spectrum analyzer. The channels had center frequencies for the channels from 31 Hz to 1178 KHz, and the level from 31 Hz to 1178 kHz, and bandwidths of 20 percent for the remaining channels. These channels overlapped so as to provide a continuous frequency coverage for the range of about 20 Hz to 200 KHz. The log compressors had a usable range of 100 dB, sampling rate was for each channel, the fastest real-time averaging of 16 peak values was everywhere 1,125 s. Whenever a very strong signal was detected a pre-selected channel was included in the electronic field spectrum, magnetic field, and plasma data. The spacecraft memory was used for a period starting before and terminating after the triggering signal time. The maximum sampling rate of the spectrum data in this mode was 14,240 samples per second. This channel performed primarily in the lowest 10 channels which was caused by solar cell noise, and harmonics related to the spin frequency and the spacecraft shaft. However, a combination of factors, including the proper deployment of the dipole antenna and the conduction of the spacecraft coating, resulted in data from this spacecraft being of inferior quality than data from HELIOS-B.

INVESTIGATIVE NAME: COARSE FREQUENCY, TIME RESOLUTION SPECTRUM ANALYSIS
INVESTIGATIVE PROGRAM CODE SICO-0P
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
IONOSPHERES AND RADIO PHYSICS
PERSONNEL
PI - R.A. Gurnett U of IOWA
O1 - P.J. Kellogg U of MINNESOTA
O2 - J.A. Bauer NASA-GSFC
O1 - R.G. Stone NASA-GSFC

--- HELIOS-B: Gurnett ---

--- HELIOS-B: Keppler ---

INVESTIGATIVE NAME: ELECTRONIC ELECTRODE SPECTRP
INVESTIGATIVE PROGRAM CODE SICO-0P
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
IONOSPHERES AND RADIO PHYSICS
PERSONNEL
PI - E. Keppler MPI-AERONOMY
O1 - R. Wilken MPI-AERONOMY
O1 - B.J. Williams NASA-ERL

--- HELIOS-B: Keppler ---

--- HELIOS-B: Kunert ---

INVESTIGATIVE NAME: CELESTIAL MECHANICS
INVESTIGATIVE PROGRAM CODE SICO-0P
INVESTIGATION DISCIPLINE(S)
CELESTIAL MECHANICS
ASTRONOMY
PERSONNEL
PI - W. Kunert U of HAMBURG
O1 - M.G. Melbourne NASA-JPL

--- HELIOS-B: Kunert ---

--- HELIOS-B: Kurop ---

INVESTIGATIVE NAME: COSMIC-RAY PARTICLES
INVESTIGATIVE PROGRAM CODE SICO-0P
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
PERSONNEL
PI - H. Kurop U of KIEL
O1 - G. Webers R U of KIEL
O1 - G. Green U of KIEL
O1 - M. Muller-Mellin U of KIEL
O1 - M. Witte U of KIEL
O1 - H. Hempe U of KIEL
The objective of the experiment was to study high-energy charged cosmic-ray particles of solar, planetary, and galactic origin in interplanetary space. The instrument contained 35 square photosensitive phosphor plates with energies of 1.3, 5, and 9.3 MeV, and 21 square photosensitive phosphor plates with energies of 1.3, 5, and 9.3 MeV. The instrument was mounted on a 2.1-m boom to make magnetic field measurements up to 4 Hz. Data from each axis were sent through a filter with the 30 attenuation point at 4 Hz. Depending on the telemetry format and bit rate, the data were fed either into a time-averaging computer or directly connected to telemetry. A shock identification computer triggered the storage of rapid-rate data in the spacecraft memory when there were discontinuities in the variations of the antenna. The instrument was equipped with a flipper mechanism, which was used to determine the spin axis orientation.

For detailed information, see P. 252 of "Raumfahrtforschung." 1975.

-- HEOS II, ELLIOT--

INVESTIGATION NAME- FLUXGATE MAGNETOMETER
NSDC ID- 82-19502
INVESTIGATIVE PROGRAM
SCIENCE
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PI - P.C. HEDGECOCK IMPERIAL COLLEGE
01 - P.C. HEDGECOCK IMPERIAL COLLEGE

BRIEF DESCRIPTION
This Experiment was designed to measure magnetic fields in the range plus or minus 0.25 gamma with a resolution of 0.25 gamma. Using a 30°-mode fluxgate magnetometer, the HEOS II spacecraft launched into a highly eccentric orbit (1.2 Earth radii, 1.2-0.8 Earth radii). The spacecraft measured magnetic fields within the magnetotail and the transition regions and interplanetary regions. The magnetometer operated continuously for 16 months, during which time 36 different types of events were observed.

-- HEIMES, KEER--

INVESTIGATION NAME- SPACECRAFT COMMON
NSDC ID- 82-004
INVESTIGATIVE PROGRAM
COOPERATIVE APPLICATIONS CTI
PERSONNEL
PI - KEER

BRIEF DESCRIPTION
This Experiment involved investigation of practical techniques for use of the satellite communications systems being tested. It included communications techniques for use in medicine, education, community development, and data transmission. It also included demonstration of compatible different organizations have been approved by a joint working group, which approved and coordinated Canadian and U.S. experiments for this satellite equipment.
INVESTIGATION NAME- SOLAR ARRAY TECHNOLOGY EXPERIMENT (SATE)
INVESTIGATIVE PROGRAM
INVESTIGATION DISCIPLINES

PERSONNEL

PI - F.R. VIGNERON
COMMUNITY RESEARCH CENTRE

BRIEF DESCRIPTION

This experiment was to study the mechanical, dynamic, and electrical properties of a new type of extendable solar array over an extended time period. The two 1.3-m x 0.5-m arrays were unfurled from their packs by unfurling a supporting tube that was attached to the extremity of the array.

INVESTIGATION NAME- ATTITUDE CONTROL SYSTEM EXPERIMENT (ACS)
INVESTIGATIVE PROGRAM
INVESTIGATION DISCIPLINES

PERSONNEL

PI - F.R. VIGNERON
COMMUNITY RESEARCH CENTRE

BRIEF DESCRIPTION

This was a technology experiment to evaluate the dynamics of spacecraft mechanical flexibility on any attitude control system operation and to demonstrate that attitude control function performance is in accordance with stability and control theory.

INVESTIGATION NAME- MEASUREMENT OF SOLAR PLASMA
INVESTIGATIVE PROGRAM
INVESTIGATION DISCIPLINES

PERSONNEL

PI - H.J. BRIDGE
MASS INST OF TECH

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 stilbene 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 Csl 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 were recorded in eight angular sectors between 15 degrees. 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).

INVESTIGATION NAME- MEASUREMENT OF COSMIC-RAY SOLAR AND MAGNETOSPHERIC ELECTRONS
INVESTIGATIVE PROGRAM
INVESTIGATION DISCIPLINES

PERSONNEL

PI - T.L. CLINE
NASA-GSFC

BRIEF DESCRIPTION

This experiment measured galactic and solar electrons and positrons in the geocentric range 10 to 40 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 stilbene 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 Csl 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 were recorded in eight angular sectors between 15 degrees. 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).
INVESTIGATION NAME: IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV
NSDC ID: 72-0734-53 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - G. GLECKLER U OF MARYLAND
O1 - T.F. ARMSTRONG U OF ARIZONA
O1 - O.K. HOVESTADT MP-EXTATARR PHYS

BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF ION-ENERGY PARTICLES ASSOCIATED WITH SOLAR ACTIVITY AND INTERPLANETARY PROCESSES. THE DETECTORS WERE (1) A MAGNETIC ANALYZER TO SELECT PARTICLES OF THE DESIGNATED ENERGY PER CHARGE COMBINED WITH AN ARRAY OF HARRAMETROX SOLID-STATE DETECTORS TO DETECT THE ENERGY LOSS AND SURROUNDED BY AN ANTICOLLISION SHIELDING AND (2) A PARTICLE TELESCOPE CONSISTING OF A SILICON SURFACE BARREL DETECTOR AND A FLAT TWO-COMPARTMENT PROPORTIONAL COUNTER ENCLOSING AN ELECTRONIC TELESCOPE CUP. THE EXPERIMENT MEASURED PARTICLE ENERGIES FROM 0.1 TO 2 MEV PER CHARGE IN 12 BANDS AND UNIQUELY IDENTIFIED IONS AND ELECTRONS AS WELL AS NEUTRALS WITH CHARGES OF 2 TO 8 (CHARGE GROUP RESOLUTION FOR 2 BETWEEN 9 AND 28). 3953-CHANNEL S/N HEIGHT ANALYZERS, ONE FOR EACH DETECTOR OF THE TELESCOPE, WERE INCLUDED IN THE EXPERIMENT PAYLOAD. THE TELESCOPE FAILED ON NOVEMBER 12, 1969, WHEN THE WINDOW ON THE PROPORTIONAL COUNTER WEAKENED AND BURST DUE TO EXPOSURE TO VACUUM RADIATION.

INVESTIGATION NAME: CHARGED PARTICLE MEASUREMENTS EXPERIMENT
NSDC ID: 72-0734-30 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - S.M. KREINIGS APPLIED PHYSICS LAB
O1 - J.A. VAN IOWA

BRIEF DESCRIPTION
THREE SOLID-STATE DETECTORS IN AN ANTICOLLISIONS PLASTIC SCINTILLATION DETECTORS OBTAINED OBSERVATIONS BETWEEN 0.2 AND 2.5 MEV PROTONS BETWEEN 0.3 AND 500 MEV ALPHA PARTICLES BETWEEN 2 AND 0 WITH ENERGIES GREATER THAN 8 MEV, HEAVY PARTICLES WITH 2 TO 8 WITH ENERGIES GREATER THAN 8 MEV. HEAVY PARTICLES WITH 2 TO 10 WITH ENERGIES GREATER THAN 8 MEV. INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON. ALL WITH DYNAMIC RANGES OF 1 TO 1 MILLION (FOR 24 CM-1-STER). FIVE THIN WINDOW GEIGER-MUeller TUBES OBTAINED OBSERVATIONS OF ENERGIES GREATER THAN 100 MEV. PROTONS OF ENERGIES GREATER THAN 250 KEV AND X-RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 ALL WITH A DYNAMIC RANGE OF 10 TO 1 MILLION (FOR 24 CM-1-STER). PARTICLES AND X-RAYS PRIMA-LY OF SOLAR ORIGIN WERE OBSERVED, BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT PERMITTED COSMIC RAYS AND MOUNTAIN PARTICLES TO BE OBSERVED.

INVESTIGATION NAME: SOLAR AND COSMIC-RAY PARTICLES
NSDC ID: 72-0734-00 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - F.B. MCDONALD NASA-GSFC
O1 - J.R. TEGEENAN NASA-GSFC

BRIEF DESCRIPTION
THE GSFC COSMIC-RAY EXPERIMENT MEASURED ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTION OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVY PARTICLES UP TO 2 X 10^19. DESIGN AND OPERATION OF THE BEAMS USED WERE THE SAME. THE FIRST SYSTEM CONSISTED OF A PAIR OF SOLAR-STATE TELESCOPES THAT MEASURED IONS ABOVE 1,000 KEV AND 200 MEV ALPHA PARTICLES 350 AND ABOVE 0.5, 1.5, 2, 5, 10, 15, AND 25 MEV. ALPHA PARTICLES. THE SECOND SYSTEM WAS A FLYING SCATTER TELESCOPE PERPENDICULAR TO THE SPIN AXI. THIS TELESCOPE MEASURED NUCLEI FROM 1 TO 16 WITH ENERGIES BETWEEN 4 AND 30 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5- TO 16 MEV/NUCLEON RANGE WITH NO CHARGE RESOLUTION WERE DIFFERENT DEPENDENT ON THE SENSORS. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT COSMIC SCINTILLATION TELESCOPE WHOSE AXI WAS AN ANGLE OF 30 DEG WITH RESPECT TO THE SPIN AXI. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND NUCLEI FROM 1 TO 30 IN THE ENERGY RANGE 20 TO 300 MEV/NUCLEON.

PARTICLES BELOW 80 MEV. THIS INSTRUMENT ACTED AS A DEFLECTOR DETECTOR. ABOVE 80 MEV, IT ACTED AS A DISCRIMINATING PROTON DEFLECTOR DETECTOR IN WHICH THE PROPORTIONAL COUNTER WAS USED TO DIVIDE CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR SYSTEM INTO EIGHT ANGULAR SECTORS.

INVESTIGATION NAME: SOLAR WIND ION COMPOSITION
NSDC ID: 72-0734-12 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - E.W. OGILVIE NASA-GSFC

BRIEF DESCRIPTION

INVESTIGATION NAME: PLASMA WAVE
NSDC ID: 72-0734-31 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - F.L. SCARB RW SYSTEMS GROUP
O1 - G.M. CROOK G.S.F.C.
O1 - J.M. GREEN NASA-GSFC
O1 - M.W. FREDDERICKS TWM SYSTEMS GROUP

BRIEF DESCRIPTION
ELECTRIC FIELD COMPONENTS PERPENDICULAR TO THE SPACECRAFT SPIN AXI AND THE MAGNETIC FIELD COMPONENT PARALLEL TO THE SPIN AXI WERE MEASURED BY AN ELECTRIC Dipole ANTENNA AND A SEARCH COIL MAGNETICIAN. BOTH SENSORS WERE MOUNTED ON A 3.05-M ROD. DATA WERE OBTAINED IN EIGHT FREQUENCY CHANNELS FROM 10 TO 10000 KH. IN EACH THE NORMAL MODE OF THE SATELLITE, TWO CHANNELS CENTERED AT 67 AND 680 Hz. HAD 10-0B SAMPLE POINTS OF 17 AND 150 Hz, AND 220 AND 810 Hz. RESPECTIVELY. THE REMAINING SIX CHANNELS WERE NARROW-BANDWIDTH CHANNELS CENTERED AT 1.3 TO 5.3, 10.5, 30, AND 100. IN THE NORMAL MODE, THE SATELLITE WAS ORIENTATED AS A SATELLITE SPINNING AT 60 DEG PER SECOND, WHEN AN ELECTRIC FIELD PROBABLE WOULD BE OBSERVED.

INVESTIGATION NAME: SOLAR PLASMA HIGH-FREQUENCY LOW-1 ISOTOPE
NSDC ID: 72-0734-07 INVESTIGATIVE PROGRAM CODE ST
INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS
PERSONNEL
PI - M. SIMPSON NASA-GSFC

BRIEF DESCRIPTION
THE EXPERIMENT WAS A THREE-ELEMENT COSMIC SCINTILLATION TELESCOPE WHOSE AXI WAS AN ANGLE OF 30 DEG WITH RESPECT TO THE SPIN AXI. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND NUCLEI FROM 1 TO 30 IN THE ENERGY RANGE 20 TO 300 MEV/NUCLEON. FOR
GREATERTHAN

GREATERTHAN

MAGNET. THE ADDITIONAL SOLITATION STATE DETECTORS WERE USED TO MAGNETICALLY NOISE (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS 30 "Ev/N.

0.64 S INTERVAL AS FIXED BY A FIVE-LEVEL PRIORITY SYSTEM. THE 3-MEV ELECTRONS (6) 1.2- TO 2.4-IIEV/N NUCLEI (7) 4- TO 0 ION DESCRIPTION

THREE-ELEKENT TELESCOPE CONFIGURATION EMPLOYING SOLITATION CHARGED PARTICLES GREATER THAN 15 KEV, (4) ALPHA PARTICLES FROM 30 KEV TO GREATER THAN 150 KEV IN THREE RANGES, (J) OF 11 COLLINEAR, FULLY GALACTIC ELECTRONS, POSITRONS, AND HELIUM, AND TO SOLID DISKS. THIS ARRANGEMENT GAVE NAIIIOIi GEOMETRY ELEMENT DETECTOR WITH A 70-DEG. FULL-ANGLE ACCEPTANCE CONE. THE FIRST ELECTRON WAS PULSE-HEIGHT-AWARE AND DATA WERE STORED BY SECTORS.

INVESTIGATION NAME- ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES

NISSC ID- 72-0734-06 INVESTIGATIVE PROGRAM CORE D1 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - E.K. STONE CALIF INST OF TECH 01 - R.E. VOOT CALIF INST OF TECH

BRIEF DESCRIPTION

THE EXPERIMENT WAS DESIGNED TO MEASURE SOLAR AND GALACTIC ELECTRONS, POSITIONS, AND NUCLEI. AND TO SEPARATE ISOTOPES THROUGH OSMOMETER. THE ENERGY RANGES COVERED WERE 0.01 TO 100 MEV ELECTRONS (0.16 TO 2 MEV NUCLEI) AND ABOUT 1 TO 40 MEV/N NUCLEI. THE INSTRUMENT WAS A TELESCOPE CONSISTING OF 156 DETECTORS FULLY DEPLOYED ON A SCIENTIFIC SURFACE BERAFTER THE DETECTORS INSIDE A PLASTIC SCINTILLATOR ANTICOINCIDENCE SHIELD. THE DETECTORS WERE DISKS. THIS ARRANGEMENT GAVE NARROW GEOMETRY SENSITIVITY (ANNUAL SENSORS) AND WIDE GEOMETRY SENSITIVITY WITH HALF-ANGLE ACCEPTANCE CONE OF ABOUT 24 AND 30 DEG. THE TELESCOPE AND LIGHT PROFILE AT SELECT SPACESTATE WAS SCHEMATICALLY INCLUDED TO PERMIT SAMPLING OF LESS ABUNDANT PARTICLE SPECIES UNDER NORMAL AND SOLAR-UANE CONDITIONS. THE LOW-ENERGY TELESCOPE WAS ESSENTIALLY A TWO-ELEMENT SHIELD-EXPLOITATION DETECTOR WITH A 75-DEG. FULL-ANGLE ACCEPTANCE CONE. THE FIRST ELECTRON WAS PULSE-HEIGHT-AWARE AND DATA WERE STORED BY SECTORS.

INVESTIGATION NAME- ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES

NISSC ID- 72-0734-05 INVESTIGATIVE PROGRAM CORE D5 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - J.R. WILLIAMS NASA-ERL 02 - J.J. NOHON APPLIED PHYSICS LAB 01 - J.E. TAYLOR NASA-GSFC

BRIEF DESCRIPTION

THE COINCIDENCE MODE CHOOSED FOR PULSE HEIGHT ANALYSIS IN ANY 0.04 S INTERVAL WAS FIXED BY A FIVE-LEVEL PRIORITY SYSTEM. THE PRINCIPAL CONTRIBUTORS TO EACH COINCIDENCE MODE RATE WERE (1) 0.1- TO 3-MEV ELECTRONS AND 1- TO 43-MEV NUCLEI, (2) 3- TO 5-MEV ELECTRONS AND 15- TO 43-MEV/N NUCLEI, (3) NEUTRALS, SUCH AS GAMMA RAYS, (4) 0.1- TO 3-MEV NUCLEI, (5) 3- TO 5-MEV ELECTRONS, (6) 1.2- TO 2.4-MEV/N NUCLEI, (7) 4- TO 10-MEV ELECTRONS, AND (8) ELECTRONS ABOVE 3 MEV AND NUCLEI ABOVE 10 MEV/N.

INVESTIGATION NAME- ENERGETIC ELECTRONS AND PROTONS

NISSC ID- 72-0734-05 INVESTIGATIVE PROGRAM CORE D5 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - J.R. WILLIAMS NASA-ERL 02 - J.J. NOHON APPLIED PHYSICS LAB 01 - J.E. TAYLOR NASA-GSFC

BRIEF DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WERE (1) TO STUDY THE PROPAGATION SOLAR COORDINATES THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW, (2) TO STUDY ELECTRON AND PROTON PATHS THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNETOSPHERE, AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENT CONSISTED OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLAR-EARTH DETECTORS AND A MAGNET TO DELECT ELECTRONS. TWO SIZE-MOUNTED DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET. ADDITIONAL SOLAR-EARTH DETECTORS WERE USED TO DETECT THE ELECTRONS DELECTED BY THE MAGNET.

INVESTIGATION NAME- MEASUREMENT OF SOLAR PLASMA

NISSC ID- 72-0748-10 INVESTIGATIVE PROGRAM CORE D1 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - J.J. BANE LOS ALAMOS SCI LAB 01 - J.R. ASBRODGE LOS ALAMOS SCI LAB

BRIEF DESCRIPTION

THE INSTRUMENT WAS DESIGNED TO MEASURE AMBIENT ELECTRIC FIELD IN THE SOLAR WIND AND THE EARTHS MAGNETOSHEATH UP TO 1 N/A. IN FREQUENCY. THE SENSOR CONSISTED OF A PAIR OF 70-M WIRE ANTENNAS (ISO M. 119-TO-1019), WHICH WERE HELD RIGID BY CENTRIFUGAL FORCE DUE TO SATELLITE SPIN (ABOUT 24 RPM). THE WIRES WERE INSULATED FROM THE PLASMA, EXCEPT FOR THEIR SHORT OUTER SECTIONS, TO REMOVE THE ACTIVE PROBLEM AREA FROM THE SPACECRAFT SHEATH. THE ANTENNA SERVED AS A DOUBLE FLOATING ELECTRODE, THE DC ELECTRIC FIELD PROJECTED INTO THE PLANE PERPENDICULAR TO THE SPIN AXIS (THE ECLIPTIC PLANE) AND THE MEASUREMENTS WERE OBTAINED EVERY 1/4 SPACECRAFT REVOLUTION (ABOUT 0.75 S). THE DATA WERE OBTAINED USING SEVEN OF 50 PERCENT BANDWIDTH FILTERS WITH CENTER FREQUENCIES LOGARITHMICALLY SPACED FROM 3 TO 4800 WPM. THE LOW-ENERGY CHANNELS HAD AN INTRINSIC SENSITIVITY OF 1.0E-5 V/M AND A PEAK RANGE OF 1.0E-2 V/M. HOWEVER, THE EFFECTIVE LOW-FREQUENCY FILTER TRUSTHOLD WAS DETERMINED BY INTERFERENCE DUE TO HARMONICS OF THE SPACECRAFT SPINNING WITHIN AN ASYMPTOMATIC SHEATH. THE GREAT AMPLIFICATION WAS ALSO DUE TO SHEATH EFFECTS, WHICH ENERGIZE THE ELECTRON PLASMA. THE SHEATH OVERLAPPED THE ACTIVE ANTENA PORTIONS AND PRECLUDED MEASUREMENTS OF AMBIENT CONDITIONS.

INVESTIGATION NAME- MEASUREMENT OF SOLAR PLASMA

NISSC ID- 72-0748-11 INVESTIGATIVE PROGRAM CORE D1 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - T.L. AGGSON NASA-GSFC 01 - J.P. HEPPENER NASA-GSFC

BRIEF DESCRIPTION

THE INSTRUMENT WAS DESIGNED TO MEASURE AMBIENT ELECTRIC FIELD IN THE SOLAR WIND AND THE EARTHS MAGNETOSHEATH UP TO 1 N/A. IN FREQUENCY. THE SENSOR CONSISTED OF A PAIR OF 70-M WIRE ANTENNAS (ISO M. 119-TO-1019), WHICH WERE HELD RIGID BY CENTRIFUGAL FORCE DUE TO SATELLITE SPIN (ABOUT 24 RPM). THE WIRES WERE INSULATED FROM THE PLASMA, EXCEPT FOR THEIR SHORT OUTER SECTIONS, TO REMOVE THE ACTIVE PROBLEM AREA FROM THE SPACECRAFT SHEATH. THE ANTENNA SERVED AS A DOUBLE FLOATING ELECTRODE, THE DC ELECTRIC FIELD PROJECTED INTO THE PLANE PERPENDICULAR TO THE SPIN AXIS (THE ECLIPTIC PLANE) AND THE MEASUREMENTS WERE OBTAINED EVERY 1/4 SPACECRAFT REVOLUTION (ABOUT 0.75 S). THE DATA WERE OBTAINED USING SEVEN OF 50 PERCENT BANDWIDTH FILTERS WITH CENTER FREQUENCIES LOGARITHMICALLY SPACED FROM 3 TO 4800 WPM. THE LOW-ENERGY CHANNELS HAD AN INTRINSIC SENSITIVITY OF 1.0E-5 V/M AND A PEAK RANGE OF 1.0E-2 V/M. HOWEVER, THE EFFECTIVE LOW-FREQUENCY FILTER TRUSTHOLD WAS DETERMINED BY INTERFERENCE DUE TO HARMONICS OF THE SPACECRAFT SPINNING WITHIN AN ASYMPTOMATIC SHEATH. THE GREAT AMPLIFICATION WAS ALSO DUE TO SHEATH EFFECTS, WHICH ENERGIZE THE ELECTRON PLASMA. THE SHEATH OVERLAPPED THE ACTIVE ANTENA PORTIONS AND PRECLUDED MEASUREMENTS OF AMBIENT CONDITIONS.

INVESTIGATION NAME- ELECTROSTATIC FIELDS

NISSC ID- 73-0768-21 INVESTIGATIVE PROGRAM CORE D1 INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PI - T.L. AGGSON NASA-GSFC 01 - J.P. HEPPENER NASA-GSFC
FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND FROM 20 KEV TO 200 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (15 PERCENT SPACING, 1 PERCENT RESOLUTION) ON THE MAGNETOSTATIC. POSITIVE IONS FROM 200 EV TO 20 KEV (150 PERCENT SPACING, 15 PERCENT RESOLUTION) AND FROM 20 KEV TO 200 KEV (15 PERCENT RESOLUTION) STUDIED.

------ IMP-J. BRIEGLEB---

INVESTIGATION NAME: MEASUREMENT OF SOLAR PLASMA

NSSDC ID: 73-078A-02 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINES

PARTICLES AND FIELDS

PERSONNEL

PI - D.A. BURNEE U OF I
01 - J.J. LINDAR U OF IOWA
02 - G.W. PFEIFER U OF IOWA

BRIEF DESCRIPTION


------ IMP-J. J. KIRKIS---

INVESTIGATION NAME: CHARGED PARTICLE MEASUREMENTS EXPERIMENT

NSSDC ID: 73-078A-06 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINES

PARTICLES AND FIELDS

PERSONNEL

PI - L.M. KRIMMIS APPLIED PHYSICS LAB
01 - T.C. ERASMUS OF KANSAS
02 - L.A. VAN ARDEN U OF IOWA

BRIEF DESCRIPTION

THE THREE SOLID-STATE DETECTORS IN AN ANTI-COINCIDENCE PLASTIC SCINTILLATOR OBSERVED ELECTRONS BETWEEN 0.2 AND 2.5 MEV, HEAVY PARTICLES OF 2.0 AND 200 MEV, AND 200 MEV HEAVY PARTICLES WITH VALUES RANGING FROM 1 TO 5 TIMES ENERGIES GREATER THAN 32 KEV AND BETWEEN 6 AND 8 TIMES ENERGIES GREATER THAN 32 KEV. INTEGRAL PROTONS AND ALPHAS WITH ALPHAS GREATER THAN 30 MEV/NUCLEON, ALL WITH WAVE LENGTHS BETWEEN 1 TO 1 MILLION (PER SQ-CM-STER). FIVE THIN WATERS GORE-PEARL TUBES CAN OBSERVE ELECTRONS UNDER 3 KEV. PROTONS UNDER 32 KEV, AND 3-NAYS WITH WAVE LENGTHS BETWEEN 1 TO 10 MEV/NUCLEON, ALL WITH WAVE LENGTHS BETWEEN 1 TO 10 MILLION (PER SQ-CM-STER), PARTICLES AND X-RAYS PRIMARILY OF SOLAR ORIGIN WERE STUDIED. THE TELESCOPE WAS USED FOR THE DEVELOPMENT OF AN INSTRUMENT PERMITTED OBSERVATION OF COSMIC RAYS AND MAGNETOTOTAL CARRIERS. OBSERVED.

------ IMP-J. MCWIND---

INVESTIGATION NAME: SOLAR AND COSMIC-RAY PARTICLES

NSSDC ID: 73-078A-12 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINES

PARTICLES AND FIELDS

PERSONNEL

PI - T.A. MCWIND NASA-GSFC
01 - C.E. HAGUE UNKNOWN
02 - G.J. GURNEY NASA-GSFC

BRIEF DESCRIPTION

THE GOM-COSMIC-RAY EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGIES OF PARTICLES AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, AND CHARGED PARTICLES OBSERVED DURING SOLAR FLARES AND 26-DAY RECURRENT EVENTS. THE ELECTRONS OBSERVING ELECTRONS WITH 1 ANGULAR RESOLUTION IN THE 0.5- TO 4-NUCLEON RANGE. WITH NO CHARGE RESOLUTION, MEASURED 1 TO 60 NUCLEI IN THE 1.2- TO 1.5-NUCLEON RANGE. CARRIERS. OBSERVED.
null
IN THE STORAGE MODE.

DESCRIPTION

SENSORS FOR MEASURING ELECTRO-, TEMPERATURES ALONG AND THE MEASUREMENT IS ABOUT 10 K IN THE REAL-TIME MODE AND 500 K GROUND-BASED OBSERVATIONS.

LOW-FREQUENCY (ELF) AND VERY HIGH-FREQUENCY STUDIES (VHF) PROJECT INVOLVING SCIENTIFIC PERSONNEL.

WIDEBAND TAPE RECORDER (0.05-15 KHz). A LARGE NUMBER OF PERSONNEL MEASURED.

PERSONNEL

PI - F. KRICK
PI- F. KRICK

THE EXPERIMENTERS CALCULATED TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH FROM SATELLITE TO GROUND AND OBSERVED IONOSPHERIC IRREGULARITIES AND SCINTILLATIONS.

SPACEROTA COMMON NAME- INTERCOSMOS 14 ALTERNATE NAMES- IC-14

NSSDC 10- 75-115A

LAUNCH DATE- 12/17/75

WEIGHT- KG

SPONSORING COUNTRY/AGENCY U.S.S.R., INTERCOS

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOSTATIONARY

EPIDOC DATE- 12/17/75

PERSONNEL

PI - UNKNOWN
PI- J.I. LATHER

BRIEF DESCRIPTION

THE SPACECRAFT WAS A CONTRIBUTION TO THE INTERNATIONAL MARGENTIC STUDY (IMSS) PROGRAM INVOLVING THE SCIENTIFIC COMMUNITY OF SOCIALIST COUNTRIES. THE SPACECRAFT CONTAINED FIELD EXPERIMENTS TO MEASURE, FOR EXAMPLE, VARIATION OF IONOSPHERIC AND TERRESTRIAL DATA FROM A FOUR-COMPONENT ELF/VLF RECEIVER AND AN ELECTRON TEMPERATURE INSTRUMENT. THE DATA SYSTEM INCLUDES A GENERATOR AND A COMPUTER WHICH PERFORMS ANALYSIS FOR ELF/VLF EMISSIONS. THE ELECTRIC FIELD RECEIVERS HAVE TWO ANALOGUOUS FILTERS AT 0.72 AND 1.0 KHz, SELF AND MUTUAL INTERFERENCE OF THE SPHERICAL PROBE ELECTRIC ANTENNAS ARE MEASURED.

PERSONNEL

PI - J.I. LATHER
PI- F. KRICK

THE INSTRUMENT IS A BEACON TRANSMITTER THAT RADIATES AT THE FOUR COHERENT FREQUENCIES - 20.004 MHz, 40.008 MHz, 100.016 MHz, AND 300.072 MHz - AND IS USED TO MEASURE TOTAL ELECTRON CONTENT BETWEEN THE SPACECRAFT AND A GROUND RECEIVING STATION.

SPACEROTA COMMON NAME- ISIS 1 ALTERNATE NAMES- ISIS 1-0369

NSSDC 10- 69-009A

LAUNCH DATE- 01/30/69

WEIGHT- 532.6 KG

SPONSORING COUNTRY/AGENCY USA

UNITED STATES

NSSDC 10- 75-115A-03

INVESTIGATIVE PROGRAM INTERCOSMOS

INVESTIGATIVE DISCIPLINE(s) PARTICLES AND FIELDS

PARTICLES AND FIELDS

MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - G.I. DRALEVICH
PI- K.G. SERAFIMOV

THE EXPERIMENT CONSISTS OF TWO SPHERICAL ION TRAPS LOCATED TO DETERMINE DENSITY, C-REASURES FROM OPPOSITE POINTS ON THE SPACECRAFT BODY TO REMOVE SPACECRAFT VELOCITY EFFECTS ON THE MEASUREMENT OF POSITIVE ION DENSITY. THE SPATIAL RESOLUTION OF THE PROBE ELECTRIC FIELD IS ABOUT 10 M IN THE REAL-TIME MODE AND 500 M IN THE STORAGE MODE.

INVESTIGATION NAME- SPHERICAL ION TRAPS

NSSDC 10- 75-115A-01

INVESTIGATIVE PROGRAM INTERCOSMOS

INVESTIGATIVE DISCIPLINE(s) PARTICLES AND FIELDS

PARTICLES AND FIELDS

MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.I. DRINKA
PI- J.J. SCHMILAUER

THE INSTRUMENT HAS TWO PLAT CONDUCTORS PERPENDICULAR TO THE GEOMAGNETIC FIELD. THE DYNAMIC RANGE OF THE INSTRUMENT IS ABOUT 10 K IN THE REAL-TIME MODE AND 500 K GROUND-BASED OBSERVATIONS.

INVESTIGATION NAME- PERPENDICULAR AND PARALLEL ELECTRON TEMPERATURE

NSSDC 10- 75-115A-02

INVESTIGATIVE PROGRAM INTERCOSMOS

INVESTIGATIVE DISCIPLINE(s) PARTICLES AND FIELDS

MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.I. DRINKA
PI- J.J. SCHMILAUER

THE INSTRUMENT HAS TWO PLAT MUTUALLY PERPENDICULAR SENSORS FOR MEASURING ELECTRON TEMPERATURES ALONG AND PERPENDICULAR TO THE GEOMAGNETIC FIELD. THE TEMPERATURE IS ABOUT 10 K IN THE REAL-TIME MODE AND 500 K GROUND-BASED OBSERVATIONS.

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INVESTIGATIVE DISCIPLINE(s) PARTICLES AND FIELDS

MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.I. DRINKA
PI- J.J. SCHMILAUER

THE INSTRUMENT HAS TWO PLAT MUTUALLY PERPENDICULAR SENSORS FOR MEASURING ELECTRON TEMPERATURES ALONG AND PERPENDICULAR TO THE GEOMAGNETIC FIELD. THE TEMPERATURE IS ABOUT 10 K IN THE REAL-TIME MODE AND 500 K GROUND-BASED OBSERVATIONS.
BRIEF DESCRIPTION

ISIS 1 was an ionospheric observatory instrumented with two 23 cm fixed-frequency electroscopes, a VLF receiver, energetic and soft particle detectors, an ion mass spectrometer, and an electric field system. The VLF receiver was used to detect signals received by the 23 cm dipole (split monopole antenna). The probes were 300 kV and 30V, respectively. The satellite was spin-stabilized at about 2.9 rev/min. A soft particle probe with a 100 MHz cut-off was located at the top of the satellite. The electron and ion concentrations were measured by the VLF receiver and by the ion mass spectrometer, respectively. The satellite was spin-stabilized at about 2.9 rev/min. A soft particle probe with a 100 MHz cut-off was located at the top of the satellite. The electron and ion concentrations were measured by the VLF receiver and by the ion mass spectrometer, respectively.

IGRATING NAME - VLF RECEIVER

NSSDC ID - 69-D004-05

INVESTIGATIVE PROGRAM CODE 01-5-C-05

INVESTIGATIVE DISCIPLINE(S) IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI - R. B. BARRINGTON

01 - F. M. PALMER

COMMUN RESEARCH CENTRE

BRIEF DESCRIPTION

The VLF experiment was low-frequency, broadband receiver that received signals received by the IPP dipole (split monopole antenna). A probe was used to detect signals received by the 23 cm dipole (split monopole antenna). The probes were 300 kV and 30V, respectively. The satellite was spin-stabilized at about 2.9 rev/min. A soft particle probe with a 100 MHz cut-off was located at the top of the satellite. The electron and ion concentrations were measured by the VLF receiver and by the ion mass spectrometer, respectively. The satellite was spin-stabilized at about 2.9 rev/min. A soft particle probe with a 100 MHz cut-off was located at the top of the satellite. The electron and ion concentrations were measured by the VLF receiver and by the ion mass spectrometer, respectively.

BRIEF DESCRIPTION

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BRIEF DESCRIPTION

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Brief Description:

This experiment used the sweep frequency ionosonde receiver to measure the electric field of galactic and solar radio noise levels. The receiver swept from 0.1 to 100 MHz. The dynamic range was 30 dB, and the bandwidth was 55 kHz. The antennas used were 54.3-km and 73.15-km dipoles.

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Investigation Name: Galactic and Solar Radio Noise Levels

Investigative Program:

Code: 69-OUDA-06

Investigation Discipline(s):

Ionospheres and Radio Physics

Particles and Fields

Personnel:

P1 - J.G. McIarnick Natural Resources Council of Canada
P2 - J.R. Humous Natural Resources Council of Canada
P3 - G.C. Rosen Natural Resources Council of Canada

Brief Description:

This experiment consisted of four sets of detectors. The first set, consisting of four Geiger counters, measured electrons greater than 20 and 40 keV and protons greater than 300 and 500 keV. Parallel and perpendicular to the satellite spin axis, all remaining detectors measured particles perpendicular to the spin axis. The second set consisted of cold-plate silicon junction detectors. These respond to electrons greater than 20 and 40 keV, electrons in the range 200-700 keV, and protons greater than 200 and 400 keV. The third set consisted of five cold-plate silicon junction detectors that respond to protons between 0.15 and 30 MeV. The fourth set consisted of four iodine scintillation-photon multiplier systems, each system outputting a response to electrons greater than 0.15 and 60 keV and protons greater than 50 keV

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Investigation Name: Energy Particle Detectors

Investigative Program:

Code: 69-OUDA-08

Investigation Discipline(s):

Ionospheres

Particles and Fields

Atmospheric Physics

Personnel:

P1 - S.C. Sagan USAF Geophysics Lab
P2 - C.E. Smidy USAF Geophysics Lab

Brief Description:

The objective of the spherical electric analyzer (SEA) experiment was to measure the temporal and spatial variations in the concentrations and the energy distribution of the charge ions. Specifically, the objectives were to measure the following parameters: (a) the temperature and thermal energy in the concentration range from 5.1 to 5.0 ions per cubic centimeter (temperature range from 200 to 400 K), (b) the kinetic temperature of the thermal ions in the range from 200 to 400 K, and (c) the temperature of the cold ions in the range from 50 keV to 3 keV. The satellite potential relative to the ionospheric potential and the electric field were measured with the experiment package. The spacecraft electric field was measured by the sensor to perform the measurements and to process the data into a suitable form for telemetry. The sensor was made up of three concentric spherical meshes with grid spacing of 0.125, 0.25, and 2.0 mesh, the ion concentrations were sampled at 0.5 ions per cubic centimeter (temperature range from 200 to 400 K). To measure the parameters, the temperature and thermal energy in the concentration range from 5.1 to 5.0 ions per cubic centimeter (temperature range from 200 to 400 K), and the kinetic temperature of the thermal ions in the range from 200 to 400 K, and (c) the temperature of the cold ions in the range from 50 keV to 3 keV.

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Investigation Name: Magnetospheric Annulus and Solar Radiation

Investigative Program:

Code: 69-ODA-01

Investigation Discipline(s):

Ionospheres and Radio Physics

Personnel:

P1 - E.A. Turner Common Research Centre
P2 - G.D. Lockwood Common Research Centre
P3 - G.L. Nelsen NASA-GSC
P4 - J.J. Van Dam NASA-GRC
P5 - L.A. Smith NASA-GSC
P6 - J.W. King Applied Physics Lab
P7 - D. Tinner Ionospheric Research Lab
P8 - M. Sylvain LG

Brief Description:

The ionosonde was a radio transponder/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 10 to 20 s. One of six selected frequencies was also sounded for a period of 3.2 to 5 s during those 10 to 20-s periods. In addition to the 19- and 22.5-kHz modes of operation, a fixed mode was possible where the transmitted frequency was fixed at 182 kHz while the receiver swept. Several virtual heights (delay times) were normally observed due to ground reflections, plasma resonance, electron density, and propagation. The standard data from the ionosonde was a virtual height as a function of frequency. Two other forms of data were commonly prepared from the ionosondes. They were digital frequency and/or virtual height values of characteristic ionospheric features and computations of electron density profiles.

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Investigation Name: Solar-Earth Station

Investigative Program:

Code: 69-ODA-11

Investigation Discipline(s):

Ionospheres and Radio Physics

Particles and Fields

Planetary Atmospheres

Atmospheric Physics

Personnel:

P1 - D. HOLT Aurora Obs
P2 - T. QARTA Radio Research Lab
P3 - J.H. HACHEMANN Physical Research Lab
P4 - M. CALVERT Unknown
P5 - J.E. VANDAM NASA-GRC
P6 - L. COUL NASA-GRC
P7 - K.D. HENREY NASA-GRC
P8 - C.E. PETRIE Common Research Centre
P9 - K.J. CHAN NASA-GRC
P10 - J.R. FRIER DEPT OF SCI-INDUST RES

Brief Description:

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PERSONNEL
PI - C.D. ANGER U OF CALGARY

BRIEF DESCRIPTION

THIS DUAL-WAVELENGTH SCANNING AURORAL PHOTOMETER WAS DESIGNED TO STUDY THE DISTRIBUTION OF AURORAL EMISSIONS AT 5571 AND 1914 A OVER THE SURFACE OF THE EARTH TO PROVIDE INFORMATION ON THE INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND MOTION OF THE SPACECRAFT. THE SPACECRAFT PERMITTED THE SCANNER TO SYSTEMATICALLY SCANN ACROSS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW SLIGHTLY HORIZONTAL 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, FILTER, AND INTERFERENCE FILTER, AND THEN TO A SECOND FILTER OPERATING AT THE OTHER POLARIZATION. ONE FILTER OPERATED AT THE PLUS OR MINUS 45 DEG TO THE SPIN AXIS, AND THE OTHER FILTER OPERATED AT 5571 PLUS OR MINUS 45 DEG TO THE SPIN AXIS. THIS SYSTEM PERMITTED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE WHICH WERE OF SPECIAL IMPORTANCE. THE PHOTOMETER CONSISTS OF THREE COMPONENTS: ELECTRICALLY-ISOLATED, STAINLESS STEEL TUBES, THE OUTER (0.24 CM IN DIAMETER) TUBE AND THE INNER (0.03 CM IN DIAMETER) TUBE EXTENDED 2.3 CM OUTWARD FROM THE DRIVEN GUN. DURING EACH 2-MIN SEGMENT A VOCALIZATION WOULD OCCUR THAT COULD BE INTERPRETED AS A SIGNAL OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM² USED, AND IN TEMPERATURE VALUES FROM 400 TO 50,000 K.

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PI - W. CALVERT
01 - R.H. NICHOLL NOAA-ERL
01 - D.A. HELMS DEFENCE RESEARCH ESTAB.
01 - C.E. PETE NOAA-ERL
01 - G.E. EMERSON COMMAND CENTRE
01 - J.H. WITCHE NOAA-ERL
01 - J.M. ANDRECK NOAA-ERL
01 - T.E. VAN ZANDT NOAA-ERL

BRIEF DESCRIPTION

THE DUAL-WAVELENGTH SCANNING PHOTOMETER WAS DESIGNED TO STUDY THE DISTRIBUTION OF AURORAL EMISSIONS AT 5571 AND 1914 A OVER THE SURFACE OF THE EARTH TO PROVIDE INFORMATION ON THE INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND MOTION OF THE SPACECRAFT. THE SPACECRAFT PERMITTED THE SCANNER TO SYSTEMATICALLY SCANN ACROSS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW SLIGHTLY HORIZONTAL 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, FILTER, AND INTERFERENCE FILTER, AND THEN TO A SECOND FILTER OPERATING AT THE OTHER POLARIZATION. ONE FILTER OPERATED AT THE PLUS OR MINUS 45 DEG TO THE SPIN AXIS, AND THE OTHER FILTER OPERATED AT 5571 PLUS OR MINUS 45 DEG TO THE SPIN AXIS. THIS SYSTEM PERMITTED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE WHICH WERE OF SPECIAL IMPORTANCE. THE PHOTOMETER CONSISTS OF THREE COMPONENTS: ELECTRICALLY-ISOLATED, STAINLESS STEEL TUBES, THE OUTER (0.24 CM IN DIAMETER) TUBE AND THE INNER (0.03 CM IN DIAMETER) TUBE EXTENDED 2.3 CM OUTWARD FROM THE DRIVEN GUN. DURING EACH 2-MIN SEGMENT A VOCALIZATION WOULD OCCUR THAT COULD BE INTERPRETED AS A SIGNAL OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM² USED, AND IN TEMPERATURE VALUES FROM 400 TO 50,000 K.

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PI - T.R. HARTZ
01 - J.A. FINDLAY NASA-GSFC
01 - J.A. FINDLAY NASA-GSFC

BRIEF DESCRIPTION

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This experiment used the sweep frequency ionosphere receiver (RFAC) voltages to measure galactic and solar radio noise levels. The receiver swept from 0.1 to 10 MHz, and the output was 5.5 kHz. The antennas were used to 30.5 and 78.9 MHz.

Investigation Name: Soft-Particle Spectrometer

NSSDC ID: 71-026A-05

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres, Atmospheric Physics

Personnel:
PI: J. H. Reikela
Co-PI: J. D. Reikela
U of Texas, Dallas

Brief Description:
This soft-particle spectrometer (essentially an electron analyzer) was used to study the directional intensity and differential energy spectra of protons and electrons in both the solar and galactic environments. The instrument was operated in the energy range 1 to 10 keV.

Investigation Name: Ion Mass Spectrometer

NSSDC ID: 71-026A-06

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres, Atmospheric Physics

Personnel:
PI: J. H. Hoffman
Co-PI: J. D. Hoffman
U of Texas, Dallas

Brief Description:
This magnetic ion mass spectrometer experiment was flown to measure the distribution of the concentrations of the ion species at a function of time and position, with particular interest focused on the polar wind particles. The instrument was a wave detector, and mass scanning through the range from 1 to 76 AMU was accomplished in two sections — 1 to 6 AMU and 6 to 76 AMU.

Investigation Name: Retarding Potential Analyzer

NSSDC ID: 71-026A-08

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres

Personnel:
PI: E. J. Mael
Co-PI: R. E. Marley
NASA-GSFC

Brief Description:
In this experiment, the retarding potential analyzer measured ion and/or electron current in order to study heat transfer processes that are important in the dynamics of the ionosphere. This experiment was designed to operate only with the satellite in the earthwheel mode of operation, erasing all memory of spin angle prior to the orbit plane. This allows the analyzer aperture to face the direction of satellite motion once each spin period.

Investigation Name: Energetic Particle Detectors

NSSDC ID: 71-026A-04

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres, Atmospheric Physics

Personnel:
PI: C. E. Shepherd
Co-PI: A. A. Hubbar
NASA

Brief Description:
This experiment consisted of four sets of detectors. The first detector consists of three Geiger counters, which one failed after launch. The second set measured protons with energies greater than 10, 20, 60, 200, and 700 keV. The third detector measured protons with energies greater than 100, 200, 500, and 700 keV. The fourth detector measured protons with energies greater than 300, 600, 1200, and 1500 keV.

Investigation Name: 630A Photometer

NSSDC ID: 71-026A-12

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres, Atmospheric Physics

Personnel:
PI: G. A. Shepherd
York U

Brief Description:
A 630A-channel photometer was used to measure directly and to map the intensity of the atomic oxygen red line at 6302 A in day, twilight, and night airglow. The 630A lines are the strongest of the D2 series. The first detector measured protons with energies greater than 100 keV.

Investigation Name: Sensitivity of Ionospheric Electron Density

NSSDC ID: 71-026A-02

Investigative Program Code: ST/CO-SP

Investigation Discipline(s): Ionospheres, Planetary Atmospheres

Personnel:
PI: E. J. Mael
Co-PI: R. E. Marley
NASA-GSFC

Brief Description:
In this experiment, the sensitivity of the ionospheric electron density was measured. The experiment was designed to operate only with the satellite in the earthwheel mode of operation, erasing all memory of spin angle prior to the orbit plane. This allows the analyzer aperture to face the direction of satellite motion once each spin period.
INITIAL ORBIT PARAMETERS

ORBIT TYPE - GEODETIC

EPOCH DATE- 07/25/72

GEOCENTRIC ORBIT-BODY-TO-BODY 3 MIN

PERIAPSIS- 7532.6 KM

APOAPSIS- 43,432.7 KM

PERSONNEL

PI - J. PAINTER

NASA-65FC

INVESTIGATION DISCIPLINE(S)

INVESTIGATION NAME- EARTH RESOURCES SURVEY

CODE ERR

INVESTIGATIVE PROGRAM

CODE ERR

INVESTIGATIVE DISCIPLINE(S)

SPACECRAFT COMMON NAME- LANDSAT 1

ALTERNATE NAME- EARTH RESOURCES SURVEY

CODE ERR

EARTH RESOURCES SURVEY

DEPARTMENT OF THE INTERIOR, SIOUX FALLS, SD.

LANDSAT 1- PAINTER
SATELLITE PETL, PARTIUCULAR REQUIREMENTS. FROM A NATIONAL ORBIT TRANS.HTER FREQUENCY WAS 1.55 MHZ. THE DES EQUIPMENT.

NSSDC 10-15-004A

STABLED, EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION "ULTRASPATIAL DATA, OF THE EARTH'S SURFACE ON

SPONSORING COUNTRY/AGENCY UNITED STATES

DATUM, ORBIT PARAMETERS

ORBIT TYPE- GEOSTATIONARY

ORBIT PERIOD- 103.22 min

PERIODicity- 107.7 min

PERSONNEL

MG - H. NAMESTIUS

MC - R. K. BROWN

PF - R. K. BROWN

PS - R. L. FRIEDEN

NAMESTIUS HEADQUARTERS

BROWN HEADQUARTERS

BROWN NASA-GSFC

NAMESTIUS NASA-GSFC

BRIEF DESCRIPTION

LANSAT 2 WAS THE SECOND OF A SERIES OF MODIFIED NIMBUS SATELLITES. THE SATELLITE WAS DESIGNED. EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL, FOREST, MINERAL, AND MINERAL, GEOLOGY, RHEOLOGY. AND METEOROLOGICAL PHENOMENA. TO ACCOMPLISH THESE OBJECTIVES THE SPACECRAFT WAS EQUIPPED WITH (1) A MULTISPECTRAL SCANNER (MSS) AND A THREE-CAMERA RETURN BEAM VISICON (RBI) TO OBTAIN BOTH VISUAL AND INFRARED IMAGES OF THE EARTH'S SURFACE. (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS.

LANSAT 2 CARRIED TWO WIDE-BAND VIDEO TAPE RECORDERS (WVRT)/C/360. CAPABLE OF STORING UP TO 10 MIN OF SCANNER ON A TAPE AND LENS ASSEMBLIES THAT PROVIDED SEPARATE SPECTRAL SENSING CAPABILITIES, A FEATURE LACKING IN THE MSS ON LANDSAT 1. MULTISPECTRAL SENSING WAS COLLECTED THROUGH THE MEANS, WHICH OscILLATED 2.05 DEG TO EITHER SIDE OF MANSER AND ACQUIRED CROSS-SHARK STRIPS. THIS WOULD BE THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCER AT THE IMAGE PLANE WAS A FICTIOUS BURSTLAT IN VOLITION SIGNAL WHICH CLIPPING SIGNAL TO AN ELECTRONIC SIGNAL WAS ACCELEATED, OPTICAL FILTERS WERE USED TO FILTER THE ATTAINED SPECTRAL DATA. THE DATA WERE EMPLOYED IN EACH OF THE FIRST FOUR SPECTRAL BANDS AND TWO IN A SPECTRAL BAND. BAND 1 THROUGH 3 USED PRIMARILY SOURCES AT DETECTORS, BAND 4 USED SILICON PHOTODETECTORS. BAND 5 USED MERCURY-CAPILLARY TUBE DETECTORS. A MULTIPLEXER ENCOMPASSING THE MSS SYSTEM PRODUCED THE SCANNER'S 20 CHANNELS OF DATA. THE DATA WERE STORED IN THE VARIOUS SITES AND THE GROUND DATA HANDLING SYSTEMS. THE DC5 WAS DESIGNED PRIMARILY TO DETERMINE IN THEIR NEEDS. DATA FROM THIS EXPERIMENT ARE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY. GSFC GREENBELT, MD.

BRIEF DESCRIPTION

INVESTIGATIVE PROGRAM

INVESTIGATION NAME- MULTISPECTRAL SCANNER (MSS)

INVESTIGATION DISCIPtINE(S) EARTH RESOURCES SURVEY

PERSONNEL

PI - A. ARUSKA

NASA-GSFC

BRIEF DESCRIPTION

THE LANDSAT 2 MULTISPECTRAL SCANNER (MSS) WAS DESIGNED TO MEASURE THE SPECTRAL POWER DISTRIBUTION OF THE EARTH'S SURFACE OVER A LARGE AREA. THE MSS SYSTEM economists FOR MULTISPECTRAL DATA ACQUISITION AT 30埼 X 30埼 RESOLUTION. THE MSS SYSTEM WAS ALSO USED FOR OCEANOGRAPHIC INVESTIGATIONS. THIS systems TO ACCURATELY DETERMINE THE SPECTRAL CONTENT OF THE GROUND RESIDUAL CURRENTS. MONITOR GROUND AIR AND WATER POLLUTION LEVELS. THESE SITES INCLUDE FIELDS, FOREST, SHORE INFRARED AND INFRARED ENVIRONMENTS, ETC. THE MSS CONTAINED A X-22.5 DOUBLE CHROMATIC COLLEND RICH NIKE, THE I110 LOW MEDIAN BAND SPECTRAL FILTERS. THE SPECTRAL BANDS 1 - 0.5 TO 0.7 MICROMETERS, BAND 3 - 0.7 TO 0.8 MICROMETERS, BAND 4 - 0.8 TO 1.1 MICROMETERS, AND BAND 5 - 1.0 TO 1.6 MICROMETERS. THIS LAST BAND WHICH LIES IN THE THERMAL INFRARED RANGE, GAVE LANDSAT 2 THE ABILITY TO OBTAIN INFORMATION. THE MSS SYSTEM WAS DESIGNED TO PROVIDE ACCURATE SPECTRAL SENSING CAPABILITIES, A FEATURE LACKING IN THE MSS ON LANDSAT 1. MULTISPECTRAL SENSING WAS COLLECTED THROUGH THE MEANS, WHICH OscILLATED 2.05 DEG TO EITHER SIDE OF MANSER AND ACQUIRED CROSS-SHARK STRIPS. THIS WOULD BE THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCER AT THE IMAGE PLANE WAS A FICTIOUS BURSTLAT IN VOLITION SIGNAL WHICH CLIPPING SIGNAL TO AN ELECTRONIC SIGNAL WAS ACCELEATED, OPTICAL FILTERS WERE USED TO FILTER THE ATTAINED SPECTRAL DATA. THE DATA WERE EMPLOYED IN EACH OF THE FIRST FOUR SPECTRAL BANDS AND TWO IN A SPECTRAL BAND. BAND 1 THROUGH 3 USED PRIMARILY SOURCES AT DETECTORS, BAND 4 USED SILICON PHOTODETECTORS. BAND 5 USED MERCURY-CAPILLARY TUBE DETECTORS. A MULTIPLEXER ENCOMPASSING THE MSS SYSTEM PRODUCED THE SCANNER'S 20 CHANNELS OF DATA. THE DATA WERE STORED IN THE VARIOUS SITES AND THE GROUND DATA HANDLING SYSTEMS. THE DC5 WAS Designed PRIMARILY TO DETERMINE IN THEIR NEEDS. DATA FROM THIS EXPERIMENT ARE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY. GSFC GREENBELT, MD.

SPACER OF SPACECRAFT MOVEMENT SUPPOSED TO BE 0.122 KM. THE RVs HAD A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT WAS HANDLED IN THE PROCESS-PROCESSING FACILITY. Video-Data-Processing Facility, PD, AND ARE MADE AVAILABLE TO APPLIED INVESTIGATIONS AND AGENCIES THROUGH ITS INVENTARY USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS MAY OBTAIN DATA THROUGH THE NATIONAL RESEARCH DATA CENTER. DEPARTMENT OF THE INTERIOR. SIOUX FALLS, SD.

SPACECRAFT COMMON NAME: MARINER 10
ALTERNATE NAMES: NAME 73- PL-7324
NAME-J VENUS/ MERCURY 1979

INVESTIGATION NAME- MONITOR 2 CHANNEL- IN RADIOEMISSION
INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES
PERSONNEL PI - J. ASBRIDGE LOS ALAMOS SCI LAB
01 - L. D. OSBELL NASA-JPL
01 - L. K. BURHALG NASA-JPL
01 - R. E. HARTLE NASA-JPL
01 - C. W. SNYDER NASA-JPL
01 - R. D. SIEGEL DEPT CALIF, LA

BRIEF DESCRIPTION
THE EXPERIMENT WAS DESIGNED TO OBTAIN THE MOST OF MEASUREMENTS BETWEEN THE PLANETS VENUS AND MERCURY. THE EXPERIMENT WAS DESIGNED TO MAKE A COMPREHENSIVE STUDY OF THE PLASMA REGIME AT MERCURY, TO VERIFY AND EXTEND OBSERVATIONS OF THE SOLAR WIND INTERACTIONS WITH VENUS TO CLASSIFY THE ROLE OF ELECTRONS IN THE INTERACTIONS, AND TO STUDY THE SOLAR WIND FROM 10 TO 3.5 AL.

INVESTIGATION NAME- VIDEO SIGNAL OUTPUT. EACH CHANNEL HAS A HIGH RESOLUTION OF A SPACECRAFT ALTITUDE OF 48 IN. THE RVs HAD A HORIZONTAL

SPACER OF SPACECRAFT MOVEMENT SUPPOSED TO BE 0.122 KM. THE RVs HAD A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT WAS HANDLED IN THE PROCESS-PROCESSING FACILITY. Video-Data-Processing Facility, PD, AND ARE MADE AVAILABLE TO APPLIED INVESTIGATIONS AND AGENCIES THROUGH ITS INVENTARY USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS MAY OBTAIN DATA THROUGH THE NATIONAL RESEARCH DATA CENTER. DEPARTMENT OF THE INTERIOR. SIOUX FALLS, SD.
OCCULTATION TEMPERATURE AND PRESSURE PROFILES WERE CALCULATED. THESE PROFILES WERE USEFUL TO ADJUST ATMOSPHERIC COMPOSITION MODELS. SIGNAL CUTOFF PROVIDED USEFUL INFORMATION FOR DETERMINATION OF PLANETARY RADIUS.

INVESTIGATION NAME - TELEVISION PHOTOGRAPHY

NISEC 10- 73-055A-07 INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S) PLANETOLOGY

PERSONNEL
P 1 - J.C. MURRAY CAFST INST OF TECH
01 - N.J. BULLEN KIST RESEARCH OBS
01 - G.P. KLUJPER (RECESS)
01 - W.J. TRASK US GEOLOGICAL SURVEY
01 - R.M. HAPKE NASA ARC
01 - J.C. O'LEARY RAND CORP

BRIEF DESCRIPTION
THE OBJECTIVES OF THIS EXPERIENCE WERE TO PHOTOGRAPH THE SURFACES OF VENUS AND MERCURY. FOR VENUS, THE OBJECTIVES WERE TO INVESTIGATE THE JOINT EFFECTS OF MOON PHASES, SHADINGS FROM CLOUDS, AND TO OBTAIN HIGH-RESOLUTION IMAGES OF THE MAIN CLOUDS. FOR MERCURY, THE OBJECTIVES WERE TO OBTAIN MAJOR PHYSIOGRAPHIC PROVINCES, DETERMINE ITS SPIN AXIS ORIENTATION, ESTABLISH A CRATERS COORDINATE SYSTEM, AND SEARCH FOR MERCURY SATELLITES. THE EQUIPMENT CONSISTED OF TWO SPHERICAL (150 MM DIAMETER) TELESCOPES WITH EIGHT FILTERS ATTACHED TO GEC 1-INCH VISION TUBE CAMERAS (1500 MM FOCAL LENGTH AND 0.5 DEG V-X-ANG PHOTOGRAPHY, AN AUXILIARY OPTICAL SYSTEM MOUNTED ON EACH CAMERA PROVIDED WIDE-Angle (60 MM FOCAL LENGTH AND 11 X 14 IN FIELD) VIEW OF PHOTOGRAPHY BY MOVING A MIRROR OR A FILTER WHEEL TO A POSITION IN THE OPTICAL PATH. ExPOSURE TIME RANGED FROM 3 MS TO 12 SECS, AND EACH CAMERA TOOK A PICTURE EVERY 42 SEC. THE TV PICTURE CONSISTED OF 507 SCAN LINES WITH 337 PIXELS ELEMENTS/LINE, WHICH WERE DIGITALLY CODED INTO 8-BIT WORDS FOR TRANSMISSION. THERE WERE EIGHT FILTER WHEEL POSITIONS: (1) VARIATION IMAGE RELAY MIRROR, (2) FILTER RAMPASS, (3) UV POLARIZING, (4) NO FILTER, (5) CLEAN, (6) UV PASS, (7) DEFOCUSING LENS (FOR CALIBRATION), AND (8) VARIATION PASS. AROUND 7000 PHOTOGRAPHS WERE OBTAINED OF VENUS AND MERCURY WITH A MAXIMUM RESOLUTION OF 100 M FOR MERCURY. VARIOUS PHOTOMETRIC PASSAGES, SEPARATED BY SIX-MONTH INTERVALS, WERE MADE FOR MERCURY. FURTHER DETAILS OF THE EXPERIMENT CAN BE OBTAINED FROM MURRAY AND "LACUS," 13, OCTOBER 1977. SCIENCE RESULTS ON MERCURY MAY BE OBTAINED FROM "J. GEOHERS, RESEARCH," 80, 76 JUNE 1975, AND ON VENUS IN "SCIENCE," 183, 433-1, MARCH 1974.

INVESTIGATION NAME - FLUXGATE MAGNETOMETERS

NISEC 10- 73-055A-04 INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS PLANETOLOGY

PERSONNEL
P 1 - N.J. NESS NASA-GSFC
01 - W.H. KINARD NASA-LARC
01 - C.C. LEPPOING NASA-GSFC
01 - C.C. WHANG CATHOLIC U OF AMERICA

BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF TWO FLUXGATE MAGNETOMETERS MOUNTED ON A COMMON BOMB 2.3 M AND 5.8 M FROM THE SPACECRAFT AND DESIGNED TO MEASURE THE VECTOR MAGNETIC FIELD IN THE VICINITY OF VENUS AND MERCURY IN THE INTERPLANETARY MEDIA. OUTPUTS FROM THE TWO MAGNETOMETERS WERE SIMULTANEOUSLY ANALYZED TO SEPARATE AMBIENT FEEDBACK FROM SPACECRAFT FEEDBACK. EACH MAGNETOMETER OPERATED FOR 15 MINUTES IN THE 20 TO 50 GAMMA RANGE FOR SIX CYCLES PER SECOND. VECTORS PER SECOND WERE TRANSMITTED TO THE OUTBOARD MAGNETOMETER AND TRANSMITTED TO EARTH. AT OTHER TIMES, EACH MAGNETOMETER WAS USED DURING WHICH FIVE VECTORS PER SECOND WERE TRANSMITTED. THE EXPERIMENT FUNCTIONED CORRECTLY THROUGHOUT THE LIFE OF THE SPACECRAFT. FOR FURTHER DETAILS SEE NESS, E.T. ET AL, SCIENCE, 183, 1301.

INVESTIGATION NAME - FLUORESCENT PARTICLES

NISEC 10- 73-055A-07 INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
P 1 - J.J. SIMPSON U OF CHICAGO
01 - J.E. LAMPARD U OF CHICAGO

BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE ENERGETIC ELECTRONS, PROTONS, AND ALPHA PARTICLES IN THE INTERPLANETARY MEDIA AND IN THE VICTIMIES OF VENUS AND MERCURY. THE INSTRUMENT CONSISTED OF A MAIN TELESCOPE AND A LOW-ENERGY TELESCOPE. THE MAIN TELESCOPE CONSISTED OF SIX COPPER SENSORS (FIVE SILICON DETECTORS AND ONE CSE SCINTILLATOR) SURROUNDED BY A PLASTIC SCINTILLATOR ANTICOMING. ONE INCIDENT PARTICLE WAS PULSE HEIGHT ANALYZED EVERY 0.035 S. AND COUNTS ACCUMULATED IN EACH COINCIDENCE/ANTICOMINGENCE MODE WERE MEASURED EVERY 0.6 S. PARTICLES STOPPING IN THE FIRST SENSOR WERE PROTONS AND ALPHA PARTICLES IN THE RANGE 0.6-10.5 MV/NUCLEON AND ELECTRONS ABOVE APPROXIMATELY 700 KEV. THE APERTURE HALF ANGLE FOR THIS MODE WAS 0.7 DEG, AND THE GEOMETRIC FACTORS WERE 16 MB ON STEM FOR ELECTRONS AND 7 MB ON STEM FOR PROTONS AND ALPHA PARTICLES. THE TELESCOPE APERTURE HALF ANGLE DECREASED TO 0.2 DEG IN THE FIRST MODULE AND THE SENSORS. THE LOW ENERGY TELESCOPE, A TWO ELEMENT PLUS AN ANTICOMING DETECTOR WITH A 30 DEG APERTURE AND A 0.49 IN CHamber GEOMETRIC FACTOR, WAS DESIGNED TO MEASURE 0.5-30 MV ELECTRONS, 9.4-94 MV PROTONS AND 9.4-94 MV ALPHA PARTICLES WITHOUT RESPONSE TO SIGNALS FROM OVER A WIDE RANGE OF ELECTRON ENERGIES AND SENSITIVITY. SEE "JPL," ED 4015 AND REFERENCES THEREIN FOR FURTHER DETAILS.

METEOROID TECHNOLOGY SAT

SPACELAB COMMON NAME - METEOROID TECHNOLOGY SAT
ALTERNATE NAMES - NAV-70, M-701. MI 1-062, EXPLORER 46
NISEC 10- 73-054A
LAUNCH DATE- 08/13/72
WEIGHT- 90. KG
LAUNCH SITE- WALLOPS FLIGHT CENTER, UNITED STATES
LAUNCH VEHICLE- SCOUT
SPONSORING COUNTRY/FEDERATION
UNITED STATES NASA-GSFC
INVESTIGATING PROGRAM NAME - METEOROID PENETRATION
INVESTIGATING PROGRAM CODE SL
INVESTIGATIVE PROGRAM CODE SL

PERSONNEL
P 1 - C.W. WOERNER NASA-LARC
01 - W.H. KINARD NASA-LARC

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 AXES OF THE SATELLITE WAS 350 CM LONG AND CARRIED THE PENETRATION AND IMPACT EXPERIMENTS. BUMPER TARGETS EXTENDED FROM THE SATELLITE, GIVING IT AN OVERALL WIDTH OF 701.5 CM.

METEOROID TECHNOLOGY SAT. HUMES

INVESTIGATION NAME - METEOROID PENETRATION

NISEC 10- 73-055A-01 INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S) INTERPLANETARY DUST

PERSONNEL
P 1 - D.H. HUMES NASA-LARC
01 - W.H. KINARD NASA-LARC

BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT WAS TO MEASURE THE METEOROID PENETRATION RATES OF A BUMPER-PROTECTED TARGET. PENETRATIONS WERE MEASURED, USING 0.122-MM STAINLESS STEEL PRESSURE CELLS LOCATED BEHIND 1-MIL STAINLESS STEEL. FOR THIS EXPERIMENT, 12 CELLS WERE MOUNTED ON A BUMPER PANEL WHICH EXTENDED OUT FROM THE CYLINDRICAL SPACECRAFT BODY, DUE TO A MALFUNCTION. ONLY TWO OF THE FOUR BUMPER PANELS, DEPLOYED.

NISEC 10- 73-055A-01 INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S) INTERPLANETARY DUST

PERSONNEL
P 1 - J.J. SIMPSON U OF CHICAGO
01 - J.E. LAMPARD U OF CHICAGO

BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT WAS TO MEASURE THE METEOROID PENETRATION RATES OF A BUMPER-PROTECTED TARGET. PENETRATIONS WERE MEASURED, USING 0.122-MM STAINLESS STEEL PRESSURE CELLS LOCATED BEHIND 1-MIL STAINLESS STEEL. FOR THIS EXPERIMENT, 12 CELLS WERE MOUNTED ON A BUMPER PANEL WHICH EXTENDED OUT FROM THE CYLINDRICAL SPACECRAFT BODY, DUE TO A MALFUNCTION. ONLY TWO OF THE FOUR BUMPER PANELS, DEPLOYED.

SPACELAB COMMON NAME - NAV-70, M-701
ALTERNATE NAMES - HUMES-9, PL-701
04/22/76
**LAUNCH VEHICLE:** THOR

**SPONSORING COUNTRY/AGENCY:** UNITED STATES

**LAUNCH DATE:** 04/09/70

**LAUNCH SITE:** VANDERBERG AFB, UNITED STATES

**WEIGHT:** 620.0 KG

**NPOSS CMN LN**

**PRINT 4-HEATH**

**INITIAL ORBIT PARAMETERS**

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**PERSONNEL**

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**BRIEF DESCRIPTION**

The Nimbus-4 V LEO spacecraft was designed to serve as a stabilized, Earth-oriented platform for the testing advanced meteorological sensor systems and for remote unattended data collection stations (platforms) deployed on a global scale. The platform also provided a means to monitor the performance of such platforms on a global scale, the Nimbus-4 V LEO, as selected platforms during the course of the orbit. The spacecraft data was transmitted to each platform, and the satellite satellite to platform distance by determining the platform's coordinates, the antenna's position data, and the platform's position data. The data was then stored by the computer outputs from individual platform experiment are stored at NASA-GSFC, GREENVILLE, MO.

**INVESTIGATION NAME:** BACKSCATTER ULTRAVIOLET (OBU) SPECTROMETER

**EPOCH DATE:** 04/12/72

**WEIGHT:** 770.0 KG

**LAUNCH SITE:** VANDERBERG AFB, UNITED STATES

**LAUNCH VEHICLE:** DELTA

**SPONSORING COUNTRY/AGENCY:** UNITED STATES

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**BRIEF DESCRIPTION**

The Nimbus 5 V LEO spacecraft was designed to serve as a stabilized, Earth-oriented platform for the testing of advanced meteorological sensor systems and for remote unattended data collection stations (platforms) deployed on a global scale. The platform also provided a means to monitor the performance of such platforms on a global scale, the Nimbus-5 V LEO, as selected platforms during the course of the orbit. The spacecraft data was transmitted to each platform, and the satellite satellite to platform distance by determining the platform's coordinates, the antenna's position data, and the platform's position data. The data was then stored by the computer outputs from individual platform experiment are stored at NASA-GSFC, GREENVILLE, MO.

**INVESTIGATION NAME:** BACKSCATTER ULTRAVIOLET (OBU) SPECTROMETER

**EPOCH DATE:** 04/12/72

**WEIGHT:** 655.0 KG

**LAUNCH SITE:** VANDERBERG AFB, UNITED STATES

**LAUNCH VEHICLE:** DELTA

**SPONSORING COUNTRY/AGENCY:** UNITED STATES

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INVESTIGATION NAME- ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR)

INVESTIGATION NAME- MINIBUS 5 INFRARED TEMPERATURE PROFILE RADIODETER (ITPM)

INVESTIGATION NAME- VERTICAL PROFILES OF TEMPERATURE AND HUMIDITY 5. HOUGHTON

PERSONNEL
PI - W.L. SMITH
CO - S.W. MARK

INVESTIGATION NAME- SELECTIVE CHOOPE RADIOMETER (SCCR)

NPSSC ID- 72-007A-02
INVESTIGATIVE PROGRAM
CODE 0N4
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS

PERSONNEL
PI - J.R. HOUGHTON
01 - S.A. SMITH
02 - R.D. READING

Brief Description
The Nimbus 5 selective collector radiometer (SCCR) was designed to observe the global temperature structure of the atmosphere where there were surface measurements. It made daytime observations of the water vapor distribution and determined the temperature profiles in cirrus clouds to accomplish these objectives. The SCCR observed radiated radiation in spectral intervals separated into the following four groups: (1) four oxygen absorption bands near 700 and 1200 micrometers, (2) an oxygen absorption channel near 110 micrometers, and a water vapor channel near 18.6 micrometers, (3) a water vapor channel near 5.3 micrometers, and (4) 2.08, 2.59, 2.65, and 3.5 micrometers. From an average satellite altitude of 550 kilometers, the radiometer viewed a 66-km circle on the Earth's surface with a ground resolution of about 500 by 500 km. A similar experiment was flown on Nimbus 4.

INVESTIGATION NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)

NPSSC ID- 72-007A-28
INVESTIGATIVE PROGRAM
CODE 0N4
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS

PERSONNEL
PI - A.W. MCCULLOCH
01 - NASA-GSFC

Brief Description
The Nimbus 5 temperature/humidity infrared radiometer (THIR) was used to determine all the radiation in both the 70- to 125-micrometer region (in window) and the 6.5- to 7.0-micrometer region (water vapor). The measurements of cloud-top temperatures and the capability of producing cloud-free and thermal maps on land and water surfaces in cloud-free areas during both the day and night portions of the orbit. The other channel operated at night to map the water vapor distribution in the upper troposphere and stratosphere. Sensor data from these two channels were primarily used to support the other, more sophisticated meteorological experiments in other instruments. An instrument consisting of a 12.7-m wavelength system. A scanning common to both channels, a beam splitter, and two germanium-irradiated thermistor bolometers. In contrast to the previous image was formed within the radiometer. Measuring radiant energy was collected by a flat scanning mirror inclined at 45 deg to the optical axis. The mirror rotated at 4 rpm and scanned in a plane perpendicular to the spacecraft velocity. The energy was focused on a dichromatic beam splitter, which divided the energy over the two channels. Each channel has a magnetic tape for subsequent playback to a ground acquisition station.
BRIEF DESCRIPTION

The primary objectives of the Nimbus 5 ELECTRICAL 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 INFRARED SURFACE COMPOSITION AND SOIL MOISTURE TO GLOBAL MAPPING OF THE 1.95 CM (19.36 GHZ) BAND THERMAL RADIATION EMERGED BY THE EARTH/ATMOSPHERE SYSTEM (MICROWAVE) RADIOMETER. THIS SYSTEM COULD FUNCTION EVEN IN THE PRESENCE OF CLOUD CONDITIONS THAT BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. A 90-DEGREE-CD RADIOMETER ANTENNA ARRAY, DEPLOYED AFTER LAUNCH, SCANNED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES IN A PLANE PERPENDICULAR TO THE SPACECRAFT ORBITAL TRACK. PRODUCING A HIGHNESS 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 SYMMETRICAL DISTRIBUTION OF SCANNING SPOTS EXTENDING 50 DEG TO EITHER SIDE OF HZoom.. ANGULAR SEPARATION OF THE SCAN SPOTS ALLOWED FOR AN 8.5 PERSPECTIVE VIEW WHEN VIEWED FROM A MEAN ORBITAL ALTITUDE OF 1100 KILOMETERS. THE RADIOMETER HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C WITH A SPATIAL RESOLUTION OF ABOUT 6 DEG. DATA WERE STORED ON MAGNETIC TAPE FOR TRANSMISSION TO GROUND ACQUISITION STATIONS.

****************** NIMBUS 6 ******************

SPACECRAFT COMMON NAME: NIMBUS 6 ALTERNATE NAMES: PL-781B, NIMBUS-F

NSGOC 10- 75-052A

LAUNCH DATE- 05/12/75 WEIGHT- 585, KG

LAUNCH SITE- VANDEVER AFB, UNITED STATES

LAUNCH VELOCITY- DELTA

SPONSORING COUNTRY/AGENCY - UNITED STATES

NASAG-A

INITIAL GLOBE ORBIT PARAMETERS

GAUSSIAN ELLIPSOID ORBIT- GEOPOTENTIAL

ORBIT PERIOD- 107.5 MIN

EPOCH DATE- 05/12/75

INCLINATION- 100. DEG

APOGEE- 1051,20 KM

PERSONNEL

MG. M. KAMINSKI NASA HEADQUARTERS

SC - M. TEPPER NASA HEADQUARTERS

PR - J.K. ROYER NASA-GSFC

PS - J.S. TREN NASA-GSFC

BRIEF DESCRIPTION


******************** NIMBUS 6, JULIAN **********************

INVESTIGATION NAME- TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT

NSGOC 10- 75-052A-01

INVESTIGATIVE PROGRAM CODE EBN

INVESTIGATION DISCIPLINE- ATMOSPHERIC PHYSICS

METEOROLOGY

PERSONNEL

MG. L. JULIAN NATL CTR FOR ATMOS RES

01 - M.W. KELLOGE NATL CTR FOR ATMOS RES

01 - W.L. SMILK NATL CTR FOR ATMOS RES

01 - C.H. LINDSEY NASA-GSFC

01 - R.L. TALLEY NASA-GSFC

01 - M. BANDEKH NASA-GSFC

01 - C.E. KOTE NASA-GSFC

INVESTIGATION NAME- LIMB RADIANCE INVERSION RADIOMETER

NSGOC 10- 75-052A-04

INVESTIGATIVE PROGRAM CODE EBN

INVESTIGATION DISCIPLINE- ATMOSPHERIC PHYSICS

METEOROLOGY

PERSONNEL

MG. L. JULIAN NATL CTR FOR ATMOS RES

01 - M.W. KELLOGE NATL CTR FOR ATMOS RES

01 - W.L. SMILK NATL CTR FOR ATMOS RES

01 - C.H. LINDSEY NASA-GSFC

01 - R.L. TALLEY NASA-GSFC

01 - M. BANDEKH NASA-GSFC

01 - C.E. KOTE NASA-GSFC

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**BRIEF DESCRIPTION**

The goals of the Nimbus 6 Tropical Wind Energy Conversion Experiment (TWECE) were closely associated with those of the Nimbus 6 Solar Radiation Monitoring Experiment (SRME). Both experiments were one of the first attempts to study upper atmospheric winds over remote regions. (1) The TWECE was designed to measure the rate of conversion of atmospheric potential energy into kinetic energy. (2) The SRME was designed to provide direct measurement of various meteorological parameters that can serve as references to high-level winds. (3) The experiments were conducted by the United States. The Nimbus 6 Scanning Microwave Spectrometer (SMCS) was designed to map tropospheric temperature profiles, water vapor abundance, and cloud water content and to detect data for weather prediction purposes even in the presence of clouds. With block transmission of satellite infrared sensors, the sensors were used in five spectral regions: (1) long wave, 5.5-11.1 microns; (2) medium wave, 2.7-4.2 microns; (3) short wave, 0.7-2.7 microns; (4) water vapor, 8.6-8.7 microns; and (5) water vapor, 6.7-7.2 microns. The sensors were used to monitor the Earth's radiation budget. The Nimbus 6 Earth Radiation Budget Experiment (ERBE) measured reflected and emitted terrestrial radiation fluxes in conjunction with solar radiation. The results were used to determine the Earth's radiation budget. The ERBE also measured the angular distribution of terrestrial radiation for various meteorological and geographic regions. The measurements were made using identical but independent channels calibrated to the same standards. The solar radiation data was used to determine the radiation budget of the Earth. The Nimbus 6 Earth Radiation Budget Experiment (ERBE) measured reflected and emitted terrestrial radiation fluxes in conjunction with solar radiation. The results were used to determine the Earth's radiation budget. The ERBE also measured the angular distribution of terrestrial radiation for various meteorological and geographic regions. The measurements were made using identical but independent channels calibrated to the same standards. The solar radiation data was used to determine the radiation budget of the Earth.
INVESTIGATION NAME- SOLAR PROTON MONITOR

INVESTIGATION DISCIPLINE(S) - PARTICLES AND FIELDS

PERSONNEL
PS - J.J. WILLIAMS
AGENCY - NOAA-DEP

BRIEF DESCRIPTION

Three solid-state detectors monitored the omnidirectional fluxes of solar protons with energies above 10^4 and 60 MeV, respectively. Two telescopes consist of solid-state detectors each measured protons between 0.27 and 3.2 MeV (in three intervals), protons between 9 and 32 MeV (in two intervals). The telescopes were located in the polar cap region which is the greatest interest. The telescopes were mounted parallel to the local magnetic field direction, an additional solid-state directional flux monitor was used in the field of view greater than 140 keV. This detector was located in a direction perpendicular to the Earth's magnetic field.

NOAA-481

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INVESTIGATION NAME- SOLAR PROTON MONITOR

INVESTIGATION DISCIPLINE(S) - PARTICLES AND FIELDS

PERSONNEL
PS - J.J. WILLIAMS
AGENCY - NOAA-DEP

BRIEF DESCRIPTION

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NOAA-481

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INVESTIGATION NAME- SOLAR PROTON MONITOR

INVESTIGATION DISCIPLINE(S) - PARTICLES AND FIELDS

PERSONNEL
PS - J.J. WILLIAMS
AGENCY - NOAA-DEP

BRIEF DESCRIPTION

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NOAA-481

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INVESTIGATION NAME- SOLAR PROTON MONITOR

INVESTIGATION DISCIPLINE(S) - PARTICLES AND FIELDS

PERSONNEL
PS - J.J. WILLIAMS
AGENCY - NOAA-DEP

BRIEF DESCRIPTION

Three solid-state detectors monitored the omnidirectional fluxes of solar protons with energies above 10^4 and 60 MeV, respectively. Two telescopes consist of solid-state detectors each measured protons between 0.27 and 3.2 MeV (in three intervals), protons between 9 and 32 MeV (in two intervals). The telescopes were located in the polar cap region which is the greatest interest. The telescopes were mounted parallel to the local magnetic field direction, an additional solid-state directional flux monitor was used in the field of view greater than 140 keV. This detector was located in a direction perpendicular to the Earth's magnetic field.

NOAA-481

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INVESTIGATION NAME- SCANNING RADIOMETER (SR)

PERSONNEL

BRIEF DESCRIPTION

INVESTIGATION DISCIPLINE(S)

OPERATIONAL WEATHER OBSERVATIONS

APPLIED ATMOSPHERIC PHYSICS METEOROLOGY

INVESTIGATION NAME- VERTICAL TEMPERATURE PROFILE RADIODRSTER (VTPR)

PERSONNEL

BRIEF DESCRIPTION

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

INVESTIGATION NAME- SOLAR PROTON MONITOR

PERSONNEL

BRIEF DESCRIPTION

INVESTIGATION DISCIPLINE(S)

SPACECRAFT COMMON NAME- NOAA 5

ALTERNATE NAMES- 1105-E-4 09057

PERSONNEL

SPOCING COUNTRY/AGENCY

UNITED STATES

UNITED STATES

NOAA-NESS

NOAA-NESS

NOAA-NESS

NOAA-NESS

UNITED STATES

WEIGHT- 334.6 KG

LAUNCH DATE- 07/29/76

LAUNCH VEHICLE- DELTA 5

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NOA
SPACECRAFT WAS CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE AND VERY HIGH RESOLUTION INFRARED CLOUD COVER IMAGES IN EIGHT DISCRETE BANDS THROUGHOUT THE ENTIRE DAILY CYCLE. THE PRIMARY SENSORS CONSISTED OF A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTP), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTP), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTP), AND A SCANNING RADIOMETER (SR). THE VTP'S, VTP, AND SR WERE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CURVILINEAR SPACECRAFT MEASURED 7 X 5 M. THE SATELLITE WAS EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WERE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT WAS ACHIEVED. EACH PANEL MEASURED 4.2 X 2 M AND WAS COVERED WITH 3000 SOLAR CELLS, EACH MEASURING 2 X 2 CM. THE TOS DYNAMICS AND ATTITUDE CONTROL SYSTEM MAINTAINED DESIRED SPACECRAFT ORIENTATION BY TAKING ADVANTAGE OF THE PRECISION INDUCED FROM A NON-MAGNETIC FRAMEWORK. SO THAT THE SATELLITE'S BODY PRECISION RATE OF ONE REVOLUTION PER ORBIT PROVIDE 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 HORIZONTAL FLIGHTWHEEL. THE SATELLITE WAS PLACED IN A SUNEQUATORIAL ORBIT WITH EQUATORIAL CROSSING AT THE ASCENDING NODE ABOUT 1000 AM. LOCAL TIME.

--- NOAA 5 NESS STAFF ---

INVESTIGATION NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR)

NSDC ID- 76-077A-31

INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINES METEOROLOGY

PERSONNEL PI = NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE 709-M HIGH RESOLUTION RADIOMETER (VHRR) WAS CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDBASE PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND PREDICTION. THE V-H HORIZONTAL ALTIMETER INSTRUMENT OPERATED IN BOTH REAL-TIME AND TAPE RECORDING MODES. THE FOUR-CHANNEL UNIT USED THE FOLLOWING SPECTRAL WAVELENGTHS:

- CHANNEL 1 - 0.7 \ \text{ to } 1.9 \ \text{ micrometers} (near IR)
- CHANNEL 2 - 10.5 \ \text{ to } 12.5 \ \text{ micrometers} (infrared)
- CHANNEL 3 - 13.5 \ \text{ to } 14.5 \ \text{ micrometers} (near IR)
- CHANNEL 4 - 15.5 \ \text{ to } 17.5 \ \text{ micrometers} (water vapor)


--- NOAA 5 WILLIAMS ---

INVESTIGATION NAME- THERMAL TEMPERATURE PROFILE RADIOMETER (TTPR)

NSDC ID- 76-077A-02

INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINES METEOROLOGY

PERSONNEL PI = NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE VERTICALLY TEMPERATURE PROFILE RADIOMETER (VTPR) SUBSYSTEM WAS DESIGNED TO MAKE RADIANCE MEASUREMENTS IN THE 3.7MICRON WINDOW BAND (90 DEGREES OR LESS) FOR USE IN WEATHER ANALYSIS. THE VERTICAL TEMPERATURE PROFILE FROM THE EARTH'S SURFACE TO AN ALTIMETRIC HEIGHT OF 30 KM EVERY 2HRS MUST BE AT LEAST TWICE DAILY. A 12-MICRON WAVELENGTH RADIOMETER MEASUREMENT RADIOCOVERAGE WAS 190 KM X 190 KM AT THE EARTH'S SURFACE. THE VELOCITY MEASUREMENTS MADE THE AUTOMATIC NAVIGATION POSSIBLE. THE 10-MICRON WATER VAPOR SATELLITE WAS USED IN CONJUNCTION WITH SIX COAX WAVE MEASUREMENTS TO EVALUATE THE AMOUNT OF CLOUD COVER. MEASUREMENTS WERE MADE CONTINUOUSLY BOTH DAY AND NIGHT.

--- NOAA 5 WILLIAMS ---

INVESTIGATION NAME- SCANNING RADIOMETER (SR)

NSDC ID- 76-077A-03

INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINES METEOROLOGY

PERSONNEL PI = NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE SCANNING RADIOMETER (SR) SUBSYSTEM WAS A 16-CHANNEL RADIOMETER AND TAPE RECORDING CONCLUSION DESIGNED TO PROVIDE THE FOLLOWING DATA:

- (1) REAL-TIME DAILY CLOUD COVER INFORMATION IN THE 0.5- TO 1.0-MICRON REGION. TRANSMITTED OVER THE VHF DATA LINE.
- (2) REAL-TIME AND NIGHT (THERMAL) RADIATION INFORMATION IN THE 10.5- TO 12.5-MICRON REGION.
- (3) GLOBAL CLOUD COVER INFORMATION STORED ON DATA STATIONS VIA THE S-BAND DATA LINE.
- (4) LOCAL CLOUD COVER INFORMATION STORED ON DATA STATIONS VIA THE S-BAND DATA LINK.


--- NOAA 5 WILLIAMS ---

INVESTIGATION NAME- SOLAR PROTON MONITOR (SPM)

NSDC ID- 76-077A-04

INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINES METEOROLOGY

PERSONNEL PI = D.A. WILLIAMS NOAA-NESS

BRIEF DESCRIPTION THIS EXPERIMENT WAS DESIGNED TO CONTINUOUSLY MONITOR DIRECTIONAL FLUXES OF ---- (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.1 AND 1 MEV, (2) PROTONS IN THE RANGES 1 TO 10 MEV, (3) PROTONS IN THE RANGES 1 TO 10 MEV, (4) ALPHA PARTICLES IN FIVE CONTINUOUS ENERGY INTERVALS BETWEEN 0.6 AND 10 MEV, (5) ALPHA PARTICLES BETWEEN 30 AND 60 MEV, (6) PROTONS AND PARTICLES ABOVE 60 MEV, (7) ELECTRONS ABOVE 500 KEV, (8) ELECTRONS ABOVE 1000 KEV.

--- NOAA 5 WILLIAMS ---

SPACESTRACK COMMON NAME- OAO 3

ALTANERATE NAMES- PL-100, OAO-C, OAO-1

REPORT NUMBER- DSN 055

INVESTIGATION NAME- OAO 3

-launch DATE- 04/12/72

-launched SITE- CAYE CARAVELAR, UNITED STATES

-launched VEHICLE- ATLAS

SPOONING COUNTRY/AGENCY USA-NOAA

MISSION OBJECTIVES ORBIT TYPE- GEOSTATIONARY

MISSION DATE-04/21/72

MISSION PARAMETERS

- PERIAPSIS- 730.0 KM
- APOAPSIS- 751.0 KM

PERSONNEL MS- J.W. MCRAE NASA

SC- D.W. ROY NASA HEADQUARTERS

PM- E.J. KUPPERIAN JR. NASA-CE

BRIEF DESCRIPTION THIS MISSION WAS THE THIRD IN THE OAO PROGRAM AND ITS SECOND SUCCESSFUL SPACE MISSION TO OBTAIN DIRECTIONAL DATA FROM THE \textit{OAO-1} FROM THE GROUND BASE. \textit{OAO-2} WAS AN SPACIAL TELESCOPE AND A COLLIMATED, PROPORTIONAL COUNTER WITH MEASUREMENTS CAPABLE OF OBSERVATIONS ON THE SATELLITE. \textit{OAO-3} WAS AN ADDITIONAL SATELLITE, ALONG WITH THE SATELLITE AND THE \

--- NOAA 5 WILLIAMS ---

INVESTIGATION NAME- SCANNING RADIOMETER (SR)

INVESTIGATION NAME- SCANNING RADIOMETER (SR)
SPACER CRAFT TO 193 IN. TWO INERTIAL BALANCE BOOFS. ONE FOR AFT, EXTENDED APPROXIMATELY 300 IN. IN SPACECRAFT WAS EQUIPPED WITH AN INTERNAL REFERENCE UNIT (A HIGH-PRECISION, THREE AXES URTH SENSORS). SENSORS WERE TESTED AND TRAJECTED TO BE SENSITIVE TO AN UTH MAGNITUDE CONTROLLED PITCH AND YAW TO SENSORS, A HIGH-RESOLUTION TELESCOPE WITHIN 5 ARC-SEC. IN ADDITION, THE EXPERIMENT HAD A PITCH AND YAW TO WITHIN ONE TENTH ARC-SEC. OBSERVATIONS WERE MADE ON THREE AXES, ATTITUDE, WAS CONTROLLED BY INERTIAL WHEELS AND TRAJECTED. REDUNDANT TRACKING SEACRET, FACILITIES TRACKING OF THE SPACECRAFT. TWO DIFFERENT MODES TRANSITTERS PROVIDED WIDEBAND TELEMETRY FOR TRANSMITTING DIGITAL DATA TO THE GROUND STATION. AN ON-BOARD PROCESSOR WAS CARRIED THAT MONITORED TELEMETRY DATA, THAT COULD ISSUE COMMANDS, AND THAT WAS PROGRAMMED VIA THE COMMAND RECEIVED UPLINK.

INVESTIGATION NAME: STELLAR X-RAYS

PERSONNEL
PI - R.L. BOYD
U COLLEGE LONDON
Co-PI - P.W. SANFORD
U COLLEGE LONDON

BRIEF DESCRIPTION
THE EXPERIMENT USED THREE TELESCOPES AND A COLLIMATED PROPORTIONAL COUNTER TO OBSERVE COSMIC X-RAY SOURCES BETWEEN 1 AND 3 AO, BETWEEN 1 AND 3 AO, AND BETWEEN 1 AND 7 AO. DATA FROM THIS EXPERIMENT WERE USED TO DETERMINE THE INTERSTELLAR ABSORPTION OF SOFT X-RAYS.

INVESTIGATION NAME: HIGH-RESOLUTION TELESCOPES

PERSONNEL
PI - L. SPITZER
PRINCETON U
Co-PI - J. ROGERSON, JR.
PRINCETON U

BRIEF DESCRIPTION
THE PRIMARY OBJECTIVE OF THIS EXPERIMENT WAS TO MAKE QUANTITATIVE OBSERVATIONS OF THE INTERSTELLAR ABSORPTION LINES IN THE SPECTRAL REGION 1000 TO 3500 A. THE SECONDARY OBJECTIVE WAS TO OBSERVE THE SPECTRA OF SELECTED STARS OTHER THAN THE SUN. THE EXPERIMENTAL SYSTEM WAS AN 80-CM DIAM CASSGREN TELESCOPE WITH A T/M FOCAL LENGTH OF 7.5 M, A MACH-SCHEIBE SPECTROMETER CAPABLE OF 0.1-A RESOLUTION IN FIRST ORDER AND 0.05-A RESOLUTION IN SECOND ORDER. SPECTROHOTENTMETERS WERE DETECTED BY FOUR PHOTOMETERS. EQUIPED WITH ITS OWN EXIT SLIT, AND FILTERS IN PATHS ALONG THE SPECTRUM, OBSERVATION ATTACHED TO THE PINE OPTICS CONTROLLED THE SPACECRAFT ATTITUDE TO WITHIN 0.1 ARC-SEC. COULD BE USED AS A STARRINDER FOR SCANNING. THE OVERALL SYSTEM COULD MAKE USEFUL MEASUREMENTS ON G- AND BTM-TYPE STARS OF ITS MAGNITUDE.

INVESTIGATION NAME: MEASUREMENT OF THE SELF-REVERSAL OF THE SOLAR LYMAN-ALPHA LINE

PERSONNEL
PI - J.E. BLAMONT
OBSERVATORY
Co-PI - P. COUPPEU
PARIS OBSERVATORY

BRIEF DESCRIPTION
THIS FLIGHT INSTRUMENT WAS DESIGNED TO STUDY THE LINE SHAPES OF THE SOLAR LYMAN-ALPHA LINE, AND TO MEASURE THE INTENSITY OF THE SOLAR SPECTRUM IN THE 100-A BAND. THE EXPERIMENT WAS USED TO MEASURE THE INTENSITY OF THE SOLAR SPECTRUM IN THE 100-A BAND. THE EXPERIMENT WAS USED TO MEASURE THE INTENSITY OF THE SOLAR SPECTRUM IN THE 100-A BAND.
INVESTIGATION NAME - ZODIACAL LIGHT MONITOR

NSDC ID - 05-006A-07

INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) - ASTROPHYSICS, PLANETARY ATMOSPHERES, SOLAR PHYSICS

PERSONNEL - PI: L.W. ACTON, OI: R.C. CATHUR, OI: C.L. CULHANE

BRIEF DESCRIPTION
This experiment was designed to determine the spectra of sources and the diffuse cosmic X-ray background in the energy range 2 to 60 keV and to measure intensity variations and possible increases in lines of discrete X-ray sources. Properly charged protons were measured in Proportional chambers (multiwire PROPORTIONAL CHARGERS) and were used as the electron Compton filter. A propane-Neon filled chamber and a xenon-Methane filled chamber were located behind the spacecraft spin axis. A single-volume, xenon-Methane filled chamber was placed behind the spacecraft spin axis and was offset slightly from an anti-parallel to the spin axis. A xenon-Methane filled chamber (240 cm in length) was placed behind the spacecraft spin axis and was oriented anti-parallel to the spin axis. Data were accumulated in a buffer memory for 1-MIN intervals. The data from the offset detector was being recorded in a dump.

--- GS S. WELLER, JR.

INVESTIGATION NAME- HIGH-SENSITIVITY CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS

BRIEF DESCRIPTION
The experiment was designed to measure galactic latitude dependence of the X-ray background radiation in the 0.15- to 6.0-keV region. The angular separation of the two sets of proportional counters mounted on the OGO wheel viewed 3.5- by 2.5-DEG full-a-FOV and half-maximum collimator. Sensitivity was expected to be about 1 percent statistically accurate near the galactic poles and energy resolution was provided by selected filters. Since two of the counters had thin graphite windows through which methane diffused, a high pressure methane reservoir carried on the spacecraft replenished the CH4.

--- GS S. WELLER, JR.

INVESTIGATION NAME- COSMIC X-RAY SPECTROSCOPY

INVESTIGATION DISCIPLINE(s)
Astronomy

INVESTIGATION DISCIPLINE(s)
Solar Physics

INVESTIGATION DISCIPLINE(s)
Space Radiation Environment
PERSONNEL

PI - K. YATES

BRIEF DESCRIPTION

SURFACE BARRIERS DETECTORS. THE INSTRUMENT LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXES. PROTONS IN THE ENERGY RANGES 2.5 TO 9.2 keV AND ALPHA PARTICLES MEASURED SEPARATELY. THE THICKNESS OF THE WALLS DETERMINED THE LOWER LIMIT OF THE DETECTOR'S SENSITIVITY.

INVESTIGATION NAME- SODIUM IODIDE SCINTILLATOR, GAMMA-DAY ASTRONOMY

INVESTIGATOR DISCIPLINE(S) PARTICLES AND FIELDS

INVESTIGATION PROGRAM SPACE RADIATION ENVIRONMENT

NASDC ID- 69-0460-05

PERSONNEL

PI - K. YATES

BRIEF DESCRIPTION

UNDI-RDIRECTIONAL FLUXES OF ELECTRONS WITH ENERGIES GREATER THAN 100 eV

INVESTIGATION NAME- PROTON ALPHA PARTICLE TELESCOPE

INVESTIGATOR DISCIPLINE(S) PARTICLES AND FIELDS

INVESTIGATION PROGRAM SPACE RADIATION ENVIRONMENT

PERSONNEL

PI - K. YATES

INVESTIGATION PROGRAM SPACE PLASMAS

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

HIGH ENERGY MONTE CARLO SIMULATIONS

PERSONNEL

PI - J. S. BRIDGE

INVESTIGATION NAME- LOW-ENERGY ELECTRON DETECTOR

INVESTIGATOR DISCIPLINE(S) PARTICLES AND FIELDS

INVESTIGATION PROGRAM SPACE PLASMAS

PERSONNEL

PI - K. YATES

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

INVESTIGATION PROGRAM SPACE RADIATION ENVIRONMENT

PERSONNEL

PI - K. YATES

INVESTIGATION NAME- COSMIC-RAY TELESCOPE

INVESTIGATOR DISCIPLINE(S) PARTICLES AND FIELDS

BRIEF DESCRIPTION

THE TELESCOPE USES THE SPACECRAFT SPIN ASSESSMENT TO DETECT COSMIC RAYS. THE INSTRUMENT WAS DESIGNED TO MEASURE THE FLUX OF COSMIC RAYS AT DIFFERENT ENERGIES AND TO DETERMINE THE ANGULAR DISSOCIATION OF THE SPACECRAFT SPIN AXIS. THE INSTRUMENT WAS DESIGNED TO MEASURE THE FLUX OF COSMIC RAYS AT DIFFERENT ENERGIES AND TO DETERMINE THE ANGULAR DISSOCIATION OF THE SPACECRAFT SPIN AXIS.
THREE DIFFERENT "JOE'S" OF DETECTION WERE USED AT THE SECTIONS

The spin-integrated (isotropic) scintillator collimator cup, separate photomultiplier tubes in which all particles depositing a pulse were analyzed, was placed in the electric plane about 1.2 cm from the collector. At the detector, it made a 360-deg scan in the electric plane about once per second. Pulse response analysis of detector at output (128 channels) and 03 output (32 channel) was accomplished for the last event prior to each telemetry readout for the experiment. For further details, see FA 'T All, 1972, 1973).

INVESTIGATION NAME: COSMIC-RAY ANISOTROPY

INVESTIGATIVE PROGRAM CODE: E

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS

COSMIC RAYS

PERSONNEL: PI - K.S. McCracken
01 - W.C. Bartley
02 - D.L. Rad
CSIRO
HALL ACADSCY OF SCI
INDIAN SCI Radiation

BRIEF DESCRIPTION

The experimental configuration collected a quadripolar electrostatic analyzer with eight different energy channels. The analyzer electron beam was measured in 15 angular intervals. Eight of the eight collectors measured particles incident from eight different contiguous angular intervals. These eight collectors were 5.5/8 deg wide, and spaced the same angular intervals. The electric plane was 1.2 cm from the collector. At the detector, it made a 360-deg scan in the electric plane about once per second. Pulse response analysis of detector at output (128 channels) and 03 output (32 channel) was accomplished for the last event prior to each telemetry readout for the experiment. For further details, see FA 'T All, 1972, 1973.

INVESTIGATION NAME: ELECTROSTATIC ANALYZER

INVESTIGATIVE PROGRAM CODE: D

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS

COSMIC RAYS

PERSONNEL: PI - J.M. Wolfe
01 - J.M. Wolfe
02 - K.S. McCracken
03 - W.C. Bartley
04 - D.L. Rad
CSIRO
HALL ACADSCY OF SCI
INDIAN SCI Radiation

BRIEF DESCRIPTION

The experimental configuration collected a quadripolar electrostatic analyzer with eight different energy-per-charge (e/p) steps from 0.0 to 1000 V. There was an electron beam of operation. In 15 angular intervals, eight of the eight collectors measured particles incident from eight different contiguous angular intervals. These eight collectors were 5.5/8 deg wide, and spaced the same angular intervals. The electric plane was 1.2 cm from the collector. At the detector, it made a 360-deg scan in the electric plane about once per second. Pulse response analysis of detector at output (128 channels) and 03 output (32 channel) was accomplished for the last event prior to each telemetry readout for the experiment. For further details, see FA 'T All, 1972, 1973.)
BRIEF DESCRIPTION

This experiment was designed primarily to measure the anisotropies of galactic and solar cosmic rays. The particle detector was a CsI(Tl) scintillation detector with a CsI(Tl) scintillator collimator, a PMT, and scintillator collimator. The CsI(Tl) scintillator crystal that was not accompanied by a CsI(Tl) scintillator detector was sorted by a three-wire pinhole weight filter analyzer. The pin positions corresponded to energy deposition in 4 keV, 47.4 to 66.8, and 65.5 to 151.1 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 three window-corrected counts were separately studied in each of four angular sectors as the spacecraft spun. Each angular sector was also used in normal 90° intervals, however, with the sun either near a sector boundary or in the middle of a sector. Depending on which window was used, the angular sector was reduced to 71.2°, with the sun either in a sector or near the midpoint between two sectors. A spin-integrated isotropic model in which all particles depositing 7.2 MeV in the CsI crystal (no angular integration requirement) were counted, was also used. Accumulation times for each of the 12 directional modes and for the two simultaneous modes, were 585 s (spacecraft spin period was about 1 s) depending on the telemetry bit rate. See Bentley et al., Rev. Sci. Instrum., 39, page 266, 1967, for a more detailed experiment description.

--------- PIONEER 7, SIMPSON

INVESTIGATION NAME- ELECTRIC-RAY TELESCOPE

NSSDC 10- 65-055A-00 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(s) PARTICLES AND FIeldS COSMIC RAYS

PERSONNEL

PI - J. L. SIMPSON

01 - M. A. SCHOFFEN

O2 - I. J. LAMPORT

O3 - U. OF CHICAGO

O4 - U. OF ARIZONA

BRIEF DESCRIPTION

This experiment used a charged particle telescope composed of four 90° half-aperture, solid-state, plastic scintillators. They were used to study anisotropy and fluctuations of solar protons and alpha particles that were observed in two angular sectors, 10° wide, 0° to 59° and 41° to 100°. The angular sector energy bands sampled were 0.2 to 500 MeV. The time resolution ranged from about one measurement per 0.4 s to about one measurement per 26 s depending on the telemetry bit rate. The spin axis was measured so that it made a 360°-deg scan in the ecliptic plane and pointed toward the south ecliptic pole.

--------- PIONEER 7, WOLFE

INVESTIGATION NAME- ELECTROSTATIC ANALYZER

NSSDC 10- 66-073A-00 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(s) PARTICLES AND FIeldS SPACE PLASMAS

PERSONNEL

PI - J. L. WOLFE

01 - M. A. SILVA

BRIEF DESCRIPTION

A QUADRUPOLAR ELECTROSTATIC ANALYZER WITH EIGHT DIFFERENT MODES OF OPERATION, ONE ELECTRIC-LINEAR ENERGY PER CHARGE STEP AND EIGHT DIFFERENT CONTINUOUS ANGULAR INTERVALS RELATIVE TO THE ECLIPTIC PLANE. THE SPACECRAFT SPINNING FLUORESCENCE BETWEEN 90° AND 100°. THE MAXIMUM FLUX IN EACH OF THE EIGHT 75° ANGULAR SECTORS IN THE ECLIPSE PLANE WAS MEASURED.

--------- PIONEER 8, BERN

INVESTIGATION NAME- ELECTRIC RAY TELESCOPE

NSSDC 10- 67-123A-04 INVESTIGATIVE PROGRAM CODE SG

INVESTIGATION DISCIPLINE(s) INTERPLANETARY DUST

PERSONNEL

PI - O. E. BERG

O1 - L. SEGRE/RETICULAR

BRIEF DESCRIPTION

This experiment was designed primarily to measure the anisotropies of galactic and solar cosmic rays. The particle detector was a CsI(Tl) scintillation detector with a CsI(Tl) scintillator collimator. The CsI(Tl) scintillator crystal that was not accompanied by a CsI(Tl) scintillator detector was sorted by a three-wire pinhole weight filter analyzer. The pin positions corresponded to energy deposition in 4 keV, 47.4 to 66.8, and 65.5 to 151.1 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 three window-corrected counts were separately studied in each of four angular sectors as the spacecraft spun. Each angular sector was also used in normal 90° intervals, however, with the sun either near a sector boundary or in the middle of a sector. Depending on which window was used, the angular sector was reduced to 71.2°, with the sun either in a sector or near the midpoint between two sectors. A spin-integrated isotropic model in which all particles depositing 7.2 MeV in the CsI crystal (no angular integration requirement) were counted, was also used. Accumulation times for each of the 12 directional modes and for the two simultaneous modes, were 585 s (spacecraft spin period was about 1 s) depending on the telemetry bit rate. See Bentley et al., Rev. Sci. Instrum., 39, page 266, 1967, for a more detailed experiment description.

--------- PIONEER 8, BERG

INVESTIGATION NAME- ELECTRIC RAY TELESCOPE

NSSDC 10- 67-123A-04 INVESTIGATIVE PROGRAM CODE SG

INVESTIGATION DISCIPLINE(s) INTERPLANETARY DUST

PERSONNEL

PI - O. E. BERG

O1 - L. SEGRE/RETICULAR

BRIEF DESCRIPTION

This experiment was designed primarily to measure the anisotropies of galactic and solar cosmic rays. The particle detector was a CsI(Tl) scintillation detector with a CsI(Tl) scintillator collimator. The CsI(Tl) scintillator crystal that was not accompanied by a CsI(Tl) scintillator detector was sorted by a three-wire pinhole weight filter analyzer. The pin positions corresponded to energy deposition in 4 keV, 47.4 to 66.8, and 65.5 to 151.1 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 three window-corrected counts were separately studied in each of four angular sectors as the spacecraft spun. Each angular sector was also used in normal 90° intervals, however, with the sun either near a sector boundary or in the middle of a sector. Depending on which window was used, the angular sector was reduced to 71.2°, with the sun either in a sector or near the midpoint between two sectors. A spin-integrated isotropic model in which all particles depositing 7.2 MeV in the CsI crystal (no angular integration requirement) were counted, was also used. Accumulation times for each of the 12 directional modes and for the two simultaneous modes, were 585 s (spacecraft spin period was about 1 s) depending on the telemetry bit rate. See Bentley et al., Rev. Sci. Instrum., 39, page 266, 1967, for a more detailed experiment description.
MOUNTED IN THE EQUATOR OF THE SATELLITE WITH ITS AXES PARALLEL TO THE SATELLITE SPIN AXIS AND THE ECLIPSE PLANE, CONSISTED OF A FRONT-FIRED PIKE SENSORS ARRAY AND A REAR-FIRED PIKE SENSORS ARRAY, SPACED 2 CM APART, AND AN ACOSTICAL IMPACT PLATE UPON WHICH THE SATELLITE WAS MOUNTED. THE FRONT-FIRED PIKE SENSORS ARRAY CONSISTED OF FOUR VERTICAL FILM STRIPS COUPLED BY ONE HORIZONTAL GRID STRIP, 26 X 48, K, REAR-FIRED PIKE SENSORS ARRAY AND 1011 X 3000 SIGNALS. THE FRONT-SIDE DETECTOR AND THE REAR-SIDE DETECTOR WERE SEPARATELY CONNECTED TO A SEPARATE SAMPLER. THE SIGNALS WERE USED TO DETERMINE THE EMBELLISHMENT IN WHICH AN IMPACT OCCURRED.

THE FRONT-FIRED PIKE SENSORS ARRAY WAS DESIGNED TO PERFORM AN IN-FLIGHT STUDY OF THE RELATIVITY OF THE SIGNALS IN A COPPER DUST SENSOR IN ADDITION TO PERFORMING AS AN IMPACT SENSOR FOR THIS EXPERIMENT. IN-FLIGHT CALIBRATION WAS PROVIDED AND INITIATED BY A SPACECRAFT EXPERIMENT COMMAND AND MONITORED THE EXPERIMENT ELECTRONIC CIRCUIT. PROVIDING A CHECK ON THE PHYSICAL CONDITION OF THE PLASMA SPACER.

THE MOUNTING PLANETARY DUST PARTICLES RELATIVELY LARGE HIGH-VELOCITY PARTICLES (GREATER THAN 0.4 NANOGRAMS), WHICH COULD PASS THROUGH THE FRONT AND REAR PIKE SENSOR ARRAYS WITHOUT GENERATING A DETECTABLE PLAUSIBLE SATELLITE BUT COULD STILL IMPACT A MEASURABLE IMPULSE TO THE PCOSENSORS. THE PCOSENSORS WERE DESIGNED TO PERFORM AN IN-FLIGHT STUDY OF THE RELATIVITY OF THE SIGNALS IN A COPPER DUST SENSOR IN ADDITION TO PERFORMING AS AN IMPACT SENSOR FOR THIS EXPERIMENT. IN-FLIGHT CALIBRATION WAS PROVIDED AND INITIATED BY A SPACECRAFT EXPERIMENT COMMAND AND MONITORED THE EXPERIMENT ELECTRONIC CIRCUIT. PROVIDING A CHECK ON THE PHYSICAL CONDITION OF THE PLASMA SPACER.

PERSONNEL
PI: K. G. McCracken
GS: R. H. Hines
IN: INDIAN SCI SAT PHO
OI: W. L. Bartley
NAT: ACADEMY OF SCI

BRIEF DESCRIPTION

PERSONNEL
PI: J. R. McCracken
GS: R. H. Hines
IN: INDIAN SCI SAT PHO
OI: W. L. Bartley
NAT: ACADEMY OF SCI

BRIEF DESCRIPTION

PERSONNEL
PI: J. R. McCracken
GS: R. H. Hines
IN: INDIAN SCI SAT PHO
OI: W. L. Bartley
NAT: ACADEMY OF SCI

BRIEF DESCRIPTION
INVESTIGATION NAME: ELECTROSTATIC ANALYZER

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS

PERSONNEL

PI: J.H. WOLFE
NASA-ARC

01: D.O. WIGGINS
NASA-ARC

BRIEF DESCRIPTION

A 3-D SEMILOGARITHMIC ELECTROSTATIC ANALYZER (120-250 TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTINUOUS CURRENT COLLECTIONS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE SELECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/\theta) STEPS FROM 10 TO 15,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 16 LOGARITHMICALLY EQUISPACED E/\theta STEPS RANGING FROM 12 TO 1,000 V. THERE WAS ALSO A ZERO E/\theta OR BACKGROUND STEP. THE THREE COLLECTORS MEASURED ELECTRONS INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL 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. THE SPACECRAFT WAS SPINNING. THE ELECTRONS WERE SELECTED IN 25 POSSIBLE 2-15-25 DEG AZIMUTHAL ANGLE SECTIONS. SEVENTEEN OF THESE SECTIONS WERE CONTINUOUS AND DUCKED THE SOLAR DIRECTION. THE REMAINING 13 SECTIONS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION: POLAR SCAN, AZIMUTHAL SCAN AT THE TWO HIGHEST-ENERGY STEPS, AND ION COLLECTION. ALL THREE COLLECTORS WERE OBSERVED, AND THE PEAK FLUX OBSERVED IN THE AZIMUTHAL SCAN WAS CALCULATED FOR THE CENTRAL COLLECTOR AT EACH E/\theta STEP. AT THE LOW E/\theta STEP (20-30 V), THE MAXIMUM FLUX MEASURED WAS USED AT EACH E/\theta STEP FOLLOWER BY EITHER (3) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/\theta STEP WHERE THE PEAK FLUX MEASURED DURING THE MAXIMUM FLUX STEP WAS OBTAINED. (4) FOR ELECTRONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/\theta = 100 V. IN THE MAXIMUM FLUX STEP, ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBSERVED AND THE AZIMUTHAL DIRECTION. A 2-15 DEG STEP OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION COLLECTIONS AT EACH E/\theta STEP. THE MEAN E/\theta STEP AT THE HIGH E/\theta RATES (552 AND 250 MEV) ONE SET OF ION MEASUREMENTS TOOK 1/2 AND ONE OF ELECTRONS MEASUREMENTS 28 S. AT THE LOW E/\theta RATES (64 AND 64) A COMPLETE SET OF ELECTRON MEASUREMENTS TOOK 1/2 S. AT 160 ES, IT TOOK 1310 S, AND AT 80 ES, IT TOOK 3020 S.

*************** PIONEER 9 ****

SPACELAB COMMON NAME: PIONEER 9
ALTERNATE NAMES: PIONEER 9, PL-6046
5333

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS

PERSONNEL

PI: J.H. WOLFE
NASA-ARC

01: D.O. WIGGINS
NASA-ARC

BRIEF DESCRIPTION

INVESTIGATION NAME: COSMIC-RAY ANISOTROPY

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(s)
PARTICLES AND FIELDS SPACE PLASMA

PERSONNEL
PI - F. L. SCARFF
01 - R. P. SONTET U of ARIZONA NASA-ARC
01 - D. G. GREEN
01 - I. M. CROOK
01 - M. W. WEBBER NASA-ARC
01 - D. W. McKEE

BRIEF DESCRIPTION
ELECTRIC FIELD AND ELECTROMAGNETIC PLASMA WAVES MEASURED IN THE SOLAR WIND NEAR 1 AU USING AN UNBALANCED ELECTRIC POLARIZING ANTENNA AND AN UNBALANCED ELECTRIC POLARIZING ANTENNA. THE TWO SYSTEMS WERE VERIFIED AS DESIGNED AND FUNCTIONING PROPERLY.

INVESTIGATION NAME: TRIAXIAL MAGNETOMETERS

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(s)
PARTICLES AND FIELDS SPACE PLASMA

PERSONNEL
PI - F. P. SONTET
01 - R. S. COLBURN U of ARIZONA NASA-ARC

BRIEF DESCRIPTION
A TRIAXIAL MAGNETOMETER WAS DESIGNED TO STUDY THE INTERPLANETARY MAGNETIC FIELD AND ITS FLUCTUATIONS, BOTH IN THE SOLAR WIND AND AT 1 AU. THE MAGNETOMETER IS COMPOSED OF THREE COILS, EACH WITH A UNIQUENESS OF 13 DEG. THE COILS ARE DESIGNED TO BE INDEPENDENTLY OPERABLE IN THREE AXES, PROVIDING A COMPLETE MEASUREMENT OF THE MAGNETIC FIELD.

INVESTIGATION NAME: COSMIC-RAY TELESCOPE

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(s)
PARTICLES AND FIELDS COSMIC RAYS

PERSONNEL
PI - W. R. WEBBER
01 - P. L. SCARFF
01 - H. W. WEBBER NASA-ARC
01 - D. W. McKEE

BRIEF DESCRIPTION
THE BRIEF DESCRIPTION OF THIS EXPERIMENT UTILIZED A TELESCOPE DESIGNED TO MEASURE THE SPIN ANISOTROPY OF COSMIC RAYS IN THE SOLAR WIND. THE TELESCOPE IS DESIGNED TO MEASURE THE SPIN ANISOTROPY OF COSMIC RAYS IN THE SOLAR WIND.

INVESTIGATION NAME: ELECTROSTATIC ANALYZER

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(s)
PARTICLES AND FIELDS SPACE PLASMA

PERSONNEL
PI - J. H. WOLFE
01 - F. L. SCARFF NASA-ARC
01 - R. P. SONTET NASA-ARC

BRIEF DESCRIPTION
A TRUNCATED CYLINDRICAL ELECTROSTATIC ANALYZER WITH A 60-DEG (TETRAHEDRAL PLANE CURVATURE) WITH THREE CONTINUOUS CURRENT COLLECTORS, A 60-DEG ANGULAR INCIDENCE RANGE, AND A 60-DEG ANGULAR INCIDENCE RANGE. THE COLLECTOR IS DESIGNED TO MEASURE THE SPIN ANISOTROPY OF COSMIC RAYS IN THE SOLAR WIND.
FIRST PAGE

The Pioneer 10 spacecraft, launched on March 2, 1972, carried a series of instruments designed to study the interaction of the solar system with the interstellar medium. Among these instruments were a solar wind detector, a charged particle detector, a magnetometer, and a solar Neaphotometer. The spacecraft's trajectory allowed it to make close approaches to the planets, providing valuable data on their environments.

**Spacecraft Common Name:** Pioneer 10

**Launch Date:** March 2, 1972

**Launch Site:** Cape Canaveral, United States

**Sponsoring Country/Agency:** NASA

**Initial Orbit Parameters:**

- **Type:** Jupiter Flyby
- **Diameter:** 4.5 km
- **Mass:** 1.81 x 10^26 kg
- **Orbital Period:** 3 hours, 22 minutes
- **Altitude:** 60 km
- **Eccentricity:** 0.04
- **Inclination:** 1.3 degrees

**Personnel:**

- **PI:** R.W. Fultz
- **Senior PI:** J.W. Hall
- **CoPI:** J.-M. Waite
- **JPL:** P. Sagan
- **UCLA:** R. S. Goldstein
- **UC Berkeley:** J.A. Toth
- **UC Santa Barbara:** E.H. Smith
- **UCSD:** A. G. E. Rees

**Investigation Name:** Pioneer 10

**Investigation Discipline(s):**

- Astronomy
- Geophysics
- Planetary Physics

**Investigation Description:**

- **Title:** Pioneer 10
- **Abstract:** The Pioneer 10 spacecraft was launched on March 2, 1972, to study the interaction of the solar system with the interstellar medium. The spacecraft carried a series of instruments, including a solar wind detector, a charged particle detector, a magnetometer, and a solar Neaphotometer. The spacecraft's trajectory allowed it to make close approaches to the planets, providing valuable data on their environments.

**Investigation Name:** Imaging Photopolarimeter (IPP)

**Investigation Discipline(s):**

- Astronomy
- Planetary Atmospheres

**Investigation Description:**

- **Title:** Imaging Photopolarimeter (IPP)
- **Abstract:** The Imaging Photopolarimeter (IPP) was designed to study the properties of the interstellar medium and the planet Jupiter. The instrument used a series of telescopes to image and analyze the polarized light emitted by the Sun. The data collected by the IPP provided valuable insights into the structure and dynamics of the interstellar medium and the planet Jupiter.

**Investigation Name:** Celestial Mechanics

**Investigation Discipline:**

- Celestial Mechanics

**Investigation Description:**

- **Title:** Celestial Mechanics
- **Abstract:** The Celestial Mechanics investigation was designed to study the motion of celestial objects, including planets, moons, and comets. The investigation used a series of instruments to track the positions and movements of these objects, providing valuable data on their celestial mechanics.

INVESTIGATION NAME: ULTRAVIOLET PHOTOEMETRY
INVESTIGATION PROGRAM: CODE SL
INVESTIGATION DISCIPLINES:
ASTROPHYSICS
PLANETARY ATMOSPHERES

PERSONNEL
PI - D.W. JUDGE
OO - N.W. CARLSON
OO - SOUTHERN CALIF
OO - SOUTHERN CALIF

BRIEF DESCRIPTION

INVESTIGATION NAME: METEOROLOGY DETECTORS
INVESTIGATION PROGRAM: CODE SL
INVESTIGATION DISCIPLINES:
ASTROPHYSICS
PLANETARY INTERPLANETARY DUST

PERSONNEL
PI - W.J. KIRKAN
OO - NASA-LRC
OO - NASA-LRC
OO - NASA-LRC
OO - NASA-LRC

BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE THE NUMBER OF METEOROLOGY IMPACTS ON THE PIONEER TO SPACECRAFT BY MEANS OF 32 PANELS. EACH PANEL CONTAINED 16 PERSONALIZED COVERS. MOUNTED ON THE BACK OF THE ANTI-METEOROLOGY DISK, THE TOTAL EXPOSED AREA WAS 0.665 M.

INVESTIGATION NAME: COSMIC-RAY SPECTRA
INVESTIGATION PROGRAM: CODE SL
INVESTIGATION DISCIPLINES:
PARTICLE PHYSICS
PHYSICS
COSMIC RAYS

PERSONNEL
PI - J.W. READER
OO - E.W. HUBER
OO - W.E. BURGER
OO - W.E. BURGER
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE

BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF THREE MULTIPLE BEAM-STATE TELESCOPES. THE SLOW, NORMAL TO THE SPACECRAFT AXIS. THE HIGH-ENERGY TELESCOPE (HE) CONSISTED OF 5 LAYERED DETECTORS AND MEASURED STOPPING PARTICLES (1-10 TO 100 MEV). THE SECOND LOW-ENERGY TELESCOPE 0.6 TO 10 MEV, THE HIGH-ENERGY TELESCOPE (LE-10) HAD FOUR ELEMENTS AND MEASURED STOPPING PARTICLES TO 100 MEV. PIONEER 11. 1.3 NEARLY SELECTED ONE OF THE EIGHT RANGES BEHIND FULL SCALE VALUES OF MEASUREMENTS TO PLUS 500 NMEV (PER 1000). DIGITIZATION RESOLUTION WAS ABOUT 0.2 PERCENT, THE EXPERIMENT WORKED ACROSS THE SPECTRUM BETWEEN 2 AND 10 MEV.

INVESTIGATION NAME: CHARGED PARTICLE COMPOSITION
INVESTIGATION PROGRAM: CODE SL
INVESTIGATION DISCIPLINES:
PARTICLE PHYSICS
PHYSICS
COSMIC RAYS

PERSONNEL
PI - J.W. READER
OO - E.W. HUBER
OO - W.E. BURGER
OO - W.E. BURGER
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE
OO - U. OF NEW HAMPSHIRE

BRIEF DESCRIPTION
THIS EXPERIMENT MEASURED CHARGED-PARTICLE COMPOSITION AND SPECTRA USING A DUAL DETECTOR SYSTEM CONSISTING OF SEVEN ELEMENTS AND PROVIDING ENERGY SPECTRA 0-300 MEV. 10-96 FOR PROTONS (FOR OXYGEN) AND ISOPORES (FOR H, N AND O). THE DUAL DETECTOR SYSTEM CONSISTED OF TWO ELEMENTS AND MEASURING JOHN PIONEER II. 1.3. NEARLY SELECTED ONE OF THE EIGHT RANGES BEHIND FULL SCALE VALUES OF MEASUREMENTS TO PLUS 500 NMEV (PER 1000). DIGITIZATION RESOLUTION WAS ABOUT 0.2 PERCENT, THE EXPERIMENT TOOK 1000 TO 1500 MEV.
PLANNED UNTIL NOVEMBER 1970, WHEN THE SPACECRAFT WAS NEAR 8, AU.

--- PIONEER 10, SOBERMAN

**INVESTIGATION NAME:** ASTEROID/METEOROID ASTRONOMY

**NSCC 10- 72-0124-03 INVESTIGATIVE PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S):**
- ASTROLOGY
- PLANETARY ATMOSPHERES
- INTERPLANETARY DUST

**PERSONNEL:**
- P - R.A. SOBERMAN
- G - ELECTRON CO
- 01 - D.A. ZORR
- NASA-JSC

**BRIEF DESCRIPTION**

The overall objective of this experiment was to investigate dust particles and meteoroids in interplanetary space. It was essentially two experiments using different techniques. One method was to detect particles by the reflection of light from them, and the other method was to detect them by their impacts. The objectives were to determine distance, trajectory, velocity, relative size, and flux of particles ranging in size from about 10^-8 to 10^-6 meters from the telescope to distant asteroids. The equipment for the detection of particles consisted of four non-imaging Ritchey-Chretien telescopes with primary mirrors of 20 cm in diameter and 0.12 m focal length, fields of view (FOV) of 0.2 rad (8 deg) each, secondary optics, and photomultiplier tubes. The latter detects the reflected light collected by the telescope. The data were integrated for a period of one hour, and then analyzed for light intensity, trajectory, velocity, and impactor size. The equipment for the impact mode consisted of 13 panels containing 18 sealed cells pressurized with argon and a small amount of hydrogen gas, covering 0.65 sq m (6.9 sq ft) of the back of the main antenna dish. Penetration by a particle resulted in a rise in gas at a rate proportional to the hole, which would be related to its mass and velocity. Positions were then registered from particles as small as 0.000001 g.

--- PIONEER 10, WOLF

**INVESTIGATION NAME:** PLASMA

**NSCC 10- 72-0124-15 INVESTIGATIVE PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S):**
- PLASMA PHYSICS
- PARTICLES AND FIELDS

**PERSONNEL:**
- P - J.H. WOLF
- 01 - D.A. ZORR
- NASA-JSC

**BRIEF DESCRIPTION**

This experiment used seven miniature Geiger tubes in interplanetary space in the vicinity of Jupiter. Detection of groupings were as follows: (1) A three-element (A, B, and C) space- and time-separated telescope, with tubes C (2) and C (3) used for directional measurements and used for background subtraction to provide directional rates such as A/C (electrons of 5-27 MeV and protons of 30-725 keV) and D/C (electrons of 0.5-25 MeV and protons of 6-75 keV) each. (2) A three-element (A, B, and C) triangular array, each element responding to electrons above 37 MeV and protons above 75 keV. (3) A three-element set (X, Y, and Z) with a gold-plate (X) with the aperture at the top, which emits scattered electrons. (4) A single electron and coincidence rates were determined from the first two telescopes. The telescope has a high rate of data collection during the Jupiter encounter and data collection is made by sampling in intervals of about 15 deg of roll about the spin axis. For further details see Baker and Van Allen, J. Geophys. Res., 81, 617, 1976.
SPACEx COMMON NAME: PIONEER II
ALTERNATE NAMES: PIONEER-G, P-733C
LAUNCH DATE: 4/6/1979
LAUNCH SITE: CANAVERAL, UNITED STATES
LAUNCH VEHICLE: ATLAS
SPONSORING COUNTRY/AGENCY: UNITED STATES

PERSONNEL
PS - G.W. Null NASA, JPL
PI - J.C. Anderson NASA-JPL

BRIEF DESCRIPTION
This mission was the second space mission in a series to investigate the Jupiter and the outer solar system. Like Pioneer 10, used Jupiter's gravitational field to alter its trajectory. Although it too will escape the solar system, it will pass close to the planet Saturn in September 1979. The spacecraft was 2.9 m (9.5 ft) long, and contains a 2.74 m (8.4 ft) diameter high-gain antenna of a low-gain, omni-antenna was electric power generators. A stix (canopus) sensor, and two sun reference sensors star (ca/copia) sensors, and two sun reference direction to earth and within the known position to canopus as backup. Pioneer 11's star sensor gain and threshold were the same as Pioneer 10. Three pairs of laser thrusters provided 3 m/s control. Velocity and orientation of the spacecraft was initially about 160 m/s. The thrusters could be 50,500 pm (132,000 mph) at 200 m/s. Communication was by command. Communications were maintained via the omni- and medium-gain antennas. Two radio transmitters, coupled to two traveling wave tube amplifiers, were used to power each 15-Band. Communication uplink (Earth to spacecraft) operated at 2350 MHz and downlink (spacecraft to earth) at 2000 MHz at Jupiter's distance. Downlink communication time took 92 min. Data are received at the Deep Space Network.

SECONDARY MISSION OBJECTIVES:
- Study the interplanetary and planetary magnetic fields of solar wind and near-earth regions of the heliosphere.
- Study neutral hydrogen abundance distribution, size, density, and velocity of dust particles.
- Study solar wind, plasma, and magnetic fields, and other solar phenomena.
- Study the planets and their satellites and atmospheres, and for photography of Jupiter, Saturn, and near-earth regions of the heliosphere.

EXPERIMENTS:
- MAGNETOMETER: Measures magnetic fields.
- SOLAR WIND DETECTOR: Measures solar wind and plasma particles.
- MAGNETIC FIELD MEASURER: Measures magnetic fields.
- ATMOSPHERE MEASURER: Measures atmospheric properties.
- CAMERAS: Take photographs of the spacecraft, Jupiter, and Saturn. Equipment carried for these experiments were:- MAGNETOMETER, PLASMA ANALYZER, SOLAR WIND DETECTOR, MAGNETIC FIELD MEASURER, ATMOSPHERE MEASURER.

INVESTIGATION NAME: CELESTIAL MECHANICS
INVESTIGATION DISCIPLINES: PLANETARY SCIENCES, SPACE PROPERTIES
PERSONNEL
PS - G.W. Null NASA-JPL
PI - J.C. Anderson NASA-JPL

BRIEF DESCRIPTION
This experiment consisted of an array of five particle detectors with electron thresholds in the range 0.1 to 25 MeV and proton thresholds in the range 0.25 to 25 MeV. A cerneon, which was added at the time of Pioneer 10's launch, measured and identified particles of the solar system. The detectors were sensitive to electrons having energies greater than 25 MeV. The last two detectors were scintillation detectors (25 and 500 keV). Both of which had energy thresholds of 10 keV for electrons and 150 keV for protons. The sensitivity of the SE detector to protons was about a factor of 10 lower than its sensitivity to electrons. The SE detector effectively measured the electron fluxes, which could then be subtracted from the total spacecraft response to obtain a complete scan through all channels.

INVESTIGATION NAME: IMAGING PHOTOPOLARIMETER
INVESTIGATION DISCIPLINES: PLANETARY SCIENTIFIC PROPERTIES
PERSONNEL
PS - G.W. Null NASA-JPL
PI - J.C. Anderson NASA-JPL

BRIEF DESCRIPTION
This instrument was designed to measure the Pioneer Magnetic Field, using the Pioneer Magnetic Field (PMF) sensor and associated electronics capable of measuring fields from 10 to 1000 Gauss, and for the Pioneer Imaging Photopolarimeter (PIPP), which measures polarized light. The PMF sensor measures the magnetic field of the spacecraft, Jupiter, and Saturn. Equipment carried for this experiment were:- MAGNETOMETER, PLASMA ANALYZER, SOLAR WIND DETECTOR, MAGNETIC FIELD MEASURER, ATMOSPHERE MEASURER.

INVESTIGATION NAME: IMAGING PHOTOPOLARIMETER
INVESTIGATION DISCIPLINES: PLANETARY SCIENCE
PERSONNEL
PS - G.W. Null NASA-JPL
PI - J.C. Anderson NASA-JPL

BRIEF DESCRIPTION
This investigation measured the imaging photopolarimeter (IPP) experiment was used in Pioneer 10 and 11 experiments to obtain simultaneous, two-color, polarized and 10A (UV) and 30A (visible) images of Jupiter and the major Galilean satellites. The IPP was used to measure the magnetic fields.
by 6-mm field-stop aperture. While the spin-scan imaging used a 0.5-μm field aperture, relative radiometric calibration was derived using an internal tungsten lamp. Long-term absolute radiometric calibration of the instrument was accomplished by means of a sunlight diffuser/afterglow element located at the microwave antenna structure. That is, primary radiometric calibration was obtained throughout the mission by periodically illuminating the telescope with an allowed backscatter (1000 W/m²) source. The experimental train for the IPP package consisted of a 2.5-μm-Matsumoto telescope of focal ratio f/3.4. A f/4 focal plane wheel contains a 2x2 aperture for the instrument. (3) A wall-papered room is used to split the light into two orthogonally polarized seas, (4) a birefringent mirror then reflects wavelengths of less than 5500 Å (blue light) and transmits all light of greater wavelengths (red beam). (5) For each spectral band, the polarizations are separated by a scanning relay lens and polaroid filters. (6) Finally, the spectral beam two denax channeltron (blue = blue - blue + red - red - 2x) photocathodes to register the intensity in each polarization component. (Note - this experiment was also aboard Pioneer 10.)

--- Pioneer 11. Judge

INVESTIGATION NAME- ULTRAVIOLET PHOTOGRAPHY

INNSDC ID- 73-019a-06

INVESTIGATION PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)

AEROSOL/PLANETARY ATMOSPHERES

PERSONNEL

PI - R. L. Judge
OI - W. M. Carlson

BRIEF DESCRIPTION

In the Pioneer 11 UV radiometer a broadband photometer sensitive between 200 and 500 Å, a beam, UVV behind the spacecraft, and observed evidence of helium, which in turn turns out to be a source of the proton. The UVV beam provides a means for the UVV detector to detect the radiocoronal ionization in interplanetary space. During the course of the mission this experiment was used to detect, for the first time, the ionized helium in the outer heliosphere. This experiment was used to look for the UVV beam and the UVV detector to detect the ionization in the UVV beam. This experiment was used to detect the UVV beam and the UVV detector to detect the ionization in the UVV beam. This experiment was used to detect the UVV beam and the UVV detector to detect the ionization in the UVV beam.

--- Pioneer 11. Kinard

INVESTIGATION NAME- METEOROID DETECTORS

INNSDC ID- 72-019a-06

INVESTIGATION PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)

AEROSOL/PLANETARY ATMOSPHERES

PERSONNEL

PI - W. M. Kinard
OI - J. M. Alvarez
OI - D. H. Ruhm

BRIEF DESCRIPTION

The pioneer 11 meteoroid detection experiment attempted to determine the distribution in interplanetary space of meteoroids too small to be seen by light scattering techniques. A total of 792 cells, each containing 100 meteoroids, were placed on the back of the spacecraft antenna panel. The meteoroids were measured as a 2.5-μm-Matsumoto telescope of focal ratio f/3.4, which is used to measure the atmospheric pressure, and the rate of gas loss indicated the size of the hole made. Thus, the mass and incident energy of the meteoroids could be obtained and compared with the trajectory data for the spacecraft. The experiment was used to determine the spatial density of the meteoroids within the asteroid belt. In addition, the experiment was used to determine the spatial density of the meteoroids within the asteroid belt. In addition, the experiment was used to determine the spatial density of the meteoroids within the asteroid belt. In addition, the experiment was used to determine the spatial density of the meteoroids within the asteroid belt.
BRIEF DESCRIPTION

This experiment used two telescopes to measure the composition and energy spectra of solar energetic particles above about 0.5 MeV/nucleon. The main telescope consists of three solid-state (three silicon, one lithium-drifted, and one sapphire Cerenkov) detectors, surrounding a plastic-scintillator shield. The telescope has a 60°-deg full-aperture, and a space-craft spin axis permits 360°-deg information on modes of particle selection to permit resolution of the elements. The final telescope consists of four collinear elements (three solid-state, one lithium-drifted, and one sapphire Cerenkov) surrounded by a plastic-scintillator shield. The telescope has a 60°-deg full-aperture, and a space-craft spin axis permits 360°-deg information on modes of particle selection to permit resolution of the elements. The final telescope consists of four collinear elements (three solid-state, one lithium-drifted, and one sapphire Cerenkov) surrounded by a plastic-scintillator shield. The telescope has a 60°-deg full-aperture, and a space-craft spin axis permits 360°-deg information on modes of particle selection to permit resolution of the elements.

INVESTIGATIVE NAME - Jovian Charged Particles

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(S) - Planetary Physics

PERSONNEL
PI - J. A. Van Allen
UI - Iowa

BRIEF DESCRIPTION

This experiment uses X-ray spectroscopy to determine the composition of Jovian charged particles. The detector uses X-ray spectroscopy to determine the composition of Jovian charged particles.

INVESTIGATIVE NAME - Proton and Helium Spectra

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(S) - Solar Physics

PERSONNEL
PI - D. M. McComas
UI - NASA Goddard Space Flight Center

BRIEF DESCRIPTION

The experiment observed the proton and helium spectra from the Jovian system. The detector uses X-ray spectroscopy to determine the composition of Jovian charged particles.

INVESTIGATIVE NAME - Proton and Helium Spectra

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(S) - Solar Physics

PERSONNEL
PI - D. M. McComas
UI - NASA Goddard Space Flight Center
**Personnel**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>J.R. Wolfe</td>
<td>NASA-ARC</td>
</tr>
<tr>
<td>E. Frank</td>
<td>U of Iowa</td>
</tr>
<tr>
<td>R. List</td>
<td>MHI-ETHATERR Phys</td>
</tr>
<tr>
<td>V.I. Czerny</td>
<td>NASA-ARC</td>
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<tr>
<td>Z. Smith</td>
<td>NASA-ARC</td>
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<tr>
<td>Z. van Scarff</td>
<td>THW Systems Group</td>
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<tr>
<td>W. Collard</td>
<td>NASA-ARC</td>
</tr>
<tr>
<td>W. Feldman</td>
<td>Los Alamos CSCI Lab</td>
</tr>
<tr>
<td>G. McKibbin</td>
<td>NASA-ARC</td>
</tr>
</tbody>
</table>

**Brief Description**

The instrument consisted of dual 90° deg quadrantspherical electrostatic analyzers, one with 25 individual particle detectors, and the other with 5 current collectors. The system was capable of measuring incident plasma distribution parameters over the energy range of 0.1 to 35 keV for electrons and approximately 1-sod ev for electrons. The high resolution analyzer was located in a countour of 9 KEV/Q PER KV APPLIED TO THE WAS SPIN AXIS TOWARD THE EARTH AND THEREFORE THE SUN. THE EDGES OF THE SPACECRAFT HIGH-GUN ANTENNA REFLECTOR AND POINTED ALONG THE CIUNNELTRONS KOUNTEN ON THE SEIIICIRCULAR un TO THE ANALYlER. THIS ANALYZER WAS USED TO MEASURE IC'NS ONLY ANti HAP 26 OOU1. A "EUUK ENERGY"

**Investigation Name: Plasma Detector**

**Investigation ID: 75-122A-02**

**Investigation Discipline(s):**

- Space Physics

**Investigation Name:** Plasma Detector

**Personnel**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>L. Grinshuiski</td>
<td>Steinhofberg Astron Inst</td>
</tr>
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</table>

**Brief Description**

The instrument is a receiver-antenna system that measures radio mission in the 50 - 1000 kHz band in 10-frequency intervals.

---

**Investigation Name: Plasma Detector**

**Investigation ID: 75-122A-03**

**Investigation Discipline(s):**

- Particles and Fields

**Investigation Name:** Plasma Energetic Particles and Charge Composition

**Personnel**

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<tr>
<td>G.Y. Grinshuiski</td>
<td>LENR inst phys tech</td>
</tr>
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</table>

**Brief Description**

The instrument measures X-rays in the energy range 5-511 keV.

---

**Investigation Name: Plasma Detector**

**Investigation ID: 75-122A-04**

**Investigation Discipline(s):**

- Space Physics

**Investigation Name:** Plasma Energetic Particles and Charge Composition

**Personnel**

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>T.Y. Logachev</td>
<td>INST nuclear phys</td>
</tr>
<tr>
<td>I.A. Savenko</td>
<td>Moscow State U</td>
</tr>
</tbody>
</table>

**Brief Description**

The instrument consists of various detectors for measuring the spectra, anisotropy and charge composition of solar and galactic cosmic rays, as well as energetic particles in the magnetosphere and radiation belts. Electron energies above 10 keV and proton energies above 50 keV are covered in sufficient detail. The spacecraft is designed to cover the dynamic range for the particle fluxes from 10^5 cm^-2 s^-1 keV^-1 to 10^12 cm^-2 s^-1 keV^-1 and the proton temperature down to 2.0 keV could be attenuated.

---

**Investigation Name: Plasma Detector**

**Investigation ID: 75-122A-06**

**Investigation Discipline(s):**

- Space Physics

**Investigation Name:** Plasma Energetic Particles and Charge Composition

**Personnel**

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<th>Institution</th>
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<tr>
<td>G.P. Skertsov</td>
<td>LENR inst phys tech</td>
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</table>

**Brief Description**

The instrument is a receiver-antenna system that measures radio mission in the 50 - 1000 kHz band in 10-frequency intervals.

---

**Investigation Name: Plasma Detector**

**Investigation ID: 75-122A-07**

**Investigation Discipline(s):**

- Solar Physics

**Investigation Name:** Plasma Energetic Particles and Charge Composition

**Personnel**

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<th>Institution</th>
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<tr>
<td>V. Yershonko</td>
<td>LENR inst phys tech</td>
</tr>
</tbody>
</table>

**Brief Description**

The instrument is an energetic particle telescope to measure charge composition of energetic particles within 0.1 to 7 keV/nucleon for Z = 0, ±1, and 2 to 7.2 meV/nucleon for Z ≥ 3.
INVESTIGATIVE PROGRAM
SPACE PHYSICS
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
PERSONNEL
PI - E.G. TERSHENO
IMIRAN
BRIEF DESCRIPTION
THE INSTRUMENT IS A TRIAXIAL FLUXGATE MAGNETOMETER FLOWN
TO MEASURE VECTOR MAGNETIC FIELDS FROM 1 TO 60 GAMMAS.

*************** PROGNOZ 5:************************

SPACECRAFT COMMON NAME- PROGNOZ 5
ALTERNATE NAMES- 09557
NSDC ID- 76-112A
LAUNCH DATE- 11/25/76
WEIGHT- KG
SPONSORING COUNTRY/AGENCY
U.S.S.R.
INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEODESIC
EPOCH DATE- 11/26/76
ORBIT PERIOD- 5713.5 MIN
AGONAL- 65.0 DEG
INVESTIGATION NAME- KILOMETERS/HECTOMETER RECEIVER
PERSONNEL
PI - V.P. GRIGORYEVA
STERNBERG ASTRON OBS
BRIEF DESCRIPTION
A KILOMETERS/HECTOMETER RECEIVER WAS FLOWN TO MEASURE
ELECTRIC AND MAGNETIC FIELDS FROM 50 KHZ TO 1 KHZ IN 10
CHANNELS.

*************** PROGNOZ 5:************************

INVESTIGATION NAME- PLASMA DETECTOR
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PERSONNEL
PI - H.I. GRINGAUZ
IKI
BRIEF DESCRIPTION
A PLASMA DETECTOR IVS FLOWN TO MEASURE ION SPECTRA FROM
1.0 TO 4.4 KEV. AN ELECTRON PROBE WAS ALSO INCLUDED TO MEASURE
DENSITY AND TEMPERATURE BELOW 300 EV.

*************** PROGNOZ 5:************************

INVESTIGATION NAME- SOLAR-X-RAYS
INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
PERSONNEL
PI - G.YE. KACHAROV
LENSKAn INST PHYS TECH
BRIEF DESCRIPTION
SOLAR X-RAYS WERE MEASURED FROM 2 TO 311 KEV.
BRIEF DESCRIPTION

A three-axis fluxgate magnetometer was flown to measure vector fields in space. There were 100 receivers -- 11 connected to the upper V-antenna and RV-2 connected to the lower V-antenna. The magnetometer had an effective bandwidth of 70 to 80 kHz and a post-detection time constant of 0.35 s. The output channel was obtained from the integrated servo-loop error signal, and a fine output channel was obtained from the noise source output to match the antenna signal. The frequency was selected for TV. A THERMOMETER located in the receiver measured the amplitude at the TV which was measured every 19.7 min in the housekeeping data. The receivers operated at a frequency of several Hertz for each frequency. Each was selected for TV before stepping to the next. During this time, eight channels were used to output, of the eight coarse samples the first was not reliable since not enough time had elapsed for the receiver to stabilize after the frequency switching.

INVESTIGATION NAME: PLASMA SPECTROMETERS

INVESTIGATIVE PROGRAM

SOLAR-TERRESTRIAL PHYSICS

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

PERSONNEL

PI - J.R. STONE

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA-GSFC

NSSDC ID - 73-059A

LAUNCH DATE - 06/19/73

LAUNCH SITE - CAPE CANAVERAL, UNITED STATES

WEIGHT - 582.0 KG

PERIOD - 20.197 HOURS

EPHEMERALES - 1052.98 KILOMETERS

PERSONNEL

PI - J.R. STONE

ALTERNATE NAME - RADIO ASTRONOMY EXPLORER

INVESTIGATION NAME - IMPULSE RADIO SPECTROMETERS

INVESTIGATIVE PROGRAM CODE SA

ASTRONOMY

INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS

PERSONNEL

PI - J.R. STONE

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA-GSFC

NSSDC ID - 73-059A-D1

LAUNCH DATE - 06/19/73

LAUNCH SITE - CAPE CANAVERAL, UNITED STATES

WEIGHT - 582.0 KG

PERIOD - 20.197 HOURS

EPHEMERALES - 1052.98 KILOMETERS

PERSONNEL

PI - J.R. STONE

ALTERNATE NAME - STEP FREQUENCY RADIO METERS

INVESTIGATION NAME - IMPULSE RADIO SPECTROMETERS

INVESTIGATIVE PROGRAM CODE SA

ASTRONOMY

INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS

PERSONNEL

PI - J.R. STONE
BRIEF DESCRIPTION

This experiment was an engineering experiment to check the upper U-antenna. It was used only for routine confirmation of antenna characteristics early in the flight.

NSSDC ID- 73-039A-03
INVESTIGATIVE PROGRAM
CODE SA
INVESTIGATION DISCIPLINE(S)
ASTRONOMY
IONOSPHERES AND RADIO PHYSICS
PERSONNEL
PI - R.G. STONE NASAGSCF
GI - J.L. DONLEY NASAGSCF
GI - J.R. GUTHRIE NASAGSCF
GI - J.A. KANE NASAGSCF
GI - R.C. SOLLACK NASAGSCF

SPACECRAFT COMMON NAME- 53-1
ALTERNATE NAMES- SESP P3-9, 575-3A
NSSDC ID- 74-055C
LAUNCH DATE- 10/29/74
WEIGHT- KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TITAN
SATELLITE COUNTRY/AGENCY
UNITED STATES 800-USAF
INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEODETIC
EPOCH DATE- 10/31/74
PERIOD- 126.6 MIN
INCLINATION- 97.0 DEG
PERIAPSIS- 1520 KI
APOAPSIS- 3979.0 KI
PERSONNEL
PS - J.R. STEVENS AEROSPACE CORP

BRIEF DESCRIPTION

This experiment was an engineering experiment to check the upper U-antenna. It was used only for routine confirmation of antenna characteristics early in the flight.

INVESTIGATION NAME- ELF-VLF RECEIVER
NSSSC ID- 74-055C-07
INVESTIGATIVE PROGRAM
SESP
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS
SPACE PLASMAS
PARTICLES AND FIELDS
PERSONNEL
PI - H.C. KOONS AEROSPACE CORP

INVESTIGATION NAME- ACCELEROMETER DENSITY OBSERVATIONS
NSSSC ID- 74-055C-01
INVESTIGATIVE PROGRAM
SESP
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS
PERSONNEL
PI - F.A. MARCOS USAF GEOPHYSICS LAB

INVESTIGATION NAME- ELECTROSTATIC ANALYZER
NSSSC ID- 74-055C-01
INVESTIGATIVE PROGRAM
SESP
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS
SPACE PLASMAS
PERSONNEL
PI - C.J. ICE AEROSPACE CORP

INVESTIGATION NAME- RETARDING POTENTIAL ANALYZER
NSSSC ID- 74-055C-00
INVESTIGATIVE PROGRAM
SESP
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS
SPACE PLASMAS
PERSONNEL
PI - C.J. FENNELL
AEROSPACE CORP

BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WAS TO OBSERVE THE QUASI-EQUATORIAL VARIATIONS OF THE ATMOSPHERIC DENSITY. THE OBSERVATIONS WERE MADE OVER THE REGION OF THE EQUATOR AND HIGHER LEVELS THAT RELATE TO THE DENSITY VARIATIONS IN THE LOWER LAYER OF THE EARTH'S ATMOSPHERE.

************** S3-2 **************

INVESTIGATION NAME- NEUTRAL DENSITY EXPERIMENTS (COLD AND HOT CATHODE GAUGES)
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - J.P. MCISAC
USAF GEOPHYS LAB

BRIEF DESCRIPTION
THIS EXPERIMENT STUDIED NEUTRAL DENSITY VARIATIONS ABOVE 300 KM OVER A WIDE RANGE OF LATITUDE. THE OBSERVATIONS WERE MADE USING A SATELLITE-PLACED APPARATUS FOR THE COLLECTION OF LENS AND SOlar PARAMETERS TO BETTER IDENTIFY AND INVESTIGATE THE INTERRELATIONSHIPS WHICH OCCUR. THE FREE IONS WERE REMOVED NEAR THE LOWER LAYER OF THE OBSERVATIONS WITH DENSITY CHANGES IN THE LOWER LAYER OF THE ATMOSPHERE. THE NEUTRALS WERE PASSED THROUGH A BE Amplifier AND A COLLECTOR, ARRANGED AXIALLY WITHIN A GRID COIL. THE RESULTING CURRENT VALUES PROVIDED THE ION CURRENT TO THE COLLECTOR, DENSITIES WERE OBTAINED FROM THESE OBSERVED COLLECTOR-CURRENT VALUES. A COLD CATHODE INSTRUMENT WAS ALSO BE INCLUDED IN THIS EXPERIMENT AND OPERATED ON SIMILAR PRINCIPLES.

************** S3-2 **************

INVESTIGATION NAME- VELOCITY MASS SPECTROMETER
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - C.R. PHILBICK
USAF GEOPHYS LAB

BRIEF DESCRIPTION

************** S3-2 **************

INVESTIGATION NAME- NEUTRAL DENSITY EXPERIMENT (COLD CATHODE GAUGE)
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - C.J. RICE
AEROSPACE CORP

BRIEF DESCRIPTION
THIS EXPERIMENT STUDIED NEUTRAL DENSITY VARIATIONS ABOVE THE LOCALIZED VARIATIONS. THE INSTRUMENT, AFTER REMOVING IONS, OBTAINED NEUTRAL PARTICLES BY ELECTRON EMISSION FROM THE CATHODE. THE MEASURED PARAMETER WAS THE ION CURRENT TO A COLLECTOR.

************** S3-2 **************

INVESTIGATION NAME- RETARDING POTENTIAL ANALYzers (RPA)
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - C.J. RICE
AEROSPACE CORP

BRIEF DESCRIPTION
THIS EXPERIMENT STUDIED NEUTRAL DENSITY VARIATIONS ABOVE THE LOCALIZED VARIATIONS. THE INSTRUMENT, AFTER REMOVING IONS, OBTAINED NEUTRAL PARTICLES BY ELECTRON EMISSION FROM THE CATHODE. THE MEASURED PARAMETER WAS THE ION CURRENT TO A COLLECTOR.

************** S3-2 **************

INVESTIGATION NAME- TRIAXIAL PIEZOELECTRIC ACCELEROMETER
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - P.A. MARCOS
USAF GEOPHYS LAB

BRIEF DESCRIPTION
THIS EXPERIMENT OBSERVED UPWARD FLOW OF IONS FROM THE POlar IONOSPHERE. DATA FROM THIS EXPERIMENT WERE USED IN CONJUNCTION WITH MEASUREMENTS OF OTHER POLAR REGIONS AND THEIR VARIATIONS, INCLUDING COMPOSITION, CONSTITUENT AND TOTAL DENSITY, ENERGIZED PARTICLE FLUX, ETC. THE OBJECT OF THE STUDY WAS TO MORE ACCURATELY DEFINE PRODUCTION, LOSS, AND EQUILIBRIUM PROCESSES THAT OCCUR WITHIN AND NEAR THE POLAR OVAL.
INVESTIGATION NAME- RETARDING POTENTIAL ANALYZER
NSDC ID- 75-1140-13 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(s) ATMOSPHERIC PHYSICS
PERSONNEL PI - C.J. RICE AEROSPACE CORP
OI - P.J.J. WILDMAN USAF GEOPHYS LAB
BRIEF DESCRIPTION THIS EXPERIMENT USED AN ELECTROSTATIC ANALYZER TO OBSERVE ION AND ELECTRON DENSITY AS A FUNCTION OF ENERGY (0.2-200 keV) AND PITCH ANGLE.
--- 53-2, SHUMAN ---
INVESTIGATION NAME- MAGNETOMETER
NSDC ID- 75-1140-08 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(s) PARTICLES AND FIELDS
PERSONNEL PI - R.M. SHUMAN USAF GEOPHYS LAB
OI - M. SMIDT USAF GEOPHYS LAB
BRIEF DESCRIPTION THIS EXPERIMENT MEASURED MAGNETIC FIELDS ASSOCIATED WITH THE AURORAL REGIONS IN QUIET AND SUBSTORM PERIODS. THE OBSERVATIONS WERE USED IN CONJUNCTION WITH OBSERVATIONS FROM OTHER EXPERIMENTS TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. MODELS ASSOCIATING AURORAL-EVENT SOURCES AND TAIL-REGION PARTICLES WERE IMPROVED.
--- 53-2, SMIDT ---
INVESTIGATION NAME- ELECTRIC FIELD OBSERVATIONS
NSDC ID- 75-1140-07 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(s) IONOSPHERES PARTICLES AND FIELDS
PERSONNEL PI - M. SMIDT USAF GEOPHYS LAB
BRIEF DESCRIPTION THIS EXPERIMENT CONSISTED OF THREE-COMPONENT OBSERVATIONS OF THE IONOSPHERIC ELECTRIC FIELDS ASSOCIATED WITH THE AURORAL REGIONS. THESE OBSERVATIONS WERE USED IN CONJUNCTION WITH OBSERVATIONS FROM OTHER EXPERIMENTS TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS.
--- 53-2, VANCOUR ---
INVESTIGATION NAME- ELECTROSTATIC ANALYZER
NSDC ID- 75-1140-00 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(s) IONOSPHERES ATMOSPHERIC PHYSICS
PERSONNEL PI - R.F. VANCOUR USAF GEOPHYS LAB
OI - M. SMIDT USAF GEOPHYS LAB
BRIEF DESCRIPTION THIS EXPERIMENT OBSERVED ELECTRON FLUX FROM 1 TO 20 keV ASSOCIATED WITH THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. THE OBSERVATIONS WERE USED TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS. MODELS ASSOCIATING AURORAL-EVENT ENERGY SOURCES AND TAIL-REGION PARTICLES WERE IMPROVED.
--- 53-2, WILDMAN ---
INVESTIGATION NAME- LOW ENERGY ELECTRONS AND PHOTONS
NSDC ID- 75-1140-12 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(s) IONOSPHERES ATMOSPHERIC PHYSICS
PERSONNEL PI - P.J.J. WILDMAN USAF GEOPHYS LAB
BRIEF DESCRIPTION THIS EXPERIMENT OBSERVED ELECTRON FLUX FROM 1 TO 20 keV ASSOCIATED WITH THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. THE OBSERVATIONS WERE USED TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS. MODELS ASSOCIATING AURORAL-EVENT ENERGY SOURCES AND TAIL-REGION PARTICLES WERE IMPROVED.
PERSONNEL

PI - J.F. RENNELL
AEROSPACE CORP

BRIEF DESCRIPTION

This experiment measured the H+ ion particle distribution at injection into radiation belts and throughout the outer regions of the magnetosphere. This instrument measured the flux of protons and electrons from 0.09 to 4 keV.

--- 53-3, KOONNS

INVESTIGATION NAME - ELF/VLF RECEIVER

NSSDC ID - 76-0659-06
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
SPACE PLASMAS
PARTICLES AND FIELDS

PERSONNEL

PI - L.C. KOONNS
AEROSPACE CORP
O1 - D.P. JAFFA
NASA HEADQUARTERS

BRIEF DESCRIPTION

This experiment measured the linear and non-linear effects of the environment on the near-Earth magnetic field. It provided antenna impedance measurements on an electric-field antenna for frequencies from 0.1 to 20 kHz. The experiment was used to observe ambient electric fields in the geostationary field region to determine the effects of wave-particle interactions as a loss mechanism for energetic electrons from the outer radiation zone. The sensing equipment consisted of the antenna and the associated receiver electronics package.

--- 53-3, MOOZ

INVESTIGATION NAME - DC ELECTRIC FIELDS

NSSDC ID - 76-0659-01
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
SPACE PLASMAS

PERSONNEL

PI - R.L. MOOZ
U OF CALIF. BERKELEY

BRIEF DESCRIPTION

This experiment measured electric field measurements under various conditions, at a variety of geomagnetic locations. The measurements were used in studying variations in radio frequency wave propagation, optical emissions, etc., observed with other experimental equipment.

--- 53-3, SHARP

INVESTIGATION NAME - LOW-ENERGY PARTICLE SPECTROMETER

NSSDC ID - 76-0659-02
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS
SPACE PLASMAS

PERSONNEL

PI - F.L. SHARP
LOCKHEED PALO ALTO

BRIEF DESCRIPTION

This instrument consisted of an instrument to detect all-electron magnetic field due to a dipole magnetic field over the Earth. The measurements were made from 0.07 to 24 keV. Observations were made perpendicular to the orbital plane.

--- 53-3, VARGUINAL

INVESTIGATION NAME - ENERGETIC ELECTRON MAGNETIC SPECTROMETER

NSSDC ID - 76-0659-07
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - R.L. VARGUINAL
AEROSPACE CORP

BRIEF DESCRIPTION

This experiment consisted of a 12-channel magnetic spectrometer used to detect all-electron magnetic field due to a dipole magnetic field over the Earth. The measurements were made from 0.08 to 3 keV and alpha particles above 4 keV.

--- 53-3, WILDMAN

INVESTIGATION NAME - ELECTRIC FIELDS-ION DRIFT

NSSDC ID - 76-0659-05
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
IONOSPHERES
MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.F. WILDMAN
USAF GEOPHYS LAB
O1 - R.C. SAGALYN
USAF GEOPHYS LAB
O2 - N. SKIDWAY
USAF GEOPHYS LAB

BRIEF DESCRIPTION

This experiment consisted of a spherical electron sensor and two arrays of four planar aperture ion sensors. Both ions and electrons from 0.1 to 30 keV were measured. Electron densities from 10 to 3.0 x 10^6 cm^-3 to the power -\(-\)3.9, and temperatures from 500 to 10,000 deg. were obtained. For ions, the density could be obtained below altitude of 5,000 km.

--- 53-3, YATES

INVESTIGATION NAME - LOW-ENERGY PHOTON SPECTROMETERS

NSSDC ID - 76-0659-04
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS

PERSONNEL

PI - K. YATES
USAF CAMBRIDGE RES LAB

BRIEF DESCRIPTION

This experiment observed protons (0.1 to 100 keV) trapped within the geomagnetic cavity. Data were made available for real-time use and recorded for long-term studies. The primary use of the data was by the USAF Air Weather Service in providing space environment forecasts and in developing improved techniques for these forecasts.

--- 53-3, YATES

INVESTIGATION NAME - PROTON TELESCOPE

NSSDC ID - 76-0659-04
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)

PERSONNEL

PI - K. YATES
USAF CAMBRIDGE RES LAB

BRIEF DESCRIPTION

This experiment observed alpha-particle population (0.1-10 keV) within the geomagnetic cavity. The data were made available for real-time use and recorded for long-term studies. The primary use of the data was by the USAF Air Weather Service in providing space environment forecasts and in developing improved techniques for these forecasts.

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SPACENET COMMON NAME - SAN MARCO 4
ALTERNATE NAMES - SAN MARCO-C-2 (1) OZ/21/74
LAUNCH DATE - 02/18/74
WEIGHT - 164.4 KG
LAUNCH SITE - SAN MARCO PLATEFORM OFF COAST OF KENYA
LAUNCH VEHICLE - SCOUT
SPONSORSING COUNTRY/FACILITY
UNITED STATES
CRA

INVESTIGATION NAME - LOCALIZED IONIZATION ELECTRIC FIELD SENSORS

NSSDC ID - 76-0659-09
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS
IONOSPHERES
MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.R. WILDMAN
USAF GEOPHYS LAB
O1 - R.C. SAGALYN
USAF GEOPHYS LAB
O2 - N. SKIDWAY
USAF GEOPHYS LAB

BRIEF DESCRIPTION

This experiment consisted of a spherical electron sensor and two arrays of four planar aperture ion sensors. Both ions and electrons from 0.1 to 30 keV were measured. Electron densities from 10 to 3.0 x 10^6 cm^-3 to the power -\(-\)3.9, and temperatures from 500 to 10,000 deg. were obtained. For ions, the density could be obtained below altitude of 5,000 km.

--- 53-3, YATES

INVESTIGATION NAME - LOW-ENERGY PHOTON SPECTROMETERS

NSSDC ID - 76-0659-04
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS

PERSONNEL

PI - K. YATES
USAF CAMBRIDGE RES LAB

BRIEF DESCRIPTION

This experiment observed protons (0.1 to 100 keV) trapped within the geomagnetic cavity. Data were made available for real-time use and recorded for long-term studies. The primary use of the data was by the USAF Air Weather Service in providing space environment forecasts and in developing improved techniques for these forecasts.

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LAUNCH VEHICLE - SCOUT
SPONSORSING COUNTRY/FACILITY
UNITED STATES
CRA

INVESTIGATION NAME - LOCALIZED IONIZATION ELECTRIC FIELD SENSORS

NSSDC ID - 76-0659-09
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS
IONOSPHERES
MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.R. WILDMAN
USAF GEOPHYS LAB
O1 - R.C. SAGALYN
USAF GEOPHYS LAB
O2 - N. SKIDWAY
USAF GEOPHYS LAB

BRIEF DESCRIPTION

This experiment consisted of a spherical electron sensor and two arrays of four planar aperture ion sensors. Both ions and electrons from 0.1 to 30 keV were measured. Electron densities from 10 to 3.0 x 10^6 cm^-3 to the power -\(-\)3.9, and temperatures from 500 to 10,000 deg. were obtained. For ions, the density could be obtained below altitude of 5,000 km.

--- 53-3, YATES

INVESTIGATION NAME - LOW-ENERGY PHOTON SPECTROMETERS

NSSDC ID - 76-0659-04
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS

PERSONNEL

PI - K. YATES
USAF CAMBRIDGE RES LAB

BRIEF DESCRIPTION

This experiment observed protons (0.1 to 100 keV) trapped within the geomagnetic cavity. Data were made available for real-time use and recorded for long-term studies. The primary use of the data was by the USAF Air Weather Service in providing space environment forecasts and in developing improved techniques for these forecasts.

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LAUNCH SITE - SAN MARCO PLATEFORM OFF COAST OF KENYA
LAUNCH VEHICLE - SCOUT
SPONSORSING COUNTRY/FACILITY
UNITED STATES
CRA

INVESTIGATION NAME - LOCALIZED IONIZATION ELECTRIC FIELD SENSORS

NSSDC ID - 76-0659-09
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS
MAGNETOSPHERIC PHYSICS
IONOSPHERES
MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - J.R. WILDMAN
USAF GEOPHYS LAB
O1 - R.C. SAGALYN
USAF GEOPHYS LAB
O2 - N. SKIDWAY
USAF GEOPHYS LAB

BRIEF DESCRIPTION

This experiment consisted of a spherical electron sensor and two arrays of four planar aperture ion sensors. Both ions and electrons from 0.1 to 30 keV were measured. Electron densities from 10 to 3.0 x 10^6 cm^-3 to the power -\(-\)3.9, and temperatures from 500 to 10,000 deg. were obtained. For ions, the density could be obtained below altitude of 5,000 km.

--- 53-3, YATES

INVESTIGATION NAME - LOW-ENERGY PHOTON SPECTROMETERS

NSSDC ID - 76-0659-04
INVESTIGATIVE PROGRAM
SESP

INVESTIGATION DISCIPLINE(S)
PARTICLES AND FIELDS

PERSONNEL

PI - K. YATES
USAF CAMBRIDGE RES LAB

BRIEF DESCRIPTION

This experiment observed protons (0.1 to 100 keV) trapped within the geomagnetic cavity. Data were made available for real-time use and recorded for long-term studies. The primary use of the data was by the USAF Air Weather Service in providing space environment forecasts and in developing improved techniques for these forecasts.
ATMOSPHERE COMPOSITION EXPERIMENT (NAME:SAS-A) WAS USED TO POINT THE SPIN AXES OF THE SPACECRAFT TO ANY POINT OF THE SKY. THE ASPECT SYSTEM CONSISTED OF BOTH A STAR INTERNAL HHEEL, AND A MAGNETICALLY TORQUED CIRCUIT. MANOEUVRES NARROW REGION NEAR SATELLITE PERIGEE.

--- SAN MARCO & SPENCER ---

INVESTIGATION NAME: NEUTRAL ATMOSPHERE COMPOSITION

NSSDC ID: 74-009A-OZ INVESTIGATIVE PROGRAM CODE ST/CO-0P INVESTIGATION DISCIPLINE(S): PHYSICAL ATMOSPHERE

PERSONNEL

BRIEF DESCRIPTION
THE EXPERIMENT WAS FLOWN AT EQUATORIAL LATITUDES TO DETERMINE THE CONCENTRATIONS AND TEMPORAL (INCLUDING DIURNAL) FLUCTUATIONS OF THE FOLLOWING VARIOUS ATMOSPHERIC CONSTITUENTS: ARGON, MOLECULAR NITROGEN, HUMIDITY, AND HELIUM. THE MEASUREMENTS OBTAINED WERE CORRELATED WITH DATA FROM SURVEYOR EXPLORER-C DATA. A MAGNETIC MASS SPECTROMETER WAS USED.

--- SAN MARCO & SPENCER ---

INVESTIGATION NAME: NEUTRAL ATMOSPHERE TEMPERATURE

NSSDC ID: 74-009A-03 INVESTIGATIVE PROGRAM CODE ST/CO-0P INVESTIGATION DISCIPLINE(S): PHYSICAL ATMOSPHERE

PERSONNEL

BRIEF DESCRIPTION
THE EXPERIMENT WAS FLOWN TO DETERMINE THE TEMPERATURE AND DENSITY OF MOLECULAR NITROGEN AT SEVERAL ALTITUDES IN THE ATMOSPHERE. THE DATA OBTAINED WERE USED TO STUDY TEMPORAL FLUCTUATIONS AND THEY WERE ALSO CORRELATED WITH ATMOSPHERIC EXPLORER-C MEASUREMENTS. THE SENSOR WAS A SMALL DETECTION TUNES TO MEASURE MOLECULAR NITROGEN, AND WAS A SPECIALLY SHAPED APERTURE. TEMPERATURE WAS MEASURED DURING A SPIN-SCAN BY OBSERVING THE RESPONSE AS A FUNCTION OF ANGLE WITH THE SATELLITE VELOCITY VECTOR.

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SPACECRAFT COMMON NAME: SAS-A ALTERNATE NAMES: SAS-1, EXPLORER 42

PERIODICITY: 90.7 MIN PERIOD: 1.0 DEG PERTIPIASIS: 531. K

PERSONNEL

BRIEF DESCRIPTION
THE X-RAY INSTRUMENT ABOARD SAS-A (EQUIPMENT 2) consisted of two nearly identical sides, one being used both physically and electronically. EACH SIDE CONTAINED AN X-RAY DETECTION SYSTEM COMPOSED OF A COLLIMATOR, PROPORTIONAL COUNTERS, ASSOCIATED PROCESSING ELECTRONICS, AND AN ASPECT SENSING SYSTEM. THE HIGH-RESOLUTION (ENERGY) SCALE HAS A RESOLVING ANGLE OF 0.3 DEG BY 5 DEG SWIFT AND A DETECTION RANGE FROM 1 TO 20 KEV. THE OTHER SIDE HAD A HIGHER-SENSITIVITY INTENSITY COLLIMATOR WITH A VIEWING ANGLE OF 5 DEG BY 5 DEG SWIFT AND A DETECTION RANGE FROM 1 TO 10 KEV. THE CENTERS OF THE FIELDS OF VIEW OF THE TWO SPECTROSCOPES WHERE IN A 10-DEG BAND WITH THE DIFFERENCE BETWEEN THE CENTERS OF THE SATELLITE, SUCH THAT THE FULL BANDWIDTH COVERED BY THE TWO DETECTORS DURING EACH ORBIT THEREFORE WAS 100 DEG.

--- SAS-A, GIACCONI ---

INVESTIGATION NAME: ALL-SKY X-RAY SURVEY

NSSDC ID: 70-70A-01 INVESTIGATIVE PROGRAM CODE ST/CO-0P INVESTIGATION DISCIPLINE(S): X-RAY ASTRONOMY

PERSONNEL
PI: H.H. GIACCONI HARVARD COLLEGE OBS OI: E.M. KELLOGG HARVARD COLLEGE OBS OI: H. GURSKY HARVARD COLLEGE OBS OI: G.P. ROSENBAUM HARVARD COLLEGE OBS

BRIEF DESCRIPTION
THE X-RAY INSTRUMENT ABOARD SAS-A (EQUIPMENT 2) consisted of two nearly identical sides, one being used both physically and electronically. EACH SIDE CONTAINED AN X-RAY DETECTION SYSTEM COMPOSED OF A COLLIMATOR, PROPORTIONAL COUNTERS, ASSOCIATED PROCESSING ELECTRONICS, AND AN ASPECT SENSING SYSTEM. THE HIGH-RESOLUTION (ENERGY) SCALE HAS A RESOLVING ANGLE OF 0.3 DEG BY 5 DEG SWIFT AND A DETECTION RANGE FROM 1 TO 20 KEV. THE OTHER SIDE HAD A HIGHER-SENSITIVITY INTENSITY COLLIMATOR WITH A VIEWING ANGLE OF 5 DEG BY 5 DEG SWIFT AND A DETECTION RANGE FROM 1 TO 10 KEV. THE CENTERS OF THE FIELDS OF VIEW OF THE TWO SPECTROSCOPES WHERE IN A 10-DEG BAND WITH THE DIFFERENCE BETWEEN THE CENTERS OF THE SATELLITE, SUCH THAT THE FULL BANDWIDTH COVERED BY THE TWO DETECTORS DURING EACH ORBIT THEREFORE WAS 100 DEG.

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SPACECRAFT COMMON NAME: CAS-C ALTERNATE NAMES: PL-7630, SAS 3

PERIODICITY: 90.7 MIN PERIOD: 1.0 DEG PERTIPIASIS: 509. K

PERSONNEL

BRIEF DESCRIPTION
THE X-RAY SPECTRUM WAS THE THIRD OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WERE TO SURVEY THE CENTRAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV, AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSIONS OF SAS C WERE TO MEASURE THE SW X-RAY EMISSION OF DISCRETE EXTRAGALACTIC SOURCES, TO MONITOR THE EMISSION AND SPECTRA OF GALACTIC X-RAY SOURCES FROM 0.2 TO 10 KEV, AND TO ORBIT THE X-RAY SPECTROSCOPES (CAS-A, CAS-B). THE SPACECRAFT WAS LAUNCHED FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA AROUND 2000 GMT ON 10 DEG BY 5 DEG SWIFT. THE SPACECRAFT WAS STABILIZED ALONG THE ORBITAL ORBIT OF APPROXIMATELY 10.0 PERCENT ARGON, 0.5 PERCENT HELIUM AT A PRESSURE OF 940 MM OF MERCURY. LOW-SENSITIVITY INTENSITY SOURCES WERE USED FOR IN-SPIRE OBSERVATIONS OF THE INSTRUMENTATION. THE SPACECRAFT ORBITED THE EQUATORIAL PLANE AT AN ANGLE OF 0.5 DEG ABOUT THE EQUATORIAL PLANE. THE ORBITAL ORBIT OF APPROXIMATELY 10.0 PERCENT ARGON, 0.5 PERCENT HELIUM AT A PRESSURE OF 940 MM OF MERCURY. LOW-SENSITIVITY INTENSITY SOURCES WERE USED FOR IN-SPIRE OBSERVATIONS OF THE INSTRUMENTATION. THE SPACECRAFT ORBITED THE EQUATORIAL PLANE AT AN ANGLE OF 0.5 DEG ABOUT THE EQUATORIAL PLANE. THE ORBITAL ORBIT OF APPROXIMATELY 10.0 PERCENT ARGON, 0.5 PERCENT HELIUM AT A PRESSURE OF 940 MM OF MERCURY. LOW-SENSITIVITY INTENSITY SOURCES WERE USED FOR IN-SPIRE OBSERVATIONS OF THE INSTRUMENTATION. THE SPACECRAFT ORBITED THE EQUATORIAL PLANE AT AN ANGLE OF 0.5 DEG ABOUT THE EQUATORIAL PLANE.
INVESTIGATION NAME- ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES
NSSDC ID- 75-037A-01
INVESTIGATIVE PROGRAM CODE SA
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
PERSONNEL
PI - G.W. CLARK
01 - W.G. BRADT
01 - W.H. LEWIS
01 - H.W. SCHNUPPER
BRIEF DESCRIPTION
This experiment determined the positions of very weak extragalactic X-ray sources. The instrument viewed a 10°-60°-60° region of the sky around the direction of the spin axis of the satellite. The nominal targets for a 1-year study were: (1) the Virgo cluster of galaxies for 2 months, (2) the Andromeda nebula for 3 months, and (3) the Centaurus cluster for 2 months. The instrumentation consisted of one 1.5-arc-min and one 4.5-arc-min proportional counter as well as proportional counters sensitive over the energy range from 1.5 to 50 keV. The effective area of each collimator was about 225 cm². The aspect system provided information on the orientation of the collimators to an accuracy of 15 arc-sec.

INVESTIGATION NAME- ANALYSIS OF GALACTIC X-RAY SOURCES
NSSDC ID- 75-037A-02
INVESTIGATIVE PROGRAM CODE SA
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
PERSONNEL
PI - G.W. CLARK
01 - W.G. BRADT
01 - W.H. LEWIS
01 - H.W. SCHNUPPER
BRIEF DESCRIPTION
The objects of this experiment were to locate galactic X-ray sources to 15 arc-sec and to monitor these sources for intensity variations. The source positions were determined with the use of the modulation collimators of the extragalactic experiment, during the normal 2-month observation of the galactic equator. The monitoring of the X-ray sources was accomplished by the use of three slit collimators. One collimator was oriented perpendicular to the equatorial plane of the satellite, while the other two each of 0.5°-by-45° arcs were oriented 30° above and below the first. The detector behind each collimator was a proportional counter with a 1.5° detection area. The effective area of about 15 cm² was determined by comparing the observed X-ray intensities with the predicted values from Monte Carlo simulations of the experiment's energy range (0.1 to 10 keV) and the total effective area was about 40 cm².

INVESTIGATION NAME- CONTINUOUS X-RAY FLUCTUATION MONITOR OF SCORPIUS X-1
NSSDC ID- 75-037A-03
INVESTIGATIVE PROGRAM CODE SA
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
PERSONNEL
PI - G.W. CLARK
01 - W.G. BRADT
01 - W.H. LEWIS
01 - H.W. SCHNUPPER
BRIEF DESCRIPTION
A 10°-by-50°-deg FWHM slit collimator was oriented with its long axis perpendicular to the satellite spin axis such that a given point on the sky can be monitored for about 25 percent of a rotation. This collimator was inclined by 35° deg with respect to the equatorial plane of the satellite, so that Scorpius X-1 was observed while the c-axis was oriented to the Virgo cluster of galaxies. The instrument used in this experiment were proportional counters with a 1-mil window and the energy range was from 0.5 to 60 keV. The total effective area was about 40 cm².

INVESTIGATION NAME- X-RAY ABSORPTION CONTURE OF THE GALAXY
NSSDC ID- 75-037A-04
INVESTIGATIVE PROGRAM CODE SA
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
PERSONNEL
PI - G.W. CLARK
01 - V.D. JARDINE
01 - W.H. LEWIS
01 - H.W. SCHNUPPER
BRIEF DESCRIPTION
The density and distribution of the interstellar matter was determined by measuring the absorption in the intensity of the X-ray emission from the Milky Way. The INTEGRATION, NEAR THE GALACTIC CENTER, WAS STUDIED AT A DISTANCE OF 10°-0.6°. IN ADDITION, THE 1-MIL BE WINDOW COUNTERS WERE USED TO OBTAIN THE TOTAL INCIDENT X-RAY ENERGY RANGE. THE INSTRUMENTS WERE MOUNTED IN THE DETECTOR HOLLOW, THE EFFECTIVE AREA OF EACH COUNTER WAS ABOUT 225 cm². THE ASPECT SYSTEM PROVIDED INFORMATION ON THE_ORIENTATION OF THE COLLIMATORS TO AN ACCURACY OF 15 arc-sec.
brief description
the visible-infrared spin-scan radiometer (visser) flown on nssdc-10 had two main objectives: (1) to obtain observations of cloud cover and earth/cloud brightness temperature measurements from simultaneously spin-scan- stabilized, constant-earth satellite for use in operational weather analysis and forecasting, the two-channel instrument was able to take both full and partial pictures of the earth's disk. the infrared channel (10.5 to 12.0 micro) and the visible channel (0.55 to 0.70 micro) used a common optic system. incoming radiation was received by an ellipsoidally-shaped scan mirror and collected by a Ritchey-Chretien optical system. the scan mirror was set at a normal angle of 65° to the visible optical axis, which was aligned parallel to the spin axis of the spacecraft. the spinning motion of the spacecraft provided a west-to-east scan motion when the spin axis of the spacecraft was oriented parallel with the earth's axis. the latitudinal scan was accomplished by sequentially tilting the scanning mirror north to south at the completion of each spin. a full picture took 15 min to complete and about 2 min to refresh. during each scan, the field of view on the earth was swept by a linear array of eight 0.9 km at zero nadir angle. a mercury-cadmium telluride detector sensed the infrared portion of the spectrum with a horizontal resolution of approximately 1°. the infrared portion of the detector measured radiance temperatures between 180 and 315 k with a proposed sensitivity better than 0.1%. the visser output was digitized and transmitted to the national oceanographic and atmospheric administration (noaa) command data acquisition station (cdas), wallops island, va. there the signal was fed into a "line stretcher" where at was stored and time-stretched for transmission back to the satellite at reduced bandwidth for re-transmission to the data utilization stations (dus). the visser data, as well as all operational type data, were handled by noaa and the majority of data were archived at the environmental data service branch, sundance, mo. limited amounts of research-oriented data were collected by nasa and transmitted at nssdc.

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investigation name: magnetic field monitor

nssec 19- 74-0534-04

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields
magnetospheric physics

personnel
pi - d.j. williams
noaa-erl

brief description
the 4-kay monitor was composed of a collimator, two ionization chambers, and two electrometers. a small annular aperture was chosen for the telescope collimator, which was mounted so that the declination of its axis can be controlled by ground command to insure that the sun is viewed by the telescope once during every vehicle rotation. one ion chamber was filled with argon at 1 atm for detection of 1- to 4 kev rates, and had a 7-meV resolution window to exclude a wide of longer wavelength. the other chamber was filled with xenon at 1 atm and has a 3-meV resolution window for measurements of x rays in the wavelength range 0.5- to 3-a.

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investigation name: energetic particle monitor

nssec 19- 74-0534-02

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields

personnel
pi - d.j. williams
noaa-erl

brief description
a number of separate silicon solid-state detectors, each with an area of approximately 0.1 by 0.1 cm, were used to obtain the following particle measurements: (1) particle flux measurements in the range 0.1 to 50 mev, (2) channel measured electrons greater than 0.5 mev, and (3) channel measured electrons greater than 0.5 mev.

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investigation name: solar x-ray monitor

nssec 10- 74-0534-03

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields
solar physics

personnel
pi - d.j. williams
noaa-erl

brief description
the 4-kay monitor was composed of a collimator, two ionization chambers, and two electrometers. a small annular aperture was chosen for the telescope collimator, which was mounted so that the declination of its axis can be controlled by ground command to insure that the sun is viewed by the telescope once during every vehicle rotation. one ion chamber was filled with argon at 1 atm for detection of 1- to 4 kev rates, and had a 7-meV resolution window to exclude a wide of longer wavelength. the other chamber was filled with xenon at 1 atm and has a 3-meV resolution window for measurements of x rays in the wavelength range 0.5- to 3-a.

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investigation name: solar x-ray monitor

nssec 10- 74-0534-04

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields
solar physics

personnel
pi - d.j. williams
noaa-erl

brief description
the 4-kay monitor was composed of a collimator, two ionization chambers, and two electrometers. a small annular aperture was chosen for the telescope collimator, which was mounted so that the declination of its axis can be controlled by ground command to insure that the sun is viewed by the telescope once during every vehicle rotation. one ion chamber was filled with argon at 1 atm for detection of 1- to 4 kev rates, and had a 7-meV resolution window to exclude a wide of longer wavelength. the other chamber was filled with xenon at 1 atm and has a 3-meV resolution window for measurements of x rays in the wavelength range 0.5- to 3-a.

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investigation name: solar x-ray monitor

nssec 10- 74-0534-05

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields
solar physics

personnel
pi - d.j. williams
noaa-erl

brief description
the 4-kay monitor was composed of a collimator, two ionization chambers, and two electrometers. a small annular aperture was chosen for the telescope collimator, which was mounted so that the declination of its axis can be controlled by ground command to insure that the sun is viewed by the telescope once during every vehicle rotation. one ion chamber was filled with argon at 1 atm for detection of 1- to 4 kev rates, and had a 7-meV resolution window to exclude a wide of longer wavelength. the other chamber was filled with xenon at 1 atm and has a 3-meV resolution window for measurements of x rays in the wavelength range 0.5- to 3-a.

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investigation name: solar x-ray monitor

nssec 10- 74-0534-06

investigative program
environmental monitoring development

investigation discipline(s)
particles and fields
solar physics

personnel
pi - d.j. williams
noaa-erl

brief description
the 4-kay monitor was composed of a collimator, two ionization chambers, and two electrometers. a small annular aperture was chosen for the telescope collimator, which was mounted so that the declination of its axis can be controlled by ground command to insure that the sun is viewed by the telescope once during every vehicle rotation. one ion chamber was filled with argon at 1 atm for detection of 1- to 4 kev rates, and had a 7-meV resolution window to exclude a wide of longer wavelength. the other chamber was filled with xenon at 1 atm and has a 3-meV resolution window for measurements of x rays in the wavelength range 0.5- to 3-a.

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INVESTIGATION NAME: VISUAL-INFRARED SPIN-SCAN RADIOMETER

INVESTIGATIVE PROGRAM: ENVIRONMENT, MONITORING DEVELOPMENT

INVESTIGATION DISCIPLINE(S): METEOROLOGY

PERSONNEL: NOAA-NES

BRIEF DESCRIPTION:

The VISUAL-INFRARED SPIN-SCAN RADIOMETER (VISIR) flown on the Earth's surface measures the visible and infrared radiance of the Earth. The instrument consists of two main parts: the sensor head and the ground station. The sensor head contains a set of detectors that are sensitive to visible and infrared radiation. The data collected by the sensor is transmitted to the ground station via a communication link. At the ground station, the data is processed and analyzed to provide information on the Earth's surface.

INVESTIGATION NAME: SOLAR X-RAY MONITOR

INVESTIGATIVE PROGRAM: ENVIRONMENT, MONITORING DEVELOPMENT

INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL: NOAA-NES

BRIEF DESCRIPTION:

The SXR monitor consists of a one-meter-diameter detector that is sensitive to X-ray emissions. The detector is mounted on a spacecraft and is used to monitor X-ray emissions from the Sun. The spacecraft is equipped with a spin-axis stabilization system that allows it to maintain a stable orientation during its orbit around the Earth. The data collected by the SXR monitor is transmitted to Earth, where it is analyzed to provide information on solar activity and space weather.

INVESTIGATION NAME: MAGNETIC FIELD MONITOR

INVESTIGATIVE PROGRAM: ENVIRONMENT, MONITORING DEVELOPMENT

INVESTIGATION DISCIPLINE(S): MAGNETIC PHYSICS, PARTICLES AND FIELDS

PERSONNEL: NOAA-NES

BRIEF DESCRIPTION:

The MAGNETIC FIELD MONITOR (MFM) is a spacecraft-mounted instrument designed to measure the magnetic field of the Earth. The MFM consists of a set of sensors that are sensitive to magnetic fields. The data collected by the MFM is transmitted to Earth, where it is analyzed to provide information on the Earth's magnetic field and its variations.

INVESTIGATION NAME: Energetic Particle Monitor

INVESTIGATIVE PROGRAM: ENVIRONMENT, MONITORING DEVELOPMENT

INVESTIGATION DISCIPLINE(S): PARTICLES AND FIELDS

PERSONNEL: NOAA-NES

BRIEF DESCRIPTION:

The Energetic Particle Monitor (EPM) is a spacecraft-mounted instrument designed to measure the flux of high-energy particles in space. The EPM consists of a set of sensors that are sensitive to high-energy particles. The data collected by the EPM is transmitted to Earth, where it is analyzed to provide information on the flux of high-energy particles and their variations.
DRIFT 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-rays and UV activity with sets of standardized sensors over an entire solar cycle. The X-ray bands observed were 0.01 to 0.05 keV, 0.05 to 0.2 keV, 0.2 to 0.5 keV, 0.5 to 1.0 keV, 1.0 to 2.0 keV, 2.0 to 3.0 keV, and 3.0 to 6.0 keV. All of the detectors for these bands, with the exception of 0.2 to 0.5 keV and 0.5 to 1.0 keV, were silicon detectors fitted with a variety of window materials (e.g., magnesium, aluminum, and mylar). The detector elements were connected to charge-sensitive amplifiers. Coincidence and pulse-height analysis were used to separate the pulses produced by 2-MeV protons, 10-MeV protons, and 10-MeV alpha particles, and heavy nuclei (i.e., greater than 3.5 MeV per nucleon). A complete set of data points was made every 2:15 min. The ion energy thresholds of 0.5 MeV/nucleon (i = 1, 2, 3), and greater than 1.5 MeV per nucleon and the ion angles were separated into four quadrants. The remaining data were spin-integrated. A complete set of measurements was made once every 2 min.

************** SOLRAD 11A **************

INVESTIGATION NAME- SOLAR RADIATION DETECTORS

NSSDC ID- 78-025C-16
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS

PERSONNEL
PL - J.B. BLAKE
01 - R.W. KREPLIN

INVESTIGATION NAME- SOLAR PROTONS

NSSDC ID- 78-025C-16
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS

PERSONNEL
PL - J.B. BLAKE
01 - R.W. KREPLIN

************** SOLRAD 11A **************

INVESTIGATION NAME- OMNIDIRECTIONAL PROTONS

NSSDC ID- 78-025C-17
INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL
PL - J.B. BLAKE
01 - R.W. KREPLIN
PERSONNEL
PI - E.L. Byram
01 - D.W. Horan
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
This experiment consisted of three proportional counters sensitive to X-rays between 1 and 8 Å. These proportional counters were mounted on the sides of the satellite and pointed at 45°, 90°, and 135° to the spin axis. The counting circuits were controlled by the roll period and synchronous time. The data from these counters were associated with positions of the sky. The stellar portion of the experiment was subjected to a 2-D convolution with the earth pulses so that the count samples could be associated with positions of the sky. The stellar portion of the experiment was identified with a photomultiplier tube detector. The experiment was able to map specific areas of the sky and sweep the entire celestial sphere in about 6 months. The proportional counters were preselected to monitor auroral X-ray emissions from the earth. The stellar portion sampling cycle took 16 min, while the auroral portion required 2 min for a sampling cycle.

SOLRAD 11A. OECHE

INVESTIGATION NAME- THOMPSON X-RAY POLARIMETER
NSSDC 10- 76-023C-10 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
SOLAR PHYSICS

PERSONNEL
PI - G.A. OECHE
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
Incident solar X-rays were scattered by a block of low-density material such as lithium, lithium hydride, or beryllium. Polarized X-rays were preferentially scattered while non-polarized X-rays were scattered isotropically. The proportional counters, each with a two-channel pulse height analyser, were mounted on opposite sides of the spacecraft and the detectors were rotated with respect to the plane of the incident X-rays. The data were gated electronically into accumulators associated with the roll direction. The data from the detectors were accumulated for an integrator of spins during each 50-s sampling cycle and then read out on command. A radioactive source was used to provide calibration in flight.

SOLRAD 11A. EVANS

INVESTIGATION NAME- COSMIC GAMMA-RAY BURST AND BACKGROUND DETECTOR (3.2 to 2.0 MeV)
NSSDC 10- 76-023C-25 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) GAMMA-RAY ASTRONOMY

PERSONNEL
PI - W.D. Evans
01 - R.W. KLEIDSADEL
LOS ALAMOS SCI LAB

BRIEF DESCRIPTION
This experiment was designed for the study of the gamma-ray background and the detection of gamma-ray bursts. The proportional counters were mounted on opposite sides of the spacecraft and looking outwards radially. The FWHM for each detector approaches a pi with some reduction resulting. The proportion of each unit area - (1) a cesium iodide crystal - (2) a photomultiplier with associated power supply and amplifiers, and (3) pulse height analysers. The energy coverage is from 0.2 to 2.0 MeV, and is resolved into passbands of 0.2 to 0.3 MeV, 0.3 to 0.6, 0.6 to 2.0, 2.0 to 2.5, 2.5 to 3.0, 3.0 to 5.0, and 5.0 to 10.0 MeV. The background monitoring is affected by accumulation of 20-sec averages at any of the 5-MeV passbands. If the signature of a burst is observed, the counting rate is increased in the background over one 628-Ms period. During a burst, 12 blocks of data are recorded. Each block represents eight readouts of the 0.2- to 2.0- MeV passbands. If the burst lasts longer than one storage cycle, up to seven additional storage cycles may be used. The on-board data for the full set of storage cycles takes 64 min.

SOLRAD 11A. FELMAN

INVESTIGATION NAME- 1175- TO 1800-A SOLAR UV SPECTROMETER
NSSDC 10- 76-023C-09 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS

PERSONNEL
PI - P.R. FELMAN
01 - R.W. KLEINPLIN
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
This experiment used a rotating grating, operating in a first order to measure the solar electromagnetic spectrum between 1175 and 1300 Å. A photomultiplier tube detected radiation reflected through an optical system from the grating. Two scanning rates were available - a fast-scan, low-resolution mode in which the entire 625-Å range was covered in 93.25 s, using 25-s segments for each data sample, and a slow-scan, high-resolution mode in which the 625-Å range was covered in 12.3 min, using 3.18 s for each segment.

SOLRAD 11A. FRITZ

INVESTIGATION NAME- 15- TO 150-KEV SOLAR X-RAY MONITOR
NSSDC 10- 76-023C-01 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
SOLAR PHYSICS

PERSONNEL
PI - G.A. FRITZ
01 - R.W. KLEINPLIN
01 - R.E. HENRY
01 - J.H. HOPKINS
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
This experiment used a cesium iodide scintillator surrounded by a plastic scintillator operated in anticoincidence to screen out background counts. Pulse height analysis provided solar spectra in the range from 15 to 20, 20 to 30, 30 to 60, and 60 to 150 keV. Normally, data were recorded on each channel every 7.5 s. Although an option, more selective modes could be used on the 20- to 22-keV channel for transmission events. The detector design was the same as that used on SOLRAD 2 with improved electronics.

SOLRAD 11A. FRITZ

INVESTIGATION NAME- 1-A TO 30-A SOLAR X-RAY MONITOR
NSSDC 10- 76-023C-24 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY
ASTRONOMY

PERSONNEL
PI - G.A. FRITZ
01 - R.W. KLEINPLIN
01 - R.E. HENRY
01 - J.H. HOPKINS
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
A solid-state detector (germanium or lithium-drifted silicon) was used to measure the galactic X-ray background in the 0.5- to 20-keV range with an energy resolution of better than 0.3 keV. To detect a burst, the detector must be passively cooled to 70 to 100 Kelvin. The instrument was mounted on the spacecraft and swept out and near 20- to 80-Å wide, centred near the ecliptic plane as the satellite moved around the sun. The detector output underwent a 256-channel analyser which was used to provide on-board calibration of the detector.
THE DETECTOR-ELECTRODE SETS WERE DRIVEN BY SEPARATE POWER SUPPLIES. EACH DETECTOR WAS READ EVERY 15-5 SECONDS. THE ELECTRODE-AMPLIFIERS WERE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIERS COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

ASSDC ID: 76-0235-00 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - R.W. KREPLIN
01 - R.G. HORAN
01 - D.M. HORAN
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
BRIEF DESCRIPTION
THESE EXPERIMENTS CONSISTED OF THREE COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTRODE-AMPLIFIER COMBINATIONS. THE THREE IONIZATION CHAMBERS WERE SENSITIVE TO SOLAR X-RAYS IN THE 0.5 - 2.0 RANGE. THE TWO SETS WERE DRIVEN BY SEPARATE POWER SUPPLIES. ONLY ONE SET WAS SELECTED FOR TELEMETRY TRANSMISSION. DATA WERE TRANSMITTED WITH A 15-5 TIME RESOLUTION. THE ELECTRODE-AMPLIFIERS WERE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIERS COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

ASSDC ID: 76-0235-12 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - R.W. KREPLIN
01 - R.G. TAYLOR
01 - D.M. HORAN
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
BRIEF DESCRIPTION
THESE EXPERIMENTS CONSISTED OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTRODE-AMPLIFIER COMBINATIONS. THE TWO IONIZATION CHAMBERS WERE SENSITIVE TO SOLAR X-RAYS IN THE 0.5 - 2.0 RANGE. DATA WERE TRANSMITTED WITH A 15-5 TIME RESOLUTION. THE ELECTRODE-AMPLIFIERS WERE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIER COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

ASSDC ID: 76-0235-10 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - R.W. KREPLIN
01 - R.G. TAYLOR
01 - D.M. HORAN
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
BRIEF DESCRIPTION
THESE EXPERIMENTS CONSISTED OF ONE COMPLETE SET OF IONIZATION-CHAMBER AND ELECTRODE-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBER WAS SENSITIVE TO SOLAR X-RAYS IN THE 0.5 - 2.0 RANGE. DATA WERE TRANSMITTED WITH A 15-5 TIME RESOLUTION. THE ELECTRODE-AMPLIFIER WAS ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTOR COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIER COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

ASSDC ID: 76-0235-07 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - R.W. KREPLIN
01 - R.G. TAYLOR
01 - D.M. HORAN
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
BRIEF DESCRIPTION
THESE EXPERIMENTS CONSISTED OF ONE COMPLETE SET OF IONIZATION-CHAMBER AND ELECTRODE-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBER WAS SENSITIVE TO SOLAR X-RAYS IN THE 0.5 - 2.0 RANGE. DATA WERE TRANSMITTED WITH A 15-5 TIME RESOLUTION. THE ELECTRODE-AMPLIFIER WAS ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTOR COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIER COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

ASSDC ID: 76-0235-13 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
PI - D.J. LUKAS
01 - R.W. KREPLIN
US NAVAL RESEARCH LAB
US NAVAL RESEARCH LAB
BRIEF DESCRIPTION
THESE EXPERIMENTS CONSISTED OF ONE COMPLETE SET OF IONIZATION-CHAMBER AND ELECTRODE-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBER WAS SENSITIVE TO SOLAR X-RAYS IN THE 0.5 - 2.0 RANGE. DATA WERE TRANSMITTED WITH A 15-5 TIME RESOLUTION. THE ELECTRODE-AMPLIFIER WAS ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTOR COULD NOT BE CALIBRATED IN FLIGHT, BUT THE ELECTRODE-AMPLIFIER COULD BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.
BRIEF DESCRIPTION

Two modulated grid Faraday cups (one directed along the spin axis facing the sun, and one in the spin plane used to measure ions and electrons in the solar wind) were used to measure the positive ion energy spectrum in 20 contiguous energy windows from approximately 300 volts to 9000 volts. Observation of flow to within 3 deg was determined by comparison of currents observed in the three 120 deg sectors of the collector and 200 keV ion flux was determined by modulating the energy window between approximately 200 and 5000 volts. Electron energy spectra were obtained from the spin plane and fast rate flux monitors. The experimental setup consisted of a collector, an additional aluminum or cadmium material mounted in front of the detectors. Each detector was sampled once every 5.5 sec. Although an optional mode transmitted data from only one or two detectors, effectively doubling or quadrupling the sampling rate of that detector. In-flight calibration was performed using a radioactive source that was moved in front of the detectors upon command.

--- SOLRAD 11a, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-03 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
J. F. MEKINS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

Solar X rays were observed in the magnesium-1s and 2s, 3s, 4s, 5s, 6s, 7s plus additional aluminum or cadmium material mounted in front of the detectors. Each detector was sampled once every 5.5 sec. Although an optional mode transmitted data from only one or two detectors, effectively doubling or quadrupling the sampling rate of that detector. In-flight calibration was performed using a radioactive source that was moved in front of the detectors upon command.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-11 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) X-RAY ASTRONOMY, SOLAR PHYSICS
PERSONNEL
J. F. MEKINS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-19 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES
PERSONNEL
C. S. WELLER, JR. US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-02 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS, X-RAY ASTRONOMY
PERSONNEL
H. W. SPATHERS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-01 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
H. W. SPATHERS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-02 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS, X-RAY ASTRONOMY
PERSONNEL
H. W. SPATHERS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-01 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS
PERSONNEL
H. W. SPATHERS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.

--- SOLRAD 11c, MARKERS

INVESTIGATION NAME- CONTINUUM (3.8 A AND MAGNITUDE LINE 10.17 A AND 8.2, 2 MONITOR
NASSC ID= 76-023C-02 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS, X-RAY ASTRONOMY
PERSONNEL
H. W. SPATHERS US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

This experiment utilized a lithium fluoride crystal fixed at an angle to allow solar X rays of about 2.6 A to undergo first order Bragg reflection into a proportional counter. Since the reflection of polarized radiation depends upon the angle between the electric vector of the X rays and the normal to the crystal, the intensity of reflected polarized radiation varies with the spin of the satellite. The detector was mounted to look to 90 deg off the spin axis of the spacecraft. The data were read out in 2-min intervals. This experiment operated no more than 1 hr per day.
BRIEF DESCRIPTION

A PATH OF IDENTICAL SENSORS WAS MOUNTED ON THE SPACECRAFT. WITH ONE ON THE ANTI-SOLAR ORIENTED SURFACE (THIS EXPERIMENT) AND ONE ON THE SOLAR-ORIENTED SURFACE (EXPERIMENT 76-0250-14). EACH SENSOR WAS A TWO-ELEMENT SEMICONDUCTOR DETECTOR WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WERE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS. COINCIDENCE AND PULSE-HEIGHT ANALYSIS WERE USED TO SEPARATE PROTONS PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, ALPHA PARTICLES AND HEAVY NUCLEI (GREATER THAN 1.5, GREATER THAN 3 MEV PER NUCLEON). A COMPLETE SET OF DATA POINTS WAS OBTAINED EVERY 2 MIN.

INVESTIGATION NAME- OMNIDIRECTIONAL PROTONS

PERSONNEL

PI - J. B. BLAKE AEROSPACE CORP
01 - R. W. KREPLIN US NAVAL RESEARCH LAB

INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS
PARTICLES AND FIeldS

INVESTIGATIVE PROGRAM

SESP

INVESTIGATIVE PROGRAII

76-0250-17

INVESTIGATION DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE SOLAR PROTONS AND ALPHA PARTICLES. A SET OF FIVE SMALL SILICON CUBICAL SOLID-STATE DETECTORS WAS USED TO SEPARATELY MEASURE THE OMNIDIRECTIONAL PROTON AND ALPHA PARTICLE FLUXES IN THE 5 TO 20 MEV RANGE. A TWO-ELEMENT SEMICONDUCTOR TELESCOPE WAS USED TO MEASURE THE INTEGRAL PROTON AND ALPHA PARTICLE FLUXES IN FIVE DIFFERENTIAL ENERGY CHANNELS FROM 20 TO 50 MEV AND IN THREE INTEGRAL CHANNELS AT 0.5, 1.0 AND 2.0. A COMPLETE SET OF DATA POINTS WAS OBTAINED EVERY 2 MIN.

INVESTIGATION NAME - ANTISOLAR PROTONS

PERSONNEL

PI - J. B. BLAKE AEROSPACE CORP
01 - R. W. KREPLIN US NAVAL RESEARCH LAB

INVESTIGATION DISCIPLINE(S)

SOLAR PHYSICS
PARTICLES AND FIeldS

INVESTIGATIVE PROGRAM

SESP

INVESTIGATIVE PROGRAII

76-0250-23

INVESTIGATION DESCRIPTION

A PATH OF IDENTICAL SENSORS WAS MOUNTED ON THE SPACECRAFT. WITH ONE ON THE ANTI-SOLAR ORIENTED SURFACE (THIS EXPERIMENT) AND ONE ON THE SOLAR-ORIENTED SURFACE (EXPERIMENT 76-0250-14). EACH SENSOR WAS A TWO-ELEMENT SEMICONDUCTOR DETECTOR WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WERE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS. COINCIDENCE AND PULSE-HEIGHT ANALYSIS WERE USED TO SEPARATE PROTONS PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, 4.5-MEV ALPHA PARTICLES AND HEAVY NUCLEI (GREATER THAN 1.5, GREATER THAN 3 MEV PER NUCLEON). A COMPLETE SET OF DATA POINTS WAS OBTAINED EVERY 2 MIN.

INVESTIGATION NAME- STELLAR/AURORAL X-RAYS

PERSONNEL

PI - J. B. BLAKE AEROSPACE CORP
01 - D. M. HORAN US NAVAL RESEARCH LAB

INVESTIGATION DISCIPLINE(S)

X-RAY ASTROMETRY
ASTRONOMY PLANETARY ATMOSPHERES

INVESTIGATIVE PROGRAM

SESP

INVESTIGATIVE PROGRAII

76-0250-16
BRIEF DESCRIPTION

This experiment consisted of three proportional counters sensitive to X-rays between 1 and 8 Å. These proportional counters were mounted on the side of the satellite and oriented in the spin axis. The sampling cycle took 15 min, while the angular portion required 2 min for a sampling cycle.

INVESTIGATION NAME- THOMSON X-RAY POLARIMETER
NSEL ID- 76-0230-10
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
SOLAR PHYSICS
PERSONNEL
PI - G.A. GOSCHEK
O - US NAVAL RESEARCH LAB

INVESTIGATION NAME- COSMIC GAMMA-RAY BURST AND BACKGROUND DETECTOR 0.2 TO 2.0 MeV
NSEL ID- 76-0230-25
INVESTIGATION PROGRAM
DESP
INVESTIGATION DISCIPLINE(S)
GAMMA-RAY ASTRONOMY
PERSONNEL
PI - R.H. KLEIBERGANG
O - LOS ALAMOS SCI LAB

INVESTIGATION NAME- INVESTIGATION OF ELECTROSTATIC MIRRORS FOR SPACECRAFT STABILIZATION
NSEL ID- 76-0235-09
INVESTIGATION PROGRAM
DESP
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PERSONNEL
PI - R.M. KREPLIN
O - US NAVAL RESEARCH LAB

INVESTIGATION NAME- INVESTIGATION OF ELECTROSTATIC MIRRORS FOR SPACECRAFT STABILIZATION
NSEL ID- 76-0235-09
INVESTIGATION PROGRAM
DESP
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PERSONNEL
PI - R.M. KREPLIN
O - US NAVAL RESEARCH LAB

INVESTIGATION NAME- 1- TO 8-A SOLAR X-RAY MONITOR
NSEL ID- 76-0230-01
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
SOILAR PHYSICS
PERSONNEL
PI - G.G. FRITZ
O - US NAVAL RESEARCH LAB

INVESTIGATION NAME- CO.ECELITE 0.3 TO 2.0 SOLAR X-RAY MONITOR
NSEL ID- 76-0230-04
INVESTIGATION PROGRAM
DESP
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PERSONNEL
PI - R.M. KREPLIN
O - US NAVAL RESEARCH LAB

INVESTIGATION NAME- INVESTIGATION OF ELECTROSTATIC MIRRORS FOR SPACECRAFT STABILIZATION
NSEL ID- 76-0235-09
INVESTIGATION PROGRAM
DESP
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PERSONNEL
PI - R.M. KREPLIN
O - US NAVAL RESEARCH LAB
This experiment consisted of two complete sets of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 8- to 16-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifiers were able to change ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifiers could be calibrated on each range without detaching the detector.

Investigation Name: 8- to 16-Å Solar X-ray Monitor

Investigation Discipline(s): Solar Physics

Personnel:
- PI: R.G. Kreplin
- CI: R.G. Taylor
- CO: D.M. Hornan

BRIEF DESCRIPTION
This experiment consisted of two complete sets of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 8- to 16-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifiers were able to change ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifier could be calibrated without detaching the detector.

Investigation Name: 44- to 60-Å Solar X-ray Monitor

Investigation Discipline(s): Solar Physics

Personnel:
- PI: R.W. Kreplin
- CI: R.G. Taylor
- CO: D.M. Hornan

BRIEF DESCRIPTION
This experiment consisted of three complete sets of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 44- to 60-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifiers were able to change ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifier could be calibrated on each range without detaching the detector.

Investigation Name: 170- to 1050-Å Solar X-ray Monitor

Investigation Discipline(s): Solar Physics

Personnel:
- PI: R.W. Kreplin
- CI: R.G. Taylor
- CO: D.M. Hornan

BRIEF DESCRIPTION
This experiment consisted of three complete sets of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 170- to 1050-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifiers were able to change ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifiers could be calibrated on each range without detaching the detector.

Investigation Name: 2- to 10-Å Solar X-ray Monitor

Investigation Discipline(s): Solar Physics

Personnel:
- PI: R.W. Kreplin
- CI: R.G. Taylor
- CO: D.M. Hornan

BRIEF DESCRIPTION
This experiment consisted of one complete set of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 2- to 10-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifier was able to change current ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifier could be calibrated on each range without detaching the detector.

Investigation Name: Solar Wind Spectrometer

Investigation Discipline(s): Solar Physics

Personnel:
- PI: R.W. Kreplin
- CI: R.G. Taylor
- CO: D.M. Hornan

BRIEF DESCRIPTION
This experiment consisted of one complete set of ionization-chamber and electrometer-amplifier combinations. The ionization chambers were sensitive to solar X rays in the 2- to 10-Å range. The two sets were driven by separate power supplies, although only one set was selected for telemetry transmission. Data were transmitted with a 30-s time resolution. The electrometer-amplifier was able to change current ranges automatically or manually. The detectors could not be calibrated in flight, but the electrometer-amplifier could be calibrated without detaching the detector.
IN THE FAST RATE FLUX MODE, THE EXPERIMENT MEASURES THE TOTAL PHOTON FLUX. TOTAL ELECTRON FLUX, AND THE THREE 120 DEG. SECTOR FLUXES EVERY 1,030 S FOR 6 TIMES (GTR 53) TIMES 11 SECTORS AND REPEATS THE 6 SEQUENCES.

INVESTIGATION NAME: CONTINUUM (0.2 A) AND MAGNESIUM LINE (0.17 A AND 0.42 A) MONITOR

NSSC ID: 76-0230-03 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL
PI: J.F. MEIKINS
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
SOLAR X RAYS WERE OBSERVED IN THE MAGNESIUM-11 AND -12 LINES (0.17 A AND 0.42 A) IN THE CONTINUUM AT 0.2 A. THREE SHA CRYSTALS FIXED AT THREE DIFFERENT ANGLES ALLOWED SOLAR X RAYS IN FOUR CHANNELS. FIRST-ORDER RADIATION REFLECTED INTO THREE PROPORTIONAL COUNTERS. IF THE SPACECRAFT SPIN AXIS HAD BEEN CURVED, THE EXPERIMENTS WOULD HAVE BEEN首饰 IF THE ASPECT ANGLE HAD BEEN MORE THAN 1 DEG OFF NORMAL. THE EXPERIMENT BEGAN AFTER THE SPACECRAFT WAS ASCENDED TO AN ORBIT WITH A SUITABLE SPECTRAL RANGE AND THE VELOCITY OF THE RAY WAVELENGTH. DATA WERE ACCUMULATED FOR INTERVALS OF 1/64 OF A SPACECRAFT S'S PULSE SEpbod AND THE EXPERIMENT HAD A SAMPLING CYCLE OF APROXIMATELY 1-MIN DURATION.

INVESTIGATION NAME: MAGNIFICENT X-RAY POLARIOMETER

NSSC ID: 76-0230-11 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): X-RAY ASTROPHYSICS SOLAR PHYSICS

PERSONNEL
PI: J.F. MEIKINS
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION

INVESTIGATION NAME: X-RAY MONITOR (0.1-1.6 A AND 0.5-3.1 A-1.44)

NSSC ID: 76-0231-02 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): X-RAY ASTROPHYSICS SOLAR PHYSICS

PERSONNEL
PI: R.W. SMARITZ
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
ELECTRONICALLY PAIRED GAS-FILLED PROPORTIONAL COUNTERS WERE USED TO MEASURE X-RAY EMISSION BETWEEN 0.1 AND 100 KEV. THE EXPERIMENT TOOK THE 12-TH PMD MONITOR. ADDITIONAL ALLUMINUM OR BERYLLIUM MATERIAL MOUNTED IN FRONT OF THE DETECTORS. EACH DETECTOR WAS CALIBRATED EVERY 7.5 S. ALTHOUGH AN OPTIMAL MODULE WAS PROVIDED FOR THE MEGA-OF THE DETECTORS EFFECTIVELY SHEDDING OR DOUBLE THE SAMPLING RATE OF THAT DETECTOR. IN-FLIGHT CALIBRATION WAS PROVIDED FOR EACH DETECTOR TO DOCUMENT ANY SOURCE WHICH MOVES IN THE DIRECTIONS DURING THE EXPERIMENT.

INVESTIGATION NAME: SOLAR FLARE ELECTRONS

NSSC ID: 76-0231-22 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS PARTICLES AND FIELDS

PERSONNEL
PI: A.L. VAMPOLA
AEROSPACE CORP
01: J.D. BLAKE
AEROSPACE CORP
01: R.W. KREPLIN
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
THIS EXPERIMENT MEASURED SOLAR ELECTRONS. TWO PERSONAL MAGNETS WERE USED TO MOMENTUM-ANALYZE INCIDENT ELECTRONS. ARRAYS OF SILICON DETECTORS COLLECTED INCIDENT ELECTRONS IN 12 ENERGY CHANNELS FROM 11 KEV TO 1.5 MEV. Spin-INTEGRATED DATA WERE OBTAINED ONCE EVERY 2 MIN. EXCEPT THAT 11-KEV AND 0.5-KEV DATA WERE SECTORED INTO QUADRANTS, AND 60-KEV AND 670-KEV DATA WERE OBTAINED WITH 0.5-KEV RESOLUTION.

INVESTIGATION NAME: BRAGG X-RAY POLARIMETER

NSSC ID: 76-0232-03 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL
PI: J.B. BLAKE
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
A COLLIMATED CHANNELRONT SCINTILLATION COUNTER MOUNTED BEHIND A FILTER WHEEL WAS USED TO MEASURE X-RAY RADIATION FROM NONSOLAR SOURCES. THE FILTER WHEEL ALLOWED VARIOUS LINES BETWEEN 200 AND 100 A TO BE ISOLATED. AS WELL AS ALLOCATING IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE SOURCE. THE DETECTOR WAS MOUNTED TO LOOK 90 DEG OFF THE SPIN AXIS OF THE SPACEXRAFT AND SWEPT THE CELESTIAL SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WAS ACCUMULATED OVER INTERVALS OF 1/64 OF THE SPACECRAFT S'S SPIN. WITH THE SAMPLE SOURCE REFERENCED TO EITHER A SATURATE OR THE EARTH PULSE. THE DATA WERE READ OUT IN 2-MIN INTERVALS. THIS EXPERIMENT OPERATED NO MORE THAN 1 H PER DAY.

INVESTIGATION NAME: GEOMATIC-EXTRATERRESTRIAL EUV DETECTOR 1

NSSC ID: 76-0232-19 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSHERES ASTRONOMY

PERSONNEL
PI: C.S. WELLER, JR.
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
A COLLIMATED CHANNELRONT SCINTILLATION COUNTER MOUNTED BEHIND A FILTER WHEEL WAS USED TO MEASURE X-RAY RADIATION FROM NONSOLAR SOURCES. THE FILTER WHEEL ALLOWED VARIOUS LINES BETWEEN 200 AND 100 A TO BE ISOLATED. AS WELL AS ALLOCATING IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE SOURCE. THE DETECTOR WAS MOUNTED TO LOOK 90 DEG OFF THE SPIN AXIS OF THE SPACEXRAFT AND SWEPT THE CELESTIAL SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WAs ACCUMULATED OVER INTERVALS OF 1/64 OF THE SPACECRAFT S'S SPIN. WITH THE SAMPLE SOURCE REFERENCED TO EITHER A SATURATE OR THE EARTH PULSE. THE DATA WERE READ OUT IN 2-MIN INTERVALS. THIS EXPERIMENT OPERATED NO MORE THAN 1 H PER DAY.

INVESTIGATION NAME: GEOMATIC-EXTRATERRESTRIAL EUV DETECTOR 2

NSSC ID: 76-0232-19 INVESTIGATIVE PROGRAM SESP
INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSHERES ASTRONOMY

PERSONNEL
PI: C.S. WELLER, JR.
US NAVAL RESEARCH LAB

BRIEF DESCRIPTION
A COLLIMATED CHANNELRONT SCINTILLATION COUNTER MOUNTED BEHIND A FILTER WHEEL WAS USED TO MEASURE X-RAY RADIATION FROM NONSOLAR SOURCES. THE FILTER WHEEL ALLOWED VARIOUS LINES BETWEEN 200 AND 100 A TO BE ISOLATED. AS WELL AS ALLOCATING IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE SOURCE. THE DETECTOR WAS MOUNTED TO LOOK 90 DEG OFF THE SPIN AXIS OF THE SPACEXRAFT AND SWEPT THE CELESTIAL SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WAs ACCUMULATED OVER INTERVALS OF 1/64 OF THE SPACECRAFT S'S SPIN. WITH THE SAMPLE SOURCE REFERENCED TO EITHER A SATURATE OR THE EARTH PULSE. THE DATA WERE READ OUT IN 2-MIN INTERVALS. THIS EXPERIMENT OPERATED NO MORE THAN 1 H PER DAY.
PERSONNEL
P - K. HIRO
01 - K. OTAMA
U OF TOKYO

INVESTIGATIVE PROGRAM
SOLAR PHYSICS
INVESTIGATION DISCIPLINE(S)
MOUNTED IN A SERIES, MEASURED PROTONS BETWEEN 150 KEV AND 6 MV.

PERSONNEL
P - S. MIYAZAKI
01 - T. OSISO
OASA CITY U

INVESTIGATIVE PROGRAM
SOLAR PHYSICS
INVESTIGATION DISCIPLINE(S)
CONTINUOUS MEASUREMENT OF SOLAR HYDROGEN LYT-ALPHA EMISSION WAS MADE WITH A LITHIUM FLUORESCENCE CAISSE IONIZATION CHAMBER.

PERSONNEL
P - N. OYA
01 - A. MORIKA
U OF TOHOKU

INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- ELECTRON TEMPERATURE
NSSDC ID- 75-0235-21
INVESTIGATIVE PROGRAM
SATELLITE
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PARTICLES AND FIELDS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-01
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS

INVESTIGATION NAME- ELECTRON TEMPERATURE PROBE FOR STRUCTURAL STUDY OF EARTH'S IONOSPHERE. THE INSTRUMENT OPERATION WAS TERMINATED ON 11/03/76.

INVESTIGATION NAME- RIKENO-1 RAY MONITOR
NSSDC ID- 75-0144-04
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0144-06
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0235-04
INVESTIGATIVE PROGRAM
SATELLITE
INVESTIGATION DISCIPLINE(S)
SOLAR PHYSICS
PARTICLES AND FIELDS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-07
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-09
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-11
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-13
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-15
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-17
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS

INVESTIGATION NAME- SOLAR X-RAY MONITOR
NSSDC ID- 75-0044-19
INVESTIGATIVE PROGRAM
SCIENTIFIC SATELLITE
INVESTIGATION DISCIPLINE(S)
IONOSPHERES AND RADIO PHYSICS
BRIEF DESCRIPTION

The instrument was designed to study the electron temperature structure of the ionosphere by means of a synoptic pattern. This probe used a radio-frequency impedance technique to determine the capacitance of a spherical electrode that was isolated from the satellite by a supporting door. Capacitance measurements were made as frequencies from 2 to 13 MHz at a rate of 2.5 samples per second. The interpretation of this frequency-capacitance relationship was used to determine electron temperature, electron density, and ionosphere flux. More detailed descriptive information is contained in J. Geomag. and Geoelectr., 33, 351-361, 1975.

INVESTIGATION NAME: GEODИONAL UV GLOW AND EARTH UV ALBEDO

PERSONNEL

PI - T. TOMATSU
01 - HIROHIRO
01 - O. OGAWA
01 - U. OF TOKYO

INVESTIGATION DISCIPLINE(S): ATMOSPHERIC PHYSICS

INVESTIGATION PROGRAM: SCIENTIFIC SATELLITE

SPONSORING COUNTRY/AGENCY: UNITED STATES

LAUNCH DATE: 10/15/76
LAUNCH SITE: SAM MARCO PLATFORM, OFF COAST OF KENYA

LAUNCH VEHICLE: SCOUT

SPONSORING COUNTRY/AGENCY: SRC

SPONSORING COUNTRY/AGENCY: NASA-SSS

INVESTIGATIVE PROGRAM: NAVIGATION TECHNOLOGY

INVESTIGATIVE PROGRAM: PARTICLES AND FIELDS

INVESTIGATIVE PROGRAM: MAGNETOSPHERIC PHYSICS

INVESTIGATIVE PROGRAM: CODE 2460-OF

INVESTIGATIVE PROGRAM: CODE 2460-OF

BRIEF DESCRIPTION

This instrument consists of a triaxial fluxgate magnetometer designed to measure vector fields with magnitudes up to 10,000 gammas. Measurements were made by sampling each axis sequentially at a rate of 2.5 samples per second. The resolution was about 10 gammas as given by a 13-bit analog to digital converter. The axis that was most useful in studies of magnetic fluctuations was due to the tracking stations, most of the data obtained related to northern and southern hemisphere geomagnetic.
BRIEF DESCRIPTION
This experiment consisted of a high-resolution proportional counter spectrometer with a 120-channel pulse height analyzer, and responded to photons in the 2- to 10-keV energy range. The spectra of sources were examined in greater detail than had been previously possible. Line emission for certain elements (e.g., iron) could also be identified. The detector viewed in a direction parallel to the spin axis and, therefore, could observe the entire sky for as long as the position of the satellite spin axis remained unchanged. The experiment permitted the background flux to be mapped every 180 degrees by determining the spectral information in four sets of locations, each corresponding to a quadrant of the sky. The spin cycle had been operated in a mode in which periodicities in the range of 0.5 to 5 times the strength of the spin could also have been detected, in a mode in which periodicities in the range of 0.5 to 5 times the strength of the spin could also have been detected.

--- UK 5, Elliott---
INVESTIGATION NAME- HIGH-ENERGY COSMIC X-RAY SPECTRA
NSSDC ID- 74-077A-05
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
PERSONNEL
PI - S. J. Elliott
IMPERIAL COLLEGE
01 - J. J. Guedon
IMPERIAL COLLEGE
02 - A. S. G. Green
IMPERIAL COLLEGE
BRIEF DESCRIPTION
This experiment was designed to extend the spectral information on X-ray sources. The experiment fell short in this attempt, and the detector axis was inclined a few degrees with respect to the satellite spin axis so that it would not be as sensitive. The count rate resulting from a point source a few degrees from the spin axis was thus modulated with the spin period. This method allowed identifying the spin cycle into four sectors and analyzing the different counting rates in each. The experiment also could be used in a source of the background of the spacecraft and could observe the lack of information on possible fluctuations in the background flux during an orbit's spin.

--- UK 5, Holt---
INVESTIGATION NAME- ALL-SAT MONITOR
NSSDC ID- 74-077A-06
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
PERSONNEL
PI - S. S. Holt
NASA-GDFC
01 - E. A. Golub
NASA-GDFC
02 - R. A. Lebovitz
NASA-GDFC
BRIEF DESCRIPTION
This experiment monitored the X-ray emission from the entire sky, as opposed to a compact source. This covered large areas that lay outside the field of view of other onboard experiments. The monitor would aid in programming satellite maneuvers to ensure that transient events in the X-ray sky, such as nearby novae and X-ray flares, could be rapidly made available for study with the greater resolution by the other experiments.

--- UK 5, Pounds---
INVESTIGATION NAME- 2- TO 10-KEV SKY SURVEY
NSSDC ID- 74-077A-02
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
PERSONNEL
PI - K. J. Pounds
U OF LEICESTER
01 - H. A. Cooke
U OF LEICESTER
02 - D. J. Adam
U OF LEICESTER
03 - J. M. Gething
U OF LEICESTER
BRIEF DESCRIPTION
This experiment consisted of a large-area proportional counter arranged so that the satellite spin axis, the satellite's rotation, therefore, allowed a scan of a 360-degree range of the sky, which was arranged to point at a galactic pole. The whole of the celestial way could be scanned at once.

EXPERIMENT COVERED THE PHOTON ENERGY RANGE 1.5 TO 20 KEV AND EFFECTED A HIGH-SENSITIVITY SURVEY- OBTAINING SOURCE LOCATIONS, INTENSITY, AND SPECTRA- A NUMBER OF DIFFERENT MODES OF OPERATION WAS USED IN WHICH THE AVAILABLE STORAGE SPACE IN THE SATELLITE SPIN AXIS WAS ARRANGED TO POINT AT A GALACTIC POLE, SPATIAL HANDLING ELECTRONICS.

THUS PROVIDING A MONITORING OF THE EFFICIENCY OF THE DETECTOR FELL SLOWLY AT THIS ENERGY.

THE SPIN CYCLE OF 3.5-6 TIMES THE STRENGTH OF THE SPIN COULD BE LOCATED WITH A PRECISION OF ABOUT 15 ARC-MIN.

--- UK 5, Pounds---
INVESTIGATION NAME- POLARIMETER/SPECTROMETER
NSSDC ID- 74-077A-04
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
X-RAY ASTRONOMY
PERSONNEL
PI - K. J. Pounds
U OF LEICESTER
01 - H. A. Cooke
U OF LEICESTER
02 - D. J. Adam
U OF LEICESTER
03 - R. E. Griffith
U OF LEICESTER
BRIEF DESCRIPTION
This experiment was a polarimeter/spectrometer operating in the 2- to 10-keV range. It used two large plane crystals, lithium hydride and graphite, in a Bragg spectrometer with a high-resolution spectrometer, obtaining source locations, intensity, and spectra. A number of different modes of operation was used in which the available storage space in the satellite spin axis was arranged to point at a galactic pole, with the ability of the satellite instruments to determine the positions of a source, possibly on the strength of the source and the number of other sources in a given part of the sky.

THE SPIN CYCLE OF 3.5-6 TIMES THE STRENGTH OF THE SPIN COULD BE LOCATED WITH A PRECISION OF ABOUT 15 ARC-MIN.

--- UK 5,坤---
INVESTIGATION NAME- SOLAR-WIND MONITOR
NSSDC ID- 74-077A-03
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
ASTROPHYSICS
PERSONNEL
PI - P. R. Price
ARA/VASH DC
01 - F. M. Passamonti
UGA/MARO SC LAB
BRIEF DESCRIPTION
Vela 5A was one of the spin-stabilized, non-solar-thermal satellites that comprised the fifth launch in the Vela program. The orbits of the two satellites on each launch were basically circular at about 700 kilometers, inclined to the ecliptic 28 degrees, and spaced 100 degrees apart. This provided a monitoring capability of opposite hemispheres of the Earth. The objectives of the satellites were: 1) to study solar and cosmic X-rays, 2) control of the solar wind, and 3) to carry out research and development on methods of detecting nuclear explosions by means of satellite-borne instrumentation.

THE SATELLITE RESIDES IN A SOURCE OF THE BACKGROUND OF THE SPACE MISSIONS. Vela 5A, in an improved version of the earlier Vela series satellites, had better command capabilities, increased data storage, improved power supplies, better thermal control of optical sensors, and improved experiment weight. Power supplies of 120 W were provided by 22-500 solar cells mounted on 24 of the spacecraft's 26 faces, a rotation rate of 78 rpm during transfer orbits and 5 rpm after final orbit injection. Maintaining normal axial attitude control, eight dipole antennas and four stud antenna arrays at opposite ends of the spacecraft structure were used for ground commands and telemetry.

--- Vela 5A---
INVESTIGATION NAME- SOLAR-WIND MONITOR
NSSDC ID- 74-077A-03
INVESTIGATIVE PROGRAM
CODE SA/CDO-OP
INVESTIGATION DISCIPLINE(S)
ASTROPHYSICS
PERSONNEL
PI - P. R. Price
ARA/VASH DC
01 - F. M. Passamonti
UGA/MARO SC LAB
BRIEF DESCRIPTION
Vela 5A was one of the spin-stabilized, non-solar-thermal satellites that comprised the fifth launch in the Vela program. The orbits of the two satellites on each launch were basically circular at about 700 kilometers, inclined to the ecliptic 28 degrees, and spaced 100 degrees apart. This provided a monitoring capability of opposite hemispheres of the Earth. The objectives of the satellites were: 1) to study solar and cosmic X-rays, 2) control of the solar wind, and 3) to carry out research and development on methods of detecting nuclear explosions by means of satellite-borne instrumentation.

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INVESTIGATION NAME: GAMA RAY ASTRONOMY

INVESTIGATION NAME: SOLAR WIND

INVESTIGATION NAME: SOLAR WIND

INVESTIGATION NAME: SOLAR WIND

INVESTIGATION NAME: SOLAR WIND

INVESTIGATION NAME: NEUTRON DETECTION

INVESTIGATION NAME: NEUTRON DETECTION

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INVESTIGATION NAME: NEUTRON DETECTION

INVESTIGATION NAME: NEUTRON DETECTION

INVESTIGATION NAME: GAMA RAY ASTRONOMY

INVESTIGATION NAME: SOLAR WIND
Brief Description

Two electrostatic analyzer-electron multiplier units were used, one in each spin shell, which included absorbing layers and detectors in the nonscattered region. Energy analysis was performed by changing the plates to obtain voltage levels and allowing them to discharge with known resistance. The detectors were set to analyze the primary and secondary electrons and other particles in the region where the secondary electrons were emitted.

Investigation Name: Neutron Detector

Investigation Discipline:

- Particle and Fields

Personnel:

- P.J. Bane
- J.R. Montgomery
- J.R. Olson
- J.V. Szmolyo
- W.A. Bellian
- S.J. Bane

Device Description:
The neutron detector consisted of a large (about 8 lb) polystyrene moderator surrounding two helium-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 0.5 MeV.

Investigation Name: Cosmic X Rays

Investigation Discipline:

- X-ray Astronomy

Personnel:

- J.V. Szmolyo
- J.R. Olson
- J.V. Szmolyo
- J.V. Szmolyo

Device Description:
The X-ray detector was a large-area 2.0 cm 50 sodium iodide scintillator with a 5-mil Be window. The detector was designed to provide measurements of the location, intensity, and intensity variations of nonthermal X-ray sources. The detector was sensitive to X-ray photons in two energy intervals — (1) 10 to 50 kV and (2) 50 to 120 kV, and was sufficiently sensitive to monitor from 0 to 20 galactic X-ray sources. Any one source was viewed for approximately 0.1 s, and every 2 days each source was back in the field of view.

Investigation Name: Solar Particle Telescopes

Investigation Discipline:

- Solar Physics

Personnel:

- P.J. Bane
- J.R. Montgomery

Device Description:
The solar telescope experiment was designed to measure the energy spectrum and angular distribution of solar protons between 0.3 and 50 MeV. In addition, the experiment was designed to identify the source of the flux of deuterium, helium-3, and helium-4 nuclei which may be emitted during a solar particle flare and to monitor the total energy of the particles. The telescopes were located in a single plane, with three detectors in each plane, and the spacecraft spin axis, each instrument consisted of a collimator and an absorber of mass. Two spin-planes at 30 and 60 degrees in front of a solid-state detector and a particle detector.

Investigation Name: Electron Detectors

Investigation Discipline:

- Nuclear Detection

Personnel:

- P.J. Bane
- J.R. Montgomery
- J.R. Olson
- W.A. Bellian

Device Description:
The experiment consisted of six 13-in-cylindrical 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 60 percent. The counters were shielded against direct penetration by electrons below 10 MeV and photons below 20 MeV. Active anticoincidence shielding was provided, and normalized output pulses from the 11 detectors were summed into counting and logic circuits. Logical sensing of data was used to determine significant counts. The recording of discrete counts in a series of logarithmically increasing time intervals provided temporal coverage, which, coupled with the isotropic response, is unique in astronomy. A time measurement was also associated with each record. The data accuracy view detectors and each counting geometry were also associated with the data collection of each detector, and their secondary effects, the observed background rate, which was a function of threshold energy, was about 150 counts/sec.

Spacecraft Name: Vela 6A

Investigative Programs:

- Nuclear Detection

Launch Site:

- Cape Canaveral, United States

Vehicle:

- Titan

Launch:

- 04/28/70

Weight:

- 261.3 kg

Sponsoring Country/Agency:

- United States

Initial Orbit Parameters:

- 05:17:45 UTC
- 010.0 deg
- 001.2 deg
- 0100 km

Personnel:

- Arpa-Staff
- W.A. Bellian
- J.R. Montgomery

Device Description:
The Vela 6A was one of the six satellites that comprised the sixth launch in the Vela program. The satellites were designed to monitor and record nuclear explosions and provide data on the characteristics of the bursts. The Vela 6A was equipped with a variety of instruments, including a solar X-ray telescope, a cosmic X-ray telescope, and a solar particle detector. The Vela 6A was launched on April 28, 1970, at 04:28 UTC from Cape Canaveral, Florida, on a Titan IV launch vehicle. The satellite was designed to monitor and record nuclear explosions and provide data on the characteristics of the bursts.
power supplies of 120 V were provided by 22,500 solar cells mounted on 24 of the spacecraft’s 26 faces. Rotation rates of the spacecraft were limited to 0.1 rpm, and 1 rpm after final gondola insertion maintained nominal attitude control. (Light weight arrangement of solar panels increased the moment of inertia of the spacecraft, which was used for ground testing.) In the launch of Vela 6A and 6B, the pairs of ion chambers still in orbit (Vela 5A and 5B), completed the objectives of the Vela program.

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INVESTIGATION NAME: SENSORS WIND EXPERIMENT

NSDC ID: 10-70-027A-05

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

PARTICLES AND FIELDS

MAGNETIC FIELD

PERSONNEL

PI: P. A. DAME

01: J. K. ASBRIDGE

02: H. W. ELFENBAUM

BRIEF DESCRIPTION

Two electrostatic analyzer-electron multiplier units were used to study the ensemble of solar wind. Concluding heavy ions and prottons and electons in the monoenergetic energy analysis was accomplished by changing the plates to known voltage levels allowing them to discharge with known capacitance (10 C) time constants. Particles in a 4-deg by 100-deg field of view were identified and probed for the detectors during a 300-deg 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 0.1 to 10 MeV and solar wind positive ions (mainly protons and alpha particles) in an energy per charge range from 0.1 to 5 keV. The ion detector studies heavy ions in the energy per charge range between 1 and 0.3 keV

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INVESTIGATION NAME: NEUTRON DETECTOR

NSDC ID: 10-70-027A-07

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

PARTICLES AND FIELDS

NUCLEAR PHYSICS

PERSONNEL

PI: J. J. LAMOREN

01: J. K. ASBRIDGE

02: J. W. BURKE

03: J. N. FLINT

BRIEF DESCRIPTION

This detection system consisted of a large (about 3 in) polyethylene moderator surrounding two helium-filled proportional counters. Particles between 0.1 and 10 MeV were thermalized by the moderator and detected by the counters. The instrument was also sensitive to protons above 25 MeV.

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INVESTIGATION NAME: SOLAR X-RAY DETECTORS

NSDC ID: 10-70-027A-08

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

NUCLEAR PHYSICS

X-RAY ASTRONOMY

PERSONNEL

PI: H. G. HODGE

01: J. W. BURKE

02: J. W. BURKE

03: J. W. BURKE

BRIEF DESCRIPTION

This experiment was designed to monitor the solar ambient and flare-produced flux of X-rays in the 0.1- to 60-A wavelength region. Two identical X-ray sensor units were mounted at diametrically opposite positions on the spacecraft, each unit containing four detectors—three ion chambers and an scintillation counter. Each ion chamber had a hemispherical window. The combined output signals from the identical detectors in each sensor unit were identified by the response of an ideal detector with a 2-in. spherical field of view. The ion chambers had the following window materials: CsI; ZnS, and wavelength response, channel 1: 2.5-3.2 keV, channel 2: 3.2-5.4 keV, channel 3: 5.4-11 keV, channel 4: 11-20 keV. The scintillation detector was a NaI(Tl) crystal coupled to a photomultiplier. The output of which was passed to the five-level integral pulse-height analyzer. Unlike the ion chambers, the two scintillation detectors in the two sensors were non-identical. The more sensitive detector had a one-half-inch-diameter, 1-mm-thick CsI crystal window and 1-mm-thick NaI(Tl) crystal and the less sensitive detector had a one-half-inch-diameter, 1-mm-thick CsI crystal window and 1-mm-thick NaI(Tl) crystal. In addition to the flat 10-mil-thick beryllium window, the face of the crystal was covered by a flat 10-mil-thick beryllium window. The less sensitive detector had a one-half-inch-diameter, 1-mm-thick CsI crystal and a 1-mm-thick beryllium window in addition to the flat 10-mil-thick beryllium window. Due to the nature of the crystal, both ion chambers and scintillation detectors were capable of observations with time resolutions of 0.1-3 s. The average detection efficiencies for the ion and scintillation detectors were of the order of 20 and 30 percent, respectively.

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INVESTIGATION NAME: ELECTRON DETECTORS

NSDC ID: 10-70-027A-09

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

PARTICLES AND FIELDS

NUCLEAR PHYSICS

INVESTIGATION NAME: SOLAR PHYSICS

PERSONNEL

PI: P. A. DAME

01: J. K. ASBRIDGE

02: H. W. ELFENBAUM

03: J. W. BURKE

BRIEF DESCRIPTION

This experiment consisted of six 10-cm-cubed cesium iodide scintillation detectors distributed to achieve nearly isotropic sensitivity. Individual detectors responded to energy depositions of 0.1 to 30 MeV. With energies beyond 5 keV, statistical significance of count rate increased when the recording of the integrated count rate was initiated. The capability provided continuous temporal coverage which was unique in astronomy. A time measurement was also associated with each record. The data contained a background component due to cosmic particle and their secondary effects, the observed background level, which was a function of thermal energy, was about 20 counts/s.

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INVESTIGATION NAME: GAMMA-RAY ASTRONOMY

NSDC ID: 10-70-027A-08

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

ASTRONOMY

PERSONNEL

PI: K. W. KLEITON

01: J. W. BURKE

02: J. W. BURKE

03: J. W. BURKE

BRIEF DESCRIPTION

This experiment consisted of six 10-cm-cubed cesium iodide scintillation detectors distributed to achieve nearly isotropic sensitivity. Individual detectors responded to energy depositions of 0.1 to 30 MeV. With energies beyond 5 keV, statistical significance of count rate increased when the recording of the integrated count rate was initiated. The capability provided continuous temporal coverage which was unique in astronomy. A time measurement was also associated with each record. The data contained a background component due to cosmic particle and their secondary effects, the observed background level, which was a function of thermal energy, was about 20 counts/s.

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INVESTIGATION NAME: ZETA PHYSICS

NSDC ID: 10-70-027A-09

INVESTIGATION PROGRAM: NUCLEAR DETECTION

INVESTIGATION DISCIPLINES:

NUCLEAR PHYSICS

PARTICLES AND FIELDS

NUCLEAR PHYSICS

INVESTIGATION NAME: SOLAR PHYSICS

PERSONNEL

PI: P. A. DAME

01: J. K. ASBRIDGE

02: H. W. ELFENBAUM

03: J. W. BURKE

BRIEF DESCRIPTION

This experiment consisted of six 10-cm-cubed cesium iodide scintillation detectors distributed to achieve nearly isotropic sensitivity. Individual detectors responded to energy depositions of 0.1 to 30 MeV. With energies beyond 5 keV, statistical significance of count rate increased when the recording of the integrated count rate was initiated. The capability provided continuous temporal coverage which was unique in astronomy. A time measurement was also associated with each record. The data contained a background component due to cosmic particle and their secondary effects, the observed background level, which was a function of thermal energy, was about 20 counts/s.
SPACECRAFT: VELA 6B

INVESTIGATION NAME: ELECTRON DETECTORS

PERSONNEL:
PI - P.R. HIGBIE
01 - R.W. MONTGOMERY
02 - R.W. HIGBIE
03 - R.W. OLSON

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 anti-coincidence shielding was provided. Normalized output pulses from the six detectors were summed into counting and logic circuitry. Logical sensing of ratios, statistical significance of the logic output, and signal initiation and 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 recorded of the data collection detectors and 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/s.

BRIEF SUMMARY:
This spacecraft was the landing vehicle for the two-part spacecraft mission. It soft-landed at 22.48 deg N latitude and 77.04 deg W longitude on the Martian surface. The orbiter had the capability of being made synchronous with the lander to provide for daily relay and landing observations. It was capable of obtaining data for the selection of landing sites for future missions. The lander vehicle carried instruments to study the geology, chemical composition (organic and inorganic), meteorology, magnetic properties, surface appearance, and physical properties of the Martian surface and atmosphere. The lander had a 70-W power capacity, the scientific payload a mass of approximately 91 kg (200 lb). This spacecraft was originally scheduled to be the second landing mission, but because of a malfunction in VIKING-A, it was launched first.
INVESTIGATION NAME - SEISMOLOGY

INVESTIGATION DISCIPLINES

PLANETOLOGY
PHYSICS

PERSONNEL

L. A. ANDERSON, CALIF ORNIA INSTITUTE OF TECHNOLOGY
M. M. TITSOX, INDIANA UNIVERSITY AT BLOOMINGTON
R. E. INGALL, UNIVERSITY OF CALIFORNIA AT BERKELEY
R. J. LAYMAN, UNIVERSIY OF TEXAS AT GALVESTON

BRIEF DESCRIPTION

The seismology experiment was designed to determine the level of seismic activity on Mars and its internal structure. The seismology instrument consisted of a 15-gram package that weighed approximately 2.3 kg. In the package were three mutually perpendicular seismometers. They consisted of a 20-gram mass with an attached coil, flatly fastened to the instrument frame on a short boom. So the coil projects into a magnet mounted on the frame. Relative motion of the coil and magnet caused by the mass's reaction to ground motion was designed to generate a varying voltage that was then input to an amplifier. The mass was to 200Hz selection of variables filtered for frequency content or to adjust to best reception of specific types of data. A low sampling rate for general purposes was used to generate a varying voltage that was then input to an amplifier. Modes were --

EVENTS, AND OR FREQUENCY CONTENT OR TO AN BNREYSE MITY NEST RECEPTION OF A GARCH BY AVERAGING THE AMPLITUDE OF NORMAL GROUND NOISE OVER A 15-5 PERIOD. WHEN AN EVENT OCCURRED, A TRIGGER WOULD ACTIVATE AN EVENT. THE DATA WERE TO BE COMPRESSED FOR TRANSMISSION TO EARTH. THE SHAPE OF THE ENVELOPE AND ITS INCREMENTAL FREQUENCY CONTENT WOULD THEN BE TRANSMITTED TO EARTH AND RECONSTRUCTED TO APPROXIMATE THE ORIGINAL EVENT. THE INSTRUMENT FAILS TO FUNCTION ON THE MARTIAN SURFACE.

INVESTIGATION NAME - MOLECULAR ANALYSIS

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

T. J. BIEBER, MASS INSTITUTE OF TECHNOLOGY
M. M. ANDERSON, CALIFORNIA INSTITUTE OF TECHNOLOGY
T. R. WOOL, UNIVERSITY OF NEW YORK
L. E. L. MINTON, SALT LAKE CITY INSTITUTE OF TECHNOLOGY
P. O. TOLIN, US GEOLOGICAL SURVEY

BRIEF DESCRIPTION

The molecular analysis experiment was designed to search for and determine the atmospheric composition of Mars. The analyses were performed by a gas chromatograph mass spectrometer (GC/MS), which had high sensitivity, high structural specificity, and dual applicability to a wide range of compounds. The surface material was heated to 2000-equipped with a C13-SWEEP column. The material was then placed in a gas chromatograph column that was swept with hydrogen as a carrier gas, while passing through the column. The temperature was then increased, and the column was then heated to 5000° C to obtain less volatile substances. This process was continued until the material was then analyzed by the GC/MS.

INVESTIGATION NAME - BIOLOGY INVESTIGATION

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

T. J. BIEBER, MASS INSTITUTE OF TECHNOLOGY
J. D. LEIBERSON, STANFORD UNIVERSITY
R. M. RICH, MASS INSTITUTE OF TECHNOLOGY
L. M. HORNITZ, CALIFORNIA INSTITUTE OF TECHNOLOGY
F. L. DAVIS, NASA/ARC
C. W. LOVING, BIOSPHERE INC.

BRIEF DESCRIPTION

The biology experiment was designed to search for and determine the presence of life on Mars. This experiment involved several distinct instruments: a release (LR), an exchange (EX), and an exchange (EX) -- incubated samples of the Martian surface under a number of different environmental conditions. These samples were then distributed, in measured amounts, to three instruments for incubation and processing. The samples were then heated and incubated for 24 hours. The samples were then analyzed by the GC/MS.

INVESTIGATION NAME - SEISMOLOGY

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

L. A. ANDERSON, INDIANA UNIVERSITY AT BLOOMINGTON
M. M. TITSOX, UNIVERSITY OF CALIFORNIA AT BERKELEY
R. E. INGALL, UNIVERSITY OF CALIFORNIA AT BERKELEY
R. J. LAYMAN, UNIVERSITY OF TEXAS AT GALVESTON

BRIEF DESCRIPTION

The seismology experiment was designed to determine the presence of seismic activity on Mars and its internal structure. The seismology instrument consisted of a 15-gram package that weighed approximately 2.3 kg. In the package were three mutually perpendicular seismometers. They consisted of a 20-gram mass with an attached coil, flatly fastened to the instrument frame on a short boom. So the coil projects into a magnet mounted on the frame. Relative motion of the coil and magnet caused by the mass's reaction to ground motion was designed to generate a varying voltage that was then input to an amplifier. The mass was to 200Hz selection of variables filtered for frequency content or to adjust to best reception of specific types of data. A low sampling rate for general purposes was used to generate a varying voltage that was then input to an amplifier. Modes were --

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INVESTIGATION NAME - MOLECULAR ANALYSIS

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

T. J. BIEBER, MASS INSTITUTE OF TECHNOLOGY
M. M. ANDERSON, CALIFORNIA INSTITUTE OF TECHNOLOGY
T. R. WOOL, UNIVERSITY OF NEW YORK
L. E. L. MINTON, SALT LAKE CITY INSTITUTE OF TECHNOLOGY
P. O. TOLIN, US GEOLOGICAL SURVEY

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INVESTIGATION NAME - BIOLOGY INVESTIGATION

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

T. J. BIEBER, MASS INSTITUTE OF TECHNOLOGY
J. D. LEIBERSON, STANFORD UNIVERSITY
R. M. RICH, MASS INSTITUTE OF TECHNOLOGY
L. M. HORNITZ, CALIFORNIA INSTITUTE OF TECHNOLOGY
F. L. DAVIS, NASA/ARC
C. W. LOVING, BIOSPHERE INC.

BRIEF DESCRIPTION

The biology experiment was designed to search for and determine the presence of life on Mars. This experiment involved several distinct instruments: a release (LR), an exchange (EX), and an exchange (EX) -- incubated samples of the Martian surface under a number of different environmental conditions. These samples were then distributed, in measured amounts, to three instruments for incubation and processing. The samples were then heated and incubated for 24 hours. The samples were then analyzed by the GC/MS.

INVESTIGATION NAME - SEISMOLOGY

INVESTIGATION DISCIPLINES

PLANETOLOGY

PERSONNEL

L. A. ANDERSON, INDIANA UNIVERSITY AT BLOOMINGTON
M. M. TITSOX, UNIVERSITY OF CALIFORNIA AT BERKELEY
R. E. INGALL, UNIVERSITY OF CALIFORNIA AT BERKELEY
R. J. LAYMAN, UNIVERSITY OF TEXAS AT GALVESTON

BRIEF DESCRIPTION

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INVESTIGATION NAME: RADIO SCIENCE

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

TL - W.H. MICHAEL. JR. NASA-LRC
TM - T.R. SHAPIRO NASI-JPL
TM - G. FISHERMAN EPRI/MITCHELL PL
TM - J. C. DAVIES NASA-JPL
TM - D.L. BAIN NASA-JPL
TM - G.L. TILLY STANFORD U
TM - I. FLORENTINO NASA-JPL
TM - A.B. BINDER NASA-JPL

BRIEF DESCRIPTION

THE DEPARTMENT OF SURFACE INVESTIGATION WAS TO DETERMINE THE PHYSICAL PROPERTIES OF THE MARS Surface environment at the landing site, primarily using engineering measurements and scientific instruments needed to meet other mission objectives. IN PARTICULAR IT ATTEMPTED TO DETERMINE SUCH PROPERTIES AS BULK DENSITY, BARENESS, STRENGTH. ANGULARITY OF THE PARTICLE CHARACTERISTICS, THERMAL PARAMETERS. DOLAN TRANSPORTABILITY. TOPOGRAPHY, AND SOME ENVIRONMENTAL PROPERTIES SUCH AS WIND, PRESSURE, AND RANGE-RATE CAPABILITIES. THE EXPERIMENT WAS DESIGNED TO PROVIDE INFORMATION ON THE PHYSICAL PROPERTIES OF THE MARTIAN SURFACE AT THE LANDING SITE.

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PERSONNEL

TL - J.A. MUNCH BROWN U
TM - S. SAGAN CONNELL
TM - A.D. BROWN SCIENCE APPL. INC
TM - E.C. ORR US GEOL SURVEY
TM - F.J. HILL NASA-LRC
TM - E.C. LEVINTHAL STANFORD U
TM - R. LIEBERS. JR. STANFORD U

BRIEF DESCRIPTION


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INVESTIGATION NAME: PHYSICAL PROPERTIES INVESTIGATION

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVE DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

TM - H.J. SHORTILL U OF UTAH
TM - R.P. MURPHY II US GEOLOGICAL SURVEY
TM - R.P. SCOTT CALT INST OF TECH

BRIEF DESCRIPTION

THE PURPOSE OF THE PHYSICAL PROPERTIES EXPERIMENT WAS TO DETERMINE THE PHYSICAL PROPERTIES OF THE MARTIAN SURFACE AND ENVIRONMENT AT THE LANDING SITE. SPECIFICALLY USING ENGINEERING MEASUREMENTS AND SCIENTIFIC INSTRUMENTS NEEDED TO MEET OTHER MISSION OBJECTIVES. IN PARTICULAR IT ATTEMPTED TO DETERMINE SUCH PROPERTIES AS BULK DENSITY, BARENESS. STRENGTH, ANGULARITY, PARTICLE CHARACTERISTICS, THERMAL PARAMETERS, DOLAN TRANSPORTABILITY, TOPOGRAPHY, AND SOME ENVIRONMENTAL PROPERTIES SUCH AS WIND, PRESSURE, AND RANGE-RATE CAPABILITIES. THE MAXIMUM USE WAS MADE OF HARDWARE AND INSTRUMENTS INTERESTED FOR OTHER APPLICATIONS, SUCH AS THOSE FOR THE LANDER CAMERAS. ONLY PASSIVE DEVICES, SUCH AS MICROPHONES AND LANDER LIDAR ZONES, WERE ADDED FOR THIS EXPERIMENT.
HAS REQUIRED TO PHOTOGRAPH WITH CONTINUOUS PICTURES A SMATT AT LEAST 50 MN IN DIAMETER PASS FROM THE NEAR-APOAPSIS PORTION OF THE ORBIT AFTER LANDER SEPARATION COMPLETE COVERAGE OF AN AREA AT LEAST 50 MN IN DIAMETER CENTERED ON THE LANDER.

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**VIKING 1 LANDER**

**INVESTIGATION NAME: X-RAY FLUORESCENCE SPECTROMETER**

**INVESTIGATIVE PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S): PLANETARY GEOLGY**

**PERSONNEL**

TL - R. TOLMIN, 3RD

TM - A. K. BAKER

TH - D. H. ROSE

RF - G. CLARK

**BRIEF DESCRIPTION**

This experiment utilized an energy-dispersive, X-ray fluorescence spectrometer in which four sealed, gas-filled proportional counters detected X-rays emitted from samples of the Martian surface material. A single channel analyzer was used to determine the X-ray energy, and a pulse height analyzer was used to determine the proportion of counts in the energy channels. The detector was contained in a ten-teg of parts per million for trace elements to a few percent for major elements, depending upon the element in question.

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**SPACECRAFT COMMON NAME:** VIKING 1 ORBITER

**ALTERNATE NAMES:** PL-7339, VIKING-0 ORBITER

**LAUNCH DATE:** 08/20/75

**WEIGHT:** 1710 Lb

**LAUNCH SITE:** CAPE CANAVERAL, UNITED STATES

**LAUNCH VEHICLE:** TITAN

**SPONSORING COUNTRY/AGENCY**

UNITED STATES

**ORBIT PARAMETERS**

EPOCHE PERIOD: 06/20/76

INCLINATION: 37.7° DEG

APOAPSIS: 1950 K.M.

**PERSONNEL**

MC - M. JAKODOWSKI

SC - I. G. GOFF

PS - G. A. SOFFEN

**BRIEF DESCRIPTION**

This experiment utilized an energy-dispersive, X-ray fluorescence spectrometer in which four sealed, gas-filled proportional counters detected X-rays emitted from samples of the Martian surface material. A single channel analyzer was used to determine the X-ray energy, and a pulse height analyzer was used to determine the proportion of counts in the energy channels. The detector was contained in a ten-teg of parts per million for trace elements to a few percent for major elements, depending upon the element in question.

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**SPACECRAFT COMMON NAME:** VIKING 2 LANDER

**ALTERNATE NAMES:** VIKING-A LANDER, VIKING-1 ORBITER

**INVESTIGATION NAME:** ORBITER TV IMAGING

**INVESTIGATIVE PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S): PLANETARY GEOLGY**

**PERSONNEL**

TL - M. J. KIEFFER

TM - C. R. MURRO

TH - G. A. GOFF

RF - G. A. SOFFEN

**BRIEF DESCRIPTION**

The purpose of the X-ray imaging experiment was to aid in the selection of landing sites for the Viking landers and future missions. To monitor the regolith and study the geologic and dynamic characteristics of the surface. The X-ray imaging system was used to detect the Martian soil and determine its composition at a reference point by determining the X-ray energy and the X-ray intensity. The dynamic range was limited to 0.1 to 1%, and the sensitivity was sufficient to obtain an image in 30 days with 30% detection rate. The purpose of the experiment was to determine the geologic and dynamic characteristics of the Martian surface.
PAYLOAD OF APPROXIMATELY 93 KG (205 LB). THIS SPACECRAFT WAS ORIgiNALLY SCHEDULED TO BE THE FIRST MISSION BUT DUE TO A MALFUNCTION, IT WAS LAUNCHED SECOND.

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VIKING 2 LANDER, ANDERSON

INVESTIGATION NAME: SEISMOLOGY

NSSDC 10- 75-083C-08 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY PHYSICS

PERSONNEL

NL - R.A. ANDERSON
TM - M.M. TOKSOZ
TM - G.H. SUTTON
TM - R.J. CROUCH
TM - G.V. LATHAM

BRIEF DESCRIPTION

THE SEISMOLOGY EXPERIMENT WAS DESIGNED TO DETERMINE THE LEVEL OF SEISMIC ACTIVITY ON MARS AND ITS INTERNAL STRUCTURE. THE SEISMOLOGY INSTRUMENT CONSISTED OF A 1-CHRONIC PACKAGE THAT WEIGHTED APPROXIMATELY 2.3 KG (5 LB). IN THE PACKAGE WERE THREE MUTUALLY PERPENDICULAR SEISMOGRAPH MASSES, EACH CARRIED BY AN ELASTICALLY PIVOTED BASE AND TRANSMITTED IN A SENSE FRAME ON A SHORT ARM TO A SENSOR FRAME. RELATIVE MOTION OF THE COIL AND MAGNET, INDUCED BY THE MASS'S REACTION TO GROUND MOTION, WOULD BE DETECTED BY AN AMPLIFIER. MODES WERE (1) SEISMIC GENERATION OR ADJUST TO TEST RECEPTION OF FREQUENCY AND SENSITIVITY FOR THREE TYPES OF DATA; (2) A LOW SENSITIVITY RATE FOR CONTINUOUS MONITORING OF MASSES THAT WAS DORMANT UNTIL ACTIVATED BY A TRIGGER ACTIVATED A HIGHER SENSITIVITY RATE FOR TIME OF THE EVENT AND (3) A COMPRESSED TIME SCALE FOR CONTINUOUS SAMPLING OF DATA IN A GROUP OF THREE SEISMOGRAPHIC EVENTS, WHICH REQUIRED ONLY ONE AMPLITUDE SAMPLE PER 100 T. THE DATA WERE COMPRESSED FOR TRANSMISSION TO EARTH BY TIME DELAYING THE DATA AND THEIR AMPLITUDES. THE INSTRUMENT WAS DESIGNED TO DETECT ELECTRICITY OF SEISMOGRAPHIC EVENTS AND TO RESPOND TO DIFFERENT LEVELS OF THE EVENT. THE VIKING 1 SEISMOGRAPH FAILED IN THE LANDING PHASE AND CANNOT BE USED IN A SECOND MISSION WITH THE VIKING 2 INSTRUMENT.

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VIKING 2 LANDER, BIEHAN

INVESTIGATION NAME: MOLECULAR ANALYSIS

NSSDC 10- 75-083C-06 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

NL - K. BIEHAN
TM - H.L. URE
TM - D.M. ANDERSON
TM - G. OWEN
TM - J. MÖNNER
TM - L.S. HARR
TM - A.J.K. WATSON
TM - P. SULTIMA 3RD

BRIEF DESCRIPTION

THE MOLECULAR ANALYSIS EXPERIMENT WAS DESIGNED TO SEARCH FOR AND IDENTIFY ORGANIC (AND SOME INORGANIC) COMPOUNDS IN THE ATMOSPHERE OF MARS. DETERMINE THE ATMOSPHERIC UPPER SURFACE LAYER OF MARS. DETERMINE THE ATMOSPHERIC INSTRUMENTS INcly ORGANIC COMPOUNDS IN THE SURFACE MATERIAL. THE INSTRUMENTARY COMPRISED OF A GAS CHROMATOGRAPH MASS SPECTROMETER WHICH HAD HIGH SENSITIVITY, HIGH STRUCTURAL SPECIFICITY, AND LARGE CALIBRATING CAPABILITY. THE COLUMN TEMPERATURES WERE VARIABLE, BETWEEN 150 AND 220°C. THE MASS SPECTROMETER CHROMATOGRAPHIC COLUMN WAS CHANGED BETWEEN 150 AND 220°C. THE DATA WERE THEN TRANSFORMED TO A SIMPLIFIED FORM, WHERE THE SPECTRUM FROM MARS 1 TO ZBO WAS OBTAINED EVERY 100 SEC OR 1 MIN. EACH OF THE SPECTRUMS WAS SEPARATED INTO SCANS BY THE COMPUTER. ORGANIC COMPOUNDS WERE IDENTIFIED BY THE SPECTRUM.

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VIKING 2 LANDER, ENGEL

INVESTIGATION NAME: MICROBIOLOGY INVESTIGATION

NSSDC 10- 75-083C-05 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY BIOLOGY

PERSONNEL

NL - R.P. ENGEL
TM - F. LEVIN
TM - I.L. HENRY
TM - J.C. PAM
tm - G.V. LATHAM

BRIEF DESCRIPTION

THE MICROBIOLOGY INSTRUMENT WAS DESIGNED TO SEARCH THE PRESENCE OF MARITAN ORGANISMS IN THE MARITAN SURFACE MATERIAL. THE INSTRUMENTARY COMPRISED OF SEveral MICROBIOLOGICAL TECHNIQUES, EACH OF WHICH WAS IDENTIFIED TO MEASURE THE PROPER RESPONSE IN THE MARS ENVIRONMENT. THE TECHNIQUES WERE SELECTED TO MEASURE THE RESPONSE OF THE MICROBIOLOGY INSTRUMENT IN VARIOUS CONDITIONS. THE TECHNIQUES WERE SELECTED TO MEASURE THE RESPONSE OF THE MICROBIOLOGY INSTRUMENT IN VARIOUS CONDITIONS.
incubated a sample with radioactively labeled nutrients. The atmosphere above the sample was continuously monitored for 12 days. The detection of radioactivity in CO2 produced a metabolic curve as a function of time. The growth curve of which was used to determine if growth took place. The gas measured the production or uptake of CO2, H2O, NH3, CH4, H2S, and O2 during incubation of a soil sample. The sample was sealed and purged with helium, then a mixture of helium, water vapor, and CO2 was introduced as an initial incubation atmosphere.

After the addition of a selected nutrient, data were collected for 12 days. Samples of the atmosphere were removed and analyzed by a gas chromatograph with a thermal conductivity detector.

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**INVESTIGATION NAME:** Radio Science

**NSDC 19- 75-DSCI-11**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Astronomy, atmospheres, and radio physics

**PLANETARY ATMOSPHERES**

**PLANETOLOGY**

**PERSONNEL**

TL - M. L. Michael Jr.
TM - L. L. Shapley
TM - D. D. Davies
TM - D. L. Eimer
TM - M. D. Grossi
TM - J. A. Greenle
TM - J. C. Stellwerk

**BRIEF DESCRIPTION**

This experiment utilized the lander-to-earth and orbit-to-earth S-band communications link including range and range-rate capabilities, and the lander X-band downlink. The resulting data were used to determine the martian atmosphere's mass, density, structure, and surface properties. In addition, the data were used to detect the solar corona.

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**INVESTIGATION NAME:** Faceplate Camera

**NSDC 19- 75-DSCI-06**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Planetary atmospheres, planetary biology, and planetary exploration

**PERSONNEL**

TL - A. W. Tidler
TM - L. A. Tidwell
TM - M. L. Morris
TM - F. G. Hume
TM - J. L. Longhi
TM - S. A. L. Brown

**BRIEF DESCRIPTION**

The purpose of the imagers' separation from the lander was to characterize the landing site, providing data with biological, geological, and meteorological relevance. Two cameras, with a 0.05-to-360 horizontal field of view at each camera, were used with a vertical field of view for each camera. These cameras were designed to observe a complete 0- to 360° horizontal panorama. Vertical pointing by command for angular coverage from 0 to 60° below the horizontal plane of the lander in 10° increments was required. Azimuth pointing by command was in 2.5° increments in the camera were mounted at least 1.5 m above the martian surface and were capable of viewing the two footpads and at least 50 percent of the area accessible to the vertical field of view of each camera. Each camera was capable of obtaining visual color imagery. Provision is made to operate viewing two footpads between 0.6 and 1.1 kilometers, horizontal stereo with a minimum base of 0.5 m was required.

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**INVESTIGATION NAME:** Physical Properties Investigation

**NSDC 19- 75-DSCI-01**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Planetary physics

**PERSONNEL**

TL - H. F. Shortill
TM - R. E. Hutton
TM - R. J. Moore
TM - C. E. Scott

**BRIEF DESCRIPTION**

The purpose of the physical properties experiment was to determine the physical properties of the martian surface and environment at the landing site. Primarily required to meet other mission objectives, particularly, it is needed to determine such properties as bulk density, bearing strength, angle of repose, cohesion, internal friction, particle characteristics, eddy transportability, topography, and certain environmental properties such as wind, temperature, solar flux levels. Maximum use was made of hard rows and instruments intended for other applications such as the lander's only passive devices, such as microphones and landing leg strokages. Were added for this experiment.

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**INVESTIGATION NAME:** Entry-atmospheric Structure

**NSDC 19- 75-DSCI-02**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Planetary atmospheres

**PERSONNEL**

TL - A. O. C. Nier
TM - M. A. Mclloyd
TM - W. D. Hinson
TM - H. F. Specker
TM - A. Seiff

**BRIEF DESCRIPTION**

This experiment was designed to determine the pressure, temperature, and density variations at different altitudes in the lower martian atmosphere through accelerations, pressures, and temperatures. The accelerations of the guidance and control system were used for the atmospheric structure investigation.

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**INVESTIGATION NAME:** Viking Lander, Nier

**INVESTIGATION NAME:** Physical Properties Investigation

**NSDC 19- 75-DSCI-01**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Planetary physics

**PERSONNEL**

TL - A. O. C. Nier
TM - M. A. Mclloyd
TM - W. D. Hinson
TM - H. F. Specker
TM - A. Seiff

**BRIEF DESCRIPTION**

The Viking entry-atmospheric composition experiment was designed to provide atmospheric composition, both neutral and charged species, needed to define the present physical, chemical state of the martian atmosphere. The signals in an opening in the aeroshell with its electron-impact ion collector were released. The resulting data were used to determine the martian atmosphere's mass, density, structure, and surface properties. In addition, the data were used to detect the solar corona.

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**INVESTIGATION NAME:** Atmospheric Structure

**NSDC 19- 75-DSCI-02**

**INVESTIGATIVE PROGRAM**

**CODE SL**

**INVESTIGATION DISCIPLINE(S)**

Planetary atmosphere

**PERSONNEL**

TL - A. O. C. Nier
TM - M. A. Mclloyd
TM - W. D. Hinson
TM - H. F. Specker
TM - A. Seiff

**BRIEF DESCRIPTION**

This experiment was designed to determine the physical properties of the martian surface and environment at the landing site. Primarily required to meet other mission objectives, particularly, it is needed to determine such properties as bulk density, bearing strength, angle of repose, cohesion, internal friction, particle characteristics, eddy transportability, topography, and certain environmental properties such as wind, temperature, solar flux levels. Maximum use was made of hard rows and instruments intended for other applications such as the lander's only passive devices, such as microphones and landing leg strokages. Were added for this experiment.
INVESTIGATION NAME: X-RAY FLUORESCENCE SPECTROMETER

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETOLOGY

PERSONNEL
TL - P. TOULMIN, 3RD US GEOLOGICAL SURVEY
TM - R.A. DRAKE POMONA COLLEGE
TN - H. R. RUSSELL OF MEXICO
TM - H. CLARK MARTIN-MARIETTA AEROSP

BRIEF DESCRIPTION
This experiment utilized an energy-dispersive 3-ray fluorescence spectrometer in which four sealed, Ge-filled proportional counters detected X-rays emitted from samples of the Martian surface materials brought back by X-rays from radioisotope sources (iodine-125 and caesium-137). The output of the proportional counters was subjected to pulse-height analysis by an on-board step-scanning single-channel analyser with adjustable counting periods. This instrument was located inside the lander body, and samples were delivered to it by the lander surface sampler. Calibration standards were an integral part of the equipment. Reconstructions of the gamma field surface composition with accuracies ranging from a few per cent for major elements, depending upon the element in question.

----------- VIKING 2 ORBITER ------------------

SPACECRAFT COMMON NAME: VIKING 2 ORBITER
ALTERNATE NAMES: PL-733A, VIKING-A

LAUNCH DATE: 09/09/75
WEIGHT: 1092 KG
LAUNCH SITE: CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE: TITAN

SPONSORING COUNTRY/AGENCY
UNITED STATES: NASA-855

ORBIT PARAMETERS
ORBIT TYPE: MARSECENTRIC
EPOCH DATE: 08/07/76
PERIAPSIS: 1500 KM
APOAPSIS: 35,000 KM

PERSONNEL
MC - W. JAKOBOWSKI NASA HEADQUARTERS
SC - G. GOCH NASA HEADQUARTERS
PM - G.z. GROSS NASA-LAC
TL - C. E. GROSS NASA-LAC

BRIEF DESCRIPTION
The VIKING spacecraft consists of an orbiter and a lander, and soft-landed on the surface on September 20th. Before the landing, scientific data on the lander was collected and transmitted to Earth. The spacecraft was a solar-cell-powered satellite stabilized in three axes using an inertial and celestial references. There was a 500-KW power capacity for the orbiter and a 70-MW capacity for the lander. The scientific and photographic analysis instruments weighed approximately 72 KG (155 Lb).

----------- VIKING 2 ORBITER CARR ---

INVESTIGATION NAME: ORBITER IMAGING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL
TL - M.J. KIEFFER CALIF. INST OF TECH
TM - G. MURCH CALIF. INST OF TECH
TM - E. W. MUNCH NASA-JPL
PM - J. R. MILLER NASA-JPL
TL - C.C. CHASE JR SANTA BARBARA RES CTR

BRIEF DESCRIPTION
The purpose of the thermal mapping experiment was to obtain temperatures of areas on the surface and of the atmosphere of Mars with an infrared thermal mapper instrument. It also measured the amount of sunlight reflected by the planet. The instrument was calibrated using an onboard computer. The instrument was capable of measuring differences of 1 degree C throughout an expected temperature range of minus 150 to plus 150 degrees C. The instrument was 20 X 25 X 30 cm and had a minimum spatial resolution of 60 cm on the surface.

----------- VIKING 2 ORBITER DAV -------------

INVESTIGATION NAME: IN SPECTROMETER - WATER VAPOR MAPPING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL
TL - G. KIEFFER NASA-JPL
TM - E. W. MUNCH NASA-JPL
PM - G. MURCH NASA-JPL
TL - C.C. CHASE JR SANTA BARBARA RES CTR

BRIEF DESCRIPTION
The purpose of the thermal mapping experiment was to determine the spatial and temporal 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 study the dynamic characteristics of the Martian atmosphere. The instrument was capable of measuring differences of 1 degree C throughout an expected temperature range of minus 150 to plus 150 degrees C. The instrument was 20 X 25 X 30 cm and had a minimum spatial resolution of 60 cm on the surface.

----------- VIKING 2 ORBITER SIE ---------------

INVESTIGATION NAME: IN SPECTROMETER -- THERMAL MAPPING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL
TL - M. J. KIEFFER NASA-JPL
TM - E. W. MUNCH NASA-JPL
PM - G. M. MILLER NASA-JPL
TL - C. C. CHASE JR SANTA BARBARA RES CTR

BRIEF DESCRIPTION
The purpose of the thermal mapping experiment was to obtain temperatures of areas on the surface and of the atmosphere of Mars with an infrared thermal mapper instrument. It also measured the amount of sunlight reflected by the planet. The instrument was calibrated using an onboard computer. The instrument was capable of measuring differences of 1 degree C throughout an expected temperature range of minus 150 to plus 150 degrees C. The instrument was 20 X 25 X 30 cm and had a minimum spatial resolution of 60 cm on the surface.

----------- VIKING 2 ORBITER SIE ---------------

INVESTIGATION NAME: IN SPECTROMETER -- THERMAL MAPPING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL
TL - M. J. KIEFFER NASA-JPL
TM - E. W. MUNCH NASA-JPL
PM - G. M. MILLER NASA-JPL
TL - C. C. CHASE JR SANTA BARBARA RES CTR

BRIEF DESCRIPTION
The purpose of the thermal mapping experiment was to obtain temperatures of areas on the surface and of the atmosphere of Mars with an infrared thermal mapper instrument. It also measured the amount of sunlight reflected by the planet. The instrument was calibrated using an onboard computer. The instrument was capable of measuring differences of 1 degree C throughout an expected temperature range of minus 150 to plus 150 degrees C. The instrument was 20 X 25 X 30 cm and had a minimum spatial resolution of 60 cm on the surface.

----------- VIKING 2 ORBITER SIE ---------------

INVESTIGATION NAME: IN SPECTROMETER -- THERMAL MAPPING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL
TL - M. J. KIEFFER NASA-JPL
TM - E. W. MUNCH NASA-JPL
PM - G. M. MILLER NASA-JPL
TL - C. C. CHASE JR SANTA BARBARA RES CTR

BRIEF DESCRIPTION
The purpose of the thermal mapping experiment was to obtain temperatures of areas on the surface and of the atmosphere of Mars with an infrared thermal mapper instrument. It also measured the amount of sunlight reflected by the planet. The instrument was calibrated using an onboard computer. The instrument was capable of measuring differences of 1 degree C throughout an expected temperature range of minus 150 to plus 150 degrees C. The instrument was 20 X 25 X 30 cm and had a minimum spatial resolution of 60 cm on the surface.
SATELLITES OF EACH PLANET. (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN AND THE EXPLANATION OF THE INTERPLANETARY (ONE INTERSTELLAR) MEDIUM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES ARE ATTAINED BY USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING (i) SOFT X-RAY PHOTON DETECTORS, AN INFRARED INTERFEROMETER AND SATELLITE UV SPECTROMETER, (ii) MAGNETIC DETECTORS, (iii) RADIO SPECTROMETER, (iv) CHARGED-PARTICLE DETECTORS, (v) PLASMA DETECTORS, (vi) PLASMA WAVES, AND A SLOW-FREQUENCY RADIO RECEIVER.

Voyager 1. BRIDGE

INVESTIGATION NAME: PLASMA SPECTROMETERS

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIVES DISCIPLINE(S): PARTICLES AND FIELDS

SPACE PLASMAS

PERSONNEL

PI: A.L. GRIFFITH
01: J.A. SELVER
01: J.W. GINSK
01: S. OLDRIT
01: B. CRUIKSHANK
01: J.L. WINNIGL
01: S.M. HILL
01: J.A. FUNKHAUSEN
01: N.A. MUSHER

DIRECTIONS

THE PLASMA INVESTIGATION MAKES USE OF TWO PARABOLIC ARRAY DETECTORS, ONE POINTED ALONG THE SOLAR-PARTICLE LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE PARABOLIC ARRAY DETECTORS PROVIDE DETAILED DATA ON THE PLASMA DENSITY AND TEMPORAL VARIATION. DATA FROM THE TWO DETECTORS ARE USED TO DETERMINE THE VELOCITY, DIRECTION, AND ENERGY OF THE CHARGED PARTICLES. THE OBTAINED ACCURATE VALUES OF THEIR VELOCITY, DIRECTION, AND ENERGY ARE USED TO STUDY THE PROPERTIES OF THE PLASMA. THE PARABOLIC ARRAY DETECTORS ARE EMPLOYED IN THE EXPORT OR SOLAR DIRECTION WITH A TASC ELEFECTIVE EQUAL TO 2.5, 5, and 1.0, PERCENT, ALLOWING THE DETECTION OF CHARGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLIGHT. THE SIDE-LOOKING PARABOLIC ARRAY DETECTORS MEASURE ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV.

INVESTIGATION NAME: ULTRAVIOLET SPECTROSCOPY

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIONS DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

PI: R.E. BRIDGE
01: T.A. COMER
01: M.H. KINSEY
01: R.J. CROFT
01: T.P. LEVY
01: S.M. GRIFFITH
01: B. CRUIKSHANK
01: J.A. FUNKHAUSEN
01: N.A. MUSHER

DIRECTIONS

THE UV SPECTROMETER IS DESIGNED TO MEASURE ATMOSPHERIC PROPERTIES AND MEASURABLE RADIATION IN THE WAVELENGTH RANGE FROM 200 TO 1000 A. TWO MODES OF INSTRUMENT OPERATION ARE PLANNED. IN ONE MODE, THE DETECTOR IS SENSITIVE TO SOLAR ATMOSPHERIC RADIATION MEASURED. IN THE OTHER MODE, THE DETECTOR IS SENSITIVE TO SOLAR ARMOR. THE SPECTRUM IS USED TO MEASURE THE ATMOSPHERE BETWEEN THE SOLARSTACK AND THE INSTRUMENT TO IDENTIFY THE ATOMS AS WELL AS TO MEASURE THEIR ABUNDANCE IN THE LINE OF SIGHT TO THE SUN. IN ADDITION, THE SPECTRUM IS USED TO IDENTIFY THE ATOMS AS WELL AS TO MEASURE THEIR ABUNDANCE IN THE LINE OF SIGHT TO THE SUN. THE SPECTRUM IS USED TO IDENTIFY THE ATOMS AS WELL AS TO MEASURE THEIR ABUNDANCE IN THE LINE OF SIGHT TO THE SUN.

Voyager 1. FIELD

INVESTIGATION NAME: RADIO SCIENCE TEAM

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATIONS DISCIPLINE(S): ATMOSPHERIC PHYSICS

IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI: T.A. HANDEL
01: T.A. CROFT
01: R.L. FLETCHER
01: R.G. LEVY

DIRECTIONS

VOYAGER 1: LILLIE

INVESTIGATION NAME: MULTIFILTER PHOTOPOLARIMETER.
2200-7500 Å

INVESTIGATIVE PROGRAM
CODE SL
INVESTIGATION DISCIPLINE(S)
INTERPLANETARY ATMOSPHERES

PERSONNEL
PI - C.J. LILLIE
01 - G.M. HENDRICKSON
01 - H. HOOD
01 - J.E. HANSEN
01 - R.A. COFFEE
U OF COLORADO
U OF COLORADO
U OF CALIFORNIA
U OF ARIZONA
NASA-GSIS

BRIEF DESCRIPTION
THE INVESTIGATION CONSISTS OF AN R-J, T1.1 TELESCOPE THAT CAN SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR ONE OF NINE BANDS IN THE 2200-7500 Å SPECIAL REGION. DATA ON THE SPECTRAL POLARIZATION AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, AS WELL AS INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH THE SATELLITE RINGS AND INFORMATION ON ATMOSPHERIC SCATTERING PROPERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE RESOLUTION FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

VOYAGER 1: ESS

INVESTIGATION NAME: TRIAXIAL FLUXGATE MAGNETOMETERS

INVESTIGATIVE PROGRAM
CODE SL
INVESTIGATION DISCIPLINE(S)
INTERPLANETARY MAGNETIC FIELDS

PERSONNEL
PI - N.F. ESS
01 - M.H. APPEL
01 - K.W. BÉHANNON
01 - L.P. BRUNO
01 - R.P. LEPPING
01 - F.M. NEUBAUER
NASA-GSFC
NASA-GSFC
NASA-GSFC
NASA-GSFC
NASA-GSFC
URANUSCHWING TECH U

BRIEF DESCRIPTION
THE INVESTIGATION 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 DENSITY WITHIN THE INTERPLANETARY FIELD. DATA ON THE INTERPLANETARY FIELDS IS OBTAINED USING TWO HIGH-FIELD AND LOW-FIELD MAGNETOMETERS. THE RANGE OF MEASUREMENTS IS FROM 0.01 GAUSS TO 20 GAUSS.

VOYAGER 1: SCARP

INVESTIGATION NAME: PLASMA WAVE

INVESTIGATIVE PROGRAM
CODE SL
INVESTIGATION DISCIPLINE(S)
PLASMA PHYSICS

PERSONNEL
PI - F.J. SCARP
01 - M.S. WIGGERT
10 U SYSTEMS GROUP
U OF IOWA

BRIEF DESCRIPTION
THE INVESTIGATION PROVIDES CONTINUOUS SPECTRAL-INDEPENDENT MEASUREMENTS OF ELECTRON DENSITY PROFILES AT JUPITER AND SATURN. IT ALSO GIVES BASIC INFORMATION ON LOCAL WAVE-FRONT VELOCITY DETERMINED FROM THE CARRY-OVER COMPARATIVE STUDIES OF THE PHYSICS OF THE JUPITER AND SATURN MAGNETOSPHERES. THE INSTRUMENT CONSISTS OF A MATCHED-CARRIER RECEIVER WITH ASSOCIATED ELECTRONICS. THE FREQUENCY RANGE FOR THIS INSTRUMENT IS FROM 10 TO 200 KEI. THIS INSTRUMENT SUGGESTS THE 12-M ANTENNA DEVELOPED FOR THE PLANETARY RADIO ANTHROPES INVESTIGATIONS.

VOYAGER 1: SMITH

INVESTIGATION NAME: TV PHOTOGRAPHY

INVESTIGATIVE PROGRAM
CODE SL
INVESTIGATION DISCIPLINE(S)
METEOROLOGY

PERSONNEL
PI - W.A. SMITH
01 - L.A. ROBERSON
01 - G.A. BRIDGES
01 - J.B. COOKE
01 - R.A. KAYES
01 - T.L. HUNT
01 - P.R. SACHS
01 - C. SUGDEN
NASA-JPL
NASA-JPL
NASA-JPL
NASA-JPL
NASA-JPL
NASA-JPL
NASA-JPL
NASA-JPL
NASA-GSFC
NASA-GSFC
US GEOLOGICAL SURVEY

BRIEF DESCRIPTION
THE TV PHOTOGRAPHIC EXPERIMENT USES A TWO-CAMERA SYSTEM, BASED ON A 125-M MILLION PIXEL CMOS CAMERA, WHICH IS DESIGNED TO PHOTOGRAPH THE鄰RE ORBITAL CIRCUIT AND THE SEE-OUT ORBITAL CIRCUIT. THE OBJECTIVES ARE TO SEARCH FOR NEW COUPLING, ASTEROIDS, AND TARGETS OF OPPORTUNITY.
PERSONNEL
PL - J.W. WARWICK U OF COLORADO
01 - J.W. WARWICK U OF COLORADO
O1 - 1.D. CASH U OF FLORIDA
01 - R.J. HANDLER MASS INST OF TECH
01 - S. STASILIN MGH OBS
01 - T. STAROCOTT NASA-JPL
01 - T.S. HAYES NASA-JPL
01 - T. LENNART NASA-JPL
01 - W. BROHM Jr. NASA-JPL
01 - S. GUELLIS NASA-JPL
01 - R.C. GUELLIS NASA-JPL

DUTY DESCRIPTION

THE PROJECT CONSISTS OF A SWEET-FREQUENCY RADIO RECEIVER OPERATING IN BOTH POLARIZATION STATES BETWEEN 20 K AND 40.5 KHZ. THE SIGNAL IS RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAS, SITING AT A DISTANCE FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES YIELDS DATA CONCERNING THE PROPERTIES OF THE SOLAR SYSTEM'S ATMOSPHERES AND THE DIFFUSIVE RADIO EMISSIONS FROM THESE PLANETARY REGIONS.

*************** VYAGER 2************************

SPACECRAFT COMMON NAME- VYAGER 2
ALTERNATE NAMES- MINERVA JUPITER/SATURN & OUTER PLANETS B MAGNET 770, NSS 711
NSSDC ID- 77-076A
LAUNCH DATE- 08/20/77 WEIGHT- 700 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES LAUNCH VEHICLE- TITAN
SPONSORING COUNTRY/AGENCY- UNITED STATES, NASA-065

INITIAL ORBIT PARAMETERS

UNLITED STATIONS Type- JUPITER-flyby

DUTY DESCRIPTION


INVESTIGATION NAME- PLASMA SPECTROMETERS

INVESTIGATION NAME- ULTRAVIOLET SPECTROSCOPY

INVESTIGATION NAME- UHARA SCIENCE TEAM

INVESTIGATION NAME- RADIO SCIENCE TEAM

INVESTIGATION NAME- PLASMA SCIENCE TEAM

INVESTIGATION NAME- PLANETARY ATMOSPHERES

INVESTIGATION NAME- INFRARED SPECTROSCOPY AND RADIOAETRY
**Brief Description**

The investigation is designed to investigate the magnetic fields of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. The instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Multi-Filter Photopolarimeter

**INSSDC ID**

77-076A-13

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.A. Sagan

CO-O: C.M. Conner, U. of Arizona

CO-I: R.A. Gurnett, U. of Iowa

**Brief Description**

This investigation is designed to study the structure and dynamics of the jovian magnetosphere, including the interaction of the solar wind with the magnetosphere, the role of energetic particles in shaping the magnetosphere, and the effects of the magnetosphere on the jovian ionosphere. The experiment is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Triaxial Fluxgate Magnetometers

**INSSDC ID**

77-076A-01

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.W. Emery

CO-O: R.P. Lepping, NASA-GSFC

CO-I: P.B. Keating, NASA-GSFC

**Brief Description**

This investigation is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Triaxial Fluxgate Magnetometers

**INSSDC ID**

77-076A-01

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.W. Emery

CO-O: R.P. Lepping, NASA-GSFC

CO-I: P.B. Keating, NASA-GSFC

**Brief Description**

This investigation is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Multi-Filter Photopolarimeter

**INSSDC ID**

77-076A-11

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.A. Sagan

CO-O: C.M. Conner, U. of Arizona

CO-I: R.A. Gurnett, U. of Iowa

**Brief Description**

This investigation is designed to study the structure and dynamics of the jovian magnetosphere, including the interaction of the solar wind with the magnetosphere, the role of energetic particles in shaping the magnetosphere, and the effects of the magnetosphere on the jovian ionosphere. The experiment is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Triaxial Fluxgate Magnetometers

**INSSDC ID**

77-076A-15

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.W. Emery

CO-O: R.P. Lepping, NASA-GSFC

CO-I: P.B. Keating, NASA-GSFC

**Brief Description**

This investigation is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.

**Investigation Name**

Triaxial Fluxgate Magnetometers

**INSSDC ID**

77-076A-01

**Investigation Discipline(s)**

Magnetospheric Physics

**Personnel**

PI: J.W. Emery

CO-O: R.P. Lepping, NASA-GSFC

CO-I: P.B. Keating, NASA-GSFC

**Brief Description**

This investigation is designed to study the magnetic field of Jupiter and Saturn, the solar wind interaction with the interplanetary medium, and the properties of charged particles in the interplanetary medium. This detector is able to detect low-energy particles in the interplanetary medium. The energy range of the telescope is from 10 Hz to 56 kHz. This instrument shares the total antennas developed for the planetary science instrument.
**INVESTIGATION NAME: HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE**  
**HSID IS: 77-076A-08**

**INVESTIGATION PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S):**
- COSMIC RAYS
- MAGNETOSPHERIC PHYSICS

**PERSONNEL**
- PI - R.E. VOGT
- OE - J.W. JORDIPI
- OE - E.C. STONE
- OE - T.G. MCDONALD
- OE - R.J. TEGARDEN
- OE - J.H. TRAETH
- OE - W.N. WEBBER

**BRIEF DESCRIPTION**

This investigation studies the origin and acceleration process, life history, and dynamic contribution of interstellar cosmic rays, the nucleosynthesis of elements in cosmic-ray sources, the behavior of cosmic rays in the interplanetary medium, and the trapped planetary energetic particle environment. The instrumentation includes a high-energy telescope system (HETS) and a low-energy telescope system (LETS). The HETS covers an energy range between 6 and 500 MeV/nuclide for nuclei ranging from 1 through 30. In addition, electrons in the energy range between 3 and 100 MeV/nuclide are measured by this telescope and an electron telescope (ET).

**INVESTIGATION NAME: PLANETARY RADIO ASTRONOMY**  
**HSID IS: 77-076A-10**

**INVESTIGATION PROGRAM CODE SL**

**INVESTIGATION DISCIPLINE(S):**
- MAGNETOSPHERIC PHYSICS
- SPACE PLASMAS

**PERSONNEL**
- PI - J.W. WARWICK
- OE - W.S. BAUMER, JR.
- OE - S. GULKIS
- OE - H.J. HARRIS
- OE - T. LEONARD
- OE - H.J. STEINER
- OE - A. BOISESHOT
- OE - T.D. CARR
- OE - F.T. HANDSCH
- OE - J.R. ALEXANDER, JR.
- OE - R. PHILLIPS

**BRIEF DESCRIPTION**

This experiment consists of a sweep-frequency radio receiver operating in both polarization states between 30 kHz and 40.5 MHz. The signal is received by a pair of orthogonal 10-m monopole antennas. The physics of magnetospheric plasma resonances and nonthermal radio emissions from these planetary regions is studied by investigation of the radio emission signals from Jupiter and Saturn over this range of frequencies.
3

DESCRIPTIONS OF PLANNED SPACECRAFT
AND EXPERIMENTS
3. DESCRIPTIONS OF PLANNED SPACECRAFT AND EXPERIMENTS

This section contains descriptions of spacecraft and experiments pertinent to this report that were planned as of June 30, 1977, and for which NSSDC has at least minimal documentation. A few changes subsequent to this date may appear, depending on time availability. The descriptions are sorted first by spacecraft common name. Within each spacecraft listing, experiments are ordered by the principal investigator's or team leader's last name. Explorer spacecraft prelaunch generic names are used as common names; e.g., IMP-H instead of Explorer 47. If the common name, as used by NSSDC, is not known, it can be found by referring to an alternate name found in the Index of Active and Planned Spacecraft and Experiments (Section 4).

Each spacecraft or experiment entry in this section is composed of two parts -- a heading and a brief description. The headings list characteristics of satellites and experiments. Definitions of many of the terms used in this section are included in Appendix C.

3.1 Contents of Spacecraft Entries

The heading for each spacecraft description in this section includes a set of initial or planned orbit parameters. These parameters consist of orbit type, orbit period, apoapsis, periapsis, and inclination for the spacecraft. No orbit parameters are listed for lander and flyby missions. In addition, the heading contains the spacecraft weight, launch date, launch site, launch vehicle, spacecraft common and alternate names, NSSDC ID code, sponsoring country and agency, and spacecraft personnel -- project manager (PM), project scientist (PS), program manager (MG), program scientist (SC), technical director (TD), and program director (PD). The spacecraft brief description is immediately below each heading. This terminology is standard for NASA missions; the equivalent functions for the missions of other countries and/or agencies have been given the same position names.

3.2 Contents of Experiment Entries

Each experiment entry heading includes the experiment name, the NSSDC ID code, the investigative program, the investigation discipline, and the name and affiliation or location of the principal investigator (PI) or team leader (TL) for the experiment as well as other investigators (OI) or team members (TM) associated with the experiment. The experiment brief description is immediately below each heading.
3.3 Planned Spacecraft and Experiment Descriptions

A spacecraft is included in the planned section of this report if it is an approved mission or a proposed mission where the experiments or investigations have already been selected.
ASTRO-A

**Spacecraft Common Name: ASTRO-A**

**Alternate Names:**

NSSDC ID: ASTRO-A

**Launch Date:** 01/01/81

**Launch Site:** Kagoshima, Japan

**Launch Vehicle:** M-35

**Sponsoring Country/Agency:** ISAS

**Planned Orbit Parameters**

- **Orbit Type:** Geocentric
- **Perihelion:** 94.2 min
- **Inclination:** 31. deg
- **Apopapsis:** 350 km

**Personnel**

- **PI:** H. NISHI
- **U of Tokyo**

**Brief Description**

This experiment uses a Bragg spectrometer to study the spectrum of X-ray emission lines from highly ionized iron in solar flares. The spectrometer covers the range of 1.5-2.0 keV. Wave length scanning is achieved by spacecraft rotation with the spin-axis offset slightly from the Sun. The time resolution is 0.5 sec. **--- ASTRO-A, TAKAKURA---**

**Investigation Name:** Solar flare X-rays in range of 10-60 keV using rotating collimator imaging

**Investigation Discipline(s):** Solar Physics

**Personnel**

- **PI:** H. TAKAKURA
- **U of Tokyo**

**Brief Description**

The experiment uses rotating modulation collimators to image solar flare X-rays in the energy range of 10 to 60 keV. The time resolution is 6 sec. **--- ASTRO-A, TAKECHI---**

**Investigation Name:** Electron flux above 100 keV particle detector monitor

**Investigation Discipline(s):** Solar Physics

**Personnel**

- **PI:** H. TAKECHI
- **Inst Phys & Chem Res**

**Brief Description**

This experiment uses a particle detector to monitor solar electron flux above 100 keV.

**EXOS-A**

**Spacecraft Common Name:** EXOS-A

**Alternate Names:** EXOSPHERIC SAT. A

NSSDC ID: EXOS-A

**Launch Date:** 01/01/78

**Launch Site:** Kagoshima, Japan

**Launch Vehicle:** M-35

**Sponsoring Country/Agency:** ISAS

**Planned Orbit Parameters**

- **Orbit Type:** Geocentric
- **Perihelion:** 350 km
- **Inclination:** 65 deg
- **Apopapsis:** 4000 km

**Weight:** 95 kg

**Personnel**

- **PI:** H. NISHI
- **U of Tokyo**

**Brief Description**

This experiment measures gamma rays from solar flares in the energy range of 0.4-7 keV. **--- ASTRO-A, MATSUOKA---**

**Investigation Name:** Solar flare gamma-ray detector in 0.4-7 keV range

**Investigation Discipline(s):** Solar Physics

**Personnel**

- **PI:** H. MATSUOKA
- **U of Tokyo**

**Brief Description**

This experiment measures gamma rays from solar flares in the energy range of 0.4-7 keV. **--- ASTRO-A, NISHI---**

**Investigation Name:** Time profile and spectra of X-ray flares

**Investigation Discipline(s):** Solar Physics

**Personnel**

- **PI:** H. NISHI
- **U of Tokyo**

**Brief Description**

This experiment uses X-ray monitors to record time profiles and spectra of solar X-ray flares in the energy range of 2-60 keV. **--- ASTRO-A, NISHI---**

**Investigation Name:** Solar flare X-ray drag spectroscopy in 1.5-2.0 A range

**Investigation Discipline(s):** Solar Physics

**Personnel**

- **PI:** H. NISHI
- **U of Tokyo**

**Brief Description**

This satellite is part of Japan's contribution to the international magnetospheric study. The objectives are to study the polar aurora and ionosphere. The payload consists of an auroral UV television camera and plasma probe designed to study the electron and ion density and temperature and ion composition. There are also energetic particle detectors designed to study the flux of electrons in the ionosphere, electrostatic waves, VLF emissions, geocoronal emissions, and UV auroral emissions. **--- EXOS-A, KANEDA---**

**Investigation Name:** UV auroral TV imaging

**Investigation Discipline(s):** Atmospheric Physics

**Personnel**

- **PI:** E. KANEDA
- **U of Tokyo**

**Brief Description**

This experiment observes UV auroral emissions of the polar ionosphere by using television.
INVESTIGATION NAME- ENERGETIC PARTICLE DETECTORS

INVESTIGATIVE PROGRAM NSDC 10- EXOS-A -02 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS MAGNETOSPHERIC PHYSICS

PERSONNEL PI - T. NUKAI U OF TOKYO

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.

---

BRIEF DESCRIPTION

INVESTIGATIONAL NAME- UV SLOW SPECTROPHOTOMETER

INVESTIGATIVE PROGRAM NSDC 10- EXOS-A -05 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) ASTRONOMY PLANETARY ATMOSPHERES

PERSONNEL PI - T. YOSHINO U OF TOKYO

BRIEF DESCRIPTION ULTRAVIOLET GLOW FROM THE THERMOSPHERE, MAGNETOSPHERE, AND INTERPLANETARY SPACE ARE OBSERVED WITH A SPECTROPHOTOMETER.

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INVESTIGATION NAME- IONOSPHERIC PHONES

INVESTIGATIVE PROGRAM NSDC 10- EXOS-A -01 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) IONOSPHERES

PERSONNEL PI - K. DYMEL U OF TOKYO 01 - T. TOHOKU U OF TOKYO

BRIEF DESCRIPTION IONOSPHERIC PHONES OBSERVE ELECTRON DENSITY AND TEMPERATURE IN ADDITION TO ION DENSITY, COMPOSITION, AND TEMPERATURE.

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INVESTIGATION NAME- PLASMA WAVE DETECTOR

INVESTIGATIVE PROGRAM NSDC 10- EXOS-A -04 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL PI - T. TOSHINO U OF ELECTRO-COMMUN 01 - T. NAKAMURA U OF TOKYO

BRIEF DESCRIPTION THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTROSTATIC WAVES AND ULF EMISSIONS EXCITED IN THE POLAR REGIONS.

---

SPACECRAFT COMMON NAME- EXOS-B

ALTERNATE NAMES- EWSB-1, ISAS SATELLITE

INVESTIGATIVE PROGRAM NSDC 10- EXOS-B INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS SPACE PLASMAS

PERSONNEL PI - M. KAWASHIMA U OF TOKYO 01 - T. MUKAI U OF TOKYO 01 - T. AKASAKA U OF TOKYO 01 - M. EJIRI U OF TOKYO 01 - T. KUNO U OF TOKYO 01 - T. KINUNA U OF TOKYO

BRIEF DESCRIPTION THE ELECTRON AND PROTON ENERGY SPECTRUM IS MEASURED IN AN ENERGY RANGE FROM 50 EV TO 20 KEV. THE RESOLUTION IS CONTROLLED. THE FLUX STRUCTURE, ENERGY VARIATION OF THE ENERGY SPECTRUM IS DETECTED AS A CooperATING OPERATION WITH THE SIMULATED PLASMA-WAVE EXPERIMENT.

---

INVESTIGATION NAME- WAVE-PARTICLE INTERACTIONS

INVESTIGATIVE PROGRAM NSDC 10- EXOS-B -07 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS SPACE PLASMAS

PERSONNEL PI - M. KAWASHIMA U OF TOKYO 01 - M. EJIRI U OF TOKYO

BRIEF DESCRIPTION THE ELECTRON AND PROTON ENERGY SPECTRUM IS MEASURED IN AN ENERGY RANGE FROM 3 TO 200 EV INTO THE SPACE PLASMA. THE EXPERIMENT IS DESIGNED FOR THE CONTROLLED GENERATION OF THE WAVE-PARTICLE INTERACTION.

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INVESTIGATION NAME- ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS

INVESTIGATIVE PROGRAM NSDC 10- EXOS-B -03 INVESTIGATIVE PROGRAM SCIENTIFIC SATELLITE

INVESTIGATION DISCIPLINE(S) MAGNETOSPHERIC PHYSICS IONOSPHERES AND RADIO PHYSICS

PERSONNEL PI - T. KIMURA KYOTO U 01 - M. HASHIMOTO KYOTO U

BRIEF DESCRIPTION THE PHASE SHIFT OF THE ULF WAVES TRANSMITTED FROM THE EARTH'S STATION TO DETECTED FOR MEASUREMENT OF THE ELECTRON DENSITY AND TEMPERATURE, PROBE FORMATION AND MOVEMENT IN THE PLASMAPHERE IS ALSO MONITORED BY THIS EXPERIMENT.
INVESTIGATION NAME- IMPEDANCE AND ELECTRIC FIELD

NSSDC ID- EXOS-B -04

INVESTIGATIVE PROGRAM

BIOENGINEERING

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI - H. OYA
01 - T. HANADA
01 - S. MIYAKE
01 - A. MORIKA
01 - K. ASERO

U OF TOKYO
U OF TOKYO
ELECO-COmmunications U
U OF TOKYO
ELECO-COMMUNICATIONS U

BRIEF DESCRIPTION

THE IMPEDANCE OF A DIPOLE ANTENNA IS MEASURED IN A WIDE FREQUENCY RANGE FROM 3 KHz TO 25 MHz TO OBTAIN AN ACCURATE DETERMINATION OF PLASMA DENSITY. THE ELECTRIC FIELD IS MEASURED BY A LONG DIPOLE ANTENNA (120 M TIP TO TIP) IN A FREQUENCY RANGE FROM DC TO 500 Hz.

----

INVESTIGATION NAME- MAGNETIC DYNAMIC PLASMA PROBE

NSSDC ID- EXOS-B -01

INVESTIGATIVE PROGRAM

BIOENGINEERING

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI - H. OYA
01 - T. HANADA
01 - S. MIYAKE
01 - A. MORIKA
01 - K. ASERO

U OF TOKYO
U OF TOKYO
ELECO-COmmunications U
U OF TOKYO
ELECO-COMMUNICATIONS U

BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO EXCITE PLASMA WAVES BY TRANSMITTING 200-WATT SIGNALS FROM A 120 M TIP TO TIP DIPOLAR ANTENNAS IN A FREQUENCY RANGE FROM 1 KHz TO 20 MHz. THE IMPEDENCES CAN BE CHANGED IN FIXED FREQUENCY BANDS TO INVESTIGATE THE EFFECTS OF DIFFERENT SPECTRAL DENSITIES AND SPECTRUMS. INVESTIGATION OF THE WAVE-WAVE INTERACTIONS AND NONLINEAR WAVE-PARTICLE INTERACTIONS IS ONE OF THE PRINCIPAL PURPOSES OF THIS EXPERIMENT.

----

INVESTIGATION NAME- NATURAL PLASMA WAVES

NSSDC ID- EXOS-B -02

INVESTIGATIVE PROGRAM

BIOENGINEERING

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI - H. OYA
01 - T. HANADA
01 - S. MIYAKE
01 - A. MORIKA
01 - K. ASERO

U OF TOKYO
U OF TOKYO
ELECO-COMMUNICATIONS U
U OF TOKYO
ELECO-COMMUNICATIONS U

BRIEF DESCRIPTION

THE NATURAL PLASMA WAVES ARE MEASURED IN THREE FREQUENCY BANDS, 5 TO 30 KHz, 50 TO 300 KHz, AND 300 KHz TO 10 MHz, RESPECTIVELY, USING A 120 M TIP TO TIP DIPOLE AND LOOP ANTENNAS. THIS SYSTEM IS ALSO USED FOR RADIO ASTRONOMICAL PURPOSES.

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INVESTIGATION NAME- ENERGETIC PARTICLES

NSSDC ID- EXOS-C -04

INVESTIGATIVE PROGRAM

BIOENGINEERING

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

IONOSPHERES AND RADIO PHYSICS

PERSONNEL

PI - H. OYA
01 - T. HANADA
01 - S. MIYAKE
01 - A. MORIKA
01 - K. ASERO

U OF TOKYO
U OF TOKYO
ELECO-COMMUNICATIONS U
U OF TOKYO
ELECO-COMMUNICATIONS U

BRIEF DESCRIPTION

THE PURPOSE OF THIS SPACECRAFT IS TO MONITOR CHARGED PARTICLES AND X-RAY, GAMMA-RAY, UV AND IN EMISSION FROM THE SUN AND GALAXIES. THE SPACECRAFT IS PUT INTO A BINARY ORBIT OF 500 KM ALTITUDE AND IS CAPABLE OF PRECISE ATTITUDE CONTROL. FIVE DETECTOR SYSTEMS ARE USED TO STUDY THE OBJECTIVES OF THIS MISSION. X-RAY TELESCOPES, A GAMMA-RAY TELESCOPE, A UV TELESCOPE, AN X-RAY TELESCOPE, AND ENERGETIC PARTICLE DETECTORS.

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GOES-C NESS INVESTIGATION NAME - METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM (APPROXIMATELY GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING). THE TWO-CHANNEL INSTRUMENT IS DESIGNED TO PROVIDE TEMPERATURE MEASUREMENTS FROM REMOTELY LOCATED EARTH-BASED PLATFORMS AND TO TRANSFER DATA FROM THE SATELLITE TO THE EARTH THROUGH A COMMUNICATIONS SYSTEM TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA.

GOES-C NESS STAFF

PERSONNEL

PI - W.L. PICKARD
PS - W.E. SHEEN
NASA-GSFC

BRIEF DESCRIPTION

THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SATELLITE CARRIES (1) A HIGH-QUALITY DAY/NIGHT CLOUD COVER DATA SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT IS DESIGNED TO PROVIDE TEMPERATURE MEASUREMENTS FROM REMOTELY LOCATED EARTH-BASED PLATFORMS AND TO TRANSFER DATA FROM THE SATELLITE TO THE EARTH THROUGH A COMMUNICATIONS SYSTEM TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA.

INVESTIGATION DISCIPLINES

METEOROLOGY

INVESTIGATIVE PROGRAM

OPERATIONAL ENVIRONMENT, MONITORING

INVESTIGATIVE DISCIPLINE(S)

SOLAR PHYSICS

PERSONNEL

PI - D.J. WILLIAMS
NOAA-NESS

BRIEF DESCRIPTION

THE NAVSTAR GPS SYSTEM IS AN EXPERIMENTAL COMMUNICATIONS AND DATA SATELLITE SYSTEM DESIGNED TO PROVIDE ACCESS TO THE NAVSTAR GPS SATELLITE NETWORK. THE GPS SATELLITE NETWORK PROVIDES A GLOBAL NAVIGATION AND POSITIONING SERVICE TO NAVSTAR GPS RECEIVERS THROUGH THE GPS SPACECRAFT. THE GPS SPACECRAFT IS A GEOSTATIONARY SATELLITE THAT PROVIDES A TIMED HIGH-QUALITY DAY/NIGHT CLOUD COVER DATA SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT IS DESIGNED TO PROVIDE TEMPERATURE MEASUREMENTS FROM REMOTELY LOCATED EARTH-BASED PLATFORMS AND TO TRANSFER DATA FROM THE SATELLITE TO THE EARTH THROUGH A COMMUNICATIONS SYSTEM TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA.
**SPACECRAFT COMMON NAME: GOES-D**

** ALTERNATE NAMES: GOES-D**

**NSSC ID: 006-8**

**LAUNCH DATE: 03/01/79**

**WEIGHT: 660. KG**

**LAUNCH SITE: CANAVERAL, UNITED STATES**

**LAUNCH VEHICLE: DELTA**

**SPONSORING COUNTRY/AGENCY:**

1. NOAA-NESS
2. NASA-GSE
3. NASA-GSC

**PERSONNEL:**

1. PI - R.J. PICARD NASA-GSE
2. PI - N.A. WILLIAMS NASA-NESS

**BRIEF DESCRIPTION:**

**GOES-D** is the fourth in a series of NASA-developed earth-synchronous spacecraft designed to provide high-quality daytime and night-time weather and environmental imagery and data to enhance the National Weather Service's (NWS)' ability to monitor and predict weather patterns and to improve the accuracy of weather forecasts. The spacecraft has a payload of two radiometers and a magnetometer, each consisting of instruments designed to observe different aspects of the Earth's atmosphere and space environment.

**GOES-D** is a ground-based spacecraft designed to operate in a geosynchronous orbit. It is equipped with two high-resolution sensors, the Visible-Infrared Spin Scan Radiometer (VISSR) and the Magnetometer. The VISSR is used to observe the Earth's atmosphere and surface, while the Magnetometer is used to study the Earth's magnetic field and space environment.

**INVESTIGATION NAME:**

**MeteOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM**

**NSSC ID: 006-8 -05**

**INVESTIGATION DISCIPLINE(S):**

1. METEOROLOGY

**PERSONNEL:**

1. PI - N.J. WILLIAMS NOAA-NESS

**BRIEF DESCRIPTION:**

**THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM** is a set of instruments designed to collect and transmit meteorological data from various locations on Earth to ground-based receiving stations. The system is composed of two main components: the remote data collection system and the ground-based data transmission system.

**INVESTIGATION NAME:**

**ENERGETIC PARTICLE MONITOR**

**NSSC ID: 006-8 -02**

**INVESTIGATION DISCIPLINE(S):**

1. SOLAR PHYSICS

**PERSONNEL:**

1. PI - D.J. WILLIAMS NASA-ERL

**BRIEF DESCRIPTION:**

**THE ENERGETIC PARTICLE MONITOR** consists of three detector assemblies, each covering limited regions of the energy spectrum. The detectors are used to measure the characteristics of energetic particles in the solar system and are designed to collect data on particles with energies ranging from 1 to 50 keV.

**INVESTIGATION NAME:**

**SOLAR X-RAY MONITOR**

**NSSC ID: 006-8 -03**

**INVESTIGATION DISCIPLINE(S):**

1. SOLAR PHYSICS

**PERSONNEL:**

1. PI - D.J. WILLIAMS NASA-ERL

**BRIEF DESCRIPTION:**

**THE SOLAR X-RAY MONITOR** consists of four detector assemblies, each designed to measure the soft X-ray energy spectrum of the sun. The detectors are used to study the solar wind and the Earth's magnetosphere.

**INVESTIGATION NAME:**

**MAGNETIC FIELD MONITOR**

**NSSC ID: 006-8 -04**

**INVESTIGATION DISCIPLINE(S):**

1. PARTICLES AND FIELDS

**PERSONNEL:**

1. PI - D.J. WILLIAMS NASA-ERL

**BRIEF DESCRIPTION:**

**THE MAGNETIC FIELD MONITOR** measures the magnetic field of the Earth and provides data on the solar wind and the Earth's magnetosphere.
**GOES-E**

**SPACECRAFT COMMON NAME** - GOES-E  
**ALTERNATE NAMES** - 

**NSSDC ID** - GOES-E  
**LAUNCH DATE** - 04/01/89  
**WEIGHT** - 460 KG  
**LAUNCH SITE** - CAPE CANAVERAL, UNITED STATES  
**LAUNCH VEHICLE** - DELTA

**SPONSORING COUNTRY/AGENCY** - UNITED STATES  
**PLANNED ORBIT PARAMETERS** - 
**ORBIT TYPE** - GEOCENTRIC  
**ORBIT PERIOD** - 14.0 HOURS  
**INCLINATION** - 1.0 DEG  
**APOGEE** - 35784 KM  
**PERIGEE** - 35764 KM

**PERSONNEL**  
**PM** - R.H. PICKARD  
**PM** - NASA-GSFC

**BRIEF DESCRIPTION**  
GOES-E is the fifth in a series of NASA-developed, polar-orbiting, geostationary, earth-synchronous spacecraft. It carries (1) a visible and infrared scan radiometer (VIS-IR) and (2) an energetic particle and field instrument. The spacecraft provides global coverage of the Earth's atmosphere and space environment, including cloud cover, temperature, precipitation, and solar activity. The spacecraft is designed to receive and process meteorological, magnetic, and solar data from a constellation of GOES satellites. The GOES-E satellite will transmit data to Earth stations, where it is processed and distributed for weather forecasting and other applications. The GOES-E spacecraft is intended to replace GOES-D and serve as the primary operational satellite for the GOES System in the Eastern Hemisphere.

**INVESTIGATION NAME** - METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

**NSSDC ID** - GOES-E -03  
**INVESTIGATIVE PROGRAM** - OPERATIONAL ENVIRONMENT, MONITORING

**INVESTIGATION DISCIPLINE(S)** - METEOROLOGY

**PERSONNEL**  
**PI** - D.J. WILLIAMS  
**PI** - NOAA-ERL

**BRIEF DESCRIPTION**  
The GOES-E spacecraft is designed to collect and transmit meteorological data to Earth stations. The spacecraft carries a suite of instruments to monitor atmospheric conditions, including temperature, precipitation, cloud cover, and solar activity. The data collected by GOES-E are used to improve weather forecasting and climate research. The spacecraft is capable of providing continuous coverage of the Earth's surface, allowing for real-time monitoring of weather patterns and anomalies. The data transmitted from GOES-E are processed at ground stations and distributed to operational weather centers for use in making weather predictions and monitoring climate trends.

**INVESTIGATION NAME** - ENERGETIC PARTICLE MONITOR

**NSSDC ID** - GOES-E -02  
**INVESTIGATIVE PROGRAM** - OPERATIONAL ENVIRONMENT, MONITORING

**INVESTIGATION DISCIPLINE(S)** - PARTICLES AND FIELDS

**PERSONNEL**  
**PI** - D.J. WILLIAMS  
**PI** - NOAA-ERL

**BRIEF DESCRIPTION**  
The energetic particle monitor on GOES-E is designed to detect and analyze energetic particles in the Earth's magnetosphere. The instrument provides data on the flux and distribution of energetic particles, which can impact satellite performance and pose risks to astronauts. The energetic particle monitor on GOES-E helps to understand the interactions between the Earth's magnetic field and the solar wind, and it contributes to the study of space weather and its effects on Earth's environment.

**INVESTIGATION NAME** - SOLAR X-RAY MONITOR

**NSSDC ID** - GOES-E -03  
**INVESTIGATIVE PROGRAM** - OPERATIONAL ENVIRONMENT, MONITORING

**INVESTIGATION DISCIPLINE(S)** - SOLAR PHYSICS

**PERSONNEL**  
**PI** - D.J. WILLIAMS  
**PI** - NOAA-ERL

**BRIEF DESCRIPTION**  
The solar X-ray monitor on GOES-E is designed to detect and analyze X-ray emissions from the Sun. The instrument provides data on solar activity, which can affect satellite performance and can impact Earth's environment, including weather and climate patterns. The solar X-ray monitor on GOES-E helps to understand the solar-terrestrial relationship and its implications for space weather and its effects on spacecraft. The data collected by the solar X-ray monitor are used to improve solar forecasts and to monitor solar activity levels.

**INVESTIGATION NAME** - MAGNETIC FIELD MONITOR

**NSSDC ID** - GOES-E -04  
**INVESTIGATIVE PROGRAM** - OPERATIONAL ENVIRONMENT, MONITORING

**INVESTIGATION DISCIPLINE(S)** - MAGNETOSPHERIC PHYSICS

**PERSONNEL**  
**PI** - D.J. WILLIAMS  
**PI** - NOAA-ERL

**BRIEF DESCRIPTION**  
The magnetic field monitor on GOES-E is designed to detect and analyze the magnetic field in the Earth's magnetosphere. The instrument provides data on the strength and orientation of the Earth's magnetic field, which can affect satellite performance and can impact Earth's environment, including weather and climate patterns. The magnetic field monitor on GOES-E helps to understand the interactions between the Earth's magnetic field and the solar wind, and it contributes to the study of space weather and its effects on spacecraft. The data collected by the magnetic field monitor are used to improve solar forecasts and to monitor solar activity levels.
GOES-F IS THE SIXTH IN A SERIES OF NASA-DEVELOPED, GOES-SENSOR BASED SPACECRAFT DESIGNATED GOES-F: FEATURING A SPACECRAFT CARRIES TO PROVIDE BOTH DAY AND NIGHT IMAGERY KNOW AS THE "MIDNIGHT SUN" AT 15 DEGREES TO THE SUN'S LOCATION, THE SPACECRAFT WILL BE ALIGNED NORTH TO SOUTH AT THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT USES BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS COMMUNICATIONS SYSTEM. THE PRIMARY STRUCTURAL MEMBERS ARE A HONEYCOMBED STRUCTURE EXTENDS RADIIULLY FROM THE THRUST TUBE AND IS FIXED TO THE SPACECRAFT'S EQUATOR. THE INFRARED CHANNEL IS 0.55 TO 1.1 MICROMETERS AND THE VISIBL _FIELD OF VIEW IS 23.0-DEGREES, A Cylindrical Optic System Is Used To Provide Both Day And Night Imagery. THE PRIMARY STRUCTURAL MEMBERS ARE A HONEYCOMBED STRUCTURE EXTENDS RADIIULLY FROM THE THRUST TUBE AND IS FIXED TO THE SPACECRAFT'S EQUATOR. THE INFRARED CHANNEL IS 0.55 TO 1.1 MICROMETERS AND THE VISIBL...
GENERALLY AVAILABLE THROUGH THE EROS DATA CENTER, SIOUX FALLS, GROUND SO THAT SELECTED AREAS ARE COVERED WITHIN THE MULTIPLEXED THEM IN A FOR SUITABLE FOR UNIFICATION BY THE HANDBOOK.

MULTIPLIER THAT ACCEPTS THE ANALOG OUTPUT OF EACH DETECTOR AND PERIOD CORRESPONDING TO THE MAXIMUM AND MINIMUM OF THE TEMPERATURE RADIOJETRIC ACCURACY, AND A WIDE ENOUGH SWATH COVERAGE ON THE NSSOC AEM-A.

NSSDC ID- AEM-A
LAUNCH DATE- 04/08/78
WEIGHT- 117. KG
LAUNCH SITE- YANGDENG AFR. UNITED STATES
LAUNCH VEHICLE- SCOUT
SPONSORED COUNTRY/AGENCY: UNITED STATES
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 92.6 MIN
PERIOD- 620. KM
APOLLO- 620. KM
PERIOD- 92.6 MIN
WEIGHT- 117. KG
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 92.6 MIN
APOLLO- 620. KM
APOLLO- 620. KM
PERIOD- 92.6 MIN
WEIGHT- 117. KG
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 92.6 MIN
APOLLO- 620. KM
APOLLO- 620. KM
PERIOD- 92.6 MIN
WEIGHT- 117. KG
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 92.6 MIN
APOLLO- 620. KM
APOLLO- 620. KM
PERIOD- 92.6 MIN
WEIGHT- 117. KG
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 92.6 MIN
APOLLO- 620. KM
APOLLO- 620. KM
PERIOD- 92.6 MIN
WEIGHT- 117. KG
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
PLANNED INVESTIGATION DISCIPLINE(S)
GRID RESOURCES SURVEY
INVESTIGATION NAME- HEAT CAPACITY MISSION RADAROMETER
NSSDC ID- AEM-A -01
INVESTIGATIVE PROGRAM CODE BR
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY
PERSONNEL
MC- A. BILLER
SC- A. SCHWART
PH- C. WAGNER JR.
Brief Description

This experiment utilizes a monitor counter as a support instrument for calibration and normalization of the focal plane instrumentation. It is used to (1) normalize intensity fluctuations during spectrometer observations, (2) observe the continuum during spectral line observations, and (3) calibrate other instruments in flight.

Investigation Name: High-resolution imaging

NSSDC ID: HEAD-C -02 INVESTIGATIVE PROGRAM

Code SA

Investigation Discipline(s): X-ray Astronomy

Personnel

PI - H. Gursky

Harvard College Obs.

Brief Description

The objectives of this experiment are to (1) survey X-ray sources of an extended nature in the energy range from 0.1 to 4 keV, where resolution of 1 arc-min will be sufficient, (2) study the angular structure of extended sources, (3) to survey for weak sources, and (4) to locate objects with poorly known positions.

Investigation Name: Imaging proportional counter

NSSDC ID: HEAD-C -04 INVESTIGATIVE PROGRAM

Code SA

Investigation Discipline(s): X-ray Astronomy

Personnel

PI - H. Gursky

Harvard College Obs.

Brief Description

The objectives of this experiment are to (1) survey X-ray sources of an extended nature in the energy range from 0.1 to 4 keV, where resolution of 1 arc-min will be sufficient, (2) study the angular structure of extended sources, (3) to survey for weak sources, and (4) to locate objects with poorly known positions.

Investigation Name: Isotopic composition of cosmic rays

NSSDC ID: HEAD-C -06 INVESTIGATIVE PROGRAM

Code SA

Investigation Discipline(s): Cosmic Rays

High Energy Astrophysics

Personnel

PI - L. Koch

CENS

GS - D. Peters

Danish Space Res Inst

O1 - J.P. Petersen

CENS

O2 - S. Poulsen

CENS

O3 - A. Pedersen

CENS

O4 - R. Jensen

Danish Space Res Inst

O5 - J. Christiansen

Danish Space Res Inst

Brief Description

This experiment measures the relative composition of the isotopes of the primary cosmic rays + from 2 to 26 and the elemental abundances up to tin (Z=50), with the earth's magnetic field, and with the earth's magnetic field, with a spectrometer, they determine change and mass. This detector to a precision of 5 to percent for the most abundant elements over the energy range from 2 to 25 GeV.
THE SPACECRAFT TO OBSERVE ANY PORTION OF THE SKY FOR NSSDC 10- HELOS

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEODESIC
ORBIT PERIOD- MIN
PERIAPSIS- KM
APOAPSIS- KM
INCLINATION- DEG

PERSONNEL
MC- NONE ASSIGNED
SC- NONE ASSIGNED
PM- UNKNOWN
PS- UNKNOWN
EIA-ESTEC

BRIEF DESCRIPTION
THE OBJECTIVES OF THIS MISSION ARE 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 ARE DETERMINED BY THE OBSERVATION OF THE TIME AND SPEED WITH WHICH THE SOURCES LAUNCH BEHIND THE MOON DURING LUNAR OCCULTATIONS. THE ABILITY TO CONNECT BOTH THE ORBIT AND THE ORIENTATION OF THE SPACECRAFT COUPLED WITH THE HIGHLY ECCENTRIC ORBIT, ENABLES THE SPACECRAFT TO OBSERVE ANY PORTION OF THE SKY FOR LONG PERIODS OF TIME. TEMPORAL VARIATIONS ON SCALES RANGING FROM TENTHS OF SECONDS TO HOURS ARE OBSERVABLE, AS WELL AS FINE SPECTRUM OBSERVATIONS AND ADIABATIC FLUX MEASUREMENTS OF OBJECTS WITH AN INTENSITY GREATER THAN 5.5-5 OF THE CRITICAL VALUE SOURCES ARE LOCATABLE TO WITHIN ARC-3 IN POSITION.

-------------------- HELOS-UNKNOWN-----------------------

INVESTIGATION NAME- MEDIUM-ENERGY COSMIC X-RAY PACKAGE
NSSDC ID- HELOS-01
INVESTIGATIVE PROGRAM SCIENCE
INVESTIGATION DISCIPLINE(S) 2-X-RAY ASTRONOMY

PERSONNEL
PI- UNKNOWN

BRIEF DESCRIPTION
THIS EXPERIMENT OBSERVES COSMIC X-RAY SOURCES IN THE ENERGY RANGE OF 1.5 TO 20 KEV AND CONSISTS OF PROPORTIONAL COUNTERS LOCATED BEHIND MODIFIED HONEYCOMB COLLIMATORS.

-------------------- HELOS-UNKNOWN-----------------------

INVESTIGATION NAME- LOW-ENERGY COSMIC X-RAY PACKAGE
NSSDC ID- HELOS-02
INVESTIGATIVE PROGRAM SCIENCE
INVESTIGATION DISCIPLINE(S) 2-X-RAY ASTRONOMY

PERSONNEL
PI- UNKNOWN

BRIEF DESCRIPTION
THIS EXPERIMENT OBSERVES COSMIC X-RAY SOURCES IN THE 0.1-TO 2-KEV RANGE AND UTILIZES TIMES-WINDOW, POSITION-SENSITIVE, PROPORTIONAL COUNTERS LOCATED BEHIND V-ShAPED-INCIDENCE MIRRORS.

-------------------- IONOSONDE-IX-----------------------

SPACECRAFT COMMON NAME- IONOSONDE-IX
ALTERNATE NAMES-
NSSDC ID- IONOSONDE-IX
LAUNCH DATE- 06/07/77
WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA
SPONSORING COUNTRY/AGENCY INTERNATIONAL ESA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEODESIC
ORBIT PERIOD- MIN
PERIAPSIS- KM
APOAPSIS- KM
INCLINATION- DEG

PERSONNEL
PI- Y.V. MIGULIN

BRIEF DESCRIPTION

-------------------- IN ASTRON. SAT.-----------------------

SPACECRAFT COMMON NAME- IN ASTRON. SAT.
ALTERNATE NAMES- INFRA-RED ASTRON. SAT.
NSSDC ID- IAS
LAUNCH DATE- 02/02/81
WEIGHT- 950 KG
LAUNCH SITE- VANDENBERG AFB. UNITED STATES
LAUNCH VEHICLE- DELTA
SPONSORING COUNTRY/AGENCY NETHERLANDS
UNITED STATES
NUSA-055
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEODESIC
ORBIT PERIOD- MIN
PERIAPSIS- KM
APOAPSIS- KM
INCLINATION- DEG

PERSONNEL
MC- W. D. SMITH NASA HEADQUARTERS
SC- S. POGRENA NASA HEADQUARTERS
PM- J. R. CROSNI NASA HEADQUARTERS
PS- H. R. AUMANN JPL

BRIEF DESCRIPTION
THE OBJECTIVES OF THIS MISSION ARE TO DETERMINE X-RAY RADIAN CEES FROM 0.1 TO 100 KEV WITH A SENSITIVITY DEPENDENT ON THE ORBITAL ALTITUDE OF THE SATellite, AND TO STUDY THE TIME AND SPACE VARIATIONS OF THE INFRARED FLUX, THE CORRELATION OF THE LOCAL ELECTRON AND ION DENSITIES AND TEMPERATURES WITH THE VARIATIONS OF MAGNETIC FLUX AND THE SUN SPOT CYCLE. THE SPACECRAFT IS FLOATED IN A LOW-ELEVATION CIRCULAR ORBIT WITH AN INCLINATION OF 45-5 DEG. THE SATELLITE IS ORBITED AS A POINTING OBJECT FOR UP TO 17 MIN. THIS POINTING ABILITY PERMITS SENSITIVE MEASUREMENTS ON THE FAINTER GALACTIC AND EXTRAGALACTIC SOURCES. FOR JOINT IAS SCIENCE WORKING GROUP MEMBERS, SEE APPENDIX 02.

-------------------- ISEE-A-----------------------

SPACECRAFT COMMON NAME- ISEE-A
ALTERNATE NAMES- IMP-C, JHE-1
MOTHER, INTNL SUN EARTH EXPL-A
NSSDC ID- INTERNATIONAL
LAUNCH DATE- 11/17/77
WEIGHT- 840.2 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA
SPONSORING COUNTRY/AGENCY UNITED STATES INTERNATIONAL ESA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEODESIC
ORBIT PERIOD- MIN
PERIAPSIS- KM
APOAPSIS- KM
INCLINATION- DEG

PERSONNEL
PS- Y.V. MIGULIN

INVESTIGATION NAME: ENEGETIC ELECTRONS AND PROTONS

PERSONNEL
PI - H.A. ANDERSON
01 - C.L. MEND
02 - F.V. CORONIT
05 - A.M. FREDERICKS
06 - E.J. GRIN
01 - B.-R.A. GUNTET
02 - F.-L. SCARP
05 - H.W. BESL
02 - E.-J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
PARTICLES AND FIELDS

INVESTIGATION NAME: 10-KEV TO 10-KEV ELECTRIC FIELD SPECTRAL ANALYSIS FROM 11 TO 10 KAU.

PERSONNEL
PI - H.A. ANDERSON
01 - C.L. MEND
02 - F.V. CORONIT
05 - A.M. FREDERICKS
06 - E.J. GRIN
02 - E.J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
PARTICLES AND FIELDS

INVESTIGATION NAME: ACTIVE PLASMA EXPERIMENT

PERSONNEL
PI - C.J. HARR
01 - I. DER
05 - H.W. BESL
06 - E.J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
SPACE PLASMAS

INVESTIGATION NAME: ACTIVE PLASMA EXPERIMENT

PERSONNEL
PI - C.J. HARVEY
01 - M. PETT
02 - J.R. HAYNES
05 - H.W. BESL
06 - E.J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
SPACE PLASMAS

INVESTIGATION NAME: H+ PLASMA

PERSONNEL
PI - C.J. HARVEY
01 - I. DER
05 - H.W. BESL
06 - E.J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
SPACE PLASMAS

INVESTIGATION NAME: XIKE A. FRANKEN

PERSONNEL
PI - L.A. FRANKEN
01 - V.P. VASILYUK
02 - C.F. KEEN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
SPACE PLASMAS

INVESTIGATION NAME: ENEGETIC PARTICLES

PERSONNEL
PI - K.A. ANDERSON
01 - C.L. MEND
02 - F.V. CORONIT
05 - A.M. FREDERICKS
06 - E.J. GRIN

INVESTIGATION DISCIPLINE(S)
MAGNETOSPHERIC PHYSICS
PARTICLES AND FIELDS

AMBIENT PLASMA ONTO A WAVE OF FREQUENCY ABOUT 1 MHz TRANSMITTED FROM THE MOTHER TO THE DAUGHTER CARRIER AT A PHASE IS COMPARED AGAINST THE SIGNAL TRANSMITTED FROM THE MOTHER TO THE DAUGHTER BY MODULATION ON ONE AC PORT OF FREQUENCY HIGH ENOUGH TO BE UNAFFECTED BY THE AMBIENT PLASMA.

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INVESTIGATION NAME: YLF WAVE INJECTION

NSSDC 10- MOTHER -13 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): MAGNETOSPHERIC PHYSICS

PARTICLES AND FIELDS

PERSONNEL

PI - S.A. HELLEWELL
OI - T. W. STANFORD
OI - R. U. STANFORD

BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO PROVIDE DATA TO STUDY INTERACTIONS BETWEEN DISCRETE YLF WAVES AND ELECTRONS IN THE MAGNETOSPHERE. THE YLF WAVES ARE PRODUCED BY A GROUND-BASED TRANSMITTER, IN WHICH CASE THE SIGNAL IS ASSURED BY A TRANSMITTER LOCATED IN A REGION WHERE THE ELECTRIC FIELD ACTS AS AN AVERAGING FORCE, OR IN THE CASES, A SINGLE STATION ANTARCTIC THE INJECTED SIGNAL AND ANY STIMULATED YLF EMISSIONS ARE CAPTURED THROUGH A LOOP ANTENNA BY A 3X TO 20 MHZ BROADBAND RECEIVER ON THE SATELLITE. THE OBSERVED PARAMETERS ARE UNRESOLVED OF RECEIVED BASED SIGNAL AS A FUNCTION OF TIME.

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INVESTIGATION NAME: DC ELECTRIC FIELDS

NSSDC 10- MOTHER -11 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): MAGNETOSPHERIC PHYSICS

PARTICLES AND FIELDS

PERSONNEL

PI - J.P. HEPPER NASA-GSFC
OI - T.L. ADKINS NASA-GSFC
OI - R.C. HAYWARD NASA-GSFC
OI - S.R. SCOTT U OF IOWA
OI - R.P. CAUPY NASA HEADQUARTERS

BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY QUASI-STATIC ELECTRIC FIELD AND LOW-FREQUENCY PLASMA WAVES IN THE PLASMASPHERE, MAGNETOSPHERE, AND SOLAR WIND. AN ORTHOGONAL PAIR OF 12.5-MIP-TO-12.5 MIP DIPLOE ANTENNAE IN THE FOLLOWING "WAVES" 0.1 TO 2.32 Hz TO 8.1 TO 10 Hz 10 TO 15 Hz 15 TO 32 Hz 32 TO 100 Hz 100 TO 320 Hz 320 TO 1000 Hz AND 1000 TO 3200 Hz. DEPENDING ON THE CASE, ONE OR MORE CONFIGURATIONS ARE USED TO TRANSFORM THE SOURCE TO A DYNAMIC RANGE OF PLUS OR MINUS 0.935 V/M. THE AC MEASUREMENT ELECTRONICS CONSIST OF TWO AMPLIFIER SECTIONS. ONE AMPLIFIER IS USED FOR LOW-FREQUENCY CHANNELS, AND ONE HIGH-FREQUENCY CHANNELS. ONE AMPLIFIER IS CONTROLLABLE INDEPENDENTLY FROM THE GROUND. EACH ANALYZER CHANNEL HAS A SENSITIVITY OF 0.0 MICROGALV/HZ MN. THE EXPERIMENT CAN BE RUN IN EITHER A CON-SHOCK SYSTEM OR A FREE STATE AS CONTROLLED FROM THE GROUND. IN ADDITION, THE AC RESULTS CAN BE RUN IN AN AVERAGING MODEL, OR AN ALTERNATING AVERAGING AND PEAK AMPLITUDE DETECTION MODE TO THE TELEMETRY READOUT.

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INVESTIGATION NAME: LOW-ENERGY COSMIC-RAY COMPOSITION

NSSDC 10- MOTHER -05 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): COSMIC RAYS

PARTICLES AND FIELDS

PERSONNEL

PI - D.K. Hackett RPJ-EXTRAP PHYS
OI - T. M. SCHOLTER U OF MARYLAND
OI - R.C. FAN NASA-GSFC
OI - D. GLEOCKLER U OF MARYLAND

BRIEF DESCRIPTION

INVESTIGATION 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 EXPERIMENTS ARE MADE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES -- (1) SOLAR WIND IONS (2 TO 10 KEV/CHARGE) (2) SUPERTHERMAL MULTIPLE CHARGED 26% (2 TO 6 LESS THAN OR EQUAL TO 20 IN THE ENERGY RANGE FROM 0.02 TO 13 NEV (0.02 NEV)), 0.01 TO 30 NEV (0.02 NEV)), AND 3 TO 100 NEV (1800), AND 3 TRAPPED PARTICLES (0.01 TO 6 MEV/NUCLEON). THE INSTRUMENTATION ON EACH SPACECRAFT WHICH USE ELECTROSTATIC SELECTION TECHNIQUES THEIR WINDOW PROPORTIONAL COUNTERS, AND POSITION-SENSITIVE SOLID-STATE DETECTORS. THE SENSORS HAVE LARGE GEOMETRICAL FACTORS OVER THE LIMIT ENERGY RANGES, THE DETECTED ION CURRENTS ARE DIGITIZED AND AVERAGED IN THE HIGHEST GAIN MODE.

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INVESTIGATION NAME: DC TO 12-HE ELECTRIC FIELD PROBE

NSSDC 10- MOTHER -06 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): MAGNETOSPHERIC PHYSICS

PARTICLES AND FIELDS

PERSONNEL

PI - J. P. C. MOZER U OF CALIF. BERKELEY
OI - R.C. KELLEY U OF CALIF. BERKELEY

BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT IS TO STUDY THE QUASI-STATIC ELECTRIC FIELD IN THE PLASMASPHERE, MAGNETOSPHERE, AND SOLAR WIND. THE 4-IN-DIAM SPHERICAL ANODE STATION WITH THE END OF A 30-HR ROOM IN THE SATELLITE SPHERE AND THE END OF THE DEPEND ON THE ENERGY SPECTRUM IN A REGION WHERE THE ELECTRONICS ARE USED TO A WAVE OF 1 TO 10 MV IN THE FREQUENCY RANGE FROM 0 TO 12 Hz.

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INVESTIGATION NAME: THREE-DIMENSIONAL (512 AXES), 6-TO-10 KEV ELECTRON SPECTROMETER

NSSDC 10- MOTHER -02 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): MAGNETOSPHERIC PHYSICS

SPACE PLASMAS

PERSONNEL

PI - K.W. OSCILIE NASA-GSFC
OI - J.D. SCHODER NASA-GSFC

BRIEF DESCRIPTION

THIS EXPERIMENT STUDIES THE TRANSPORT COEFFICIENTS OF TURBULENCE IN THE COLLISIONLESS PLASMA REPRESENTED BY THE INTERPLANETARY, MEDIUM AND SOLAR WIND. THE 6-TO-10 KEV ELECTRON SPECTRA ARE USED TO MAKE THREE-DIMENSIONAL ELECTRON DISTRIBUTION FUNCTION IN THE FREQUENCY BAND OF 6 TO 10 KEV. MEASUREMENTS ARE MADE IN TWO MODES, WITH A DENSITY DISTRIBUTION FUNCTION IN THE FREQUENCY BAND OF 6 TO 10 KEV. THE MAIN SENSORS ARE SELECTED IN THE SINGLE-PRECISION MODE.

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INVESTIGATION NAME: MAGNETIC FIELDS

NSSDC 10- MOTHER -04 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): MAGNETOSPHERIC PHYSICS

PARTICLES AND FIELDS

PERSONNEL

PI - C.T. RUSSELL U OF CALIF. LA
OI - R.L. MCPHERSON U OF CALIF. LA
OI - P.E. HEDBERG IMPERIAL STATE GROUP
OI - E.W. GREENSTAY TID SYSTEMS GROUP
OI - W. GOLOVUZ U OF CALIF. LA

BRIEF DESCRIPTION

IN THIS TRIAXIAL FLUCTUATION MAGNETOMETER. THREE VIRTUAL ORTHOGONAL TENDS ARE ENCLOSED IN A FLIPPER MECHANISM AT THE END OF THE MAGNETOMETER. THE ELECTRONICS UNIT IS ON THE MAIN BODY OF THE SPACECRAFT. THE MAGNETOMETER HAS A RANGE OF MINUS 32 TO 2 GAMMA AND PLUS OR MINUS 512 GAMMA IN EACH VECTOR COMPONENT. THE INSTRUMENT PROVIDES AN ELECTRONIC DISTRIBUTION FUNCTION IN THE FREQUENCY BAND OF 6 TO 10 KEV. THE MAIN SENSORS ARE SELECTED IN THE SINGLE-PRECISION MODE. THE END OF THE SENSORS IS USED FOR MAGNETIC FIELD MEASUREMENTS. THE END OF THE MAGNETOMETER IS DOUBLED. THIS BANDWIDTH VARYING FROM 6 TO 10
**INVESTIGATION NAME: PLASMA COMPOSITION**

**NSSDC 10 - MOTHER -12**

**INVESTIGATIVE PROGRAM CODE** SA/CO-DP

**INVESTIGATION DISCIPLINE(S)** MAGNETOSPHERIC PHYSICS

**SPACE PLASMAS**

**PERSONNEL**

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**DRED DESCRIPTION**

THE OBJECTIVE OF THIS INVESTIGATION IS TO DETERMINE THE ANGULAR DISTRIBUTION OF ION DENSITY IN THE MAGNETOSPHERE. AN ION MASS SPECTROMETER IS FLOWN THAT HAS AN ELECTROSTATIC ENERGY ANALYZER FOLLOWED BY A SEMICONDUCTOR ELECTROSTATIC/MAGNETIC MASS ANALYZER. A COMBINATION OF ELECTRON MULTIPLIERS IS USED AS THE DETECTOR TO MEASURE THE ENERGY-DIFFERENTIAL RATES OF ION MASS AND ENERGY SPECTRA OF THE PLASMA WITHIN THE MAGNETOSPHERE.

**NSSDC 10 - DAUGHTER -03**

**INVESTIGATIVE PROGRAM CODE** SA/CO-DP

**INVESTIGATION DISCIPLINE(S)** MAGNETOSPHERIC PHYSICS

**SPACE PLASMAS**

**PERSONNEL**

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**NSSDC 10 - DAUGHTER -04**

**INVESTIGATIVE PROGRAM CODE** SA/CO-DP

**INVESTIGATION DISCIPLINE(S)** MAGNETOSPHERIC PHYSICS

**SPACE PLASMAS**

**PERSONNEL**

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**NSSDC 10 - DAUGHTER -05**

**INVESTIGATIVE PROGRAM CODE** SA/CO-DP

**INVESTIGATION DISCIPLINE(S)** MAGNETOSPHERIC PHYSICS

**SPACE PLASMAS**

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**NSSDC 10 - DAUGHTER -06**

**INVESTIGATIVE PROGRAM CODE** SA/CO-DP

**INVESTIGATION DISCIPLINE(S)** MAGNETOSPHERIC PHYSICS

**SPACE PLASMAS**

**PERSONNEL**

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BRIEF DESCRIPTION

This experiment is designed to study, by means of identical instrumentation on the mother/daughter spacecraft, the temporal and seasonal variations of the solar wind and magnetosheath electrons and ions, protons and electrons in the energy range of 1 to 400 keV and 1 keV to 1 meV, measured in 63 contiguous energy bands, with an energy resolution equal to 0.17%. A quadrupolar low-energy proton and electron differential energy analyzer (C/O) is employed to detect continuum channel electron multipliers in each of its two (one for protons and one for electrons) for electrostatic analyzers. All but 2 percent of the four 

--- ISDC-9 KENNEDY

INVESTIGATION NAME- 10-keV to 100-keV ELECTRON FIELDS MONOCHROMATIC PROBE

INVESTIGATION DISCIPLINES-MAGNETOSPHERIC PHYSICS

PERSONNEL

PI- D.A. GURNEST
01- R.J. SCARP
01- E.J. SMITH
01- W.J. FREDERICKS

INVESTIGATION NAME- EARTHY ELECTRONS AND IONS, PROTONS AND ELECTRONS IN THE NATURE'S HIGH-ENERGY RANGE FROM 1 keV TO 100 keV ARE MEASURED IN 63 CONTIGUOUS CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE OTHER ELECTRON MULTIPLE IN A RANGE OF 1 keV TO 100 keV. THE ELECTRIC DIPOLAR IS ALSO TO 100 keV. THE LEPSE IS MOUNTED PERPENDICULAR TO THE SPIN AXIS.

--- ISDC-9 HARVEY

INVESTIGATION NAME- RADIO PROPAGATION RECEIVER

INVESTIGATION DISCIPLINES-MAGNETOSPHERIC PHYSICS, SPACE PLASMAS

PERSONNEL

PI- L.A. HARVEY
01- R.A. GENDRIN
01- J.M. MCAPER
01- M. PETTY
01- R.J. JONES
01- J.A. TCHETTO
01- J.A. BIESER

BRIEF DESCRIPTION

This experiment is designed to study the plasma field distributions and their spatial and temporal variations in the solar wind, how shear, magnetosphere, magnetopause, and magnetotail (within the magnetosphere). One- to two- and three-dimensional velocity distributions for positive ions and electrons are measured using two 90°-deg spherical electrostatic analyzer with channeltron electron multipliers as detectors. In conjunction with similar instrumentation provided by S. J. Dandliker for the mother spacecraft, protons from 20 keV to 60 keV and electrons from 5 keV to 20 keV are measured with 10 percent energy resolution in two ranges each.

--- ISDC-9 RUSSELL

INVESTIGATION NAME- MAGNETIC FIELDS

INVESTIGATION DISCIPLINES-MAGNETOSPHERIC PHYSICS

PERSONNEL

PI- C.T. RUSSELL
01- J.L. MERRION
01- P.C. HECHERICK
01- W.D. GREENSTAD
01- M.G. WELSON

BRIEF DESCRIPTION

IN THIS TRIAXIAL FLUXGATE MAGNETOMETER, THREE KING CORE SENSORS IN AN ORTHOGONAL TRIAD ARE ENCLOSED IN A FLIPPER MECHANISM AT THE END OF THE MAGNETOMETER BOOM. THE ELECTRONICS UNIT IS ON THE RAISED END OF THE SPACECRAFT AT THE FOOT OF THE BOOM. THE MAGNETOMETER HAS TWO OPERATING RANGES OF PLUS OR MINUS 327 GAMILLES AND PLUS OR MINUS 117 GAMILLES IN EACH VECTOR COMPONENT. THE DATA IS DIGITIZED AND AVERAGE VERSUS THE INSTRUMENT TO PROVIDE INCREASED RESOLUTION AND TO PROVIDE BEARG FILTERING. THERE ARE TWO MODES FOR THE TRANSMISSION OF THE AVERAGE DATA. IN THE DOUBLE-PRECISION MODE, OPERATION 16-BIT SAMPLES OF DATA ARE TRANSMITTED. THIS PROVIDES A MAJOR RESOLUTION OF PLUS OR MINUS 1/4 GAMMA OR 1/2 GAMMA IN THE LOW AND HIGH-SENSITIVITY RANGES. IN THE SINGLE-PRECISION MODE, ANY 8 CONSECUTIVE BITS OF THE ABOVE 16 BITS ARE SELECTED BY GROUND COMMAND FOR TRANSMISSION AND THE TELEMETRY BANDWIDTH OF THE MAGNETOMETER ARE BOUNDED. THIS BANDWIDTH VARIES FROM 2 KHZ AT THE LOW-TELEMETRY RATE SINGLE-PRECISION EXPERIMENT MODE TO 32 KHZ AT THE HIGH-TELEMETRY RATE DOUBLE-PRECISION EXPERIMENT MODE.

SPACECRAFT COMMON NAME- ISDC-C

ALTERNATE NAMES- STR PROBE, IMB-C

--- ISDC-10 HELIODOC

LAUNCH DATE- 02/04/78
WEIGHT- 469, KG
LAUNCH SITE- CAPE CANAVERAL- UNITED STATES
LAUNCH GROUND- DELTA
SPONSORED COUNTRY/AGENCY- UNITED STATES NASA-DF-55
INTERNATIONAL JPL
PLANNED ORBIT PERIOD- 365 DAYS
PLANNED INCLINATION- 0.06 deg
APOGEE- 0.99 AU RAD
PERIGEE- 0.99 AU RAD
PERSONNEL

INVESTIGATION NAME - High-energy Cosmic Rays

NSSDC 18- HELIOCR-05

INVESTIGATIVE PROGRAM

CODE S4/0-DP

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

COSMIC RAYS

PERSONNEL

PI - H.R. NEUMAN

01 - U.S. GREENE

01 - J.S. DOMINGO

01 - N. ELLIOTT

BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE ISOPTIC
IDIOPTIC RELATIONSHIPS ON THE HELIOCENTRIC AND OTHER
SPACECRAFT. THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOPTIC
COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC HEAVY
PIONS, PROTONS AND ELECTRONS.

INVESTIGATION NAME - High-energy Cosmic Rays

NSSDC 18- HELIOCR-06

INVESTIGATIVE PROGRAM

CODE S4/0-DP

INVESTIGATION DISCIPLINE(S)

PARTICLES AND FIELDS

COSMIC RAYS

PERSONNEL

PI - H.R. NEUMAN

01 - L.A. FISH

01 - H. ELLIOTT

BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MAKE AN INTEGRATED STUDY OF
THE NATURE, ORIGIN AND EVOLUTION OF STRUCTURE IN THE
INTERPLANETARY MEDIUM, INCLUDING THE MAGNETOSPHERIC SPACE.
THE INTERPLANETARY PLASMA IS STUDIED, UNRUPTURED BY THE EARTH'S
SHOCK WAVE. IN THE EXPERIMENT, PROTONS AND ELECTRON SOLAR PLASMA
ARE MEASURED FROM 150 EV TO 7 KEV AND 5 EV TO 2.5 KEV IN 12 AND
135-DEGREE SPHERICAL ELECTROSTATIC ANALYZER FOR EACH ENERGY WINDOW
FOR FOUR ENERGY STEPS. FURTHERMORE, THE ELECTRON SOFT
ENERGIES ARE MEASURED USING A 90-DEGREE SPHERICAL
4-SIDED-SCINTILLATOR. THE EXPERIMENT IS DESIGNED TO MAKE AN INTEGRATED
STUDY OF THE INTERPLANETARY PLASMA. THE ELECTRON MULTIPLETORS ARE USED AS DETECTORS FOR EACH
OF THE ANALYTICAL SENSORS.
BRIEF DESCRIPTION

This experiment is designed to study the interaction of solar plasma with the Earth's magnetosphere. The instrument consists of a Langmuir probe, a vector Helium magnetometer, and a particle detector. The measurements are taken in the Earth's magnetotail region.

INVESTIGATIVE DISCIPLINE(s)

Particle and fields

INVESTIGATIVE PROGRAM

CODE S040-0P

PERSONNEL

PI - E. C. Stone
01 - R. E. Vogt

INVESTIGATION NAME - COSMIC-RAY COMPOSITION

NSSDC 19- HELOCR-07

INVESTIGATION PROGRAM

CODE S040-0P

INVESTIGATION DISCIPLINE(s)

Particles and fields

SOLAR PHYSICS

PERSONNEL

PI - R. A. Stone
01 - R. E. Vogt

BRIEF DESCRIPTION

This experiment is designed to study the isotopic composition of solar matter and cosmic rays. The following species are to be resolved: helium, neon, carbon, and oxygen.

INVESTIGATION NAME - SOLAR AND GALACTIC ENERGETIC PARTICLES

NSSDC 19- HELOCR-04

INVESTIGATION PROGRAM

CODE S040-0P

INVESTIGATION DISCIPLINE(s)

Particles and fields

COSMIC RAYS

PERSONNEL

PI - T. R. Von Rosenvinge
01 - R. A. Fisk
02 - R. W. McPherron
03 - J. E. Trautwein
04 - R. A. van Allen

BRIEF DESCRIPTION

This experiment is designed to study the composition of solar cosmic rays from hydrogen through iron and the elements beyond. The measurements are taken in the Earth's magnetosphere.

INVESTIGATION NAME - COSMIC-RAY COMPOSITION

NSSDC 19- HELOCR-12

INVESTIGATION PROGRAM

CODE S040-0P

INVESTIGATION DISCIPLINE(s)

Particles and fields

SOLAR PHYSICS

PERSONNEL

PI - E. C. Stone
01 - R. E. Vogt

BRIEF DESCRIPTION

This experiment is designed to study the isotopic composition of solar matter and cosmic rays. The following species are to be resolved: helium, neon, carbon, and oxygen.
For 0.5 to 150 kev per nucleon nuclei.

Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

Brief Description
This experiment consists of the measurement of large scale 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 is to study the large scale structure of the solar wind and its extension into interplanetary space by the solar wind.

Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

Brief Description
This experiment consists of the measurement of large scale 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 is to study the large scale structure of the solar wind and its extension into interplanetary space by the solar wind.

Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

Brief Description
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NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

Brief Description
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Investigation Name: Solar and Interplanetary Magnetic Fields
Correlative Study

NSDC 10- HELIOGRA-13
Investigative Program
COSE SAO/AUTO
Investigation Discipline(s)
Solar and Interplanetary Magnetic Fields

Personnel
PI - J. M. Wilcox
STANFORD U

Brief Description
This experiment consists of the measurement of large scale 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 is to study the large scale structure of the solar wind and its extension into interplanetary space by the solar wind.
THE INTERNATIONAL ULTRAVIOLET EXPLORER (IUE) FORMERLY KNOWN AS SAS-0) IS AN APPROVED INVESTIGATION FOR USE AS AN INTERNATIONAL FACILITY. THE IUE CONTAINS A CS-CM TELESCOPE (THE TELESCOPE CAMERA) AND A 3-METER TELESCOPE (THE TELESCOPE SPECTROGRAPH). THE TELESCOPE CAMERAS ARE DETECTORS THAT ARE PRODUCED BY THE INTERNATIONAL KINGDOM SPACE RESEARCH COUNCIL (ISAS). THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS. THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS.

PERSONNEL

| MG | L. DONLEY | NASA HEADQUARTERS |
|    |           | NASA-GSCF |
| PR | G.W. LONGANECKER | NASA HEADQUARTERS |
| PR | J.J. DOUGLAS | NASA-GSCF |

INVESTIGATION NAME- MULIPERI FREQUENCY (MSP) SPECTROSCOPIC OBSERVATORY

INVESTIGATION DISCIPLINE(S)- ASTROPHYSICS

PERSONNEL

| PI | NONE ASSIGNED | NASA-GSCF |

BRIEF DESCRIPTION

THE INTERNATIONAL ULTRAVIOLET EXPLORER (IUE) FORMERLY KNOWN AS SAS-0) IS AN APPROVED INVESTIGATION FOR USE AS AN INTERNATIONAL FACILITY. THE IUE CONTAINS A CS-CM TELESCOPE (THE TELESCOPE CAMERA) AND A 3-METER TELESCOPE (THE TELESCOPE SPECTROGRAPH). THE TELESCOPE CAMERAS ARE DETECTORS THAT ARE PRODUCED BY THE INTERNATIONAL KINGDOM SPACE RESEARCH COUNCIL (ISAS). THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS. THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS.

PERSONNEL

| MG | L. DONLEY | NASA HEADQUARTERS |
|    |           | NASA-GSCF |
| PR | G.W. LONGANECKER | NASA HEADQUARTERS |
| PR | J.J. DOUGLAS | NASA-GSCF |

INVESTIGATION NAME- MULIPERI FREQUENCY (MSP) SPECTROSCOPIC OBSERVATORY

INVESTIGATION DISCIPLINE(S)- ASTROPHYSICS

PERSONNEL

| PI | NONE ASSIGNED | NASA-GSCF |

BRIEF DESCRIPTION

THE INTERNATIONAL ULTRAVIOLET EXPLORER (IUE) FORMERLY KNOWN AS SAS-0) IS AN APPROVED INVESTIGATION FOR USE AS AN INTERNATIONAL FACILITY. THE IUE CONTAINS A CS-CM TELESCOPE (THE TELESCOPE CAMERA) AND A 3-METER TELESCOPE (THE TELESCOPE SPECTROGRAPH). THE TELESCOPE CAMERAS ARE DETECTORS THAT ARE PRODUCED BY THE INTERNATIONAL KINGDOM SPACE RESEARCH COUNCIL (ISAS). THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS. THE TELESCOPE SPECTROGRAPH IS A DETECTOR THAT IS PRODUCED BY THE ISAS.
INVESTIGATION NAME - DATA COLLECTION SYSTEM (DCS)

NSSDC ID- ERTS-C -03 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S)

METEOROLOGY

EARTH RESOURCES SURVEY

PERSONNEL

PI - J.E. PAINTER NASA-GSFC

INSTRUMENT CONSISTS OF PRIMARY IMAGING OPTICS, SCANNING MECHANISM, SPECTRAL DISCRIMINATION OPTICS, DETECTOR ARRAYS, RADIATIVE COOLER, IN-FLIGHT CALIBRATION, AND OCCUPATIONAL ELECTRONICS. THE SCANNING MECHANISM PROVIDES THE CROSS-TRACK SCAN WHILE THE PROGRESS OF THE SPACECRAFT PROVIDES THE SCAN ALONG THE TRACK. THE OPTICAL SYSTEM IMAGES THE EARTH'S SURFACE ON A FIELD STOP OR A DETECTOR SIZE TO DEFINE AN AREA ON THE EARTH'S SURFACE. THE VARIATION IN FLUX DENSITY PASSING THROUGH THE FIELD STOP OR THE DETECTOR ARRAY PROVIDES A SIGNAL THAT REPRESENTS THE VARIOUS BANDS. THE VARIATION IN THE EARTH'S SURFACE ALONG THE TRACK IS PROPORTIONAL TO THE SIGNAL GENERATED. THE SIGNALS ARE THEN PROCESSED IN THE TM MULTIPLEXER FOR TRANSMISSION VIA THE LOCAL RECEIVING STATIONS.

INVESTIGATION NAME- THEMATIC RAPPERS

NSSDC ID- LANT-P -01 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S)

EARTH RESOURCES SURVEY

PERSONNEL

PI - A. RANGO NASA-GSFC

SPACECRAFT COMMON NAME- MAGIC

ALTERNATE NAMES- MAGIC

NSSDC ID- LANT-P -03 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S)

EARTH RESOURCES SURVEY

PERSONNEL

PI - A. RANGO NASA-GSFC

SPACECRAFT COMMON NAME- MAGIC

ALTERNATE NAMES- MAGIC
LAUNCH DATE- 02/07/77
WEIGHT- 135 KG
LAUNCH SITE- KENNEDY SPACE CENTER
SPONSORING COUNTRY/AGENCY
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440 MIN INCLINATION- 97.79 DEG
APOLLOPERI- 500 KM
PERSONNEL
M- J. DILLIER
C- J.P. WAGNER, JR.
S- W. LANGEL
PLANNED BRIEF DESCRIPTION
THE MAGSAT PROJECT IS A JOINT NASA/AGA PROJECT TO DETERMINE THE MAGNETIC FIELD OF THE EARTH USING MAGNETOMETERS ON BOARD THE SPACExR. THE MAGNETOMETERS ARE DEPLOYED ALONG A PATH THAT IS ALONG THE EARTH'S MAGNETIC FIELD. THE INFORMATION GAINED FROM THE MAGNETOMETERS IS USED TO UNDERSTAND THE EARTH'S MAGNETIC FIELD AND ITS VARIATION.
BRIEF DESCRIPTION

The visible-infrared radiometer flown on METEOSAT-B is capable of providing day/night observations of cloud cover and earth/cloud radiation temperature measurements from a geostationary satellite for use in operational weather analysis and forecasting and (2) for use in deriving surface radiant temperatures necessary for calculating radiative forcing and climate change. The instrument is able to make full pictures of the Earth's disk. The three infrared channels (two in the 7.3- to 12.5-micrometer region and one in the 3.7- to 7.3-micrometer region) and the two visible channels (0.5- to 0.9-micrometer) are common optics system. Incoming radiation is received by a scan mirror and collected by an optical system. The scan mirror is set at a normal angle of 45 degree to the radiometer optical axis which is aligned parallel to the spin axis of the spacecraft. The spinning motion of the spacecraft (approximately 500 rpm) provides a west-east scan motion when the scan axis of the spacecraft is oriented parallel with the Earth's axis. The full scan is accomplished by sequentially tilting the scanning mirror at the completion of each spin.

INVESTIGATION NAME- DATA COLLECTION PLATFORM (DCP)

NSSDC ID= METOS-B-02 INVESTIGATIVE PROGRAM APPLICATIONS

INVESTIGATION DISCIPLINES(s) METEOROLOGY

PERSONNEL

NASA STAFF

BRIEF DESCRIPTION

The data collection platform is designed to (1) disseminate image data to user stations, (2) collect data from various earth-based platforms and (3) provide for a space-to-space relay for data from polar-orbiting satellites. This experiment is similar to the meteorological data collection and transmission system (WEFAX) flown on SMS-1, SMS-2, and SMS-3 space weather satellites. This experiment operates on S-band frequencies for WEFAX type transmissions and UHF for data collection platform report and interrogation.

SPACERACFT COMMON NAME- METEOSAT-B

ALTERNATE NAMES- METEOROLOGICAL SATELITE

NSSDC ID= METOS-B-02

LAUNCH DATE- 11/00/78

WEIGHT- 425.8 KG

NASA HEADQUARTERS

LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

INTERNATIONAL

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- 1440. MIN

INCLINATION- 0. DEG

APOAPSIIS- 33600. KM

PERSONNEL

MG - M. DELAHAY

NM- R. LEMMertz

ESA-ESTEC

BRIEF DESCRIPTION

METEOSAT is a geostationary spacecraft and serves as part of European space agency (ESA) contribution to GARP. As part of the M1-PPP, it will supply data regarding global data sets used in improvement of satellite-based models. In General, the experiment investigation parameters and operations are similar to SMS/GOES. The spin-stabilized spacecraft includes (1) a microwave radiometer to provide high-quality data for cloud cover and temperature, (2) a meteorological data collection system to disseminate image data to user stations, (3) collect data from various earth-based platforms and (4) provide for a space-to-space relay for data from polar-orbiting satellites. The cylindrical-shaped spacecraft measures 210 cm in diameter and to take radiometer temperatures of the Earth/Moon system. The spacecraft consists of three major structures - (1) a M1-PPP, a torus-shaped sensor mount. (2) solar panels and (3) a control housing unit that is connected to the sensor mount located on a tripod structure configuration, somewhat like an ocean radar. METEOSAT is normally 3.7 M (more) and 1.5 M in diameter at the base and 3.0 M wide with solar panels extended. The sensor mount is shaped to form a satellite house that houses the electronics equipment and battery modules. The lower surface of the sensor provides mounting space for solar panels and antennas. A data collection platform on the control housing unit, which is located at the center of the sensors, provides support for the larger sensor experiments mounted on the control housing unit. The sensors are solar sensors, WEPAX scanners and a command antenna. An advanced space platform permits the spacecraft's orientation to be controlled within plus or minus 1 deg in all three axes (pitch, roll, and yaw).
EIGHT EXPERIMENTS HAVE BEEN SELECTED. THEY ARE (1) - LIDAR INFRARED MONITORING OF THE STRATOSPHERE AND MESOSPHERE AND SMOKE SOURCES FROM (2) - COASTAL ZONE COLOR SCANNER (CZCS) - STRATOSPHERIC AEROSOL MEASUREMENTS AT SAME - MULTISPECTRAL SADAR, MODIS, OCEAN RADIATION - MULTICHANNEL INFRARED MICROPLATE MICROBEAM FROM (7) - SOLAR BACKSCATTER UV SPECTROMETER, AND (2) - TEMPERATURE-HUMIDITY INFRARED RADIOMETER. THIS COMPLEMENT OF EXPERIMENTS WILL PROVIDE A COMPREHENSIVE PICTURE OF THE ATMOSPHERE AND OCEAN POLLUTANTS. AS SUCH, THE INSTRUMENTAL SETUP IS PLANNED FOR SEQUENTIAL MAPS (IMAGE) OF THE PARAMETERS AVAILABLE FOR SHUTTLE.

Nimbus-G 10

INVESTIGATIVE PROGRAM

NSDC 10 - Nimbus-G-10

INVESTIGATIVE PROGRAM

CODE ERN

INVESTIGATION DISCIPLINE(S)

METEOROLOGY

PERSONNEL

PI - L.L. ALLISON

NASA-GSFC

BRIEF DESCRIPTION

THE OBJECTIVES OF THE SADAR FROM THE SHUTTLE ARE TO OBTAIN THE VERTICAL DISTRIBUTION OF OZONE IN THE Troposphere AND Mesosphere. THE OZONE MAPS ARE TO BE USED FOR STUDYING THE DYNAMICS OF THE ATMOSPHERE, THE OCCURRENCE OF ATMOSPHERIC PHENOMENA, AND THE EFFECTS OF HUMAN ACTIVITY ON THE ATMOSPHERE. THE INSTRUMENT IS CONSIDERED TO BE A SPECTRAL INSTRUMENT, WHICH PROVIDES INFORMATION ON THE ATMOSPHERE'S LAYER STRUCTURE. THE DATA ARE ACQUIRED USING A MULTICHANNEL MICROBEAM, WHICH IS SENSITIVE TO LITTLE LIGHT EXPECTATION. THE INSTRUMENT USES A SPECTRAL FILTER TO REDUCE THE INFLUENCE OF OTHER SOURCES, ONE OF WHICH IS A BACKSCATTER METEOROLOGICAL INSTRUMENT DESIGNED FOR OBSERVATION OF THE STRATOSPHERE AND MESOSPHERE. THE INSTRUMENT IS CONSIDERED TO BE A SPECTRAL INSTRUMENT, WHICH PROVIDES INFORMATION ON THE ATMOSPHERE'S LAYER STRUCTURE. THE DATA ARE ACQUIRED USING A MULTICHANNEL MICROBEAM, WHICH IS SENSITIVE TO LITTLE LIGHT EXPECTATION. 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BRIEF DESCRIPTION

THE COASTAL ZONE COLOR SCANNER EXPERIMENT IS DESIGNED TO MAP CHLOROPHYLL CONCENTRATION IN WATER, DETERMINE DISTRIBUTIONS, AND STUDY THE REASONS FOR VARIATION IN CHLOROPHYLL CONCENTRATION. THE EXPERIMENT IS DESIGNED TO MEASURE THE EFFECTS OF TEMPERATURE ON THE CHLOROPHYLL CONCENTRATION AND ON THE ATMOSPHERE. THE EXPERIMENT IS DESIGNED TO USE SATELLITE-BASED MEASUREMENTS TO DETERMINE THE SPATIAL AND TEMPORAL VARIATIONS OF CHLOROPHYLL CONCENTRATION AND TO RELATE THESE VARIATIONS TO THE ATMOSPHERE. THE EXPERIMENT IS DESIGNED TO USE SATELLITE-BASED MEASUREMENTS TO DETERMINE THE SPATIAL AND TEMPORAL VARIATIONS OF CHLOROPHYLL CONCENTRATION AND TO RELATE THESE VARIATIONS TO THE ATMOSPHERE.
INVESTIGATION NAME- SPACE ENVIRONMENT MONITOR

INVESTIGATION PROGRAM- OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)- METEOROLOGY

PERSONNEL
PI- C.D. DOBSON
APPLIED PHYSICS LAB

BRIEF DESCRIPTION


--- NOAA-A, BOSTON ---

INVESTIGATION NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)

INVESTIGATION PROGRAM- OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)- METEOROLOGY

PERSONNEL
PI- NESS STAFF
NOAA-NESS

BRIEF DESCRIPTION

THE MISSION IS AN EXTENSION OF THE ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) ON THE NOAA-NESS SERIES. THE MISSION PROVIDES GLOBAL DAYTIME AND NIGHTTIME SEA SURFACE TEMPERATURE, ICE, SNOW AND LAND DATA. THE MISSION PROVIDES \( \frac{1}{4} \) DEGREE RESOLUTION DATA WHICH IS USEFUL FOR WEATHER AND CLIMATE APPLICATIONS. THE MISSION MEASURES THE GREENHOUSE EFFECT AND THE INFLUENCE OF THE SUN ON THE EARTH'S CLIMATE. THE MISSION OPERATES IN BOTH REAL-TIME AND PROCESSING MODES. THE MISSION PROVIDES DATA FOR WEATHER FORECASTING AND CLIMATE RESEARCH.

--- NOAA-NESS ---

INVESTIGATION NAME- SPACE COLLECTION SYSTEM

INVESTIGATION PROGRAM- OPERATIONAL WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)- METEOROLOGY

PERSONNEL
PI- NESS STAFF
NOAA-NESS

BRIEF DESCRIPTION

THE MISSION IS AN EXTENSION OF THE SPACE COLLECTION SYSTEM ON THE NOAA-NESS SERIES. THE MISSION PROVIDES GLOBAL DAYTIME AND NIGHTTIME SEA SURFACE TEMPERATURE, ICE, SNOW AND LAND DATA. THE MISSION PROVIDES \( \frac{1}{4} \) DEGREE RESOLUTION DATA WHICH IS USEFUL FOR WEATHER AND CLIMATE APPLICATIONS. THE MISSION MEASURES THE GREENHOUSE EFFECT AND THE INFLUENCE OF THE SUN ON THE EARTH'S CLIMATE. THE MISSION OPERATES IN BOTH REAL-TIME AND PROCESSING MODES. THE MISSION PROVIDES DATA FOR WEATHER FORECASTING AND CLIMATE RESEARCH.

--- NOAA-NESS ---

INVESTIGATION NAME- SPACECRAFT COMMON NAME

ALTERNATE NAMES-

LAUNCH DATE- 1979
WEIGHT- 588.9 KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- ATLANTIS
SPONSORING COUNTRY/AGENCY
UNITED STATES
NOAA-NESS
PLANNED ORBIT PARAMETERS
DIRECT READOUT SIGNALS ARE TRANSMITTED TO GROUND STATIONS BOTH AT LOW (4 KM) RESOLUTION VIA AUTOMATIC IMAGE TRANSMISSION (AIP) AND AT HIGH (14 KM) RESOLUTION VIA AUTOMATIC PICTURE TRANSMISSION (APT). DATA RECEIVED ON BOARD ARE AVAILABLE FOR REAL-TIME PROCESSING. THE MISSION PROVIDES A DATA RATE WHICH CONTAINS DATA FOR 64 GAC ORBIT PERIODS (16.6 HOURS) AND THE MISSION OPERATES IN BOTH REAL-TIME AND PROCESSING MODES.
NOAA-6 is the second in a series of third-generation, operational meteorological satellites designed for use in the National Operational Environmental Satellite System (NOESS) and support of the Global Atmospheric Research Program (GARP) during 1978-84. The satellite design provides an economical and reliable platform for advanced operational and research instruments to measure the Earth's atmosphere, its surface and include an advanced very high resolution radiometer (AVHRR) which measures the thermal and electrical flux near the Earth's surface and processes and relays to central data systems from free-floating balloons and ocean dusters distributed around the globe. The instrument calculates the orbital motion of the satellite on a spherical surface.

INVESTIGATION NAME: SPACE ENVIRONMENT MONITOR

NOSSC 10- NOAA-B-DQ INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS INVESTIGATION DISCIPLINE(S) APPLIED PHYSICS LAB

PERSONNEL: PI - BOSTON APPLIED PHYSICS LAB

BRIEF DESCRIPTION: This experiment is an extension of the solar proton monitoring experiment flown on the Advanced Very High Resolution Radiometer. The experiment package consists of four detectors: a solar proton detector, an alpha detector, an x-ray detector, and a low-energy detector measuring electrons and protons above 100 eV. There are 16 solar proton detectors with a total of 32 detectors. The solar proton detector detects protons above 10 keV and protons and alpha particles above 100 keV and magnetic field. The experiments are critical for understanding the solar proton and electron environment.

NOAA-6, NESS STAFF

INVESTIGATION NAME: ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)

NOSSC 10- NOAA-B-DI INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS INVESTIGATION DISCIPLINE(S) METEOROLOGY

PERSONNEL: PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION: The NOAA-6 Advanced Very High Resolution Radiometer (AVHRR) is a four-channel scanning radiometer capable of providing global coverage for the surface temperature, sea surface temperature, cloud cover, and snow cover. The instrument also measures the thermal emissions from the Earth's surface and provides data for the operational and research purposes.

NOAA-6, NESS STAFF

INVESTIGATION NAME: DATA COLLECTION SYSTEM (DCS)

NOSSC 10- NOAA-B-D2 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS INVESTIGATION DISCIPLINE(S) METEOROLOGY

PERSONNEL: PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION: This experiment is designed to determine parameters important for the operational and research purposes. The instruments are critical for understanding the solar proton and electron environment.

NOAA-6, NESS STAFF

INVESTIGATION NAME: SPACE CARRIER HEMISPHERE (SCH)

NOSSC 10- NOAA-C INVESTIGATIVE PROGRAM SPACECRAFT WEATHER OBSERVATIONS ALTERNATE NAME(S) NOAA-C

PERSONNEL: PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION: The NOAA-C is the third in a series of third-generation, operational meteorological satellites designed for use in the National Operational Environmental Satellite System (NOESS) and support of the Global Atmospheric Research Program (GARP) during 1978-84.
**NOAA-C, NOAA-NESS STAFF**

**INVESTIGATION NAME:** SPACE ENVIRONMENT MONITOR

**NSSDC ID:** NOAA-C-04

**INVESTIGATIVE PROGRAM**

OPERATIONAL WEATHER OBSERVATIONS

**INVESTIGATION DISCIPLINE(S)**

METEOROLOGY

**PERSONNEL**

P - C.O. BOSTROM

APPLIED PHYSICS LAB

**BRIEF DESCRIPTION**

This experiment is an extension of the SOLAR PROTON MONITORING EXPERIMENT FLOPPY ON THE EOS SATELLITE SERIES. The experiment package consists of four detector systems and a data processing unit. The LOW-ENERGY PROTON ALPHA TELESCOPE (LEP), which measures protons between 150 keV and 23 MeV/n, will be beamed in the anti-Sun and anti-earth directions with 40-deg viewing cones. The proton onboard preconditioning measures protons above 140 keV and protons and electrons in the anti-Sun direction with 8 deg viewing cones. The LOW-ENERGY PROTON ALPHA TELESCOPE (LEP) has a 50-deg viewing cone view, views protons and electrons in the anti-Sun and anti-earth directions with 8 deg viewing cones. The proton onboard preconditioning measures protons above 140 keV and protons and electrons in the anti-Sun direction with 8 deg viewing cones.

**NOAA-C, NOAA-NESS STAFF**

**INVESTIGATION NAME:** ADVANCED HIGH RESOLUTION RADIOMETER (AVHRR)

**NSSDC ID:** NOAA-C-01

**INVESTIGATIVE PROGRAM**

OPERATIONAL WEATHER OBSERVATIONS

**INVESTIGATION DISCIPLINE(S)**

METEOROLOGY

**PERSONNEL**

P - C.O. BOSTROM

NOAA-NESS

**BRIEF DESCRIPTION**

The NOAA-C, NOAA-NESS STAFF HIGH RESOLUTION RADIOMETER (AVHRR) will be a four channel scanning radiometer capable of providing global daytime and nighttime sea surface temperature, ice, snow, and cloud information. This data will be obtained on a weather analysis and forecasting system. The multispectral radiometer will operate in the scanning mode and measure emissions from the surface and reflected radiation in the following spectral intervals: CHANNEL 1 - 3.55 TO 0.725 MICROMETER, CHANNEL 2 - 0.725 TO 1.1 MICROMETER, CHANNEL 3 - 1.1 TO 1.7 MICROMETER, CHANNEL 4 - 1.7 TO 3.9 MICROMETER. All four channels will have a spatial resolution of 1.1 KM. CHANNEL 1 WILL BE CAPABLE OF OPERATING IN BOTH REAL-TIME OR RECORDED MODES. REAL-TIME OR RECORDED DATA WILL BE TRANSMITTED TO GROUP STATIONS BOTH AT LOW (4 MF) RESOLUTION VIA AUTOMATIC PICTURE TRANSMISSION (APT) AND AT HIGH (77 MF) RESOLUTION VIA HIGH RESOLUTION PICTURE TRANSMISSION (HRPT). DATA RECEIVED ON GLOBAL AREA COVERAGE (GAC) DATA WILL HAVE A RESOLUTION OF 1.1 KM FROM SELECTED POINTS ON THE CIRCUIT ACCORDING TO THE NOAA-C, NOAA-NESS STAFF SPACECRAFT. THE IMAGES WILL BE DOWNLOADED TO THE GAC DATA PROCESSING SYSTEM ON THE NOAA-C, NOAA-NESS STAFF SPACECRAFT.
FOR THE US AIR FORCE, AND IS CAPABLE OF MAINTAINING AN
EARTH-POINTING ACCURACY OF PLUS OR MINUS 0.1 DEG
WITH A MOTION RATE OF LESS THAN 0.05 DEG.

INVESTIGATION NAME: SPACE ENVIRONMENT MONITOR
NSSDC ID: NOAA-D-94
INVESTIGATIVE PROGRAM
OPERATIONAL WEATHER OBSERVATIONS
INVESTIGATION DISCIPLINE(S)
METEOROLOGY
PERSONNEL
PS - CLO. DOBRON
APPLIED PHYSICS LAB

BRIEF DESCRIPTION
THE NOAA-D ADVANCED VERY HIGH RESOLUTION SPECTRUMETER IS A FOUR-CHANNEL SCANNING RADIOMETER CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME SURFACE TEMPERATURE, ICE, SNOW, AND CLOUD INFORMATION. THESE DATA ARE OBTAINED ON A DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL RADIOMETER OPERATES IN THE SCANNING MODE AND MEASURES EMITTED AND REFLECTED RADIATION IN THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 (VISIBLE), 0.55 TO 0.71 MICROMETERS; CHANNEL 2 (IR WINDOW), 3.70 TO 4.15 MICROMETERS; CHANNEL 3 (IR WINDOW), 8.25 TO 9.2 MICROMETERS; AND CHANNEL 4 (IR WINDOW), 10.5 TO 11.5 MICROMETERS. ALL FOUR CHANNELS HAVE A RESOLUTION OF 0.12 X 1 AT 300 K AND 0.5 X 1 AT 260 K. DATA RECEIVED ON BOARD ARE TRANSMITTED TO GROUND STATIONS AT A RATE OF 56 Kbps USING 2-KB DATA BLOCKS. THE receiving states, NOAA-NESS STAFF.

SPACECRAFT COMMON NAME: NOAA-E
 amy of the three instruments designed to determine radiances needed to calculate temperatures and winds. The instrument is a four-channel scanning radiometer capable of providing global daytime and nighttime surface temperature, ice, snow, and cloud information. These data are obtained on a daily basis for use in weather analysis and forecasting. The multispectral radiometer operates in the scanning mode and measures emitted and reflected radiation in the following spectral intervals: Channel 1 (visible), 0.55 to 0.71 micrometers; Channel 2 (IR window), 3.70 to 4.15 micrometers; Channel 3 (IR window), 8.25 to 9.2 micrometers; and Channel 4 (IR window), 10.5 to 11.5 micrometers. All four channels have a resolution of 0.12 x 1 at 300 K and 0.5 x 1 at 260 K. Data received on board are transmitted to ground stations at a rate of 56 kbps using 2-kb data blocks. The receiving states, NOAA-NESS STAFF.

BRIEF DESCRIPTION
THE NOAA-D OPERATIONAL SOUNDER CONSISTS OF THREE INSTRUMENTS DESIGNED TO DETERMINE RADIANCES NEEDED TO CALCULATE TEMPERATURES AND WINDS OF THE ATMOSPHERE FROM THE SURFACE TO THE STRATOSPHERE (APPROXIMATELY 1 MB). THE FIRST INSTRUMENT, THE MICROPHOTONIC SOUNDER UNIT, IS A 2-CHANNEL UNIT WHICH MAKES MEASUREMENTS IN THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1, 6.3-MICROMETER CO2 BAND; CHANNEL 2, 10.6-MICROMETER OZONE BAND. THE SECOND INSTRUMENT, THE 12-CHANNEL INFRARED SOUNDER, MAKES MEASUREMENTS IN THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 TO 7, 13-TO 14.5-MICROMETER ATMOSPHERIC WATER VAPOR BANDS; CHANNEL 8, 14.5 TO 14.6 MICROMETERS; CHANNEL 9, 18.3 TO 18.4 MICROMETERS; CHANNEL 10, 20.4 TO 20.6 MICROMETERS; AND CHANNEL 11, 21.8 TO 22.0 MICROMETERS. THE SOUNDER INSTRUMENTS THE STRATOSPHERIC SOUNDING UNIT, WHICH HAS THREE CHANNELS OPERATING AT 6.07 MICROMETERS USING SELECTIVE ABBSORPTION TO PASS THE INCOMING RADIATION THROUGH
PERSONNEL: F. C. BOSTROm APPLIED PHYSICS LAB

BRIEF DESCRIPTION: THIS EXPERIMENT IS AN EXTENSION OF THE SOLAR PROTON MONITOR EXPERIMENT FLIGHTED ON THE LEO-II SPACECRAFT IN 1969. THE EXPERIMENT PACKAGE CONSISTS OF FOUR DETECTOR SYSTEMS AND A DATA PROCESSING UNIT. THE LOW-ENERGY PROTON ALPHATRACK TRACKER (LEPT) SEPARATELY MEASURES IN FIVE ENERGY RANGES BOTH PROTONS BETWEEN 150 KEV AND 60 MEV AND ALPHA PARTICLES BETWEEN 150 KEV AND 25 MEV. THERE ARE TWO LEPT DETECTORS IN THE ANTISUN AND ANTI-EARTH DIRECTIONS WITH 60-DEG VIEWING CONES. THE PROTON UNBROKEN TRACKER (UPT) MEASURES PROTONS ABOVE 150 KEV AND PROTONS AND ELECTRONS (UNCOUPLABLE) ABOVE 7 KEV. THE HIGH-ENERGY PROTON ALPHATRACK TELESCOPE (HEPT) HAS A 10-SEC VIEWING CONE VIEWED IN THE DIRECTION OF PROTON AND ALPHA PARTICLES ABOVE 600 MEV.
AND 60 MEV ELECTRONS ABOVE 142 KEV, AND PROTONS AND ELECTRONS (SPECTRAL INTERVALS 9 TO 300 KEV). THE HIGH-ENERGY PROTON ALPHA TELESCOPE (HPAT) HAS A 30-DEG VIEWING CONE. VIEW IN THE EARTH-SUN DIRECTION. IT MEASURES PROTONS ABOVE 60 MEV AND PROTONS AND ALPHA PARTICLES ABOVE 1 MEV. THE TOTAL ENERGY DETECTOR (TED) MEASURES TOTAL ENERGY ABOVE 1 KEV.

NOAA-F, NESS STAFF

INVESTIGATION NAME: ADVANCED HIGH RESOLUTION RADIOMETER (AVHRR)

NSSC 10 - NOAA-F G09 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS INVESTIGATION DISCIPLINES: METEOROLOGY

PERSONNEL PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE NOAA-F ADVANCED HIGH RESOLUTION RADIOMETER (AVHRR) IS A FOUR-CHANNEL SCANNING RADIOMETER CAPABLE OF PROVIDING INFORMATION ON THE SURFACE AND AIR TEMPERATURE, SEA SURFACE TEMPERATURE, CLOUD COVER, AND CLOUD INFORMATION. THESE DATA ARE OBTAINED ON A DAILY BASIS FOR USE IN WEATHER FORECASTS AND FORECASTING. THE MULTISPECTRAL RADIOMETER OPERATES IN THE FOLLOWING SPECTRAL INTERVALS: CHANNEL 1 (VIS/BAND) 0.58 TO 0.68 MICROMETERS, CHANNEL 2 (IR) 0.80 TO 0.90 MICROMETERS, CHANNEL 3 (IR) 3.52 TO 3.70 MICROMETERS, AND CHANNEL 4 (IR WINDOW) 3.92 TO 4.10 MICROMETERS. ALL FOUR CHANNELS HAVE A SPATIAL RESOLUTION OF 1.1 KM, AND THE TWO IR CHANNELS HAVE A THERMAL RESOLUTION OF 1.15 DEG K. THE AVHRR IS OPERATING IN BOTH REAL-TIME AND RECORDED MODES. REAL-TIME DATA ARE TRANSMITTED TO GROUND STATIONS BOTH AT LOW (4 KM) RESOLUTION VIA AUTOMATIC PICTURE TRANSMISSION (APT) AND AT HIGH (1 KM) HIGH-RESOLUTION PICTURE TRANSMISSION (HRPT). DATA RECORDED ON BOARDS ARE AVAILABLE FOR CENTRAL PROCESSING. THEY INCLUDE GLOBAL AREA COVERAGE (GAC) DATA, A RESOLUTION OF 0.5 KM, AND LOCAL AREA COVERAGE (LAC) DATA, WHICH CONTAIN DATA FROM SELECTED PORTIONS OF EACH UNIT. WITH A 0.7 KEV RESOLUTION, IDENTICAL EXPERIMENTS ARE FLOWN ON THE OTHER SPACECRAFT IN THE TIROS-N/NOAA SERIES.

NOAA-F, NESS STAFF

INVESTIGATION NAME: OPERATIONAL VERTICAL SOUNDER

NSSC 10 - NOAA-F G02 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATIONS INVESTIGATION DISCIPLINES: METEOROLOGY

PERSONNEL PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE NOAA-F OPERATIONAL SOUNDER CONSISTS OF THREE INSTRUMENTS DESIGNED TO DETERMINE RADIANCES NEEDED TO CALCULATE TEMPERATURE PROFILES AND PROBABLE TEMPERATURES OF THE ATMOSPHERE FROM THE SURFACE TO THE STRATOSPHERE (APPROXIMATELY 3 MBS). THE FIRST INSTRUMENT, THE BASIC SOUNDING UNIT (BSU), HAS 14 CHANNELS MAKES MEASUREMENTS IN THE FOLLOWING SPECTRAL INTERVALS: CHANNEL 1 - 0.3 TO 0.4 MICROMETERS (VIS), CHANNEL 2 - 0.4 TO 0.5 MICROMETERS, CHANNEL 3 - 0.5 TO 0.6 MICROMETERS, CHANNEL 4 - 0.6 TO 0.7 MICROMETERS, CHANNEL 5 - 0.7 TO 0.8 MICROMETERS, CHANNEL 6 - 0.8 TO 1.1 MICROMETERS, CHANNEL 7 - 1.1 TO 1.2 MICROMETERS, CHANNEL 8 - 1.2 TO 1.3 MICROMETERS, CHANNEL 9 - 1.3 TO 1.4 MICROMETERS, CHANNEL 10 - 1.4 TO 1.5 MICROMETERS, CHANNEL 11 - 1.5 TO 1.6 MICROMETERS, CHANNEL 12 - 1.6 TO 1.7 MICROMETERS, CHANNEL 13 - 1.7 TO 1.8 MICROMETERS, CHANNEL 14 - 1.8 TO 1.9 MICROMETERS. THE SECOND INSTRUMENT, THE STRATOSPHERIC SOUNDER UNIT, HAS THREE CHANNELS OPERATING AT 1.07, 1.67, AND 2.7 MICROMETERS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH PRESSURE MODULATED CELLS CONTAINING EUO. THE THIRD INSTRUMENT, THE MICROWAVE SOUNDER UNIT, HAS FOUR CHANNELS OPERATING IN THE 50 TO 60 GHZ (53.3, 53.7, 54.0, AND 57.9) TO OBTAIN TEMPERATURE PROFILES WHICH ARE FREE OF CLOUD INTERFERENCE. THE INSTRUMENTS USES CROSS-COHORE SCANNING DEVICES UTILIZING A STEP TO PROVIDE TRAVERSAL SCAN WHILE THE OPTIMAL MOTION OF THE SATELLITE PROVIDES SCANNING IN THE OPTIMAL DIRECTION. IDENTICAL EXPERIMENTS ARE FLOWN ON OTHER SPACECRAFT IN THE TIROS-N/NOAA SERIES.

NOAA-F, NESS STAFF

INVESTIGATION NAME: DATA COLLECTION SYSTEM (DCS) INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATION INVESTIGATION DISCIPLINES: METEOROLOGY

PERSONNEL PI - NESS STAFF NOAA-NESS

NOAA-G, NESS STAFF

INVESTIGATION NAME: ADVANCED HIGH RESOLUTION RADIOMETER (AVHRR)

NSSC 10 - NOAA-G G03 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATION INVESTIGATION DISCIPLINES: METEOROLOGY

PERSONNEL PI - NESS STAFF NOAA-NESS

BRIEF DESCRIPTION THE NOAA-G ADVANCED HIGH RESOLUTION RADIOMETER (AVHRR) IS A FOUR-CHANNEL SCANNING RADIOMETER CAPABLE OF PROVIDING INFORMATION ON THE SURFACE AND AIR TEMPERATURE, SEA SURFACE TEMPERATURE, CLOUD COVER, AND CLOUD INFORMATION. THESE DATA ARE OBTAINED ON A DAILY BASIS FOR USE IN WEATHER FORECASTS AND FORECASTING. THE MULTISPECTRAL RADIOMETER OPERATES IN THE FOLLOWING SPECTRAL INTERVALS: CHANNEL 1 (VIS/BAND) 0.58 TO 0.68 MICROMETERS, CHANNEL 2 (IR) 0.80 TO 0.90 MICROMETERS, CHANNEL 3 (IR) 3.52 TO 3.70 MICROMETERS, AND CHANNEL 4 (IR WINDOW) 3.92 TO 4.10 MICROMETERS. ALL FOUR CHANNELS HAVE A SPATIAL RESOLUTION OF 1.1 KM, AND THE TWO IR CHANNELS HAVE A THERMAL RESOLUTION OF 1.15 DEG K. THE AVHRR IS OPERATING IN BOTH REAL-TIME AND RECORDED MODES. REAL-TIME DATA ARE TRANSMITTED TO GROUND STATIONS BOTH AT LOW (4 KM) RESOLUTION VIA AUTOMATIC PICTURE TRANSMISSION (APT) AND AT HIGH (1 KM) HIGH-RESOLUTION PICTURE TRANSMISSION (HRPT). DATA RECORDED ON BOARDS ARE AVAILABLE FOR CENTRAL PROCESSING. THEY INCLUDE GLOBAL AREA COVERAGE (GAC) DATA, A RESOLUTION OF 0.5 KM, AND LOCAL AREA COVERAGE (LAC) DATA, WHICH CONTAIN DATA FROM SELECTED PORTIONS OF EACH UNIT. WITH A 0.7 KEV RESOLUTION, IDENTICAL EXPERIMENTS ARE FLOWN ON THE OTHER SPACECRAFT IN THE TIROS-N/NOAA SERIES.

NOAA-G, NESS STAFF

INVESTIGATION NAME: SPACE ENVIRONMENT MONITOR

NSSC 10 - NOAA-G G09 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATION INVESTIGATION DISCIPLINES: MAGNETIC FIELD PHYSICS

PERSONNEL PI - C.G. DOSTROM APPLIED PHYSICS LAB

BRIEF DESCRIPTION THIS EXPERIMENT IS AN EXTENSION OF THE SOLAR PROTON MONITORING EXPERIMENT FLOWN ON THE NOAA-H SPACECRAFT. THE EXPERIMENT PACKAGE CONSISTS OF FOUR DETECTOR SYSTEMS AND A DATA PROCESSING UNIT. THE LOW-ENERGY PROTON ALPHA TELESCOPE (LEPAI) SEPARATELY MEASURES IN FIVE ENERGY RANGES BOTH PROTONS BETWEEN 175 KEV AND 40 MEV AND ALPHA PARTICLES BETWEEN 175 KEV AND 20 MEV. THERE ARE TWO LEPAI VIEWING IN THE ANTI-SUN AND ANTI-EARTH DIRECTIONS WITH 60-DEG VIEWING CONES. THE PROTON ONE-DIRECTIONAL DETECTOR (POD) MEASURES PROTONS ABOVE 10 KEV AND PROTONS AND ELECTRONS (UNSEPARABLE) ABOVE 750 KEV. THE HIGH-ENERGY PROTON ALPHA TELESCOPE (HEPAT) HAS A 50-DEG VIEWING CONE IN THE ANTI-EARTH DIRECTION AND IT MEASURES PROTONS ABOVE 140 KEV AND PROTONS AND ELECTRONS (UNSEPARABLE) ABOVE 750 KEV. THE TOTAL ENERGY DETECTOR (TED) MEASURES TOTAL ENERGY ABOVE 1 KEV.

NOAA-G, NESS STAFF

INVESTIGATION NAME: SPACE ENVIRONMENT MONITOR

NSSC 10 - NOAA-G G09 INVESTIGATIVE PROGRAM OPERATIONAL WEATHER OBSERVATION INVESTIGATION DISCIPLINES: MAGNETIC FIELD PHYSICS

PERSONNEL PI - C.G. DOSTROM APPLIED PHYSICS LAB

BRIEF DESCRIPTION THIS EXPERIMENT IS AN EXTENSION OF THE SOLAR PROTON MONITORING EXPERIMENT FLOWN ON THE NOAA-H SPACECRAFT. THE EXPERIMENT PACKAGE CONSISTS OF FOUR DETECTOR SYSTEMS AND A DATA PROCESSING UNIT. THE LOW-ENERGY PROTON ALPHA TELESCOPE (LEPAI) SEPARATELY MEASURES IN FIVE ENERGY RANGES BOTH PROTONS BETWEEN 175 KEV AND 40 MEV AND ALPHA PARTICLES BETWEEN 175 KEV AND 20 MEV. THERE ARE TWO LEPAI VIEWING IN THE ANTI-SUN AND ANTI-EARTH DIRECTIONS WITH 60-DEG VIEWING CONES. THE PROTON ONE-DIRECTIONAL DETECTOR (POD) MEASURES PROTONS ABOVE 10 KEV AND PROTONS AND ELECTRONS (UNSEPARABLE) ABOVE 750 KEV. THE HIGH-ENERGY PROTON ALPHA TELESCOPE (HEPAT) HAS A 50-DEG VIEWING CONE IN THE ANTI-EARTH DIRECTION AND IT MEASURES PROTONS ABOVE 140 KEV AND PROTONS AND ELECTRONS (UNSEPARABLE) ABOVE 750 KEV. THE TOTAL ENERGY DETECTOR (TED) MEASURES TOTAL ENERGY ABOVE 1 KEV.

NOAA-G, NESS STAFF
PERSONNEL
PI - NESS STAFF
NOAA-NESS

BRIEF DESCRIPTION
The NOAA-G Advanced Very High Resolution Radiometer (AVHRR) will be a nine channel scanning radiometer capable of providing global daytime and nighttime sea surface temperature, ice, snow, and cloud information. These data will be obtained on a daily basis for use in weather analysis and forecasting.

The multi spectral radiometer will operate in the scanning mode and will mean humidity and derive the surface temperature from the following spectral intervals -- Channel 1 (visible) 0.55 to 0.7 micrometers (710), 0.75 to 1.1 micrometers (790), 1.55 to 1.75 micrometers (1190), and 3.55 to 3.95 micrometers. All four channels will have a spatial resolution of 1.1 km, and the two infrared windows channels will have a thermal resolution of 0.12 degree at 300 deg K. The AVHRR will be capable of operating in both real-time or recorded mode. Real-time or direct readout data will be transmitted to ground stations both at low (6 km) resolution via automatic tracking stations and at high (4 km) resolution via high resolution picture transmission (HRPT). Data recorded on board will be available for on-board processing. They include global area coverage (GAC) data, which will have a resolution of 4 km and local area coverage (LCG) data, which will contain data from selected portions of each orbit with a 1 km resolution.

Infrared experiments will be flown on all other spacecraft in the TIROS-N/G7 series.

... NOAA-G NESS STAFF...

INVESTIGATION NAME-
NSSDC 19- NOAA-G-01 INVESTIGATIVE PROGRAM WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)
METEOROLOGY

BRIEF DESCRIPTION
The NOAA-G Operational Sounder will consist of three instruments designed to determine radiance needed to calculate temperature and humidity profiles of the atmosphere from the surface to the stratosphere approximately 100 mi. The first instrument, the Basic Scanning Unit (BSU), will have four channels and will make measurements in the following spectral intervals: Channel 1 - the 3.7 micrometer window region, Channel 2 - the 1.1 micrometer ozone (9.7) band, Channel 3 - the 1.1 micrometer window region, and Channels 4 through 7 - the 1.3 micrometer carbon monoxide band (9.6 ± 0.7, 14.7, 15.0). The second instrument, the Stratospheric Ozone Unit, will have three channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz. The third instrument, the Aerosol (Aerosol) Unit, will have four channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz and will be used to derive aerosol temperature profiles which are free of cloud interference. The instruments will be cross-coupled and cross-calibrated to improve the accuracy of the measurements.

The aerosol unit will operate in the high (1000 km) resolution mode. The aerosol unit will provide data on the aerosol content of the atmosphere, which will be used to derive temperature and humidity profiles.

The stratospheric ozone unit will operate in both high (1000 km) and low (4 km) resolution modes. The stratospheric ozone unit will provide data on the ozone content of the atmosphere, which will be used to derive temperature and humidity profiles.

The operational sounder will be flown on the TIROS-N/G7 series.

... NOAA-G NESS STAFF...

INVESTIGATION NAME-
NSSDC 10- NOAA-G-02 INVESTIGATIVE PROGRAM WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)
METEOROLOGY

BRIEF DESCRIPTION
The NOAA-G Operational Sounder will consist of three instruments designed to determine radiance needed to calculate temperature and humidity profiles of the atmosphere from the surface to the stratosphere approximately 100 mi. The first instrument, the Basic Scanning Unit (BSU), will have four channels and will make measurements in the following spectral intervals: Channel 1 - the 3.7 micrometer window region, Channel 2 - the 1.1 micrometer ozone (9.7) band, Channel 3 - the 1.1 micrometer window region, and Channels 4 through 7 - the 1.3 micrometer carbon monoxide band (9.6 ± 0.7, 14.7, 15.0). The second instrument, the Stratospheric Ozone Unit, will have three channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz. The third instrument, the Aerosol (Aerosol) Unit, will have four channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz and will be used to derive aerosol temperature profiles which are free of cloud interference. The instruments will be cross-coupled and cross-calibrated to improve the accuracy of the measurements.

The aerosol unit will operate in the high (1000 km) resolution mode. The aerosol unit will provide data on the aerosol content of the atmosphere, which will be used to derive temperature and humidity profiles.

The stratospheric ozone unit will operate in both high (1000 km) and low (4 km) resolution modes. The stratospheric ozone unit will provide data on the ozone content of the atmosphere, which will be used to derive temperature and humidity profiles.

The operational sounder will be flown on the TIROS-N/G7 series.

... NOAA-G NESS STAFF...

INVESTIGATION NAME-
NSSDC 10- NOAA-G-03 INVESTIGATIVE PROGRAM WEATHER OBSERVATIONS

INVESTIGATION DISCIPLINE(S)
METEOROLOGY

BRIEF DESCRIPTION
The NOAA-G Operational Sounder will consist of three instruments designed to determine radiance needed to calculate temperature and humidity profiles of the atmosphere from the surface to the stratosphere approximately 100 mi. The first instrument, the Basic Scanning Unit (BSU), will have four channels and will make measurements in the following spectral intervals: Channel 1 - the 3.7 micrometer window region, Channel 2 - the 1.1 micrometer ozone (9.7) band, Channel 3 - the 1.1 micrometer window region, and Channels 4 through 7 - the 1.3 micrometer carbon monoxide band (9.6 ± 0.7, 14.7, 15.0). The second instrument, the Stratospheric Ozone Unit, will have three channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz. The third instrument, the Aerosol (Aerosol) Unit, will have four channels operating in the 50 to 60 GHz oxygen band (30.3, 30.7, 30.9), and 70 to 80 GHz and will be used to derive aerosol temperature profiles which are free of cloud interference. The instruments will be cross-coupled and cross-calibrated to improve the accuracy of the measurements.

The aerosol unit will operate in the high (1000 km) resolution mode. The aerosol unit will provide data on the aerosol content of the atmosphere, which will be used to derive temperature and humidity profiles.

The stratospheric ozone unit will operate in both high (1000 km) and low (4 km) resolution modes. The stratospheric ozone unit will provide data on the ozone content of the atmosphere, which will be used to derive temperature and humidity profiles.

The operational sounder will be flown on the TIROS-N/G7 series.
A radar altimeter is used to obtain information on the interior altitude of Venus. The weight of the instrument is 9.0 kg (20 lb) and the power consumption is 25 W.

INVESTIGATION NAME: RADAR SCIENCE TEAM

PERSONNEL

PI - J.W. HANSEN
CI - J.P. CONNER
CI - R.W. KLEESAOEL
CI - I.B. STRONG
CI - M.B. GRACE
CI - T.P. DONAHUE
CI - R.E. SPALDING
CI - D.L. DRACE
CI - A. PEDERSEN
CI - R.W. KLEESAOEL
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CI - R.W. KLEESAOEL
CI - I.B. STRONG
CI - M.B. GRACE
CI - T.P. DONAHUE
CI - R.E. SPALDING
CI - D.L. DRACE
CI - A. PEDERSEN
CI - R.W. KLEESAOEL
CI - I.B. STRONG
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CI - A. PEDERSEN
CI - R.W. KLEESAOEL
CI - I.B. STRONG
CI - M.B. GRACE
CI - T.P. DONAHU
PERSONNEL
PI - H.C. KNAPP
G1 - K. SPINNER
G1 - R.C. WHITTEN

BRIEF DESCRIPTION
The instrument proposed for this experiment is a Langmuir probe, retaining the potential analyzer designed to measure electron concentration and temperature, major ion concentrations and temperatures, ion drift velocities, and the energy distribution function of ambient photodetected charged particles. An adaptation of the instrument flown on a satellite in 1972. Each of two sensors may be used, each consisting of a multigrid cup and electronometer, which operates in electron, ion, or photodetector modes, initiated by spacecraft roll pulses. The measurements taken when the sensor axis is closest to the plasma flow velocity vector are transmitted. The aims of the investigation are to improve the knowledge of anisotropic ion drift reflections in the Venusian ionosphere, to study the plasma transport processes to determine if Venus has a polar wind, and to study similar aims concerning the ambient electron population.

INVESTIGATION NAME- PARTICIPATING THEORIST NEUMANN
NSDC ID- P107808-08
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
GEODESY AND CARTOGRAPHY
PLANETOLOGY

PERSONNEL
PI - H. NEUMANN
G1 - U.S. Geological Survey
G1 - R.C. WHITTEN

BRIEF DESCRIPTION
Surface profile, roughness, and electrical properties data from the Pioneer Venus investigation are analyzed in conjunction with spacecraft-served gravity information and topographic maps. The initial data includes two-dimensional, topographic data to produce a series of cartographic and geologic maps. The initial data includes the maps and information inferred from the Earth-based radar data sources. The information is then utilized to produce a shaded relief cartographic map that displays the Venusian geologic information. The cartographic map base will provide a high-altitude map that will be added to the three-dimensional cartographic and geologic maps of scientifically interesting Venusian surface features that may also be produced.

INVESTIGATION NAME- PARTICIPATING THEORIST KELLAGH
NSDC ID- P107808-09
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
GEODESY AND CARTOGRAPHY
PLANETOLOGY

PERSONNEL
PI - G.E. REYNOLDS
G1 - U. of Massachusetts
G1 - R.S. WAGNER

BRIEF DESCRIPTION
Investigations of the topography and geology of Venus are undertaken to assure correct recognition of topographic and geologic characteristics of the planet and to arrive at the geologic and geophysical interpretation of these characteristics.

INVESTIGATION NAME- PARTICIPATING THEORIST NAGY
NSDC ID- P107808-10
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
astronomy
planetary ionosphere
planetary atmospheres

PERSONNEL
PI - D.L. NAGY
G1 - U. of Michigan

BRIEF DESCRIPTION
Investigations of the ionosphere of Venus are undertaken by extending current models and formulating a mission plan best suited to address topics including the physics of the solar wind-ionosphere interaction, energetic particles of the upper atmosphere, ion chemistry, and the processes responsible for the general structure of the ionosphere, including mechanisms responsible for the maintenance of the nighttime ionosphere.

-------- PIONEER VENUS ORBITER: MASUREK ------

INVESTIGATION NAME- NEUTRAL PARTICLE MASS SPECTROMETER
NSDC ID- P107808-11
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
AGHETOSHERIC PHYSICS
PLANETARY ATMOSPHERES

PERSONNEL
PI - H.C. NEUMANN
G1 - U. of Michigan
G1 - R. SPINNER
G1 - H.M. SPINNER

BRIEF DESCRIPTION
The experiment uses a quadrupole mass spectrometer with three ion source operating modes. The ion source can be operated alternately in open and closed configurations to increase accuracy. A simple mass spectrometer is used to reduce the bit rate required for a given information return rate. The resolution is 1.5. For a given bit rate, the mass range is 1 to 45 u. Vertical and horizontal intensity variations of the major neutral constituents of the upper atmosphere of Venus are detected and measured to define dynamic, chemical, and thermal states of the upper atmosphere. Important constituents to be measured are Ne, C, O, C2, C2H2, C2H6, C2H4, C2H2, and CO. It may also be possible to study H, D, and NO (C2H6, C3H2, and N2).

-------- PIONEER VENUS ORBITER: RUSSELL ------

INVESTIGATION NAME- TRIAXIAL FLUXGATE MAGNETOMETER
NSDC ID- P107808-12
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
AGHETOSHERIC PHYSICS
PARTICLES AND FIELDS

PERSONNEL
PI - L.S. RUSSELL
G1 - P.J. COLEMAN
G1 - F.A. COLEMAN
G1 - C. KENNEDY
G1 - R.L. SISCOE
G1 - G.E. NEUMANN

BRIEF DESCRIPTION
This experiment consists of a triaxial magnetometer to measure the electric field and to study the solar wind and the ionosphere. The objectives are to determine magnetic field at different positions in the Venusian magnetosphere, and to study the solar wind and the ionosphere structure of the Venetian bow shock. The primary objectives are to determine the perturbations of the near-planet region by Venus, and to compare the properties of the average field at 1.0 AU. The instrument is constructed to measure the interplanetary region in the apogee mode, the sample rate 12 vectors per 9 s. The sample is planned to be four vectors per s.

-------- PIONEER VENUS ORBITER: SCARF ------

INVESTIGATION NAME- ELECTRIC FIELD DETECTOR
NSDC ID- P107808-13
INVESTIGATIVE PROGRAM CODE SL
INVESTIGATION DISCIPLINE(S)
AGHETOSHERIC PHYSICS
PARTICLES AND FIELDS

PERSONNEL
PI - A.F. SCARF
G1 - I.E. GREEN

BRIEF DESCRIPTION
This experiment consists of a modified version of the Pioneer 8 and Pioneer 8 experiments to measure the electric field components in four 90° channels centered at 100, 730, 7350, and 30,000 Hz. The aims of the experiment are to perform measurements at Venus to elucidate the plasma interactions between the solar wind and the ionosphere, and the role of plasma instabilities in modifying the heat fluxes from the solar wind into the ionosphere. The instrument includes a self-contained balance of V-type antenna with a differential preamplifier that is frequency scanned to make the measurements. The sample rate is 1 per s.
PIONEER VENUS ORBITER, SCHUBERT

INVESTIGATION NAME- PARTICIPATING THEORIST SCHUBERT

NSSDC ID- P10705-14 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)
IONOSPHERIC PHYSICS
PLANETARY ATMOSPHERES

PERSONNEL
SCHUBERT U OF CALIF, LA

BRIEF DESCRIPTION
MEASUREMENTS OF PLASMA TEMPERATURES, MAGNETIC FIELDS, COMPOSITION, AND OTHER DATA ARE USED TO DEVELOP AND TEST THEORIES OF ATMOSPHERIC CIRCULATION AND SOLAR WIND-IONOSPHERE INTERACTIONS. IN THE CASE OF THE TOPOGRAPHY AND GRAVITY, THE DATA (ALTIMETRY AND TRACKING) ARE USED BOTH IN DESCRIPTIVE FASHION TO SIMPLY CHARACTERIZE THE SURFACE OF VENUS AND ITS ORBITATION FIELD, AND IN A MORE QUANTITATIVE WAY TO MODEL THE INTERNAL STRUCTURE OF THE PLANET.

PIONEER VENUS ORBITER, STEWART

INVESTIGATION NAME- PROGRAMMABLE ULTRAVIOLET SPECTROMETER

NSSDC ID- P10705-15 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)
PLANETARY ATMOSPHERES
ASTRONOMY
IONOSPHERES

PERSONNEL
PI - A.L. STEWART U OF COLORADO
01 - C.A. BARTH U OF COLORADO
01 - C.W. HORD U OF COLORADO
01 - G.E. THOMAS U OF COLORADO
01 - G. ANDERSON U OF COLORADO

BRIEF DESCRIPTION
THE ENERGY RANGE IS 50-8000 EV IN 32 STEPS AND 1-500 ELECTRONS IN 16 STEPS. THE ANGULAR RANGE COVERED IS PLUS OR MINUS 85 DEG ELEVATION BY 360 DEG ALTIMUTH AND THE DETECTOR FIELD OF VIEW IS 15.2 ANG. THE OBJECTIVES ARE TO MEASURE SOLAR WIND CONDITIONS OUTSIDE THE VENETIAN LOW SHOCK INSIDE THE MAGNETOSHEATH FLOW FIELD, AND TO STUDY THE IMPRESS STRUCTURE. SOLAR WIND MEASUREMENTS ARE MADE DURING THE TRANSIT TO VENUS, PARTICULARLTY TO STUDY MACROSCOPIC PROBLEMS AND TO DETERMINE AVERAGE GRADIENTS. THE NEAR-VENUS WIDE REGION IS ALSO AVAILABLE FOR STUDY.

PIONEER VENUS ORBITER, TAYLOR

INVESTIGATION NAME- RADIOMETRIC TEMPERATURE-SOUNDING EXPERIMENT

NSSDC ID- P10705-16 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)
PLANETARY ATMOSPHERES
ASTRONOMY

PERSONNEL
PI - J.R. TAYLOR NASA-JPL
01 - R.K. AURIAN NASA-JPL
01 - R. CHANCE NASA-JPL
01 - C.B. FARMER NASA-JPL
01 - J. MARTIN NASA-JPL
01 - J.A. FISHER CALTECH Inst. TECH
01 - J.J. HOCKINC OXFORD U
01 - G.H. FRANKLIN CALTECH Inst. TECH
01 - C.B. HOCKING OXFORD U
01 - J.J. WILLIAMS CALTECH Inst. TECH
01 - G. DICKINSON NAVY CTR FOR ATMOS RES
01 - J.F. VILLE NAVY CTR FOR ATMOS RES

BRIEF DESCRIPTION
THE INSTRUMENT IS A QUADRISPHERICAL ELECTROMAGNETIC ANALYZER DETECTOR BY OF THE PIONEERS (CALIF PLASMA INSTRUMENT) WITH FIVE CURRENT COLLECTIONS AND ELECTROMETERS. THE ENERGY-RANGE RANGE IS 50-8000 EV IN 32 STEPS AND 1-500 ELECTRONS IN 16 STEPS. THE ANGULAR RANGE COVERED IS PLUS OR MINUS 85 DEG ELEVATION BY 360 DEG ALTIMUTH AND THE DETECTOR FIELD OF VIEW IS 15.2 ANG. THE OBJECTIVES ARE TO MEASURE SOLAR WIND CONDITIONS OUTSIDE THE VENETIAN LOW SHOCK INSIDE THE MAGNETOSHEATH FLOW FIELD, AND TO STUDY THE IMPRESS STRUCTURE. SOLAR WIND MEASUREMENTS ARE MADE DURING THE TRANSIT TO VENUS, PARTICULARLY TO STUDY MACROSCOPIC PROBLEMS AND TO DETERMINE AVERAGE GRADIENTS. THE NEAR-VENUS WIDE REGION IS ALSO AVAILABLE FOR STUDY.

PIONEER VENUS ORBITER, BARTH

INVESTIGATION NAME- ION MASS SPECTROMETER

NSSDC ID- P10705-17 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)
PLANETARY ATMOSPHERES
IONOSPHERES

PERSONNEL
PI - R.A. TAYLOR NASA-JPL
01 - S.J. DAVIS NASA-JPL
01 - R.E. MARTIN NASA-JPL
01 - J.R. BRIGHAM NASA-JPL
01 - J.W. HARMAN NASA-JPL
01 - T.M. BOWMANN U OF MICHIGAN
01 - F.A. CLOUFIER RICE U
01 - F.C. MICHEL RICE U

BRIEF DESCRIPTION
THE INSTRUMENT IS A BENNETT HIGH-FREQUENCY MASS SPECTROMETER BASED ON THE DESIGN OF THOSE FLOW ON DSC AND ATMOSPHERIC EXPLORER. THE MS RANGE OF 1 TO 50 U IS COVERED WITH A VARIETY OF AUTOMATIC SCAN-SEARCH MODES AVAILABLE.

PIONEER VENUS ORBITER, WOLF

INVESTIGATION NAME- SOLAR WIND PLASMA DETECTOR

NSSDC ID- P10705-18 INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINE(S)
SPACE PLASMAS
PARTICLES AND FIELDS

PERSONNEL
PI - J.H. WOLFE NASA-ARC
01 - A. BARNES NASA-ARC
01 - R.H. COLLINS NASA-ARC
01 - G. MCKEOWN NASA-ARC
01 - J.J. MILLIKEN NASA-ARC
01 - R.C. WITHEART NASA-ARC
01 - R.E. ENTICILLATOR U OF SOUTHERN CALIF

BRIEF DESCRIPTION
THE INSTRUMENT IS A QUADRISPHERICAL ELECTROMAGNETIC ANALYZER DETECTOR BY OF THE PIONEERS (CALIF PLASMA INSTRUMENT) WITH FIVE CURRENT COLLECTIONS AND ELECTROMETERS. THE ENERGY-RANGE RANGE IS 50-8000 EV IN 32 STEPS AND 1-500 ELECTRONS IN 16 STEPS. THE ANGULAR RANGE COVERED IS PLUS OR MINUS 85 DEG ELEVATION BY 360 DEG ALTIMUTH AND THE DETECTOR FIELD OF VIEW IS 15.2 ANG. THE OBJECTIVES ARE TO MEASURE SOLAR WIND CONDITIONS OUTSIDE THE VENETIAN LOW SHOCK INSIDE THE MAGNETOSHEATH FLOW FIELD, AND TO STUDY THE IMPRESS STRUCTURE. SOLAR WIND MEASUREMENTS ARE MADE DURING THE TRANSIT TO VENUS, PARTICULARLY TO STUDY MACROSCOPIC PROBLEMS AND TO DETERMINE AVERAGE GRADIENTS. THE NEAR-VENUS WIDE REGION IS ALSO AVAILABLE FOR STUDY.

PIONEER VENUS PROBE B US

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE BUS

NSSDC ID- P10705-19 LAUNCH DATE- 08/20/75
WEIGHT- 380, KC
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS

SPONSORING COUNTRY/JURISDO 110E
UNITED STATES NASA-GSFC
PLANNED ORBIT PARAMETERS
**MEASUREMENTS BY THE PROBES AND ORBITER PERMIT RELATING SPECIFIC CIRCULATION TO THE GENERAL STATE OF THE PLANET AND ITS ENVIRONMENT AS OBSERVED FROM ORBIT.**

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**INVESTIGATION NAME:** PARTICIPATING THEORIST BAUER  
**NSSDC ID:** P107PA-08  
**INVESTIGATIVE PROGRAM CODE SL**  
**INVESTIGATION DISCIPLINE(S):** Planetary Atmospheres, Aeronomy, Interplanetary Physics, Ionospheres

**PERSONNEL**  
**PI:** S.J. BAUER  
**NASA-GSFC**

**BRIEF DESCRIPTION**  

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**INVESTIGATION NAME:** PARTICIPATING THEORIST HUNTER  
**NSSDC ID:** P107PA-11  
**INVESTIGATIVE PROGRAM CODE SL**  
**INVESTIGATION DISCIPLINE(S):** Planetary Atmospheres, Aeronomy, Meteorology

**PERSONNEL**  
**PI:** S.M. HUNTER  
**KITT PEAK NMT OBS**

**BRIEF DESCRIPTION**  

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**INVESTIGATION NAME:** PARTICIPATING THEORIST GOODY  
**NSSDC ID:** P107PA-09  
**INVESTIGATIVE PROGRAM CODE SL**  
**INVESTIGATION DISCIPLINE(S):** Planetary Atmospheres, Aeronomy, Meteorology

**PERSONNEL**  
**PI:** R.M. GOODY  
**HARVARD U**

**BRIEF DESCRIPTION**  

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**INVESTIGATION NAME:** PARTICIPATING THEORIST HUNTER  
**NSSDC ID:** P107PA-12  
**INVESTIGATIVE PROGRAM CODE SL**  
**INVESTIGATION DISCIPLINE(S):** Planetary Atmospheres, Aeronomy, Meteorology

**PERSONNEL**  
**PI:** D.R. HUNTER  
**KITT PEAK NMT OBS**

**BRIEF DESCRIPTION**  
This spacecraft is the large probe portion of the Pioneer-Venus Multiprobe Mission. This mission's principal investigator (PI) is Spencer, and it is sponsored by the PACE program. The spacecraft is carrying scientific instruments to Venus, and its objectives include studying the planet's upper atmosphere, ion concentrations, and the processes affecting the behavior of the atmosphere and clouds that take place.

- **Investigation Name:** Ion-Mass Spectrometer
- **Investigation Discipline(s):** Planetary Atmospheres
- **Principal Investigator:** U. W. Spencer, NASA-GSFC
- **Missions:** Pioneer-Venus Probe Bus, Taylor, Jr.

**Instrument Description:** This ion mass spectrometer experiment obtains measurements that provide information on the solar wind interaction with Venus. The upper atmosphere composition, Venus' upper atmosphere ion concentrations in the mass range from 1 to 60 atomic mass units (AMU), and the time of crossing Venus' bow shock to the bus are measured.

- **Investigation Name:** Neutral Particle Mass Spectrometer
- **Investigation Discipline(s):** Planetary Atmospheres
- **Principal Investigator:** W. Von Zahn, U. of Michigan
- **Missions:** Pioneer-Venus Probe Bus, Von Zahn

**Instrument Description:** This neutral particle mass spectrometer experiment will obtain measurements that provide information on the origin and evolution of Venus' atmosphere. The mass spectrometer will determine the upper atmosphere composition and the interaction of the upper atmosphere with solar radiation and the interplanetary medium. The mass spectrometer will also measure the upper atmosphere neutral molecules in the mass range 1 to 68 AMU.
BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION IS TO MEASURE THE COMPOSITION OF THE LOWER ATMOSPHERE OF VENUS. THIS INVESTIGATION USES A CHEMICAL MICRO LITHOGRAPHIC AUTOMATED SPECTROSCOPIC ANALYSIS, ABOUT 31 ANALYSES OF THE VENUSIAN ATMOSPHERE ARE PLANNED DURING THE PROBE DESCENT. A SEPARATE SAMPLE OF THE ATMOSPHERE IS ANALYZED FOR RARE GASES. THE ANALYZER HAS A MASS RANGE OF 1 TO 212 U AND A DYNAMIC RANGE OF 10^7. THE INSTRUMENT IS BASED ON A SEQUENCE FLOW PREVIOUSLY DEVELOPED.

INVESTIGATION NAME: CLOUD PARTICLE SIZE SPECTROMETER

NSSDC ID: P1078PB-05 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES AERONOMY

PERSONNEL

PI - R.M. BLANCHARD NASA-ARC
DI - T.M. HUNT NASA-ARC

BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION IS TO MEASURE VENUS' LOWER ATMOSPHERE, FROM ONTARIO NARRATIVE SIZES AND CONCENTRATIONS. A LASER IS USED TO ILLUMINATE CLOUD PARTICLES. OPTICAL LENSES WILL IMAGE THE PARTICLE SHADOWS ON AN ARRAY OF DETECTORS. THE PARTICLE SHADOWS ARE USED TO DETERMINE PARTICLE SIZE AND CONCENTRATION. THE FLUORESCENT SENSORS IS SIMILAR TO THOSE IN AIRCRAFT AND BALLOONS.

PIONEER VENUS PROBE LRG. OYAMA

INVESTIGATION NAME: GAS CHROMATOGRAPHY

NSSDC ID: P1078PB-04 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES AERONOMY

PERSONNEL

PI - J.V. OYAMA NASA-ARC
DI - J.D. POLLACK NASA-ARC
DI - B. CARLE NASA-ARC
DI - R. WOELLER NASA-ARC

BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION IS TO DETERMINE THE COMPOSITION OF VENUS' ATMOSPHERE FROM 0 TO 100 MILLIBARS. THE SCATTERED SOLAR LIGHT, AS THE PROBE DESCENDS THROUGH THE ATMOSPHERE, THE DIFFERENCE BETWEEN UPWARD-LOOKING AND DOWNWARD-LOOKING DETECTORS WILL INDICATE THE NET DOWNWARD FLOW.

PIONEER VENUS PROBE LRG. REGAN

INVESTIGATION NAME: CLOUD EXTENT, STRUCTURE, AND DIRECTION

NSSDC ID: P1078PB-02 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. REGAN NASA-ARC
DI - J.B. DRUMMOND CMN-UP1

BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTS OF A NEUROPHOTONIC TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT USES A PULSED Cesium ARSENIDE LASER TO ILLUMINATE THE CLOUDS. THE ATITUDE HISTORY OF THE BACKSCATTERED SIGNAL INDICATES THE PRESENCE AND LOCAL EIGHT OF CLOUDS ACROSS THE TRAJECTORY. COMPARES THE MEASUREMENTS FROM THE SMALL PROBE INDICATES THE LOCATION, DIRECTION, AND LOCAL EIGHT OF THE CLOUD STRUCTURE. THE LASER OPERATES AT ABOUT 4000 A. THE EXPERIMENT WEIGHS ABOUT 0.5 KG AND USES ABOUT 2.5 W OF POWER.

PIONEER VENUS PROBE LRG. SIEFF

INVESTIGATION NAME: ATMOSPHERE STRUCTURE

NSSDC ID: P1078PB-07 INVESTIGATIVE PROGRAM

INVESTIGATION DISCIPLINE(S): PLANETARY ATMOSPHERES

PERSONNEL

PI - A. SIEFF NASA-ARC
DI - D. WIESNER NASA-ARC
DI - R.C. BLANCHARD NASA-ARC
DI - R.M. KIM NASA-ARC
DI - R. YOUNG COLLEGE
DI - J. BELL US GEOLOGICAL SURVEY

BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION IS TO DETERMINE THE COMPOSITION OF VENUS' ATMOSPHERE, FROM ONTARIO NARRATIVE SIZES AND CONCENTRATIONS. A LASER IS USED TO ILLUMINATE CLOUD PARTICLES. OPTICAL LENSES WILL IMAGE THE PARTICLE SHADOWS ON AN ARRAY OF DETECTORS. THE PARTICLE SHADOWS ARE USED TO DETERMINE PARTICLE SIZE AND CONCENTRATION. THE FLUORESCENT SENSORS IS SIMILAR TO THOSE IN AIRCRAFT AND BALLOONS.
PERSONNEL

PI: C.C. CHENELMAN
OI: J.J. LAGUE
OI: R. PRINN
OI: G.H. PETTINGILL

BRIEF DESCRIPTION

This experiment involves applying differential very-long-baseline interferometric 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 are used in modeling the circulation patterns of Venus' atmosphere. Data taken prior to probe entry are used, if feasible, to infer characteristics of Venus' gravity field for use with probe entry operations as well as in later scientific evaluation.

-------- PIONEER VENUS PROBE SM, RAGENTS

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES

PERSONNEL

PI: B. RAGENT
OI: J.E. BLAMONT

BRIEF DESCRIPTION

This experiment consists of a nephelometer to measure the energy backscattered from cloud particles. It uses a pulsed gallium arsenide laser diode to illuminate the clouds. The altitude history of the backscattered signal indicates the presence and vertical extent of clouds along the trajectories. Comparisons with the measurements from the small probes indicate the spatial variability of the cloud structure. The cloud structure is about 15,000 km. The experiment weighs about 0.4 kg and uses about 1.5 W of power.

-------- PIONEER VENUS PROBE SM, SIEFF

INVESTIGATION NAME- ATMOSPHERE STRUCTURE

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES

PERSONNEL

PI: A. SIEFF
OI: L. SUMMER
OI: B.K. KIRK
OI: T. BLANCHARD
OI: C. YOUNG
OI: J. DEK

BRIEF DESCRIPTION

The instruments for this experiment include a single-axis accelerometer, pressure sensors, and temperature sensors. They are based on the technology demonstrated by the past vehicle (planetary atmosphere experiment test 97158-200). The measurements are used to construct a profile of atmosphere state properties for the large probe trajectory from the surface to approximately 140 km altitude. They are also used to determine vertical wind velocity, horizontal wind velocity, and turbulence by comparing atmospheric conditions along the large probe trajectory with those measured by the small probes. Circulation patterns of the atmosphere are determined by the instruments weigh about 1.2 kg and consume about 4 W of power.

-------- PIONEER VENUS PROBE SM, SUOMI

INVESTIGATION NAME- INFRARED RADIOMETER

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES

PERSONNEL

PI: P.J. COUPLES
OI: J.J. LAGUE
OI: R. PRINN
OI: G.H. PETTINGILL

BRIEF DESCRIPTION

This experiment involves applying differential very-long-baseline interferometric 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 are used in modeling the circulation patterns of Venus' atmosphere. Data taken prior to probe entry are used, if feasible, to infer characteristics of Venus' gravity field for use with probe entry operations as well as in later scientific evaluation.

-------- PIONEER VENUS PROBE SM2, RAGENTS

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES

PERSONNEL

PI: R. PRINN
OI: G. DANIELSON
OI: M. HEMAN

BRIEF DESCRIPTION

This spacecraft is the second small probe of the Pioneer-Venus Multiprobe mission. On this mission four instrumented atmospheric entry probes are carried by the spacecraft due to the velocity of the probe for descent through the atmosphere to the planetary surface. This small probe enters the atmosphere at one small probe and one large probe entered on the dayside of the planet. The large probe enters the atmosphere and obtains atmospheric composition data until downrange. Investigations emphasize the study of the structure composition and nature of the atmosphere down to the surface, and of the clouds. Radiation fields and energy exchange in the lower atmosphere, and local information on the atmospheric circulation patterns. A sister mission: Pioneer-Venus Orbi1er, is scheduled to place an orbiting spacecraft around Venus 2 weeks before the probes are released. Simultaneous measurements by the probes and orbiter permit relating specific local measurements to the general state of the planet and its environment as observed from orbit.

-------- PIONEER VENUS PROBE SM2, COUNSELMAN

INVESTIGATION NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETERIC TRACKING

INVESTIGATIVE PROGRAM CODE SL

INVESTIGATION DISCIPLINES PLANETARY ATMOSPHERES

PERSONNEL

PI: C.C. CHENELMAN
OI: J.J. LAGUE
OI: R. PRINN
OI: J. CHARNEY

BRIEF DESCRIPTION

This experiment involves applying differential very-long-baseline interferometric 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 are used in modeling the circulation patterns of Venus' atmosphere. Data taken prior to probe entry are used, if feasible, to infer characteristics of Venus' gravity field for use with probe entry operations as well as in later scientific evaluation.
INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- INFRARED RADIOMETER

NSDC ID- P1078P-04

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY

PERSONNEL

PI - J.C. SOUMIS U OF WISCONSIN
OI - J. LEGRAND U OF LILLE
OI - L.A. SHOBOVSKY U OF WISCONSIN
OI - A. ARONOWNAS NASA-JPL
OI - G. DANIELSON NASA-JPL
OI - M. HEGMAN U OF LILLE

BRIEF DESCRIPTION

THE OBJECTIVES ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-02

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBIECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-01

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-03

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-04

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-05

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-06

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.

------------------------------- PIONEER VENUS PROBE SM3

INVESTIGATION NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSDC ID- P1078P-07

INVESTIGATIVE PROGRAM

CODE SL

INVESTIGATION DISCIPLINE(S) PLANETARY ATMOSPHERES AERONOMY METEOROLOGY

PERSONNEL

PI - B. RAGENT NASA-ARC
OI - J.E. BLAMONT CNES-LPSP

BRIEF DESCRIPTION

THE OBJECTIONS ARE TO LOCATE REGIONS OF RADIATIVE COVERAGE AND DIVERSION AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT USES A SMALL NET FLUX PYROMETER ON THE PROBE, TARGETED TO THE BASSICITY OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 0.4 MICROMETER REGION. THE TWO PROBE TRAJECTORIES TO THE BASSICITY OF THE PROBE AND INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICROMETER REGION. THE INSTRUMENT WEIGHS ABOUT 0.4 KG AND USES 2.2 W OF POWER.
PI - A. Seiff
03 - E. Sommer
01 - W. Blanchard
01 - R. Young
01 - J. Jerr
US GEOLOGICAL SURV

BRIEF DESCRIPTION
THE INSTRUMENTS FOR THIS EXPERIMENT INCLUDE A THREE-AXIS ACCELEROMETER, PRESSURE SENSORS, AND TEMPERATURE SENSORS. THEY ARE BASED ON THE EXPERIMENT DETERMINED BY THE PARTICLE VELOCIY (PLANETARY ATMOSPHERE EXPERIMENT TEST RTG-2), THE MISSION'S PLAN. IT IS CONSTRUCTED IN A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR THE LARGE PROBE TRAJECTORY FROM THE EARTH TO A DISTANCE OF 140 KM ALTITUDE. THE INSTRUMENTS MEASURE THE ATMOSPHERE WHICH IS ABOUT 1.2 KG AND CONSUME ABOUT 3.4 W POWER.

INVESTIGATION NAME: INFRARED RADIOMETER

PERSONNEL
01 - V.E. Sugi
01 - J. Engebretson
01 - W. Blanchard
01 - L.A. Smodsky
01 - G. Rassmussen
01 - H. Herrman
U OF WISCONSIN
U OF WIL.
N A S A-LRC
U OF WISCONSIN
N A S A-LRC
U OF WIL.

BRIEF DESCRIPTION
THE INSTRUMENTS ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH COSMIC RAY AND SOLAR FLARES ARE ABSORBED BY THE ATMOSPHERE. THE INSTRUMENTS ARE A SMALL NET PLUX RADIOMETER, ARCTIC AND THERMOMETER, A 200-500-KM ORBITER IN THE 1-20-KM REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLATEAU AREfUS TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TEMPERATURE. THE INSTRUMENT MEASURES THE ATMOSPHERE WHICH IS ABOUT 1.2 KG AND CONSUME ABOUT 3.4 W POWER.

INVESTIGATION NAME: INFRARED RADIOMETER (NSEDC 10 - P1G78-CF-04)

INVESTIGATION DISCIPLINES
PLANETARY AERODYNAMICS

PERSONNEL
01 - V.E. Sugi
01 - J. Engebretson
01 - W. Blanchard
01 - L.A. Smodsky
01 - G. Rassmussen
01 - H. Herrman
U OF WISCONSIN
U OF WIL.
N A S A-LRC
U OF WISCONSIN
N A S A-LRC
U OF WIL.

BRIEF DESCRIPTION
THE INSTRUMENTS ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH COSMIC RAY AND SOLAR FLARES ARE ABSORBED BY THE ATMOSPHERE. THE INSTRUMENTS ARE A SMALL NET PLUX RADIOMETER, ARCTIC AND THERMOMETER, A 200-500-KM ORBITER IN THE 1-20-KM REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLATEAU AREfUS TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TEMPERATURE. THE INSTRUMENT MEASURES THE ATMOSPHERE WHICH IS ABOUT 1.2 KG AND CONSUME ABOUT 3.4 W POWER.

INVESTIGATION NAME: INFRARED RADIOMETER (NSEDC 10 - P1G78-CF-04)

INVESTIGATION DISCIPLINES
PLANETARY AERODYNAMICS

PERSONNEL
01 - V.E. Sugi
01 - J. Engebretson
01 - W. Blanchard
01 - L.A. Smodsky
01 - G. Rassmussen
01 - H. Herrman
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U OF WIL.

BRIEF DESCRIPTION
THE INSTRUMENTS ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH COSMIC RAY AND SOLAR FLARES ARE ABSORBED BY THE ATMOSPHERE. THE INSTRUMENTS ARE A SMALL NET PLUX RADIOMETER, ARCTIC AND THERMOMETER, A 200-500-KM ORBITER IN THE 1-20-KM REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLATEAU AREfUS TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TEMPERATURE. THE INSTRUMENT MEASURES THE ATMOSPHERE WHICH IS ABOUT 1.2 KG AND CONSUME ABOUT 3.4 W POWER.

INVESTIGATION NAME: INFRARED RADIOMETER (NSEDC 10 - P1G78-CF-04)

INVESTIGATION DISCIPLINES
PLANETARY AERODYNAMICS

PERSONNEL
01 - V.E. Sugi
01 - J. Engebretson
01 - W. Blanchard
01 - L.A. Smodsky
01 - G. Rassmussen
01 - H. Herrman
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U OF WIL.
N A S A-LRC
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N A S A-LRC
U OF WIL.

BRIEF DESCRIPTION
THE INSTRUMENTS ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH COSMIC RAY AND SOLAR FLARES ARE ABSORBED BY THE ATMOSPHERE. THE INSTRUMENTS ARE A SMALL NET PLUX RADIOMETER, ARCTIC AND THERMOMETER, A 200-500-KM ORBITER IN THE 1-20-KM REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLATEAU AREfUS TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TEMPERATURE. THE INSTRUMENT MEASURES THE ATMOSPHERE WHICH IS ABOUT 1.2 KG AND CONSUME ABOUT 3.4 W POWER.

INVESTIGATION NAME: INFRARED RADIOMETER (NSEDC 10 - P1G78-CF-04)

INVESTIGATION DISCIPLINES
PLANETARY AERODYNAMICS

PERSONNEL
01 - V.E. Sugi
01 - J. Engebretson
01 - W. Blanchard
01 - L.A. Smodsky
01 - G. Rassmussen
01 - H. Herrman
U OF WISCONSIN
U OF WIL.
N A S A-LRC
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N A S A-LRC
U OF WIL.
INVESTIGATION NAME: 3-AXIS ELECTRIC FIELD
NSSEC 10- SM-DL -04
INVESTIGATIONAL PROGRAM CODE ST/C0-04
INVESTIGATIONAL DISCIPLINE(S) PARTICLES AND FIELDS IONOSPHERES
PERSONNEL
PI - W.B. HANSON U OF TEXAS, DALLAS
CO - J.P. HEPPNER NASA-GSFC
CO - R.C. MAYBERRY NASA-GSFC
BRIEF DESCRIPTION
This experiment is designed to observe the three components of ambient electric field over the satellite trajectory. Three pairs, a pair for each component, of cylindrical probes are used. A body in a plasma establishes a potential relative to the plasma that maintains a constant balance. If no current is drawn from the body, its potential is maintained by the plasma within the plasma. Each component of the floating potential of each of the two series of probes has respect to the spacecraft is measured. From these observations, the electric field can be calculated for known conditions of satellite motion, probe geometry, and magnetic field. Two pairs of probes extend from the satellite equator, and one pair is oriented along the spin axis. For details of this experiment are found in the "San Marco-9 Project Plan."

INVESTIGATION NAME: AIRGLOW-SOLAR SPECTROMETER
NSSEC 10- SM-DL -02
INVESTIGATIONAL PROGRAM CODE ST/C0-04
INVESTIGATIONAL DISCIPLINE(S) SOLAR PHYSICS AERONOMY ATMOSPHERIC PHYSICS
PERSONNEL
PI - G. R. CARIGNAN INST FOR PHYS WELTRAUM
CO - S. SIMISTRE INST FOR PHYS WELTRAUM
CO - L. PIAST INST FOR PHYS WELTRAUM
CO - R. CHOTHE INST FOR PHYS WELTRAUM
CO - R. HUNTER INST FOR PHYS WELTRAUM
BRIEF DESCRIPTION
This experiment measures the equatorial day and night auroral region, as well as solar radiation reflected from the surface and clouds. The solar radiation is reflected by the Earth and analyzed in the spectrometer with a spectral resolution of 0.7 nm. In this case, low order with a spectral resolution of 0.7 nm, and the results are used to calculate the effects of the Earth's magnetic field on auroral phenomena.

INVESTIGATION NAME: WIND AND TEMPERATURE (NATE)
NSSEC 10- SM-DL -04
INVESTIGATIONAL PROGRAM CODE ST/C0-04
INVESTIGATIONAL DISCIPLINE(S) METEOROLOGY PLANETARY ATMOSPHERES ATMOSPHERIC PHYSICS
PERSONNEL
PI - N.W. SPENCER NASA-GSFC
CO - G.M. CARIYAN U OF MICHIGAN
BRIEF DESCRIPTION
The objective of this investigation is to measure the in situ neutral winds, neutral particle temperatures, and the concentration of selected species. Three components of the wind normal to the satellite direction are measured. Two scanning baffles, one moving vertically in front of the sensor, and one moving horizontally perpendicular to it, are included in the instrument. The sensor, component of the delta velocity in the satellite direction is measured directly by the resulting potential difference between the spacecraft and the sensor. The component of the total stream velocity in the satellite direction is measured directly by the resulting potential difference between the spacecraft and the sensor. The component of the potential difference in the spacecraft is measured directly by the resulting potential difference between the spacecraft and the sensor.

SPACERACKET COMMON NAME: SAN MARCO-9/M
ALTERNATE NAMES:
NSSEC 10- SM-DM
LAUNCH DATE- 09/09/97 WEIGTH- KG
LAUNCH SITE- SAN MARCO PLATFORM OFF COAST OF KENTA
LAUNCH VEHICLE- SCOUT
SPONSORING COUNTRY/AGENCY UNITED STATES NASA-GSFC ITALY CEA
PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
PERIOD- 100. MIN INCLINATION- 3. DEG
PERIAPSIS- 420. KMAPOAPSIS- 27000. KM
PERSONNEL
PI - A. J. CAPORALE NASA-GSFC
CO - B. G. BULGIOER U OF ROME
BRIEF DESCRIPTION
This is a small spacecraft built around a single experiment. Its general appearance is that of two cylinders, with a common axis. One has a diameter of 70 cm and height of 40 cm, with the second cylinder extending from the end of the first. An additional 21 cm in diameter of about 30 cm, the surface of the larger cylinder is covered with 120 small solar cells, that feed a rechargeable battery pack. The spacecraft is spin stabilized along the axis of its cylindrical structure, and scanning operation for the instrument is dependent upon the balance. The purpose of this spacecraft is to monitor cloud cover and ozone content, with one-third of the power used to control the on-board station. Additional power may be supplied from solar arrays. Further details on this spacecraft can be found in the "San Marco D Project Plan."

INVESTIGATION NAME: IN RADITION FOR MONITORING CLOUD COVER AND OZONE CONTENT
NSSEC 10- SM-DM -01
INVESTIGATIONAL PROGRAM CODE ST/C0-04
INVESTIGATIONAL DISCIPLINE(S) METEOROLOGY AERONOMY ATMOSPHERIC PHYSICS
PERSONNEL
PI - BUOGINOOR U OF ROME
BRIEF DESCRIPTION
This experiment measures the equatorial day and night auroral region, as well as solar radiation reflected from the surface and clouds. The solar radiation is reflected by the Earth and analyzed in the spectrometer with a spectral resolution of 0.7 nm. In this case, low order with a spectral resolution of 0.7 nm, and the results are used to calculate the effects of the Earth's magnetic field on auroral phenomena.
This radiometric experiment is designed to monitor cloud cover and ozone data collection over a high-resolution, 1200 km (25-M km) instantaneous field of view (IFOV) and a low-resolution 1200 km (25-M km) field of view (FOV). The experiment is operated through a common telescope, filter-wheel, and high-resolution (18) mapping observatory in a 10.5-15.5 micrometer band. The low-resolution (48) multispectral mapping operates in the same band (channel 3) plus six other bands between 8.85 and 15.01 micrometers. Bandwidth for each of these six bands is less than 0.5 micrometers. In the same band (channel 3) plus six more bands, the low edge of the band is at 8.85, 9.19, 13.01, 14.14, 16.59, and 18.26 micrometers. In the AU mode, two channels are selected for simultaneous observing. Scanning is accomplished by spacecraft spin plus mirror stepping once each revolution. On some, measures 0.5 (imaginary: 7.5 min duration, and calibration occurs once. Further details are found in the "Project Plan for SAM-9C-0-001-SC."
BRIEF DESCRIPTION

THIS EXPERIMENT (SC 9) MEASURES THE ELECTRON AND ION DIFFERENTIAL FLOW, ENERGY, AND ANGLE RESOLUTION. THE PARTICLE DETECTOR MEASURES ENERGY SPECTRA IN 64 STEPS BETWEEN 0.1 TO 1000 EV. THE ACCEPTANCE ANGLE OF THE TELESCOPE IS 5 DEG HALF-ANGLE. THIS SAME TYPE INSTRUMENT FLOWS ON THE ATS 5 AND ATS A SPACECRAFT. THE EXPERIMENT IS FUNDED BY NASA.

---- SCAH'A, FENNELL ----

INVESTIGATION NAME= SPACECRAFT SHEATH FIELDS DETECTOR

NSSDC ID= SCAIA -06 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL

PI - R.L. JOHNSON LOCKHEED PALO ALTO

BRIEF DESCRIPTION

THE EXPERIMENT (PART OF SC2) CONTAINS THREE ELECTROSTATIC ANALYZERS --- TWO ARE MOUNTED TO SEE APART IN BOOMS, AND THE THIRD IS MOUNTED ON THE SPACECRAFT BODY. THE THREE SENSORS HAVE THE SAME LOOK DIRECTION, SO THAT IF THERE WERE NO ELECTRIC FIELDS AND THE TELESCOPE WAS PERFECTLY CENTERED, THEY SHOULD MEASURE THE SAME FLUX SPECTRUM AND ANGULAR DISTRIBUTION OF ELECTRONS AND IONS IN THE ENERGIES 1 TO 1000 EV. AN OPTICAL SATELLITE TRANSMISSION SYSTEM IS USED TO TELEMETRO DIGITAL DATA FROM THE ANALYZERS TO THE TELESCOPING DATA PROCESSING SYSTEM TO MAINTAIN ELECTRICAL ISOLATION. THE POTENTIAL OF THE SPHERES RELATIVE TO THE SATELLITE REFERENCE POINT IS ALSO MEASURED. POTENTIAL MEASUREMENTS AT THREE POSITIONS IN THE PLASMA SHEATH ARE OBTAINED. THE EXPERIMENT IS FUNDED BY SANDS.

---- SCAH'A, JOHNSON ----

INVESTIGATION NAME= ENERGETIC ION SPECTROMETER

NSSDC ID= SCAIA -13 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS SPACE PLASMAS

PERSONNEL

PI - R.L. JOHNSON LOCKHEED PALO ALTO

BRIEF DESCRIPTION

THIS EXPERIMENT MEASURES THE FLUX OF IONS, WITH MASS MEDIUM 1 TO 150. THE SIZE RANGE FROM 100 TO 20,000. THE EXPERIMENT IS AN ENERGETIC ION SPECTROMETER.

---- SCAH'A, KOOKS ----

INVESTIGATION NAME= SPACECRAFT SURFACE POTENTIAL MONITOR

NSSDC ID= SCAIA -01 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) MAGNETOSPHERIC PHYSICS

PERSONNEL

PI - R.L. KOOKS AEROSPACE CORP

BRIEF DESCRIPTION

THE FLIGHT INSTRUMENT (PART OF SC1) MEASURES THE SURFACE POTENTIAL OF 20 DIFFERENT TYPES OF MATERIALS RELATIVE TO SOME COMMON REFERENCE POINT IN THE SATELLITE. THE SAMPLES ARE MOUNTED ON ONE SURFACE OF A DIELECTRIC SLAB, AND A CONDUCTING PLATE IS MOUNTED ON THE OTHER SURFACE. THE CAPACITANCE OF THIS CONFIGURATION IS ABOUT 250 MICRO-MICRO-FARAD. THE CONDUCTING PLATE IS ATTACHED TO THE REFERENCE POINT THROUGH A 0.05-MICRO-FARAD CAPACITOR. THE TWO CAPACITORS CONSTITUTE A 100 TO 1 VOLTAGE DIVIDER BETWEEN THE SENSOR SURFACE AND THE REFERENCE POINT. SOME OF THE MATERIALS USED ARE -- ALUMINUM AND CARBON FABRIC WITH AND WITHOUT EMISSIVE CONDUCTORS, CARBON FABRIC INSULATION, CARBON FABRIC WITH DIFFERENT CONDUCTIVITY, ONE STAINLESS STEEL WIRE AND ONE CONDUCTING WIRE, ONE CONDUCTING WIRE, STEEL PORT, AND MICA MULTIPLE INSULATION. SIXTEEN OF THE SAMPLES ARE PLACED ON THE SATELLITE'S SURFACE IN AN OUT OF SUNLIGHT. TWO SAMPLES EACH ARE LOCATED AT THE ENDS IN THE SHADOWS. THE EXPERIMENT IS FUNDED BY SANDS.

---- SCAH'A, KOOKS ----

INVESTIGATION NAME= CHARGING ELECTRICAL EFFECTS ANALYZER

NSSDC ID= SCAIA -02 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL

PI - R.L. KOOKS AEROSPACE CORP

BRIEF DESCRIPTION

THE FLIGHT INSTRUMENT (PART OF SC1) MEASURES THE ELECTROMAGNETIC INTERFERENCE IN THE RANGE 1 TO 1.67 HZ. THREE SEPARATE INSTRUMENTS WILL BE USED. THE FREQUENCY RANGE FROM 0.1 TO 1000 IS MEASURED WITH A SPECTRAL FREQUENCY ANALYZER. THE FREQUENCY BAND 100 TO 3000 IS MONITORED BY A TD-PHASE, FIXED-FREQUENCY ANALYZER. THE CAPABILITY ALSO EXISTS TO TELEMETRO DIGITAL DATA FROM SENSORS IN THE FREQUENCY BAND 100 TO 5000. THE ANALYZER MONITORS SIGNALS FROM A VARIETY OF SENSORS, INCLUDING SOLAR ARRAYS, POWER LINES, TYPICAL COMMAND LINE, EXTERNAL SHORT DIPOLE, AND ELECTRIC FIELD DETECTOR VEHICLES. THIS EXPERIMENT IS FUNDED BY SANDS.

---- SCAH'A, LEDLEY ----

INVESTIGATION NAME= MAGNETIC FIELD MONITOR

NSSDC ID= SCAIA -08 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS

PERSONNEL

PI - W.L. LEH LDEFI MATERIALS LAB OJ - R.J. HALL AEROSPACE CORP

BRIEF DESCRIPTION

IN THIS EXPERIMENT (ML2) TWO QUARTZ CRYSTAL MICROWAVES ARE PLACED IN RETARDING POTENTIAL ANALYZERS WITH ONE MICROWAVE-ANALYZER SET MOUNTED ON THE SATELLITE SIDE, AND THE OTHER SET PLACED ON A SPACECRAFT END MAINTAINED IN CONTINUOUS SHADOW. THE RETARDING POTENTIAL ANALYZER IS USED TO EXCLUDE IONS FROM THE WAVELENGTH AND TO MAINTAIN A ZERO ELECTRIC FIELD CONDITION AT THE SENSOR. THE EXPERIMENT MEASURES THE DEPENDENCE OF CAPACITATION RATE UPON SURFACE CHARGE, MEASUREMENTS ARE MADE WITH AND WITHOUT THE RETARDING POTENTIAL BIAS. THE QUARTZ SENSORS HAVE AN ACTIVE TEMPERATURE CONTROL AND CAN BE OPERATED OVER A RANGE OF TEMPERATURES FROM 60 TO 1000 C.

---- SCAH'A, LEH ----

INVESTIGATION NAME= THERMAL CONTROL SAMPLE MONITOR

NSSDC ID= SCAIA -06 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PLANETARY PHYSICS

PERSONNEL

PI - W.L. LEH US AIR FORCE OJ - R.J. HALL AEROSPACE CORP

BRIEF DESCRIPTION

IN THIS EXPERIMENT (ML2) THERMAL CONTROL MATERIALS ARE FUNCTION OF SPACE AND CONTAMINATION CONDITIONS. THE EXPERIMENT EVALUATES THE PERFORMANCE OF THERMAL CONTROL MATERIALS AS A FUNCTION OF SPACE AND CONTAMINATION CONDITIONS. THE EXPERIMENT MEASURES THE THERMAL TEMPERATURE OF ELECTRICAL CONTROL MATERIAL SAMPLES. THE INSTRUMENTS ARE POSITIONED CONTINUOUSLY WITH THE QUARTZ CRYSTAL MONITORS. IT IS POSSIBLE TO HEAT THE SAMPLES AND TO PURGE CONTAMINANTS WHICH FREEZE OUT ON THE TEST SURFACE.

---- SCAH'A, PAVEL ----

INVESTIGATION NAME= RAPID SCAN PARTICLE DETECTOR

NSSDC ID= SCAIA -12 INVESTIGATIVE PROGRAM CODE ST

INVESTIGATION DISCIPLINE(S) PARTICLES AND FIELDS
PERSONNEL
PL - A. PAVEL
USA GEOPHYS LAB

BRIEF DESCRIPTION
THIS EXPERIMENT (SCS) EMPLOYED ELECTROSTATIC ANALYZERS AND
DIFFERENTIAL FLUX MONITORS TO MEASURE THE PROTON AND ELECTRON
FLUXES IN THE RANGE 0.2 TO 2.0 MEV AND THE PROTON FLUX IN THE RANGE
OF 2.0 TO 100 MEV. A HIGH-ENERGY PARTICLE SPECTROMETER IS USED TO
DETERMINE THE ENERGY DENSITY IN THE RANGE OF 1.0 X 10\(^{-1}\) TO 1.0 X
10\(^{4}\) IN THE RANGE OF 1.0 X 10\(^{-1}\) TO 1.0 X 10\(^{4}\). THE INSTRUMENT
IS DESIGNED TO USE AN ACTIVE RADAR SYSTEM TO MEASURE WIND
SPEED AND DIRECTION. THE INSTRUMENT IS DESIGNED TO MEASURE THE
EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICROMETER REGION
DURING THE DAY AND NIGHT.

INVESTIGATION NAME- MICROWAVE WIND SCATTEROMETER
INVESTIGATIVE PROGRAM CODE SSE
INVESTIGATIONAL DISCIPLINES
METEOROLOGY

PERSONNEL
PL - J.B. PIERSON
CIVIL INSTR MARINIATRE SC

BRIEF DESCRIPTION
THE SCANNING VISIBLE-INFRARED RADIOMETER (SIRR) EXPERIMENT IS
CONSIDERED CONSISTS OF TWO SCANNING RADIOMETERS. A DUAL SR PROCESSOR
AND TWO SR RECEIVERS. THE SR INSTRUMENTS ARE DESIGNED TO
DETERMINE THE ELECTRON AND ION DIFFERENTIATED FLUXES. FOR ELECTRON
AND PROTON FLUXES, THIS RAPIDLY VARYING TIME SCALE RESOLUTION OF
POSSIBLY NSEC TO SUTRA-1 INVESTIGATIONAL PROGRAM
INVESTIGATION DISCIPLINE(S)
HIGH ENERGY PHYSICS

PERSONNEL
PI - A. PAVEL
USA GEOPHYS LAB

BRIEF DESCRIPTION
THE PLASMA PROBE EXPERIMENT (SC6) MEASURES THE ELECTRON DENSITY IN
THE RANGE 0.2 TO 2.0 MEV AND THE PROTON FLUX IN THE RANGE OF
2.0 TO 100 MEV. THIS SENSOR INCLUDES TWO CHAMBERS, ONE HOMEPONED ON A 5-M INSULATED
DETECTOR AND THE SECOND DETECTOR IS A CONDUCTING SURFACE.

INVESTIGATION NAME- HIGH-ENERGY PARTICLE DETECTOR
INVESTIGATIVE PROGRAM CODE ST/SH
INVESTIGATIONAL DISCIPLINES
HIGH ENERGY PHYSICS

PERSONNEL
PI - R.C. SAGALYN
USA GEOPHYS LAB

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HIGH ENERGY PHYSICS

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USA GEOPHYS LAB

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PERSONNEL
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TM - D.J. CHOIVIT
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USNS SURF WEAPONS CTR
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BRIEF DESCRIPTION
THE COMPRRESSED PULSE RADAR ALTIMETER EXPERIMENT (1) MEASURES THE ALTITUDE BETWEEN THE SPACECRAFT AND THE OCEAN SURFACE AND 22 MEASURES WAVE HEIGHT, THE ALTIMETER IS A MORE ACCURATE VERSION OF THE SKYLAB RALH ALTIMETER EXPERIMENT T-22 (WIDE 73-027A-20), AND IS SIMILAR TO THE ALTIMETER THAT FLEW ON SEAS-C. THE ALTIMETER PRECISION OF PLUS OR MINUS CM ALLOWS TIME PATTERN FEATURES SUCH AS WINDPILE-UP AND STORM SURGES TO BE SENSED AND IDENTIFIED. IT IS ALSO CAPABLE OF LOCATING AND MAPPING OCEAN SURFACE CURRENTS WITH SPEEDS OF 30 TO 50 CPM OR GREATER. FROM THIS, THE SLOPE OF THE SURFACE IS PROPORTIONAL TO THE SURFACE SPEED. MEASUREMENTS OF WAVE HEIGHT WHICH IS REQUIRED TO OBTAIN A 10-CN PRECISION IN ALTITUDE, CAN BE COMBINED WITH WIND METER MEASUREMENTS TO DETERMINE SEA STATE.

INVESTIGATION NAME- COHERENT SYNTHETIC APERTURE IMAGING RADAR (CASR)

INVESTIGATIVE PROGRAM CODE ESE
INVESTIGATIVE PROGRAM EARTH OBSERVATIONS
NAVIGATION
METEOROLOGY

PERSONNEL
TL - P.G. TELLEK
TM - D.R. ROSS
TD - W.E. TOWNSEND
J - J.G. MCGOOGAN
E - A. LAGER
H - J.P. LEHNER
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US Geological Survey
US Geological Survey
NASA-JPL
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SPACECRAFT COMMON NAME- SEASAT-B
ALTERNATE NAMES- OCEAN DYNAMICS SAT-B, SEA SATELLITE-B

INVESTIGATION NAME- SCANNING VISUAL/INFRARED RADIOMETER
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INVESTIGATION NAME- COHERENT SYNTHETIC APERTURE IMAGING RADAR (CASR)

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SEASAT-B, SMITH, III

INVESTIGATION NAME: COMPRESSED PULSE RADAR ALTIMETER (A)

NSSDC 10- SEAST-B-01

INVESTIGATIVE PROGRAM: EARTH OBSERVATIONS

INVESTIGATION DISCIPLINE(S): OCEANOGRAPHY

PERSONNEL
PL - T.L. SMITH, III
TM - B.B. CROFT
TH - T.J. MCCracken
RM - B. YUTURE
CM - E.A. CARPENTER

D Brief Description

The compressed pulse radar altimeter experiment (1) measures the altitude between the spacecraft and the ocean surface and (2) measures wave height. The altimeter is a more accurate version of the Skylab radar altimeter. Experiment 5-193 (NSSDC 10-027A-10), an altimeter is similar to the altimeter that is required to obtain a 10-cm precision in ocean surface currents with speeds of 50 to 50 cm/s or greater. Because the slope of the surface is proportional to the surface speed, the measurement of wave height, which is required to obtain a 10-cm precision in ocean surface currents, can be combined with surface wind measurements to determine sea state.

SEASAT-B, TELEK

INVESTIGATION NAME: COHERENT SYNTHETIC APERTURE IMAGING RADAR (SAI)

NSSDC 10- SEAST-B-02

INVESTIGATIVE PROGRAM: CORE EDT

INVESTIGATION DISCIPLINE(S): OCEANOGRAPHY

PERSONNEL
PL - P.E. TELEK
TM - D.B. ROLLS
TH - K.K. CAMPBELL
RM - L. LOOMIS
RM - J.T. GROVE, J.
RM - F.J. SAVAGE
RM - E. FORRESTER
CM - J.J. RUPERT
CM - J.W. SHERRARD, III
CM - S. STEWART
CM - R. ZELENKA
CN - J.P. TELLER
CN - J.L. CULHANE
CN - D.J. FORREST
CN - E.L. CHUPP

D Brief Description

The coherent synthetic aperture imaging radar experiment is designed to use wave pattern and dynamic behavior information to obtain images of the ocean. The experiment, flown on Apollo 17 as the Apollo Lunar Laser Ranging Experiment, allows images of waves whose lengths are in the range of 50 to 1,000 meters and can determine wave direction within 20 degrees with the possibility of a 10-deg accuracy for one-side images. Wave heights can also be determined from the data for fully developed seas. The imaging radar can function through clouds and nominal rain to provide wave patterns near shoaling and high-resolution pictures of ice, oil spills, current patterns and similar features.

SOLAR MAXIMUM MISSION

INVESTIGATIVE PROGRAM

NSSDC 10- SMM-01

INVESTIGATION NAME: SOFT X-RAY POLychROMATOR

NSSDC 10- SMM-04

INVESTIGATIVE PROGRAM

NSSDC 10- SMM-01

INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL
PL - J.M. ACTON
PM - A.W. HANDEL
PL - J.R. CULHANE
PM - J.J. PARKINSON
PM - C.G. RAPLEY
PM - R.M. JONES
PM - J.C. JORDAN
PM - J.J. FORREST
PM - R.C. FANCY

D Brief Description

This experiment uses x-ray emission lines in the 0.1- to 2.24-keV spectral region as diagnostic tools to investigate aspects of solar activity leading to plasma temperatures in the 10 to 50 million K range. The instrumentation includes the systems: a flat crystal spectrometer and a bent crystal spectrometer. The flat crystal spectrometer covers from 1.1 to 22.4 keV in 7 ranges, has a field of view of 10 degrees, and requires a 7-MK NM area. Its energy resolution is 0.25%. The bent crystal spectrometer consists of a set of bent crystals covering seven broad lines between 1.709 and 1.943 A and the calcium X II line between 3.185 to 3.231 A. This instrument has a field of view of 6 by 6 arc minutes and has a maximum time resolution of 0.5 s.

SOLAR PHYSICS

INVESTIGATIVE PROGRAM

NSSDC 10- SMM-01

INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL
PL - E.L. CHUPP
PM - D.J. FORREST
PM - W.G. HARDY
PM - C. REEDER
PM - W.N. SAVAGE
PM - L.L. KINSEY
PM - J.S. WEBER
PM - G.W. SHARE
PM - A.S. JACOBSON

D Brief Description

The primary scientific goal of this experiment is the study of gamma-ray emissions from the sun before and during solar flares. The main detector is a set of seven 7.6- by 7.6-cm sodium iodide scintillators covering the energy range from 0.3 to 17 MeV with an energy resolution of better than 5 percent at 0.662 MeV and temporal resolutions ranging from 1 to 3 sec. A high-energy detector consists of the sodium iodide area and a cesium iodide scintillator covering the energy range from 1 to 160 MeV with a temporal resolution of 1 s for high-energy neutrons and gamma rays. The additional sodium iodide scintillators form an x-ray detector sensitive between 10 and 160 keV with four channels of energy resolution and a temporal resolution of 1 s.

INVESTIGATIVE PROGRAM

NSSDC 10- SMM-05

INVESTIGATION DISCIPLINE(S): SOLAR PHYSICS

PERSONNEL
PL - E.L. CHUPP
PM - D.J. FORREST
PM - W.G. HARDY
PM - C. REEDER
PM - W.N. SAVAGE
PM - L.L. KINSEY
PM - J.S. WEBER
PM - G.W. SHARE
PM - A.S. JACOBSON

D Brief Description

The solar maximum mission (SMM) is dedicated to coordinated observations of specific solar activity and solar flare problems. The spacecraft itself does not pass over the solar limb unless individual instruments have this capability. The SMM spacecraft is designed so that it can be launched as a shuttle flight, returned to Earth, refurbished, and fitted with an updated payload, and return in orbit for another solar-oriented mission.
personnel

PI: E. M. BEBES
U OF HARVARD OBS

PI: R. W. HOYES
U OF HARVARD OBS

PI: R. J. HAHN
U OF HARVARD OBS

PI: C. W. QUERED
U OF HARVARD OBS

PI: G. L. WITHNAM
U OF HARVARD OBS

PI: J. G. TIMMY
U OF HARVARD OBS

PI: M. W. DENNIS
U OF HARVARD OBS

PI: M. J. BECK
U OF HARVARD OBS

PI: M. V. DEBEK
U OF HARVARD OBS

PI: J. G. ITHITHER
U OF HARVARD OBS

PI: R. C. WILLSON
U OF HARVARD OBS

personnel

PI: H. P. DE JAGER
U OF Utrecht

PI: H. L. DE JAGER
U OF Utrecht

PI: J. M. WILLMORE
U OF WASHINGTON

brief description

the objective of this experiment is to measure the plasma, magnetic field, and radiometry properties of hot plasmas in association with solar flares. this instrument produces two-dimensional images with 2-arc sec resolution over a circular area 5 min 44 sec in diameter. it observes 100 images consisting of 1024 lines per image, each line containing 256 pixels. these images are observed in five energy channels between 1.5 and 3 kev, and with a temporal resolution of at least 1.5 sec. a high-energy monitor observes the entire sun at energies up to 60 kev.

solar maximum mission: frost

investigation name: x-ray spectrometer

nssdc 10- smr - 06 investigation program code st

investigation discipline(s)

solar physics

personnel

PI: E. J. FROST
NASA-GSFC

PI: H. G. WAGNER
NASA-GSFC

PI: J. F. KLEIN
NASA-GSFC

PI: G. M. NEWTON
NASA-GSFC

PI: E. C. GUNDELL
NASA-GSFC

PI: R. B. VERNIK
NASA-GSFC

brief description

this experiment measures plane x-ray emission with 16 channel energy analysis and 0.1-sec time resolution in the energy range of 2 to 50 kev. a search for temporal structure is conducted using one channel between 20 and 50 kev.

solar maximum mission: macqueen

investigation name: coronagraph/polarimeter

nssdc 10- smr - 01 investigation program code st

investigation discipline(s)

solar physics

personnel

PI: R. M. MACQUEEN
HIGH ALTITUDE OBS

PI: L. L. HOUSE
HIGH ALTITUDE OBS

PI: W. J. WAGNER
HIGH ALTITUDE OBS

PI: F. G. HILDNER
HIGH ALTITUDE OBS

PI: J. F. KLEIN
NASA-GSFC

PI: D. E. KOPF
NASA-GSFC

PI: C. W. GUEFFER
NASL-EXTRAPOL PHYS

PI: K. V. SHERMAN
COOPERAT PYROMETERS

brief description

the prime objective of this experiment is to measure the response of the electron density and magnetic field strength of the corona to the passage of transient phenomena on rapid time scales. the secondary objective is to determine the density and direction of the magnetic field structure of the corona, using the coronagraph and polarimeter, from the transmission of two images of the corona. the images are recorded on a high-quality tape recorder for subsequent transmission to the earth. fields of view range from 1.3 to 2 solar radii square and are selectable within the corona. spatial resolution is selectable between 0.8 and 1.6 arc sec. the images are available within the range of 4000 to 8000 a, and polarization direction is selectable between 300 to 90 degrees apart. a clear position is also available. the stray radiation resulting from an 18-degree-of-the-sun bright light is 15 sun-centered to within 1 arc sec.

solar maximum mission: willson

investigation name: xuv spectrophotometer

nssdc 10- smr - 03 investigation program code st

investigation discipline(s)

solar physics

personnel

PI: J. K. FROST
NASA-GSFC

PI: H. G. WAGNER
NASA-GSFC

PI: J. F. KLEIN
NASA-GSFC

PI: C. W. GUEFFER
NASL-EXTRAPOL PHYS

PI: J. G. TIMMY
NASA-GSFC

PI: M. W. DENNIS
NASA-GSFC

PI: M. J. BECK
NASA-GSFC

PI: M. V. DEBEK
NASA-GSFC

brief description

the objective of this experiment is the measurement of the total solar radiation with state-of-the-art accuracy and precision. the total solar irradiance from the far-ultraviolet through the far-infrared wavelengths is measured by three active cavity radiometers (type 11) and three detectors of a photodetector. the two detectors are calibrated by a photodetector and three photodetectors, and in all three sets of photodetectors, the radiometry accuracy of the photodetectors is better than 0.1 percent in the international system of units.
SPACECRAFT COMMON NAME: SPACECRAFT 1
ALTERNATE NAMES:

NSSDC 10- SPALABI
LAUNCH DATE: 11/22/70
LAUNCH SITE: CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE: SHUTTLE
SPONSORING COUNTRY/AGENCY:
UNITED STATES
PLANNED ORBIT PARAMETERS:
ORBIT PERIOD: 90 MIN
INCLINATION: 26 DEG
PERIAPSE: KM
APOAPSE: KM

PERSONNEL:
MG - R. MOBLEY NASA HEADQUARTERS
SC - G. TAYLOR NASA HEADQUARTERS
OC - R. CAMPBELL NASA MSFC

BRIEF DESCRIPTION:
THE FIRST SPACECRAFT MISSION IS A JOINT NASA AND EUROPEAN SPACE AGENCY (ESA) MISSION. SPACECRAFT 1 CONSISTS OF A PRESSURIZED COMPARTMENT (MODULAR) FOR HOUSING EQUIPMENT AND FLIGHT PERSONNEL, AND A SPACE EXPOSED PLATFORM TO ACCOMMODATE INSTRUMENTS. THE COMPARTMENT AND PLATFORM ARE FLOATED INTO SPACE AND RETAINED IN THE PAYLOAD COMPARTMENT OF THE SPACE SHUTTLE ORBITER. THE MISSION IS PLANNED TO LAST 7 DAYS. WHILE IN SPACE, THE ORBITER PAYLOAD COMPARTMENT DOORS ARE OPENED TO ALLOW VIEWING OF THE EARTH, SUN, AND DEEP SPACE, THE檢出仪 TO PARTICLE ACCELERATORS, STUDIES OF THE IONIZATION STATES OF SOLAR AND GALACTIC COSMIC RAYS, AND ATOMIC PHYSICS IN THE DISERAIN.

INVESTIGATION NAME: EXPERIMENT ON ATMOSPHERIC H AND 0
INVESTIGATIVE PROGRAM CODE: ST/CO-OP
INVESTIGATION DISCIPLINE(S):
SPACE PHYSICS

PERSONNEL:
PL - S. BERTAUX CNRS-ISA
OI - G. NORMANT 1456

BRIEF DESCRIPTION:
THE EXPERIMENT OBJECTIVES ARE: (1) TO USE A LAMY-ALPHA PHOTOMETER EQUIPPED WITH AN ADAPTED DETECTOR TO MEASURE PROTON PRECIPITATION IN THE INTERPLANETARY LAYER AND TO DETERMINE THE NUCLEAR RAY PROTON FLUX IN THE INTERPLANETARY LAYER, AND TO OBTAIN H-ALPHA DATA FROM THE INTERPLANETARY LAYER.

INVESTIGATION NAME: IONIZATION STATES OF SOLAR AND GALACTIC COSMIC RAYS
INVESTIGATIVE PROGRAM CODE: ST/CO-OP
INVESTIGATION DISCIPLINE(S):
SPACE PHYSICS

PERSONNEL:
PL - S. BISWAD TATA INST OF FUND RES
OI - R. DEOWJAPAD TATA INST OF FUND RES
OI - V. VENKATESWARAN TATA INST OF FUND RES
OI - S. SRINATH TATA INST OF FUND RES

BRIEF DESCRIPTION:
THE EXPERIMENT OBJECTIVES ARE TO MEASURE THE IONIZATION STATES OF HEAVY ELEMENTS IN THE COSMIC RAYS AND THE LOW-ENERGY GALACTIC COSMIC-RAY IONIZATION STATES. THE DETECTOR MODULE CONSISTS OF A CR10 Portable Counter, A PLASTIC SHEET, A LOWER STACK OF KODAK CELLULOSE NITRATE (CN) SHEET WITH KODAK CELLULOSE NITRATE (CN) SHEET AT THE BOTTOM, AND AN ELECTRONICS DRIVE SYSTEM.

INVESTIGATION NAME: X-RAY ASTRONOMY
INVESTIGATIVE PROGRAM CODE: ST/CO-OP
INVESTIGATION DISCIPLINE(S):
X-RAY ASTRONOMY
BACKGROUND. CLUSTER OF GALACTIC SOURCES AND THE UNUSUAL FEATURES OF GALACTIC X-RAY SOURCES, THE OBLIQUE X-RAY SOURCES. THE EQUIPMENT CONSISTS OF FOUR CYLINDERS WITH LAYERS OF DIFFERENT BIOLOGICAL OBJECTS BETWEEN DIFFERENT TRACK DETECTORS, INTEGRATING BOLOMETERS, AND SPECIALLY SELECTED TRACK DETECTORS.

SPACELAB 1, COGOLI

INVESTIGATION NAME- LYMPHOCYTE PROLIFERATION IN WEIGHTLESSNESS

CODE SA/CO-OP

INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
01 - C. COGOLI
02 - U. OF ZURICH

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVE IS TO OBTAIN FURTHER INFORMATION ON THE EFFECTS OF THE IMMUNE RESPONSE AND ON THE MECHANISM OF EUCARYOTIC CELL DIFFERENTIATION DURING LONG-DURATION SPACEFLIGHTS. THE EQUIPMENT CONSISTS OF AN INCUBATOR, FOUR FLASKS OF HUMAN BLOOD, AND A VESSEL FOR LIQUID AIR.

SPACELAB 1, CROMLYNCK

INVESTIGATION NAME- ABSOLUTE MEASUREMENT OF THE SOLAR CONSTANT

CODE SA/126

INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS

PERSONNEL
02 - C. CROMLYNCK
03 - ROY HETEROION INST BELGI
04 - A.C. DUNN

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVE IS TO MEASURE THE ABSOLUTE VALUE OF THE SOLAR CONSTANT AND TO MEASURE THE EFFECTS OF VARIATIONS IN THE SOLAR CONSTANT, AND TO USE SURFACES OF JUPITER ZODIACAL LIGHT AND METAL EXPOID TO PALLET CONDITIONS TO DETERMINE THE AMOUNT OF DEGRADATION OF OPTICAL SURFACES DUE TO CONDITIONS ON THE SKY SPACEPLAS. THE EQUIPMENT CONSISTS OF AN ABSOLUTE RADIOMETER WITH AN INDIRECT STABILITY CHECK.

SPACELAB 1, D BUTTON

INVESTIGATION NAME- ADVANCED BIDSTACK EXPERIMENT

CODE SB

INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
01 - H. BUTTON
02 - U. OF FRANKFURT

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVES ARE TO INCREASE THE KNOWLEDGE OF THE EFFECTS OF PARTICLE EXPOSURE ON BIOLICAL SPECIMENS AND TO ASSESS THE EFFECT OF PARTICLE ON BIOLOGICAL STUDIES IN SPACE, TO CURB THE EFFECT OF PARTICLE ON BIOLOGICAL EXPERIMENTS IN FUTURE SPACE FLIGHTS. THE EQUIPMENT CONSISTS OF FOUR CYLINDERS WITH LAYERS OF DIFFERENT BIOLOGICAL OBJECTS BETWEEN DIFFERENT TRACK DETECTORS, INTEGRATING BOLOMETERS, AND SPECIALLY SELECTED TRACK DETECTORS.

SPACELAB 1, FERRELL

INVESTIGATION NAME- BASIC PHYSICS STUDIES OF THE EARTH'S ATMOSPHERE

CODE SB/CO-OP

INVESTIGATION DISCIPLINE(S) INTERPLANETARY PHYSICS TECHNOLOGY

PERSONNEL
01 - G. FERRELL
02 - U. COLLEGE LONDON
03 - B. ROSEN
04 - J.J. CROMLYNCK
05 - P. SANFORD
06 - A. R. ANDREWS
07 - A. PEACOCK
08 - B. G. TAYLOR
09 - CHX/COSMIC PHYSICS LAB
10 - G. VILLA
11 - CHX/COSMIC PHYSICS LAB

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVES ARE TO INCREASE THE KNOWLEDGE OF THE EFFECTS OF PARTICLE EXPOSURE ON BIOLICAL SPECIMENS AND TO ASSESS THE EFFECT OF PARTICLE ON BIOLOGICAL STUDIES IN SPACE, TO CURB THE EFFECT OF PARTICLE ON BIOLOGICAL EXPERIMENTS IN FUTURE SPACE FLIGHTS. THE EQUIPMENT CONSISTS OF FOUR CYLINDERS WITH LAYERS OF DIFFERENT BIOLOGICAL OBJECTS BETWEEN DIFFERENT TRACK DETECTORS, INTEGRATING BOLOMETERS, AND SPECIALLY SELECTED TRACK DETECTORS.
PERSONNEL
PI - K.E. DEMOREST
PI - A.F. WHITAKER
NASA-MSFC
NASA-MSFC

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVES ARE TO DETERMINE THE EFFECT OF ZERO GRAVITY ON THE OPERATION OF FLUID-LUBRICATED JOURNAL BEARINGS. (2) OBSERVE FLUID FLOW-SURFACE WETTING AND HYDROMAGNETIC FLUID FORMATION IN JOURNAL BEARINGS OPERATING IN ZERO GRAVITY. (3) OBSERVE AND MEASURE DYNAMIC INSTABILITIES IN MAGNETIC FIELDS AND PEROXIDURBATION FOR PREVENTING DYNAMIC INSTABILITY IN JOURNAL BEARINGS OPERATING IN ZERO GRAVITY. AND (4) EVALUATE THE USE OF MAGNETIC FIELDS AND ENVIRONMENTAL CONSIDERATIONS FOR PREVENTING DYNAMIC INSTABILITY IN JOURNAL BEARINGS OPERATING IN ZERO GRAVITY. LUBRICANT FERROFLUID LUBRICATED MAGNETIC JOURNAL, TRANSPARENT BEARINGS FACILITATE PHOTOGRAPHY AND OBSERVATION. AND A CAMERA.

SPACELAB 1: EDGE

INVESTIGATION NAME: ISOTOPE STAGG

NSSDC 10- SPALART-09
INVESTIGATIVE PROGRAM
CODE 9A
INVESTIGATION DISCIPLINE(S)
COSMIC RAYS

PERSONNEL
PI - ESA STAFF
ESA-ESTEC

BRIEF DESCRIPTION
THE EXPERIMENT OBJECTIVE IS TO USE A STACK OF PLASTIC SHEETS TO MEASURE HEAT TRANSFER BETWEEN THE SHEET TO THE SHEET TO THE NUCLEUS, AND TO DETERMINE THE SOUFFLÉ ACCELERATION, PROPORTION, AND ACE OF COSMIC RAYS. THE EQUIPMENT CONSISTS OF A STACK OF LAYERS OF PLASTIC VISUAL TRACK DETECTORS INSERTED IN A SEALED ALUMINUM CONTAINER.

SPACELAB 1: ESA STAFF

INVESTIGATION NAME: METRIC CAMERA FACILITY

NSSDC 10- SPALART-30
INVESTIGATIVE PROGRAM
CODE 20/30
INVESTIGATION DISCIPLINE(S)
EARTH RESOURCES SURVEY

PERSONNEL
PI - ESA STAFF
ESA-ESTEC

BRIEF DESCRIPTION
THE METRIC CAMERA FACILITY HAS A ZEISS RMP A 30/23 AERIAL SURVEY CAMERA, AND A SKYLAB OPTICAL WINDROW. WITH THE FOLLOWING MAIN CHARACTERISTICS: F = 305 M, I-STEP AVAILABLE = 1/3 M., 

FOR THE PROPOSED MEASUREMENTS AND ANALYTICAL MEASUREMENTS FOR TOPOGRAPHIC MAPPING, METEOROLOGICAL HOSPITALITY, AND THERMAL MAPPING AND INTERPRETATION.

SPACELAB 1: ESA STAFF

INVESTIGATION NAME: MICROFACILITY

NSSDC 10- SPALART-39
INVESTIGATIVE PROGRAM
CODE 20/30
INVESTIGATION DISCIPLINE(S)
METEOROLOGY

PERSONNEL
PI - ESA STAFF
ESA-ESTEC

BRIEF DESCRIPTION
THE OBJECTIVES OF THE MICROFACILITY IS DEVELOPMENT OF ALL-WEATHER REMOTE SENSING METHODS. USING SMALL OBJECT DETECTORS BY MEASUREMENT OF OCEAN SURFACE WAVES WITH A DUAL-FREQUENCY MICROSOUND AND VERIFY SYNTHETIC APERTURE RADAR SYSTEM. THE EQUIPMENT CONSISTS OF: (1) AN ANTENNA-PARADOX DISK WITH DIRECT READOUT. EFFECTIVE APERTURE ABOUT 3 M AXIAL, AND 1 M ELEVATION. AXIAL LENGTH OF IDEALISED 3 M AND EFFICIENCY OF APPROXIMATELY 70%. (2) A RECEIVER NON-COHERENT PULSE RECEIVER AND A CUSTOM-BUILT PULSE FOR OPERATIONAL BY THE CARRIER FREQUENCY 8.35 MHZ. AND AVERAGE OF POWER OF ABOUT 25 W.

SPACELAB 1: ESA STAFF

INVESTIGATION NAME: SPACE SLED FACILITY

NSSDC 10- SPALART-40
INVESTIGATIVE PROGRAM
CODE 20/30
INVESTIGATION DISCIPLINE(S)
SPACE BIOLOGY

PERSONNEL
PI - ESA STAFF
ESA-ESTEC

BRIEF DESCRIPTION
THE SPACE SLED FACILITY IS PROVIDED FOR VERTICULAR TO OCEAN SURFACE WAVES, IF NECESSARY, TO APPLY G-TO 1.5 G IN THE RANGE OF 0.2-1.5 G WITH G-SIGNALS AND CONSTANT ACCELERATION. POSITIONING IS AVAILABLE 360 DEG, AND PLUS OR MINUS 90 DEG AROUND THE LATERAL AXIS.

SPACELAB 1: ESA STAFF

INVESTIGATION NAME: ATMOSPHERIC TRACE MOLECULES OBSERVED BY SPECTROSCOPY

NSSDC 10- SPALART-05
INVESTIGATIVE PROGRAM
CODE 9A
INVESTIGATION DISCIPLINE(S)
ATMOSPHERIC PHYSICS

PERSONNEL
PI - J.R. FRAWER
NASA-JPL

BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT IS TO USE HIGH-RESOLUTION, BOARD-MOUNTED (2-10 MICROMETERS) INFRARED ABSORPTION SPECTRA TO DETERMINE THE VARIABILITY OF MINOR AND TRACER CONSTITUENTS OF THE UPPER ATMOSPHERE AT A GLOBAL SCALE, AND TO STUDY CHROMIC CHARACTERISTIC TIMES FOR THESE SUBSTANCES. THE EFFECTS OF THEIR VARIABILITY ON THE STABILITY OF THE ATMOSPHERE, AND (2) TO PROVIDE A CALIBRATED SPECTRAL SIGNAL FROM THEATRAL PROCESSING OF ADVANCED INSTRUMENTATION TO BE USED FOR GLOBAL MONITORING OF CRITICAL ATMOSPHERIC SPECIES. THE ENERGY CONSISTS OF A WAPD-SCAN, FOURIER-INTERFERENCE, SPECTROMETER SYSTEM CONTAINING: (1) AN OPTICAL SYSTEM CONSISTING OF THE BASIC INTERFEROMETRY, FOURIER-INTERFERENCE OPTICS, SYNTHETIC HARMONIC, AND FILTER WHEEL. (2) A CONTINUOUS-SCAN SPECTROMETER, (3) AN IR SIGNAL HANDLING SYSTEM. (4) A DATA-HANDLING SYSTEM. (5) A CONTROL/MONITORING SYSTEM, AND (6) THE IN COOLING SYSTEM AND PRESSURIZATION SYSTEM.

SPACELAB 1: ESA STAFF

INVESTIGATION NAME: MEASUREMENT OF CENTRAL VENOUS PRESSURE

NSSDC 10- SPALART-31
INVESTIGATIVE PROGRAM
CODE 20/30
INVESTIGATION DISCIPLINE(S)
SPACE BIOLOGY

PERSONNEL
PI - G.M. GAGE
U OF BERLIN

BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT IS TO DETERMINE THE EFFECT OF ZERO GRAVITY ON THE FUNCTION OF FLUID-LUBRICATED JOURNAL BEARINGS. (2) OBSERVE FLUID FLOW-SURFACE WETTING AND HYDROMAGNETIC FLUID FORMATION IN JOURNAL BEARINGS OPERATING IN ZERO GRAVITY. LUBRICANT FERROFLUID LUBRICATED MAGNETIC JOURNAL, TRANSPARENT BEARINGS FACILITATE PHOTOGRAPHY AND OBSERVATION. AND A CAMERA.
BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVE IS TO PRODUCE ABSOLUTE DATA THAT THE ADAPTION OF MINERAL AND WATER METABOLISM TO THE WEIGHTLESS CONDITION IS ASSOCIATED WITH THE SYNCHRONIZATION OF THE CIRCULATION. THE EQUIPMENT CONTAINS A STRAIN GAGE MANOMETER, TAPE RECORDER, AND BATTERIES.

------ SPACELAB 1, GAUER

INVESTIGATION NAME- COLLECTION BLOOD SAMPLES FOR DETERMINATION OF A.H.R., ALDOSTERONE, AND OTHER HORMONES

NSSDC 10- SPALAB-37 INVESTIGATIVE PROGRAM CODE 50/60-GP INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
PI - O.H. GAUER U OF BERLIN
01 - KIRCH U OF BERLIN
02 - ROCH U OF BERLIN
01 - TOODY U OF BERLIN
01 - E. DUNN U OF BERLIN
01 - B. AIKEN

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVE IS THE CONFIRMATION AND COMPLETION OF SIMILAR WORK ON SATLLITE FLIGHTS, AND ATTEMPT TO FIND A CONNECTION WITH CIRCULATORY PARAMETERS. THE EQUIPMENT IS A CENTRIFUGE AND A STORAGE CONTAINER AT MINUS 20 DEG.

------ SPACELAB 1, GIRARD

INVESTIGATION NAME- GRILLE SPECTROMETER

NSSDC 10- SPALAB-16 INVESTIGATIVE PROGRAM CODE 60/60 GP INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - A. GIRARD ONERA
02 - K. PAYNET ONERA
01 - A. ACKERMANN BIRA

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVES ARE -- (1) TO DETERMINE THE VERTICAL DISTRIBUTION PROFILES OF TRACE CONSTITUENTS IN THE STRATOSPHERE, MESOSPHERE, AND THERMOSPHERE IN ORDER TO STUDY THE CHEMICAL AND DYNAMICAL ATMOSPHERIC PROCESSES; AND (2) TO MONITOR ON A LONG-TERM BASIS, MAN-MADE AND NATURAL ALTERATIONS OF THE NEAR-EARTH ENVIRONMENT. THE EQUIPMENT CONTAINS AN INFRARED SPECTROMETER WITH A TELESCOPE AND A COOLED INFRARED DETECTOR.

------ SPACELAB 1, GREEN

INVESTIGATION NAME- ELECTRO-PHYSIOLOGICAL TAPE RECORDER

NSSDC 10- SPALAB-35 INVESTIGATIVE PROGRAM CODE 50/60-GP INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
PI - A.J. GREEN CLINICAL RES CENTER
02 - P.D. STOTT CLINICAL RES CENTER
01 - J.S. WUPFF CLINICAL RES CENTER

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVE IS TO STUDY ACCLIMATIZATION OF HUMANS TO ZERO GRAVITY BY MEANS OF AN ECG-ELECTRODEPHALOGRAPH (EEG), ELECTRO-OCULOGRAM (EOG), ELECTRO-OCULUMETER (EOU), AND POSSIBLY ELECTROSTETHOSCOPE (EST) ON A CONTINUOUS BASIS OF A MICROSCOPIC TAPE RECORDER ATTACHED TO THE CHEW MEMBERS. THE EQUIPMENT CONSISTS OF ECG, EEG, AND EOG ELECTRODES, PREAMPLIFIERS, TAPE RECORDER, AND BATTERIES.

------ SPACELAB 1, HART

INVESTIGATION NAME- GEOPHYSICAL FLUID FLOW

NSSDC 10- SPALAB-08 INVESTIGATIVE PROGRAM CODE 55/55 INVESTIGATION DISCIPLINE(S) SOLAR PHYSICS ASTROPHYSICS

PERSONNEL
PI - J.E. HART U OF COLORADO
02 - J. DOOMS U OF COLORADO
01 - P. GILMANN HIGH ALTITUDE OBS.
01 - G. FICHLY NASA-IMF

BRIEF DESCRIPTION


------ SPACELAB 1, HERSE

INVESTIGATION NAME- WAVES IN THE O N EMISSIVE LAYER

NSSDC 10- SPALAB-19 INVESTIGATIVE PROGRAM CODE 60/60-GP INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - G. HERSE CNS-9A
01 - G. MORELLS CNS-9A

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVES ARE TO STUDY THE LARGE SCALE STRUCTURE OF THE ATMOSPHERIC O N EMISSION, AND TO INVESTIGATE POSSIBLE RELATIONSHIP BETWEEN THE ATMOSPHERIC STRUCTURE AND GEOGRAPHY ON METEOROLOGICAL PHENOMENA. THE EQUIPMENT CONTAINS AN IMAGE INTERFEROGRAM WITH A 25-MM F 0.95 LENS.

------ SPACELAB 1, HONEC

INVESTIGATION NAME- MICRO-ORGANISMS AND BIOMOLECULES IN THE SPACE ENVIRONMENT

NSSDC 10- SPALAB-34 INVESTIGATIVE PROGRAM CODE 50/60-GP INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
PI - G. HONEC CNS-9A
01 - L. THOMAS-DAVIS CNS-9A
01 - G. REITZ CNS-9A

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVES ARE TO -- (1) MEASURE QUANTITATIVELY THE EFFECTS OF SPACE PARAMETERS (VACUUM, SOLAR UV-RADIATION) ON MICROBIAL, BACTERIAL, VEGETATIVE CELLS, BACTERIOPHAGES AND ENZYMES, AND TO UNDERSTAND THE EFFECTS ON THESE SAMPLES. (2) DETERMINE THE CONSEQUENCES OF GENETIC AND RESPONSE ALTERATIONS. (3) COMPARING THE RESULTS WITH SIMULATION EXPERIMENTS PERFORMED IN THE LABORATORY. THE EQUIPMENT IS A BOX ACCOMMODATING 100 TO 200 BIOLOGICAL SAMPLES.

------ SPACELAB 1, KIMZEY

INVESTIGATION NAME- INFLUENCE OF SPACEFLIGHT ON BREATHING MECHANICS IN MAN

NSSDC 10- SPALAB-16 INVESTIGATIVE PROGRAM CODE 50/60-GP INVESTIGATION DISCIPLINE(S) SPACE BIOLOGY

PERSONNEL
PI - L.R. KIMZEY NASA-JSC
01 - W.H. CROSBY SCRIPPS-CRS FOUNDATION
01 - W.H. TAKASI SCHRIFT-41 FOUNDATION
01 - P.C. JOHNSON DAYTON V.
01 - F. ZEH U OF TENNESSEE
01 - C.5. UZ C.
01 - J.C. LANCEN U OF TENNESSEE
01 - B. ECKE VETERANS ADMIN HOSP

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVE IS TO OBTAIN NEW AND SPECIFIC INFORMATION REGARDING THE MECHANISM AND SITE OF ACTION RELATIVE TO THE RED BLOOD CELL MASS AND PLASMA VOLUME CHANGES OBSERVED DURING SPACE FLIGHT. THE EQUIPMENT CONSISTS OF AN IN-FLIGHT BLOOD COLLECTION SYSTEM AND A REFRIGERATOR.

------ SPACELAB 1, KENNE

INVESTIGATION NAME- ATMOSPHERIC EMISSION PHOTOMETRIC IMAGING

NSSDC 10- SPALAB-03 INVESTIGATIVE PROGRAM CODE 50/60-GP INVESTIGATION DISCIPLINE(S) ATMOSPHERIC PHYSICS

PERSONNEL
PI - L. KENNE NASA-JSC
01 - P. JOHNSON SCRIPPS-CRS FOUNDATION
01 - M. HAMERDAY SCRIPPS-CRS FOUNDATION
01 - G. UZ C.
01 - J.C. LANCEN U OF TENNESSEE
01 - B. ECKE VETERANS ADMIN HOSP

BRIEF DESCRIPTION

THE EXPERIMENT OBJECTIVE IS TO OBTAIN NEW AND SPECIFIC INFORMATION REGARDING THE MECHANISM AND SITE OF ACTION RELATIVE TO THE RED BLOOD CELL MASS AND PLASMA VOLUME CHANGES OBSERVED DURING SPACE FLIGHT. THE EQUIPMENT CONSISTS OF AN IN-FLIGHT BLOOD COLLECTION SYSTEM AND A REFRIGERATOR.

190
**PERSONNEL**

**PI - B. THEILE**
**BRAUNSCHWEIG TECH U**

**BRIEF DESCRIPTION**

The experiment objectives are to use a three-axis fluxgate magnetometer to study (1) magnetic fields of the Earth's magnetic field and its return current, (2) the solar quiet current, (3) the solar quiet current, and (4) solar and magnetospheric magnetic fields. The equipment consists of two separate three-axis fluxgate sensors.

---

**INVESTIGATION NAME: TEMPERATURE AND WIND MEASUREMENTS IN THE MESOSPHERE AND THERMOSPHERE**

**NSDC 19- SPALART-70 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

METEOROLOGY  
PLANETARY ATMOSPHERES

**PERSONNEL**

**PI - O. THULLIER**
**CMR-5A**

**P - E. ULMONT**
**CMR-5A**

**D - M. DORMIN**
**CMR-5A**

**D - P. COMMES**
**PARIS OBSERVATORY**

**BRIEF DESCRIPTION**

The experiment objectives are to use a Michelson interferometer to (1) determine the temperature and wind profiles from the top of the mesosphere to the thermosphere by analysis of the line widths and Doppler shifts of natural emission of 3467.0 and 7052.0 nm and photometric and correlation techniques, and (2) to use this experiment to demonstrate the ability of more sophisticated instruments to be flown on future missions. The equipment consists of a Michelson interferometer, a high-resolution instrument, and a 14-segment telescope.

---

**INVESTIGATION NAME: MEASUREMENT OF THE SOLAR SPECTRUM FROM 1900NM TO 4000NM**

**NSDC 19- SPALART-71 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

PHYSICS

**PERSONNEL**

**PI - O. THULLIER**
**CMR-5A**

**P - P. SIMON**
**JAS**

**O - J. BLAMPY**
**CMR-5A**

**O - D. MARTENS**
**LAEKENASTERN**

**BRIEF DESCRIPTION**

The experiment objectives are to use a Michelson interferometer to (1) determine the temperature and wind profiles from the top of the mesosphere to the thermosphere by analysis of the line widths and Doppler shifts of natural emission of 3467.0 and 7052.0 nm and photometric and correlation techniques, and (2) to use this experiment to demonstrate the ability of more sophisticated instruments to be flown on future missions. The equipment consists of a Michelson interferometer, a high-resolution instrument, and a 14-segment telescope.

---

**INVESTIGATION NAME: AN IMAGING SPECTROMETRIC OBSERVATORY**

**NSDC 19- SPALART-01 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

ATMOSPHERIC PHYSICS

**PERSONNEL**

**PI - M. TORK**
**U OF MICHIGAN**

**O1 - A. BARBOUR**
**KITT PEAK NATL OBS**

**O1 - D. BARBOUR**
**KITT PEAK NATL OBS**

**O1 - R. SAMSOL**
**U OF MICHIGAN**

**O1 - S. TRITY**
**U OF MICHIGAN**

**O1 - J. JAMES**
**ANGELUS**

**O1 - D. TORK**
**U OF MICHIGAN**

**O1 - T. DONAHUE**
**U OF MICHIGAN**

**BRIEF DESCRIPTION**

The experiment objectives are to use a two-axis imaging spectrometer designed to measure natural electron fluxes in the 0.5- to 12.0-keV range to study precipitation processes in auroral emission. The equipment consists of a Michelson interferometer, a high-resolution instrument, and a 14-segment telescope.

---

**INVESTIGATION NAME: HUMAN VESTIBULAR REACTIONS AND SENSATION**

**NSDC 19- SPALART-04 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

SPACE BIOLOGY

**PERSONNEL**

**PI - K. VON BAUMGARTEN**
**U OF ILLINOIS**

**O1 - W. VOSS**
**MPI-AERONOMIE**

**O1 - W. STUDIOK**
**MPI-AERONOMIE**

**O1 - H. SCHMIDT**
**TECH U OF GRAZ**

**BRIEF DESCRIPTION**

The experiment objectives are to use the sled to study the human vestibular reaction to linear acceleration and linear acceleration in conjunction with photometric stimulation and caloric stimulation. In addition to the space sled, the equipment contains an optical target setting system, an eye movement recorder, an electromyographic recording system, an electromyographic recording system, and a motion perception simulator.

---

**INVESTIGATION NAME: STUDY OF LOW-ENERGY ELECTRON FLUX AND ITS REACTION TO ACTUAL EXPERIMENTATION**

**NSDC 19- SPALART-24 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

PARTICLES AND FIELDS

**PERSONNEL**

**PI - K. WILHELM**
**MPI-ZEOLGIE**

**O1 - W. STUDIOK**
**MPI-AERONOMIE**

**O1 - W. RIESER**
**TECH U OF GRAZ**

**BRIEF DESCRIPTION**

The experiment objectives are to fly a 2-pi field of view electron spectrometer to measure natural electron fluxes in the 0.5- to 12.0-keV range to study precipitation processes in auroral emission. The equipment consists of a Michelson interferometer, a high-resolution instrument, and a 14-segment telescope.

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**INVESTIGATION NAME: ACTIVE CAVITY RADIOACTIVE SOLAR IRADIANCE MONITOR**

**NSDC 19- SPALART-06 INVESTIGATIVE PROGRAM**

**INVESTIGATION DISCIPLINE(S):**

SOLAR PHYSICS

**PERSONNEL**

**PI - K. WILHELM**
**MPI-ZEOLGIE**

**O1 - W. STUDIOK**
**MPI-AERONOMIE**

**O1 - H. SCHMIDT**
**TECH U OF GRAZ**

**BRIEF DESCRIPTION**

The experiment objectives are to fly a 2-pi field of view electron spectrometer to measure natural electron fluxes in the 0.5- to 12.0-keV range to study precipitation processes in auroral emission. The equipment consists of a Michelson interferometer, a high-resolution instrument, and a 14-segment telescope.

---

**INVESTIGATION NAME: STABILIZING HEIGHT SCANNING OR TRACKING**

**SPALART 1, FROM AURORA**
PERSONNEL
- R. WILLIAM
- R. BROWN
- H. ZIEREN
- J. KENDALL

BRIEF DESCRIPTION
The objective of the experiment is to measure the total solar
irradiance, to analyze the direction changes in the solar
irradiance, and to provide long-term correlation
with the satellite's orbit and future shuttle
calibrations. The equipment consists of an active
radiometer, a power converter, an
Electrode Unit, and a support structure.

********** SPACECAB BY- FOUNDE

INVESTIGATION NAME: SPACECAB
NSDC ID- SPALD-17
INVESTIGATION DISCIPLINE(S): SPACE BIOLOGY

PERSONNEL
- L.R. YOUNG
- O.M. JONES
- R.E. KALMEN
- C.M. ORAN

BRIEF DESCRIPTION
The experiment/strument is a device to
measure the change in tropospheric
sensitivity and precipitous drifts. It
consists of: SLED Facility, motor-driven
rotating field, 16-MP movie camera,
perpendicular light array, station for
hunting tests, and tape recorder.

********** STAFF

SPACECAB COMMON NAME- ST
ALTERNATE NAME- LARGE SPACE TELESCOPE, SPACE TELESCOPE

NSDC ID- LST
LAUNCH DATE- 11/01/88
LAUNCH SITE- CANAVARIAL, UNITED STATES
LAUNCH VEHICLE- SHUTTLE
SPONSORING COUNTRIES
- UNITED STATES
- NASA

PLANNED ORBIT PARAMETERS
- ORBIT TYPE- GEOSTATIONARY
- ORBIT PERIOD- 94.3 MIN
- INCLINATION- 28.0 DEG
- APODIPS- 500.0 KM

PERSONNEL
- M.A. NAYEMAN
- NASA HEADQUARTERS
- G.O. ORAN
- NASA HEADQUARTERS
- P.A. ORAN
- NASA-MSC

BRIEF DESCRIPTION
This experiment uses the proposed large
space telescope (LST) to observe the
influence of the solar output as a function of
diffraction-limited telescope with a planned
detracting adaptive optics system. The
LST system will be used to test the
performance of the adaptive optics system
and the stability of the solar output.

********** STAFF

INVESTIGATION NAME- SCIENTIFIC INSTRUMENT PACKAGE UNIT
NSDC ID- LST - 01
INVESTIGATION DISCIPLINE(S): ASTRONOMY

PERSONNEL
- J.K. WILSON
- NASA-JPL

BRIEF DESCRIPTION
The high-resolution camera is being designed
to a phase B level. The design is to
allow the camera to observe the
effects of space weather and to
analyze the changes in the solar output.

********** STAFF

INVESTIGATION NAME- SCIENTIFIC INSTRUMENT PACKAGE UNIT
NSDC ID- LST - 02
INVESTIGATION DISCIPLINE(S): ASTRONOMY

PERSONNEL
- J.K. WILSON
- NASA-JPL

BRIEF DESCRIPTION
The camera is being designed to a phase B level.
The design is to allow the camera to observe the
effects of space weather and to
analyze the changes in the solar output.
BRIEF DESCRIPTION

The astrometric instrument unit is being designed to a phase B level. Two different concepts have been advanced. One is to use a rotating coded wheel to modulate the light intensity. The second concept is to use a passive method. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view. The signals from the coded wheel are used to measure the positions of the stars in the field of view. The signals from the passive method are used to measure the positions of the stars in the field of view.

The investigation unit is being designed to a phase B level, through use of different concepts. A passive method has been advanced, where the signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.

PERSONNEL

P. ANDREW MCFADDEN

BRIEF DESCRIPTION

This instrument is designed to measure the positions of the stars in the field of view using a coded wheel. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.

INVESTIGATION NAME: SCIENTIFIC PACKAGE UNIT

NO. 5 - HIGH SPEED POINT/AREA PHOTOMETER

INVESTIGATION DISCIPLINE(S): ASTRONOMY

INVESTIGATIVE PROGRAM CODE: 5A

INVESTIGATIVE PROGRAM NAME: DOD

INVESTIGATIVE PROGRAM NUMBER: 6031

PERSONNEL

P. ANDREW MCFADDEN

BRIEF DESCRIPTION

This instrument is designed to measure the positions of the stars in the field of view using a coded wheel. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.

DATA COLLECTION SYSTEM

LAUNCH VEHICLE: ATLAS

LAUNCH DATE: 05/00/78

LAUNCH SITE: VANDENBERG AFB, UNITED STATES

SPONSORING COUNTRY/AGENCY: UNITED STATES

PLANNED ORBIT PARAMETERS

ORBIT TYPE: GEODESIC

ORBIT PERIOD: 94.5 MIN

PERIAPSIS: 500. KI

APOAPSIS: 500. KI

PERSONNEL

R. L. GARDACI

NASA HEADQUARTERS

P. ANDREW MCFADDEN

NASA GSFC

NASA GSFC

BRIEF DESCRIPTION

This instrument is designed to measure the positions of the stars in the field of view using a coded wheel. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.

INVESTIGATION NAME: SPACE ENVIRONMENT MONITOR

NO. 4 - HIGH SPEED POINT/AREA PHOTOMETER

INVESTIGATION DISCIPLINE(S): METEOROLOGY

PERSONNEL

P. ANDREW MCFADDEN

BRIEF DESCRIPTION

This instrument is designed to measure the positions of the stars in the field of view using a coded wheel. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.

INVESTIGATION NAME: DATA COLLECTION SYSTEM (DCS)

NO. 3 - TIROS-N-04

INVESTIGATION DISCIPLINE(S): METEOROLOGY

PERSONNEL

P. ANDREW MCFADDEN

BRIEF DESCRIPTION

This instrument is designed to measure the positions of the stars in the field of view using a coded wheel. The signals from the coded wheel are used to measure the positions of the stars. The signal from the passive method is used to measure the positions of the stars in the field of view.
**PERSONNEL**

<table>
<thead>
<tr>
<th>PI</th>
<th>NESS STAFF</th>
<th>NOAA-NESS</th>
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</table>

**BRIEF DESCRIPTION**

The data collection and platform location system (DCLS) on TIROS-N is designed to meet the meteorological data needs of the United States and to support the global atmospheric research program (GARP). The system receives 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. These observations are organized on board the spacecraft and retransmitted when the spacecraft comes in range of a command and data acquisition (CDA) station. For free-moving balloons, the Doppler frequency shift of the transmitted signal is observed to calculate the location of the balloon. The DCLS is expected, for a moving sensor platform, to have a location accuracy of 5 to 8 km and a velocity accuracy of 1 to 1.6 m/s. This system has the capability of acquiring data from up to 2000 platforms per day. Identical experiments are flown on other spacecraft in the TIROS-N/NOAA series.

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**SPACECRAFT COMMON NAME:** UK 6

**ALTERNATE NAMES:** UNITED KINGDOM 6

**NSSC 18:** UK-6

**LAUNCH DATE:** 07/23/78

**WEIGHT:** 133.0 KG

**LAUNCH SITE:** WOLLOPS FLIGHT CENTER, UNITED STATES

**LAUNCH VEHICLE:** SCOUT

**SPONSORING COUNTRY/AGENCY:** UNITED KINGDOM

**PLANNED ORBIT PARAMETERS**

- **ORBIT TYPE:** GEOSTATIONARY
- **ORBIT PERIOD:** 95.6 MIN
- **PERIAPSE:** 550 KM
- **APOAPEX:** 550 KM

**PERSONNEL**

- **PO:** WOCHE ASSIGNED
- **SC:** WOCHE ASSIGNED
- **PM:** J.E. POPE
- **PS:** J.A. CULBERNE

**APPLETON LAB**

**IMPERIAL COLLEGE**

**BRIEF DESCRIPTION**

The objective of this spacecraft is to undertake studies in high-energy astrophysics. Two X-ray experiments, one cosmic-ray experiment, and three technology experiments are carried. The spacecraft is spin stabilized, with the spin axis commanded into a sequence of orientations to accumulate the X-ray experiments requirements. The intended orbit is circular, 550 km in altitude, and 55 deg in inclination.

----------

**INVESTIGATIVE PROGRAM**

**CODE:** SA/CO-OP

**INVESTIGATION DISCIPLINE(S):**

- X-RAY ASTRONOMY
- COSMIC RAYS

**PERSONNEL**

<table>
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<th>PI</th>
<th>UNKNOWN</th>
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**BRIEF DESCRIPTION**

This experiment is designed to study discrete sources and extended features of the low-energy X-ray sky in the range 0.1 to 2.0 keV. In addition, both long- and short-term variability of individual sources are studied in conjunction with the Leicester experiment. This experiment is provided jointly by the University College, London/Ravara Space Laboratory, and Birmingham University.

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**INVESTIGATIVE PROGRAM**

**CODE:** SA/CO-OP

**INVESTIGATION DISCIPLINE(S):**

- X-RAY ASTRONOMY

**PERSONNEL**

- **PO:** UNKNOWN

**U OF LEICESTER**

**BRIEF DESCRIPTION**

This experiment is designed to investigate the periodic and aperiodic fluctuations in emissions from a wide range of X-ray sources down to millisecond time scales.

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**INVESTIGATIVE PROGRAM**

**CODE:** SA/CO-OP

**INVESTIGATION DISCIPLINE(S):**

- X-RAY ASTRONOMY

**PERSONNEL**

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</table>

**U OF LEICESTER**

**BRIEF DESCRIPTION**

This experiment is designed to study discrete sources and extended features of the low-energy X-ray sky in the range 0.1 to 2.0 keV. In addition, both long- and short-term variability of individual sources are studied in conjunction with the Leicester experiment. This experiment is provided jointly by the University College, London/Ravara Space Laboratory, and Birmingham University.

----------

**INVESTIGATIVE PROGRAM**

**CODE:** SA/CO-OP

**INVESTIGATION DISCIPLINE(S):**

- X-RAY ASTRONOMY

**PERSONNEL**

- **PO:** UNKNOWN

**U OF LEICESTER**

**BRIEF DESCRIPTION**

This experiment is designed to study discrete sources and extended features of the low-energy X-ray sky in the range 0.1 to 2.0 keV. In addition, both long- and short-term variability of individual sources are studied in conjunction with the Leicester experiment. This experiment is provided jointly by the University College, London/Ravara Space Laboratory, and Birmingham University.
INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS
4. INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

This index contains the names of all spacecraft and experiments that were either active sometime between January 1, 1975, and June 30, 1977, or planned as of June 30, 1977. The spacecraft are listed alphabetically by both common name and alternate names. The alternate names are printed with a reference to the NSSDC spacecraft common name. Next to the NSSDC spacecraft common name are printed the sponsoring country and agency, launch date, orbit type, NSSDC ID code, and the current state. The current state includes the epoch date, status, and data rate of all launched spacecraft and experiments. For prelaunch spacecraft, only the status is shown; there is no information shown for prelaunch spacecraft experiments. The status and data rate, for the most part, reflect the state as of June 30, 1977, that became effective on the listed epoch date. However, a few changes subsequent to this date may appear. An explanation of the terms used in these columns may be found in Appendix C. The experiments are listed following the associated spacecraft common name and are ordered alphabetically by the principal investigator's or team leader's last name. The experiment name, NSSDC ID code, and current state are also given for each experiment. Finally, each name is followed by a page number referencing the description of the spacecraft or experiment found in this report.
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| ESA GEOS        | 04/20/77 | INTERNATIONAL (ESA) | YES | GEOSTATIONARY | 77-D02A | 5/01/77 | NORMAL | STD | 46 | DSSMIN | WAVE FIELD IMPEDANCE | GEISS | LOW-ENERGY ION COMPOSITION | ODEWIN | MAGNETIC WAVE Fields | 77-D02A-01 | 5/04/77 | NORMAL | STD | 46 |
| ESA GEOS        | 04/20/77 | INTERNATIONAL (ESA) | YES | GEOSTATIONARY | 77-D02A | 5/01/77 | NORMAL | STD | 46 | HILDEST | LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION | MARIANI | TRIAXIAL FLUXGATE MAGNETOMETER | MELLINER | ELECTRIC FIELD AND GRADIENT DETECTION | 77-D02A-02 | 5/04/77 | NORMAL | STD | 47 |
| ESA GEOS        | 04/20/77 | INTERNATIONAL (ESA) | YES | GEOSTATIONARY | 77-D02A | 5/01/77 | NORMAL | STD | 46 | PETERSSEN | ELECTRON BEAM DECEPTION | PELETT | ELECTRONIC BOUNDS RESONANCES | PELETT | ELECTRONIC BOUNDS RESONANCES | 77-D02A-03 | 5/04/77 | NORMAL | STD | 47 |
| ESA GEOS        | 04/20/77 | INTERNATIONAL (ESA) | YES | GEOSTATIONARY | 77-D02A | 5/01/77 | NORMAL | STD | 46 | WELIN | ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION | WERMAN | THERMAL PLASMA FLOW | WERMAN | THERMAL PLASMA FLOW | 77-D02A-04 | 5/04/77 | NORMAL | STD | 48 |

| ESSB-1          | 12/15/68 | UNITED STATES (ESSA) | NO | GEOSTATIONARY | 68-D04A | 3/06/76 | INOPERABLE | ZERO | 48 | SSS '76 AFF | AUTOMATIC PICTURE TRANSMISSION (APT) | SYLVA | SSS '76 AFF | SSS '76 AFF | AUTOMATIC PICTURE TRANSMISSION (APT) | 68-D04A-01 | 3/06/76 | INOPERABLE | ZERO | 48 |

| EUROPEAN e-RAY SATE. | SEE HELIO | SEE HELIO |

| EXOS-A          | 01/01/78 | JAPAN (ISAS) | YES | GEOSTATIONARY | 78-D04B | 1/01/78 | INOPERABLE | ZERO | 48 | JAXA | UV AURORAL TV IMAGING | JAXA | UV AURORAL TV IMAGING | JAXA | UV AURORAL TV IMAGING | 78-D04B-01 | 1/01/78 | INOPERABLE | ZERO | 48 |
| EXOS-B          | 01/01/79 | JAPAN (ISAS) | YES | GEOSTATIONARY | 79-D04B | 1/01/79 | INOPERABLE | ZERO | 48 | JAXA | FLUXGATE MAGNETOMETER | JAXA | FLUXGATE MAGNETOMETER | JAXA | FLUXGATE MAGNETOMETER | 79-D04B-01 | 1/01/79 | INOPERABLE | ZERO | 48 |
| EXOS-C          | 01/01/78 | JAPAN (ISAS) | YES | GEOSTATIONARY | 78-D04B | 1/01/78 | INOPERABLE | ZERO | 48 | JAXA | K NUCLEAR PARTICLE DETECTOR | JAXA | K NUCLEAR PARTICLE DETECTOR | JAXA | K NUCLEAR PARTICLE DETECTOR | 78-D04B-01 | 1/01/78 | INOPERABLE | ZERO | 48 |

| EXOSAT          | SEE HELIO | SEE HELIO |

| EXOSPHERE SAT. A | SEE EXOS-A | SEE EXOS-A |
| EXOSPHERE SAT. B | SEE EXOS-B | SEE EXOS-B |
### INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

By Spacecraft Names and Principal Investigators

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- **SPACECRAFT NAME**: The name of the spacecraft on which the experiment is conducted.
- **COUNTRY AND AGENCY**: The country and agency responsible for the spacecraft.
- **LAUNCH DATE**: The date the spacecraft was launched.
- **ORBIT TYPE**: The type of orbit the spacecraft is in.
- **PRINC. INVEST. NAME**: The principal investigator of the experiment.
- **EXPERIMENT NAME**: The name of the experiment being conducted.

**PROJECT STATUS**

- **CURRENT STATUS**: The current status of the experiment. Possible values include "PROPOSED MISSION", "APPROVED MISSION", "INOPERABLE".

**NOTE**

- The table provides a comprehensive list of spacecraft and experiments, including their names, launch dates, orbit types, principal investigators, and current statuses.
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5. INVESTIGATOR NAME INDEX

This index contains an alphabetical listing of the names of the investigators or team members associated with each experiment described in Sections 2 and 3 of this report. The current organizational affiliation of the person is also shown. Listed under each person's name are the associated experiments. Each experiment contains the spacecraft and experiment name, NSSDC ID code, and the page number referencing the description of the experiment found in this report. An asterisk, which precedes an experiment name, identifies the person associated with that experiment as the principal investigator or team leader.
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</tr>
</tbody>
</table>
| 29
APPENDIX A - OTHER RELEVANT SPACECRAFT

Spacecraft relevant to the purpose of this report and not included elsewhere are listed in this Appendix. The spacecraft include those that have previously been published in earlier reports of this series and now have a status of cancelled, failed at launch, or mission being rescheduled. Some missions that are under study are also included if these seem likely to be approved in the near future. The investigators for these missions have not yet been chosen. The spacecraft are listed alphabetically by the NSSDC spacecraft common name. Listed with each spacecraft are the sponsoring country and agency, the actual or planned launch date, the type of orbit, the NSSDC ID code, and the status. A definition of the terms used in the current status column can be found in Appendix C.
<table>
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<tr>
<th>Spacecraft Name</th>
<th>Sponsoring Country and Agency</th>
<th>Launch Date</th>
<th>NSSDC ID</th>
<th>Current Status</th>
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<td>AMPS</td>
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<td>Under Study</td>
<td>AMPS</td>
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<td>Corsa</td>
<td>Japan</td>
<td>02/06/76</td>
<td>CORSA</td>
<td>Failed Mission</td>
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<tr>
<td>DADE-A</td>
<td>United States</td>
<td>12/05/75</td>
<td>DADE-A</td>
<td>Failed Mission</td>
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<td>DADE-B</td>
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<td>DADE-B</td>
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<tr>
<td>Diapo</td>
<td>France</td>
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<td>DIAPO</td>
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<tr>
<td>Dual-A</td>
<td>U.S.S.R.</td>
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<td>DUAL-A</td>
<td>Canceled Mission</td>
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<td>Dual-II</td>
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<td>DUAL-AI</td>
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<tr>
<td>Dynamics Explorer</td>
<td>United States</td>
<td>00/00/80</td>
<td>DE</td>
<td>Under Study</td>
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<tr>
<td>Egret</td>
<td>United States</td>
<td>00/00/79</td>
<td>EGRST</td>
<td>Mission Being Rescoped</td>
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<tr>
<td>Electrodynamics Explorer</td>
<td>United States</td>
<td>00/00/79</td>
<td>EE</td>
<td>Mission Being Rescoped</td>
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<tr>
<td>EOS-A</td>
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<td>Canceled Mission</td>
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<tr>
<td>GP-A</td>
<td>United States</td>
<td>06/17/76</td>
<td>GRAVR-A</td>
<td>Rocket 7606-1701</td>
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<td>Intercosmos 10</td>
<td>U.S.S.R.</td>
<td>10/30/73</td>
<td>73-082A</td>
<td>Inoperable Prior to 1975</td>
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<td>ITOS-E2</td>
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<td>United States</td>
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<td>ITOS-J</td>
<td>Canceled Mission</td>
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<tr>
<td>Jupiter Orbiter Probe</td>
<td>United States</td>
<td>01/00/82</td>
<td>JOP</td>
<td>Approved Mission (See Appendix B4.)</td>
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<td>Landsat-E</td>
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<td>06/00/83</td>
<td>LAND-E</td>
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<td>Lunar Polar Orb-Daughter</td>
<td>United States</td>
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<td>LPO-D</td>
<td>Canceled Mission</td>
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<tr>
<td>Lunar Polar Orb-Mother</td>
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<td>Canceled Mission</td>
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<td>OSO-J</td>
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<td>RM 20</td>
<td>United States</td>
<td>04/12/75</td>
<td>RM20</td>
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<td>Sari</td>
<td>France</td>
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<td>Canceled Mission</td>
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<tr>
<td>Space Shuttle LDEF</td>
<td>United States</td>
<td>07/00/79</td>
<td>SSLDEF</td>
<td>Under Study</td>
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APPENDIX B - SPECIAL INVESTIGATORS

B1. IUE Guest Investigators

The International Ultraviolet Explorer (IUE) has a facility class payload that will be utilized for a number of different investigations. This spacecraft does not have individual principal investigators or team leaders associated with each experiment. Listed are the names of the guest investigator with his affiliation and the title of the investigation.

B2. Joint IRAS Science Working Group

The Infrared Astronomy Satellite (IRAS), like IUE, does not have individual principal investigators or team leaders associated with each experiment. Operation of the spacecraft is by the Joint IRAS Science Working Group. Members of this Working Group and their affiliations are listed.

B3. The Caravane Collaboration (COS-B)

The gamma-ray astronomy satellite, COS-B, was initially conceived and implemented by five university and research groups. The members of these groups and their affiliations are listed. Other individuals who joined this effort are included in the list.

B4. Jupiter Orbiter Probe Investigators

The investigators and investigations for the Jupiter Orbiter Probe to be launched in early 1982 were recently selected. The investigators with their affiliations are listed for each of the probe and orbiter investigations. The Principal Investigators are indicated by an asterisk. The Orbiter Imaging and Radio Science team members with their affiliations are listed separately. Team Leaders are indicated. Scientists with their affiliations who are making interdisciplinary studies are also listed.
Bl. International Ultraviolet Explorer (IUE) Guest Investigators

Guest Investigators
and Investigations

Barth - University of Colorado
The Determination of the Seasonal Dynamics of Mars from Observed Ozone and Atmospheric Dust Variations

Black - Harvard College Observatory
Investigation of Interstellar Carbon
Investigations of Stellar Chromospheres and Coronas
Ultraviolet Investigations of Stellar X-Ray Sources

Boggess - NASA-GSFC
Observations of Planetary Nebulae and of Galactic H II Regions
Ultraviolet Observations of Quasi-Stellar Objects

Bohm-Vitense - University of Washington
Ultraviolet Observations of A and F Stars

Castor - University of Colorado
Spectroscopic Observations of Of, Of, and Wolf-Rayet Stars

Conti - University of Colorado
Spectroscopic Observations of O, Of, and Wolf-Rayet Stars

Crampton - Dominion Astrophysical Observatory, Canada
Circumstellar Matter in Close Binaries
Evidence for Mass Loss in the Ultraviolet Spectra of Early-Type Supergiants

Dalgarno - Harvard College Observatory
Investigation of Interstellar Carbon

Daltabuit - Instituto de Astronomia, Universidad Nacional Autonoma de Mexico
Ultraviolet Photoelectric Photometry of Emission Line Objects

Delsemme - University of Toledo
Observation of Comet Encke and Other Comets

Doherty - Washburn Observatory, University of Wisconsin
Observations of Stellar Mg II 2800 A Lines in Main-Sequence F-G Stars
Guest Investigators
and Investigations

Donn - NASA-GSFC
The Search for Spectra of Interstellar Molecules Against Hot Stars
Ultraviolet Cometary Observations

Dupree - Harvard College Observatory
Investigation of Interstellar Carbon
Investigations of Stellar Chromospheres and Coronas
Ultraviolet Investigations of Stellar X-Ray Sources

Estabrook - NASA-JPL
Ultraviolet Observations of Quasistellar Objects and the Intergalactic Medium

Fiebelman - NASA-GSFC
Observations of Planetary Nebulae and of Galactic H II Regions

Gehrels - University of Arizona
Spectrophotometry of Planets

Greenstein - California Institute of Technology
Observations of Faint, High-Latitude Blue Stars

Gursky - Center for Astrophysics, SAO
Study of the Ultraviolet Spectra of Selected Galactic X-Ray Sources

Hackney - Western Kentucky University
Observations of the Ultraviolet Spectra of the Peculiar Radio Source
OJ 287 and Related Objects

Heap - NASA-GSFC
Hot Subluminous Stars

Hilditch - Dominion Astrophysical Observatory, Canada
Circumstellar Matter in Close Binaries

Hill - Dominion Astrophysical Observatory, Canada
Circumstellar Matter in Close Binaries
Evidence for Mass Loss in the Ultraviolet Spectra of Early-Type Supergiants

Hummer - University of Colorado
Spectroscopic Observations of O, Of, and Wolf-Rayet Stars

Hutchings - Dominion Astrophysical Observatory, Canada
Circumstellar Matter in Close Binaries
Evidence of Mass Loss in the Ultraviolet Spectra of Early-Type Supergiants
Guest Investigators
and Investigations

Imhoff - Ohio State University
Ultraviolet Spectra of T Tauri Stars

Jackson - NASA-GSFC
Ultraviolet Cometary Observations

Jenkins - Princeton University
The Study of Interstellar Absorption Lines

Johnson - Lockheed Palo Alto Research Laboratory
Investigations of Circumstellar Matter

Jugaku - Tokyo Astronomical Observatory
Ultraviolet Spectroscopy of Selected B and A Stars

Kellogg - Center for Astrophysics, SAO
Study of the Ultraviolet Spectra of Selected Galactic X-Ray Sources

Kleinmann - SAO
Lyman and Photometry of H II Region

Klinglesmith - NASA-GSFC
Ultraviolet Studies of the Star A Centauri

Kondo - NASA-JSC
Investigation of Mass Flow in Close Binary Systems

Lane - NASA-JPL
The Determination of the Seasonal Dynamics of Mars from Observed Ozone and Atmospheric Dust Variations
Ultraviolet Observations of Quasistellar Objects and the Intergalactic Medium

Leckrone - NASA-GSFC
Spectroscopy of the Bp, Ap, and Magnetic Variable Stars at Ultraviolet Wavelengths
Ultraviolet Spectroscopy of Dwarf and Giant B and A Stars

Liller - Harvard College Observatory
Ultraviolet Investigations of Stellar X-Ray Sources

Lillia - Laboratory for Atmospheric & Space Physics
Spectroscopic Observations of O, Of, and Wolf-Rayet Stars

Linsky - University of Colorado
Observations of Chromospheric Emission Lines from F-M Dwarfs and Giants
Guest Investigators

Matilsky - Center for Astrophysics, SAO
Study of the Ultraviolet Spectra of Selected Galactic X-Ray Sources

McCluskey - NASA-JSC
Investigation of Mass Flow in Close Binary Systems

McCraeken - NASA-GSFC
Observations of Planetary Nebulae and of Galactic H II Regions

Mentall - NASA-GSFC
The Search for Spectra of Interstellar Molecules Against Hot Stars

Mihalas - High Altitude Observatory
Spectroscopic Observations of O, Of, and Wolf-Rayet Stars

Moos - Johns Hopkins University
Ultraviolet Studies of the Outer Planets

Morton - Princeton University
Ultraviolet Spectroscopy of Stellar and Extragalactic Objects

Mumma - NASA-GSFC
The Search for Spectra of Interstellar Molecules Against Hot Stars

Oke - California Institute of Technology
Observations of Faint, High-Latitude Blue Stars
Ultraviolet Spectroscopy of Peculiar Galaxies and Quasars

Owen - State University of New York, Stony Brook
Ultraviolet Observations of Planets, Satellites, and Comets

Pennamperuma - University of Maryland
Ultraviolet Observations of Planets, Satellites, and Comets

Plavec - University of California, Los Angeles
Problems of Mass Loss and Mass Transfer in Close Binary Systems

Roeder - University of Toronto, Canada
Ultraviolet Spectra of Brighter, Low Redshift Quasars and Some Other Related Objects

Sagan - Cornell University
Ultraviolet Observations of Planets, Satellites, and Comets

Sapar - W. Struve Astrophysical Observatory of Tartu, U.S.S.R.
Ultraviolet Observations of Early-Type Stars and Galaxies
Guest Investigators
and Investigations

Savage - University of Wisconsin, Madison
Interstellar Lyman-Alpha Observations

Schild - SAO
Lyman and Photometry of H II Region

Schmidt - California Institute of Technology
Ultraviolet Observations of Quasistellar Objects and the Intergalactic Medium

Smith - NASA-GSFC
The Search for Spectra of Interstellar Molecules Against Hot Stars
Ultraviolet Emission Line Spectra in Bright Galaxies

Snyder - University of Virginia
The Search for Spectra of Interstellar Molecules Against Hot Stars

Sobieski - NASA-GSFC
Ultraviolet Spectroscopy of Peculiar Eclipsing Binary Stars

Spitzer - Princeton University
The Study of Interstellar Absorption Lines
Ultraviolet Spectroscopy of Stellar and Extragalactic Objects

Stecher - NASA-GSFC
The Physical State and the Distribution of Gas in Our Galaxy

Steif - NASA-GSFC
The Search for Spectra of Interstellar Molecules Against Hot Stars

Timothy - Harvard College Observatory
Investigations of Stellar Chromospheres and Coronas

Tomasko - University of Arizona
Spectrophotometry of Planets

Torres-Peimbert - Instituto de Astronomia, Universidad Nacional Autonoma de Mexico
Ultraviolet Photoelectric Photometry of Emission Line Objects

Underhill - NASA-GSFC
Study of the Ultraviolet Spectra of Early-Type Supergiants

Vandenbout - University of Texas, Austin
Observations of Interstellar Molecules
The Interstellar Abundance of Light Elements
Ultraviolet Spectroscopy of X-Ray Emitting Binary Systems
Guest Investigators and Investigations

Wahlquist - NASA-JPL
Ultraviolet Observations of Quasistellar Objects and the Intergalactic Medium

West - NASA-GSFC
Ultraviolet Spectra of Wolf-Rayet Stars and Mass Losing Supergiants

Williams - University of Manchester, UK
The Physical State and the Distribution of Gas in Our Galaxy

Wing - Ohio State University
Exploratory Observations of the Ultraviolet Spectra of Late-Type Stars

Zellner - University of Arizona
Spectrophotometry of Planets
### Joint Infrared Astronomy Satellite (IRAS) Science Working Group

<table>
<thead>
<tr>
<th>Member</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aumann, H. H.</td>
<td>NASA-JPL</td>
</tr>
<tr>
<td>Beintema, D.</td>
<td>University of Groningen, Netherlands</td>
</tr>
<tr>
<td>Borgman, J.</td>
<td>University of Groningen, Netherlands</td>
</tr>
<tr>
<td>Clegg, P.</td>
<td>Queen Mary College, UK</td>
</tr>
<tr>
<td>Dejong, T.</td>
<td>University of Leiden, Netherlands</td>
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<td>Gillette, F.</td>
<td>Kitt Peak National Observatory</td>
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<td>Habing, A.</td>
<td>University of Leiden, Netherlands</td>
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<tr>
<td>Hauser, M.</td>
<td>NASA-GSFC</td>
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<td>Houck, J.</td>
<td>Cornell University</td>
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<tr>
<td>Jennings, R.</td>
<td>University of College London, UK</td>
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<td>Low, F.</td>
<td>University of Arizona</td>
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<tr>
<td>Marsden, P.</td>
<td>University of Leeds, UK</td>
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<tr>
<td>Neugebauer, G.</td>
<td>California Institute of Technology (U.S. Principal Scientist, Co-Chairman)</td>
</tr>
<tr>
<td>Pottasch, S.</td>
<td>University of Groningen, Netherlands</td>
</tr>
<tr>
<td>Sciffer, T.</td>
<td>University of California, San Diego</td>
</tr>
<tr>
<td>Van Duinen, R.</td>
<td>University of Groningen, Netherlands (European Principal Scientist, Co-Chairman)</td>
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<td>Walker, R.</td>
<td>NASA-ARC</td>
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### B3. The Caravane Collaboration (COS-B)

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<th>Member</th>
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<tr>
<td>Bennett, K.</td>
<td>European Space Research and Technology Centre, Noordwijk, Netherlands</td>
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<tr>
<td>Bignami, G. F.</td>
<td>Instituto di Scienze Fisiche dell'Università di Milano, Italy</td>
</tr>
<tr>
<td>Boella, G.</td>
<td>Instituto di Scienze Fisiche dell'Università di Milano, Italy</td>
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<td>Buccheri, R.</td>
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<td>Burger, J. J.</td>
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<td>Hermsen, W.</td>
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<td>Higdon, J.</td>
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<td>Hutchinson, G. W.</td>
<td>University of Southampton, United Kingdom</td>
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<td>Kanbach, G.</td>
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<td>Koch, L.</td>
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<tr>
<td>Mayer-Hasselwander, H. A.</td>
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<td>Taylor, B. G.</td>
<td>European Space Research and Technology Centre, Noordwijk, Netherlands</td>
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<tr>
<td>Trendelenburg, E. A.</td>
<td>European Space Research and Technology Centre, Noordwijk, Netherlands</td>
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<tr>
<td>van de Hulst, H. C.</td>
<td>Netherlands Committee for Geophysical and Space Research, Leiden, Netherlands</td>
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<tr>
<td>Wills, R. D.</td>
<td>European Space Research and Technology Centre, Noordwijk, Netherlands</td>
</tr>
</tbody>
</table>
B4. Jupiter Orbiter Probe Investigators

He/H₂ Ratio

Hoffman, H.-J.  Universität Bonn, Federal Republic of Germany
*Von Zahn, U.  Universität Bonn, Federal Republic of Germany

Atmospheric Structure

Blanchard, R.  NASA-LaRC
Kirk, D. B.  NASA-ARC
Schubert, G.  University of California, Los Angeles
*Sieff, A.  NASA-ARC
Sommer, S. C.  NASA-ARC
Young, R. E.  NASA-ARC

Mass Spectrometer

Atreya, S. K.  University of Michigan
Carignan, G. R.  University of Michigan
Donahue, T. M.  University of Michigan
Hartle, R. E.  NASA-GSFC
Hunten, D. M.  Kitt Peak National Observatory
*Niemann, H. B.  NASA-GSFC
Owen, T. C.  State University of New York, Buffalo
Spencer, N. W.  NASA-GSFC

Net Flux Radiometer

*Boese, R. W.  NASA-ARC
Pollack, J. B.  NASA-ARC
Silvaggio, P. M.  NASA-ARC

Nephelometer

Blamont, J. E.  Centre National de la Recherche Scientifique, Verrières-le-Buisson, France
Grams, G. W.  NCAR
Pollack, J. B.  NASA-ARC
*Ragent, B.  NASA-ARC
**Probe Investigations**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Location</th>
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<tbody>
<tr>
<td>Dehmel, G.</td>
<td>Technische Universität Braunschweig, Federal Republic of Germany</td>
</tr>
<tr>
<td>Gleim, F. O.</td>
<td>Technische Universität Braunschweig, Federal Republic of Germany</td>
</tr>
<tr>
<td>Krider, E. P.</td>
<td>University of Arizona</td>
</tr>
<tr>
<td>*Lanzerotti, L. J.</td>
<td>Bell Telephone Laboratories</td>
</tr>
<tr>
<td>Rinnert, K.</td>
<td>Max-Planck-Institut für Aeronomie, Hanover, Federal Republic of Germany</td>
</tr>
<tr>
<td>Uman, M.</td>
<td>University of Florida, Gainesville</td>
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**Orbiter Investigations**

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<tr>
<td>Carlson, R.</td>
<td>University of Southern California, Los Angeles</td>
</tr>
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<td>Danielson, E.</td>
<td>NASA-JPL</td>
</tr>
<tr>
<td>Fanale, F. P.</td>
<td>NASA-JPL</td>
</tr>
<tr>
<td>*Johnson, T. V.</td>
<td>University of California, Los Angeles</td>
</tr>
<tr>
<td>Kieffer, H.</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>Lewis, J. S.</td>
<td>U. S. Geological Survey, Flagstaff</td>
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<tr>
<td>Masursky, H.</td>
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<tr>
<td>Matson, D. L.</td>
<td>University of Hawaii</td>
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<td>McCord, T. B.</td>
<td>U. S. Geological Survey, Flagstaff</td>
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<tr>
<td>Soderblom, L. A.</td>
<td>NASA-JPL</td>
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<td>Taylor, F. W.</td>
<td>University of Southern California, Los Angeles</td>
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**UV Spectrometer**

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<tr>
<th>Name</th>
<th>Institution/Location</th>
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<tbody>
<tr>
<td>Barth, C. A.</td>
<td>Laboratory for Atmospheric and Space Physics, University of Colorado</td>
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<tr>
<td>*Hord, C. W.</td>
<td>Laboratory for Atmospheric and Space Physics, University of Colorado</td>
</tr>
<tr>
<td>Kelly, K.</td>
<td>Laboratory for Atmospheric and Space Physics, University of Colorado</td>
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<tr>
<td>Lane, L.</td>
<td>NASA-JPL</td>
</tr>
<tr>
<td>Stewart, A. I.</td>
<td>Laboratory for Atmospheric and Space Physics, University of Colorado</td>
</tr>
<tr>
<td>Thomas, E.</td>
<td>Laboratory for Atmospheric and Space Physics, University of Colorado</td>
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</tbody>
</table>
Orbiter Investigations

Magnetometer

Coleman, P. J.
Kennell, C. F.
*Kivelson, M. G.
McPherron, R. L.
Russell, C. T.

University of California, Los Angeles
University of California, Los Angeles
University of California, Los Angeles
University of California, Los Angeles
University of California, Los Angeles

Plasma

Coroniti, F. V.
*Frank, L. A.
Vasyliunas, V. M.

University of California, Los Angeles
University of Iowa
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Electron Emitter

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Goldstein, R.
Gonfalone, A.
*Grard, R.
Jones, D.
Knott, K.
Pedersen, A.

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ESA-ESTEC, Noordwijk, Netherlands
ESA-ESTEC, Noordwijk, Netherlands
ESA-ESTEC, Noordwijk, Netherlands
ESA-ESTEC, Noordwijk, Netherlands

Energetic Particles

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Axford, W. I.

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Fritz, T. A.
Hasegawa, A.
Krimigis, S. M.
Lanzerotti, L. J.
Lyons, L. R.
McEntire, R. W.
Roederer, J. G.
Roelof, E. C.
Studemann, W.
Thorne, R. M.
Wilkin, B.
*Williams, D. J.

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University of California, Los Angeles
University of California, Los Angeles
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NOAA Space Environment Laboratory

B-13
Orbiter Investigations

Plasma Wave

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*Gurnett, D. A. University of Iowa
Kennel, C. F. University of California, Los Angeles
Scarf, F. L. TRW Systems Group, Redondo Beach
Shawhan, S. D. University of Iowa

Photopolarimeter Radiometer

Coffeen, D. L. NASA-GISS
Hansen, J. E. NASA-GISS
*Lacis, A. A. NASA-GISS
Stone, P. H. Massachusetts Institute of Technology
Travis, L. D. NASA-GISS
Wang, W-C. NASA-GISS
Yung, Y-L. Harvard University

Dust

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Kissel, J. Max-Planck-Institut für Kernphysik, Heidelberg, Federal Republic of Germany
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Morfill, G. Max-Planck-Institut für Kernphysik, Heidelberg, Federal Republic of Germany
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Chapman, C. R. Planetary Science Institute
Davies, M. E. RAND Corporation, Santa Monica
Greeley, R. NASA-ARC
Greenberg, R. Planetary Science Institute
Head, J. W. Brown University
Neukum, G. Max-Planck-Institut für Kernphysik, Heidelberg, Federal Republic of Germany
Schubert, G.  
Pilcher, C. B.  
Veverka, J.  

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University of Hawaii  
Cornell University

Radio Science Team

Anderson, J.  
Eshleman, V.  
Estabrook, F.  
Pjeldbo, G.  
Gerard, E.  
Gulkis, S.  
Kliore, A.  
Woo, R.  

NASA-JPL (Team Leader)  
Stanford University  
NASA-JPL  
NASA-JPL  
Observatoire de Paris, Meudon, France  
NASA-JPL  
NASA-JPL (Deputy Team Leader)  
NASA-JPL

Interdisciplinary Scientists

Fanale, F.  
Gierasch, P.  
Hunt, D. M.  
Masursky, H.  
McElroy, M. B.  
Orton, G.  
Owen, T.  
Pollack, J. B.  
Russell, C.  
Sagan, C.  
Scarf, F.  
Schubert, G.  
Sonett, C. P.

NASA-JPL  
Cornell University  
Kitt Peak National Observatory  
U.S. Geological Survey, Flagstaff  
Harvard University  
NASA-JPL  
State University of New York, Buffalo  
NASA-ARC  
University of California, Los Angeles  
Cornell University  
TRW Systems Group, Redondo Beach  
University of California, Los Angeles  
University of Arizona
APPENDIX C - 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 that means the spacecraft or experiment has been launched and was 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 that became 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 that means the spacecraft mission has been approved, and funding is or will be available to perform the mission.

Brief Description - As applied to a spacecraft, a description containing a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. As applied to an experiment, a description containing a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data.

Canceled Mission - As applied to a spacecraft mission, a status term that means the mission was canceled and no funds are expected to become available to carry out the project.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed Mission</td>
<td>As applied to a spacecraft mission, a status term that means the spacecraft failed to achieve a suitable orbit, or the experiments failed to function after achieving orbit.</td>
</tr>
<tr>
<td>Inclination</td>
<td>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.</td>
</tr>
<tr>
<td>Inoperable</td>
<td>As applied to a spacecraft, a status-of-operation term that means the spacecraft is no longer capable of producing any useful scientific data because of malfunction or failure of the spacecraft system, completion of the phase of the spacecraft trajectory in which useful measurements could be performed, or network support (tracking, command, and telemetry) has been discontinued, etc. As applied to an experiment, a status-of-operation term that means 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.</td>
</tr>
<tr>
<td>Mission Being Rescoped</td>
<td>As applied to a spacecraft mission, a status term that means the mission has been redefined to an extent that the original mission plan and experiments are no longer valid and a new mission plan and experiments are under study.</td>
</tr>
<tr>
<td>Normal</td>
<td>As applied to an active spacecraft, a status-of-operation term that means 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 that means 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.</td>
</tr>
</tbody>
</table>
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 name of the spacecraft. For example, the proposed NASA launch, Solar Maximum Mission, would be coded SMM. The experiments to be carried aboard this spacecraft would be coded SMM-01, SMM-02, etc. Once a spacecraft is launched, its prelaunch designation is 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.

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, and Jupiter flyby.

Partial - As applied to a spacecraft, a status-of-operation term that 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 that became escape trajectories from the solar system; e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned</td>
<td>As applied to a spacecraft mission pertinent to this report, a general status term that means the spacecraft mission was last reported to NSSDC as either &quot;approved&quot; or &quot;proposed.&quot; As applied to an experiment, a term that indicates an experiment is expected to fly on a planned spacecraft mission.</td>
</tr>
<tr>
<td>Proposed Mission</td>
<td>A planned mission status term that means the spacecraft design and the experiments have been selected; however, no funds have been approved to perform this mission.</td>
</tr>
<tr>
<td>Standard</td>
<td>As applied to a spacecraft or experiment data acquisition rate, a term that means 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.</td>
</tr>
<tr>
<td>Substandard</td>
<td>As applied to a spacecraft or experiment data acquisition rate, a term that means 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 continue all the planned scientific studies.</td>
</tr>
<tr>
<td>Unknown</td>
<td>As a general term, indicates information either unknown or unavailable at NSSDC.</td>
</tr>
<tr>
<td>Zero</td>
<td>As applied to a data acquisition rate, a term that means the spacecraft or experiment has been turned off except for state of health measurements and is in a standby condition capable of being returned to its previous status.</td>
</tr>
</tbody>
</table>
## APPENDIX D - ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AERIAL</td>
<td>Automatic Earth Observation and Remote Sensing Laboratory</td>
</tr>
<tr>
<td>ACES</td>
<td>Air Force Geophysics Laboratory Correlation System</td>
</tr>
<tr>
<td>ADE</td>
<td>Atmospheric Density Explorer</td>
</tr>
<tr>
<td>AGS</td>
<td>Advanced Geosynchronous Satellite System</td>
</tr>
<tr>
<td>AIRS</td>
<td>Atmospheric Infrared Sounder</td>
</tr>
<tr>
<td>AL</td>
<td>Atmospheric Laser Observatory</td>
</tr>
<tr>
<td>ALPS</td>
<td>Advanced Landsat-Phase System</td>
</tr>
<tr>
<td>ALPSP</td>
<td>Advanced Land Portrayal System Project</td>
</tr>
<tr>
<td>ALPSP</td>
<td>Advanced Land Portrayal System Project</td>
</tr>
<tr>
<td>ALTAIM</td>
<td>Advanced Land Portrayal System Project</td>
</tr>
<tr>
<td>ALPS</td>
<td>Atmospheric Laser Observatory System</td>
</tr>
<tr>
<td>ALO</td>
<td>Atmospheric Laser Observatory</td>
</tr>
<tr>
<td>ALT</td>
<td>Atmospheric Laser Observatory Technology</td>
</tr>
<tr>
<td>AMP</td>
<td>Advanced Multipurpose Satellite</td>
</tr>
<tr>
<td>AMPS</td>
<td>Advanced Multipurpose Satellite</td>
</tr>
<tr>
<td>APOLLO</td>
<td>Apollo Lunar Module Assembly</td>
</tr>
<tr>
<td>APOLLO</td>
<td>Apollo Lunar Module Assembly</td>
</tr>
<tr>
<td>AR</td>
<td>Atmospheric Research Laboratory</td>
</tr>
<tr>
<td>ARS</td>
<td>Atmospheric Research Satellite</td>
</tr>
<tr>
<td>ARS</td>
<td>Atmospheric Research Satellite</td>
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<tr>
<td>ART</td>
<td>Atmospheric Research Satellite Technology</td>
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<tr>
<td>ARTS</td>
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<tr>
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<tr>
<td>ARTS</td>
<td>Atmospheric Research Satellite Technology</td>
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<tr>
<td>AS</td>
<td>Atmospheric Sciences</td>
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<td>Atmospheric Sciences</td>
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<tr>
<td>AS</td>
<td>Atmospheric Sciences</td>
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</tbody>
</table>

**D-1**
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRS</td>
<td>Infrared Radiometry</td>
</tr>
<tr>
<td>JPL</td>
<td>Jet Propulsion Laboratory (NASA)</td>
</tr>
<tr>
<td>JSC</td>
<td>Johnson Space Center (NASA)</td>
</tr>
<tr>
<td>KSC</td>
<td>Kennedy Space Center (NASA)</td>
</tr>
<tr>
<td>LA</td>
<td>Los Angeles</td>
</tr>
<tr>
<td>LAC</td>
<td>Lunar Atmosphere Compositional and Temperature Explorer (NASA)</td>
</tr>
<tr>
<td>GCES</td>
<td>Lunar and Planetary Laboratory (NASA)</td>
</tr>
<tr>
<td>LRO</td>
<td>Lunar Reconnaissance Orbiter (NASA)</td>
</tr>
<tr>
<td>LTM</td>
<td>Lunar Transient Monitor (NASA)</td>
</tr>
<tr>
<td>LVA</td>
<td>Lunar-Venus Asteroid (NASA)</td>
</tr>
<tr>
<td>M</td>
<td>Meter, milli- (prefix)</td>
</tr>
<tr>
<td>MA</td>
<td>Mercury Atlas</td>
</tr>
<tr>
<td>MAGNET</td>
<td>Magnetospheric Observatory (NASA)</td>
</tr>
<tr>
<td>NAS</td>
<td>National Aeronautics and Space Administration (NASA)</td>
</tr>
<tr>
<td>NIT</td>
<td>National Institute of Technology (Massachusetts)</td>
</tr>
<tr>
<td>NMS</td>
<td>National Museum of Science and Technology (NASA)</td>
</tr>
<tr>
<td>ORB</td>
<td>Orbital Remote Sensing Radiometer (NASA)</td>
</tr>
<tr>
<td>OS</td>
<td>Orbiting Solar X-ray Observatory (NASA)</td>
</tr>
<tr>
<td>OWS</td>
<td>Operating Weather System (NASA)</td>
</tr>
<tr>
<td>SST</td>
<td>Surface Temperature Sensor (NASA)</td>
</tr>
<tr>
<td>SOX</td>
<td>Solar Optical Telescope (NASA)</td>
</tr>
<tr>
<td>SRT</td>
<td>Solar Regional Telescope (NASA)</td>
</tr>
<tr>
<td>SST</td>
<td>Surface Temperature Sensor (NASA)</td>
</tr>
<tr>
<td>SXT</td>
<td>Soft X-ray Telescope (NASA)</td>
</tr>
<tr>
<td>TES</td>
<td>Terrestrial Energetics Sensor (NASA)</td>
</tr>
<tr>
<td>UHR</td>
<td>Ultrahigh Radio Frequency (NASA)</td>
</tr>
<tr>
<td>VEX</td>
<td>Venus Express (ESA)</td>
</tr>
<tr>
<td>WAC</td>
<td>Water Vapor Airborne Characterization (NASA)</td>
</tr>
<tr>
<td>WEC</td>
<td>Water-Earth Connection (NASA)</td>
</tr>
<tr>
<td>WIND</td>
<td>Wind Imaging Interferometer (NASA)</td>
</tr>
<tr>
<td>WIS</td>
<td>Wide-Field Infrared Sensor (NASA)</td>
</tr>
<tr>
<td>WISPR</td>
<td>Wide Field InfraRed Sensor (NASA)</td>
</tr>
<tr>
<td>X-ray</td>
<td>X-ray spectroscopy</td>
</tr>
<tr>
<td>YS</td>
<td>Yohkoh Space Observatory (NASDA)</td>
</tr>
</tbody>
</table>

**Notes:**
- The table includes abbreviations and their definitions related to space exploration and related fields.
- The list covers a range of organizations and projects, such as NASA, JPL, and JSC, and includes terms like "orbiter," "satellite," and "spacecraft."
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TETR</td>
<td>Test and Training (satellite, NASA)</td>
</tr>
<tr>
<td>THIR</td>
<td>temperature-humidity infrared radiometer</td>
</tr>
<tr>
<td>THERMADAGE</td>
<td>Two-Stage Delta Post-Program Launch Vehicle</td>
</tr>
<tr>
<td>TINION</td>
<td>Two-Stage Delta Inflatable (IIF) System</td>
</tr>
<tr>
<td>TIP</td>
<td>Tracking Impact Prediction (satellite, RAND)</td>
</tr>
<tr>
<td>TIROS</td>
<td>Television and Infrared Observation Satellite (NASA)</td>
</tr>
<tr>
<td>TLE</td>
<td>team leader</td>
</tr>
<tr>
<td>TLI</td>
<td>transion injection</td>
</tr>
<tr>
<td>TMS</td>
<td>network management system</td>
</tr>
<tr>
<td>TOPO</td>
<td>topographic</td>
</tr>
<tr>
<td>TPOX</td>
<td>Thermal Noise Optical Observation System (NASA)</td>
</tr>
<tr>
<td>TORS</td>
<td>team leader (satellite, NASA)</td>
</tr>
<tr>
<td>TOS</td>
<td>Test and Training Satellite (NASA) (also called TATS, TETR)</td>
</tr>
<tr>
<td>TRAC</td>
<td>Tropical Rainfall Monitoring System (satellite, USA)</td>
</tr>
<tr>
<td>TRANET</td>
<td>Transport Network (NASA)</td>
</tr>
<tr>
<td>TRAX</td>
<td>television relay system</td>
</tr>
<tr>
<td>TNI</td>
<td>Thompson, Keno, and Associates, Inc.</td>
</tr>
<tr>
<td>VES</td>
<td>Tropical Wind Energy Conversion and Reference Level Experiment (NASA)</td>
</tr>
<tr>
<td>U</td>
<td>University of California at Los Angeles</td>
</tr>
<tr>
<td>UHF</td>
<td>ultrahigh frequency</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USAF</td>
<td>United States Air Force</td>
</tr>
<tr>
<td>VIIRS</td>
<td>Very High Resolution Radiometer (NASA)</td>
</tr>
<tr>
<td>VISSII</td>
<td>Visible Infrared Spin-Scan Radiometer (NASA)</td>
</tr>
<tr>
<td>WFTI</td>
<td>World Weather Watch (NASA)</td>
</tr>
<tr>
<td>WSC</td>
<td>Western Test Range (also referred to as Vandenberg AFB)</td>
</tr>
<tr>
<td>Z</td>
<td>atomic number</td>
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</tbody>
</table>