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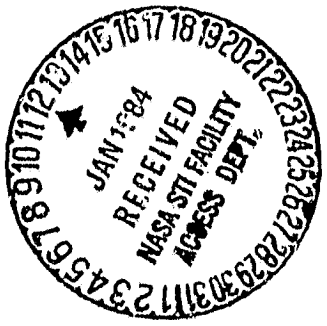

FY 1983 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS

Compiled by Sarah S. Thacker
Management Operations Office

November 1983

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After being announced in STAR, all of the NASA series reports may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

The information in this report may be of value to the scientific and engineering community in determining what information has been published and what is available.

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FOREWORD

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Since July 1, 1960, when the George C. Marshall Space Flight Center was organized, the reporting of scientific and engineering information has been considered a prime responsibility of the Center. Our credo has been that "research and development work is valuable, but only if its results can be communicated and made understandable to others."

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GEORGE C. MARSHALL SPACE FLIGHT CENTER
Marshall Space Flight Center, Alabama

FY 1983 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS

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TM-82478 October 1982

Space and Planetary Environment Criteria Guidelines for Use in Space Vehicle Development, 1982 Revision (Volume 1). Compiled by Robert E. Smith and George S. West. N83-18816

This document provides guidelines on space and planetary environment criteria for use in space vehicle development. Information is incorporated in the disciplinary areas of atmospheric and ionospheric properties, radiation, geomagnetic field, astrodynamic constants, and meteoroids for the Earth's atmosphere above 90 km, interplanetary space, and the atmosphere and surfaces (when available) of the Moon and the planets (other than Earth) of this solar system. Chapters on the Sun, Terrestrial Space, the Moon, Mercury, Venus, and Mars constitute Volume 1 (NASA TM-82478). Volume 2 (NASA TM-82501) contains chapters on Jupiter, Saturn, Uranus, Neptune, Pluto, Comets, Asteroids, and Interplanetary Dust.

These documents (Volumes 1 and 2) are recommended as tools for use in the development of space vehicles. However, an environment specialist should be consulted in critical design interface applications for the most current information and scientific interpretation.

NASA TM-82473 entitled, "Terrestrial Environment (Climatic) Criteria Guidelines for Use in Aerospace Vehicle Development, 1982 Revision," provides natural environmental information for altitudes below 90 km.

There is no intent to automatically change any references to previous documents in contract Scopes of Work by the issuance and acquisition of either NASA TM-82473, NASA TM-82478, or NASA TM-82501.

TM-82500 September 1982

Exothermic Furnace Module Development. Roy R. Darnell and Richard M. Poorman. Materials Processing In Space Projects Office. N83-10093

An Exothermic Furnace Module (EFM) has been developed to rapidly heat and cool a 0.820-in. (2.1 cm) diameter by 2.75-in. (7.0 cm) long TZM Molybdenum alloy crucible. The crucible contains copper, oxygen, and carbon for processing in a low-g environment. Peak temperatures of 1270°C were obtainable 3.5 min after start of ignition, with cooling below 950°C some 4.5 min later. These time-temperature relationships were conditioned from a Foam-Copper Experiment, Space Processing Applications Rocket (SPAR) Experiment 77-9, in a sounding rocket having a low-g period of 5 min.

TM-82502 November 1982

Spacelab Mission 3 Experiment Descriptions. Edited by C. Kelly Hill. Space Science Laboratory. N83-15335

The Spacelab 3 Mission is the first operational flight of Spacelab aboard the Shuttle Transportation System. The primary objectives of this mission are to conduct application, science, and technology experimentation that requires the low gravity environment of Earth orbit and an extended-duration, stable vehicle attitude with emphasis on materials processing. This document provides descriptions of the experiments to be performed during the Spacelab 3 Mission.

TM-82503 November 1982

Automatic Weld Torch Guidance Control System. H. E. Smith, W. A. Wall, and M. R. Burns, Jr. Materials and Processes Laboratory. N83-14493

The objective of this project was to develop a totally new, highly reliable, fully digital, closed circuit television optical, type automatic weld seam tracking control system. Improved automatic tracking equipment is needed, and has been long sought, to reduce weld tooling costs and increase overall automatic welding reliability. This system utilizes a Charge Injection Device (CID) digital camera which has 60,512 individual pixels as the light sensing elements. Through conventional scanning means, each pixel in the focal plane is sequentially scanned, the light level signal digitized, and an 8-bit word transmitted to scratchpad memory. From memory, the microprocessor performs an analysis of the digital signal and computes the tracking error. Lastly, the corrective signal is transmitted to a cross-seam

actuator digital drivemotor controller to complete the closed loop, feedback, tracking system.

The result of this development is a vastly improved weld seam tracking control system capable of a tracking accuracy of ±0.2 mm, or better. As configured, the system is applicable to square butt, V-groove, and lap joint weldments. Several innovations have been incorporated which include using algorithms to minimize the effects of stray light reflection, light level changes, erroneous signals, momentary loss of signal, and error causing scratches on the workpiece.

A significant advantage of the system is its wide degree of flexibility. Being microprocessor controlled, the software can be readily changed, or modified, to optimize the system's performance for a given set of welding conditions.

TM-82504 October 1982

FY 1982 Scientific and Technical Reports, Articles, Papers, and Presentations. Compiled by Sarah S. Thacker. Management Services Office. N83-17410

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY 82. It also includes papers of MSFC contractors.

After being announced in STAR, all of the NASA series reports may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

The information in this report may be of value to the scientific and engineering community in determining what information has been published and what is available.

TM-82505 November 1982

STS Payload Retention System Concept. Keith H. Clark. Information and Electronic Systems Laboratory. N83-14152

This memorandum presents a look at an advanced payload retention concept that may be utilized on future Space Shuttle missions. This concept appears to embody all the desirable features for the very demanding requirements for space flight. The attractive features are as follows: light weight, low cost, high reliability, excellent load distribution, critical alignment is virtually eliminated, and is extremely versatile.

TM-82507 January 1983

Materials Processing in Space Bibliography 1983 Revision. Compiled by Elizabeth Pentecost. Space Science Laboratory. N83-18774

This edition of the Materials Processing in Space (MPS) Bibliography is a compilation of Government reports, contractor reports, conference proceedings, and journal articles dealing with flight experiments utilizing a low-gravity environment to elucidate and control various processes or with ground-based activities that provide supporting research. It encompasses literature published but not cited in the first bibliography and that literature which has been published in the past year. Subdivisions of the bibliography include six major categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes; Glasses and Ceramics; Ultrahigh Vacuum and Containerless Processing Technologies; Combustion, in addition to a list of patents and appendices providing a compilation of anonymously authored collections and reports and a cross reference index.

TM-82508 October 1982

Investigation of Surface Tension Phenomena Using the KC-135 Aircraft. W. S. Alter. Space Science Laboratory.

The KC-135 aircraft provides a short-duration, microgravity environment which is useful for performing certain types of experiments. In particular, small-scale, free-format investigations which would otherwise be neglected can be conveniently pursued on the KC-135. Three hand-held experiments were performed during the 1982 May and July flights. The purpose of these experiments was to verify their concepts in order to justify more extensive investigation. These experiments are described, and plans for further research, based on preliminary results, are discussed.

TM-82509 December 1982

Evaluation of a Barnes-Type Objective Analysis Scheme for Surface Meteorological Data. David R. Smith and Fred W. Leslie. Space Science Laboratory.

The Purdue Regional Objective Analysis of the Mesoscale (PROAM) is a Barnes-type scheme for the analysis of surface meteorological data. Modifications are introduced to increase its flexibility and to permit greater ease of usage. A multiple iteration technique has been implemented for greater accuracy. PROAM is then subjected to a series of experiments to evaluate its performance and monitor the computation time under a variety of analysis conditions. The tests include use of a known analytic temperature distribution to quantify error bounds for the scheme. Similar experiments were conducted using actual atmospheric data. Results indicate that the multiple iteration technique increases the accuracy of the analysis. Furthermore, the tests verify appropriate values for the analysis parameters in resolving meso-β scale phenomena.

TM-82510 November 1982

An Approach Toward Function Allocation Between Humans and Machines in Space Station Activities. Georg von Tiesenhausen. Program Development. N83-19470

Present NASA and contractor studies are evolving toward the definition of a future manned permanent space station. This report attempts to provide certain basic guidelines and data to assist in the allocation of functions between humans and automated systems and for human/machine participation. The report describes the significant human capabilities and limitations and provides criteria and guidelines for various levels of automation and human participation. An appendix contains a collection of human factors data.

TM-82511 December 1982

Description of a Mathematical Model and Computer Simulation of Separation of the Nose Cap from the Solid Rocket Booster. Arthur J. Schwaniger, Jr. and Hughlen I. Murphree. Systems Dynamics Laboratory. N83-18837

A system of equations which models the motion of the Solid Rocket Booster Nose Cap upon separation is described. The computer program which utilizes these equations to generate nose cap trajectories is described in detail. Application of the program to simulate a rocket sled test of the nose cap separation is discussed and the results of the applications are presented. With the information given a user should be able to exercise the computer program with a minimum of effort.

TM-82512 February 1982

A Preliminary Look at Control Augmented Dynamic Response of Structures. Robert S. Ryan and Ronald E. Jewell. Systems Dynamics Laboratory. N83-20281

This report deals with the augmentation of structural characteristics, mass, damping, and stiffness through the use of control theory in lieu of structural redesign or augmentation. Treated first is the standard single-degree-of-freedom system followed by a treatment of the same system using control augmentation. The system is extended to elastic structures using single- and multi-sensor approaches and concludes with a brief discussion of potential application to large orbiting space structures.

TM-82513 February 1983

Eddy Current X-Y Scanner System. George W. Kurtz. Materials and Processes Laboratory. N83-22571

The Nondestructive Evaluation Branch of the Materials and Processes Laboratory became aware of a need for a miniature, portable X-Y scanner capable of performing eddy current or other non-destructive testing scanning operations such as ultrasonic, or small areas of flat plate. This report covers the technical description and operational theory of the X-Y scanner system designed and built to fulfill this need. The scanner has been given limited testing and performs according to its design intent, which is to scan flat plate areas of approximately 412 cm^2 (64 $in.^2$) during each complete cycle of scanning.

TM-82514 April 1983

MSFC Scan Stage 1 Workshop. James L. Green, J. H. Waite, J. F. E. Johnson, Joseph R. Doupnik, and Rod A. Heelis. Space Science Laboratory. N83-30095

This report describes the planning, implementation, and accomplishments of the first Space plasma Computer Analysis Network (SCAN) workshop held at Marshall Space Flight Center (MSFC). The purpose of the workshop was to identify specific cooperative scientific study topics within the discipline of Ionosphere Magnetosphere Coupling processes and to develop methods and procedures to accomplish this cooperative research using SCAN facilities. Cooperative scientific research was initiated in the areas of polar cusp composition, O^+ polar outflow, and magnetospheric boundary morphology studies and an approach using a common metafile structure was adopted to facilitate the exchange of data and plots between the various workshop participants. The advantages of in person versus remote workshops were discussed also.

TM-82515 March 1983

Atmospheric Environment for Space Shuttle (STS-5) Launch. D. L. Johnson, C. K. Hill, and G. W. Batts. Space Science Laboratory. N83-22908

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-5 launch time on November 11, 1982, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consists of wind and thermodynamic parameters versus altitude, for STS-5 vehicle ascent and SRB descent have been constructed. The STS-5 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center.

TM-82516 February 1983

Pseudo-Random Number Generator for the Sigma V Computer. Stanley N. Carroll. Systems Dynamics Laboratory. N83-23084

A technique is presented for developing a pseudo-random number generator based on the linear congruential form. The two numbers used for the generator are a prime number and a corresponding primitive root, where the prime is the largest prime number that can be accurately represented on a particular computer. The primitive root is selected by applying Marsaglia's lattice test. The technique presented has been applied to write a new random number program for the Sigma V computer. The new program, named S:RANDOM1, is judged to be superior to the older program named S:RANDOM. For applications requiring several independent random number generators, a table is included showing several acceptable primitive roots. The technique and programs described in the report can be applied to any computer having word length different from that of the Sigma V.

TM-82517 January 1983

Attitude Control and Drag Compensation Propulsion System for the Gravity Probe-B Spacecraft. D. H. Blount. Structures and Propulsion Laboratory. N83-22315

An on-board propulsion system for attitude control and drag compensation is presented which uses helium boiloff gas from an experiment package dewar as propellant. This boiloff gas would normally be vented non-propulsively. Use of a small allowable temperature range in the dewar is exploited to store helium and accommodate incompatibilities in dewar heat leak and thruster demand flow over periods of more than one orbit. A relatively detailed thermodynamics analysis of the two-phase helium dewar and simulation of pressure loss through the helium distribution system is included.

TM-82518 January 1983

Gravity Probe-B Control Subsystem. John Farmer. Systems Dynamics Laboratory. N83-23336

The purpose of this document is to identify and briefly examine the control problems of the proposed Gravity Probe-B spacecraft. Suggestions are made for control thruster geometry, dynamics, and maximum output value. Maximum total thrust is also a consideration since all thrusters expel gaseous helium produced from a common liquid supply. Control philosophy and preliminary designs are presented for both the attitude and drag free control systems. A radial separation of the spacecraft center of mass and the center of the proof mass cavity produces cross coupling between the attitude and drag free systems. The low available thrust implies that this separation, throughout the mission, must be kept within very close tolerance. For this reason an on-board mass balance control system may be necessary.

Simulation was performed only to the extent necessary to show the control concepts to be feasible.

TM-82520 April 1983
Analysis of "Pull-Test" Tools and Their Limitations as Applied to Terminal Junction Blocks. James Lee Smith, Information and Electronics System Laboratory. N83-24553

Discovery of unlocked contacts in Deutsch Block terminal junctions in Solid Rocket Booster flight hardware prompted an investigation into "pull-test" techniques to help insure against possible failures. In this paper, internal frictional forces between socket and pin and between wire and grommet were examined. Pull-test force must be greater than internal friction yet less than the crimp strength of the pin or socket. For this reason, a 100 percent accurate test is impossible. Test tools were evaluated. Currently available tools are adequate for "pull-testing."

TM-82521 December 1982
Liquid Helium Management for Gravity Probe-B. Charles Schafer. Space Science Laboratory. N83-24830

The Gravity Probe-B (GP-B) experiment will be degraded if accelerations at a proof mass become larger than 10^{-10} g. This makes necessary the management of the configuration and dynamical behavior of the large amount of liquid helium present in the GP-B spacecraft dewar. Three approaches to the solution of this problem are discussed. It is concluded that the most promising technique involves the use of baffles into which the liquid helium can be forced during a relatively high spacecraft rotation period, and in which the liquid helium will be held by capillary forces during the operational period when the rotation rate is much lower. Some likely baffle configurations are suggested.

TM-82522 January 1983
Significant Events in Low-Level Flow Conditions Hazardous to Aircraft. Margaret B. Alexander and Dennis W. Camp. Space Science Laboratory. N83-25268

Atmospheric parameters recorded at the NASA 150-Meter Ground Winds Tower Facility at Kennedy Space Center during high surface winds are analyzed to determine magnitude, frequency, duration, and simultaneity of occurrence of low-level flow conditions known to be hazardous to the ascent and descent of conventional aircraft and the Space Shuttle. Graphic and tabular presentations of mean and extreme values and simultaneous occurrences of turbulence (gustiness and gust factor), wind shear (speed and direction), and vertical motion (updrafts and downdrafts), along with associated temperature inversions are included as a function of tower height, layer and/or distance for six 5-sec intervals (one interval every 100 sec) of parameters sampled simultaneously at the rate of 10 speeds, directions and the temperatures per second during an approximately 10-min period (2143 47.0 to 2152 16.9 UT) on July 3, 1973.

TM-82523 April 1983
A Study Into the Loss of Lock of the Space Telescope Fine Guidance Sensor. Michael E. Polites. Systems Analysis and Integration Laboratory. N83-26768

This report documents the results of a study into the loss of lock phenomenon associated with the Space Telescope (ST) Fine Guidance Sensor (FGS). The primary cause of loss of lock has been found to be a combination of cosmic ray spikes and photon noise due to a 14.5 Mv star. The

probability of maintaining lock versus time is estimated both for the baseline FGS design and with parameter changes in the FGS firmware which will improve the probability of maintaining lock. The parameters varied are changeable in-flight from the ground and hence do not impact the design of the FGS hardware.

TM-82524 February 1983
STS-2, -3, -4 Induced Environment Contamination Monitor (IECM) Summary Report. Edited by E. R. Miller. Space Science Laboratory. N83-24539

A brief description of the STS-2, -3, and -4 missions is given with the location of the IECM in the payload bay and the Shuttle coordinate systems used in this report. Measurement results from the three flights are given in the following sections for each instrument with comparisons to original goals for preflight environment and induced environment contamination. These results include very low levels of molecular mass accumulation rates, absence of molecular films on optical samples, out-gassing species above 50 amu undetectable, general low levels of on-orbit particulates, and decay rates for early mission and water dump particulates. Results of exposure of several optical materials and coatings to atomic oxygen are also presented. From these results, it is concluded that the Space Shuttle has met the established induced environment contamination goals.

TM-82525 April 1983
Materials Processing in Space Program Tasks. Compiled by Elizabeth Pentecost. Space Science Laboratory. N83-25737

This report is a compilation of the active research tasks as of the end of the fiscal year 1983 of the Materials Processing in Space Program, NASA-Office of Space and Terrestrial Applications, involving several NASA centers and other organizations. The purpose of this document is to provide an overview of the program scope for managers and scientists in industry, university, and government communities. The report is structured to include an introductory description of the program, its history, strategy and overall goal; identification of the organizational structures and people involved; and a description of each research task, together with a list of recent publications.

The tasks are grouped into four categories: Crystal Growth; Solidification of Metals, Alloys, and Composites; Fluids, Transports, and Chemical Processes; and Ultrahigh Vacuum and Containerless Processing Technologies.

TM-82526 April 1983
Statistical Aspects of the 1980 Solar Flares – III. Parametric Comparisons and Final Comments. Robert M. Wilson. Space Science Laboratory.

Based on 1349 Hα flares with X-ray counterparts occurring near solar maximum, an investigation into the relationship between pairs of parameters, including rise time, decay time, Hα importance, and X-ray class, has been accomplished. As past experience has shown, it is found that, on average, long Hα rise-time flares tend to have long Hα decay time (on average about 2.9 times longer than the associated rise time), are more likely associated with areal class $\geq$ class 1 and relative brightness class bright, and are more likely associated with X-ray events of X-ray class $\geq$ C5. Also, it is noted that during 1980 2800-MHz radio flux (denoted F_{2800}) appeared to crudely track the south latitudinal regions for the first 10 months of the year and thereafter the north latitudinal regions, at least through December 1980, the Solar Maximum Year, which met certain selection criteria. No effort has been made to model flare frequency correlation and distribution based on more advanced statistical techniques.

TM-82527 April 1983
The Feasibility of Low-G Grey Solidification of Nodular Iron in the F-104 Experimental Furnace Package. P. A. Curreri, G. A. Smith and G. Workman. Space Science Laboratory.

The rationale for low-g experiments with cast iron and the need for solidification in the grey form during these experiments are reviewed. The factors which determine whether an iron melt will solidify grey or white are discussed. Cooling rate versus microstructure was studied

for a nodular iron candidate material for F-104 low-g solidification. The study determined that low-g grey solidification, using the present F-104 furnace system, of the nodular iron composition studied is not feasible. Specimen microstructure strongly suggested that the F-104 furnace's gas cooling system was causing excessive localized chill resulting in the nucleation of the unwanted iron carbide phase. A change is suggested, in the quench system design, that could possibly overcome this problem.

TM-82528 April 1983
Preliminary Science Report on the Directional Solidification of Hypereutectic Cast Iron During KC-135 Low-g Maneuvers. P. A. Curreri, D. M. Stefanescu, and J. C. Hendrix. Space Science Laboratory.
N83-25854

An ADSS-P directional solidification furnace has been reconfigured for operation on the KC-135 low-g aircraft. The system offers many advantages over quench ingot methods for study of the effects of sedimentation and convection on alloy formation. The directional solidification furnace system was first flown during the September 1982 series of flights. The microstructure of the hypereutectic cast iron sample solidified on one of those flights suggests a low-g effect on graphite morphology. Further experiments are needed to ascertain that this effect is due to low-gravity and to deduce which of the possible mechanisms is responsible for it.

TM-82529 May 1983
Atmospheric Environment for Space Shuttle (STS-6) Launch. D. L. Johnson, C. K. Hill, and G. W. Batts. Systems Dynamics Laboratory.
N83-29926

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-6 launch time on April 4, 1983, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-6 vehicle ascent and SRB descent have been constructed. The STS-6 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center.

TM-82530 June 1983
Thunderstorm Observations from Space Shuttle. B. Vonnegut, O. H. Vaughan, Jr., and M. Brook. Space Science Laboratory.
N83-31246

This report covers the results of the Nighttime/Daytime Optical Survey of Lightning (NOSL) experiments done on the STS-2 and STS-4 flights. During these two flights of the Space Shuttle Columbia, the astronaut teams of J. Engle and R. Truly, and K. Mattingly II and H. Hartsfield took motion pictures of thunderstorms with a 16 mm cine camera. Film taken during daylight showed interesting thunderstorm cloud formations, where individual frames taken tens of seconds apart, when viewed as stereo pairs, provided information on the three-dimensional structure of the cloud systems. Film taken at night showed clouds illuminated by lightning with discharges that propagated horizontally at speeds of up to 10^5 m/sec^{-1} and extended for distances on the order of 60 km or more.

TM-82531 June 1983
Interim Report on Microfissuring of Inconel 718. A. C. Nunes, Jr. Materials and Processes Laboratory.
N83-29356

A tentative mathematical computer model of the microfissuring process during electron beam welding of Inconel 718 has been constructed. Predictions of the model are compatible with microfissuring tests on eight 0.25-in. thick test plates. The model takes into account weld power and speed, weld loss (efficiency), parameters and material characteristics. Besides the usual material characteristics (thermal and strength properties), a temperature and grain size dependent critical fracture strain is required by the

model. The model is based upon fundamental physical theory (i.e., it is not a mere data interpolation system), and can be extended to other metals by suitable parameter changes.

TM-82532 June 1983

The Variable Polarity Plasma Arc Welding Process: Its Application to the Space Shuttle External Tank — First Interim Report. A. C. Nunes, Jr., E. O. Bayless, Jr., C. S. Jones III, P. M. Munafo, A. P. Biddle, and W. A. Wilson. Materials and Processes Laboratory. N83-31021

The Variable Polarity Plasma Arc (VPPA) welding process is being introduced as a partial replacement for the Gas Shielded Tungsten Arc process in assembly welding of the Space Shuttle External Tank. This report describes the technical history of the development of the VPPA process, interim results of the weld strength qualification studies, and plans for further work in the implementation of the VPPA process.

TM-82533 June 1983

An Evaluation of Grease Type Ball Bearing Lubricants Operating in Various Environments (Status Report No. 7). E. L. McMurtrey. Materials and Processes Laboratory. N83-31020

Because many future spacecraft or space stations will require mechanisms to operate for long periods of time in environments which are adverse to most bearing lubricants, a series of tests is continuing to evaluate 38 grease-type lubricants in R-4 size bearings in five different environments for a 1-year period. Four repetitions of each test are made to provide statistical samples. These tests have also been used to select four lubricants for 5-year tests in selected environments with five repetitions of each test for statistical samples. At the present time, 142 test sets have been completed and 30 test sets are underway. The three 5-year tests in (1) continuous operation and (2) start-stop operation, with both in vaccum at ambient temperatures, and (3) continuous vacuum operation at 93.3°C are now completed. To date, in both the 1-year and 5-year tests, the best results in all environments have been obtained with a high viscosity index perfluoroalkylpolyether (PFPE) grease.

TM-82534 June 1983

Sensitivity/Comparison Study Between the Jacchia 1970, 1971, and 1977 Upper Atmospheric Density Models. Dale L. Johnson. Systems Dynamics Laboratory.

The neutral upper atmospheric models for the Earth's thermosphere currently used in NASA-MSFC programs are the Jacchia 1970 (J70), 1971 (J71), and 1977 (J77). The Jacchia 1970 model (modified) is used in all MSFC orbital mechanics analyses. Since total density and its variations are the main environmental parameters of interest in orbital lifetime and attitude control studies, the total neutral density was selected for this analysis.

This report presents the results of a parametric study of the total density (at 400 km altitude) as computed with the three MSFC/Jacchia models. The sensitivity of each of the density models at the summer solstice to varying solar conditions (flux) and geomagnetic (index) values is discussed.

TM-82535 August 1983

Space Processing Applications Rocket (SPAR) Project SPAR VII Final Report. Compiled by Richard M. Poorman.

The Space Processing Applications Rocket Project (SPAR) VII Final Report contains the compilation of the post-flight reports of each of the Principal Investigations (PI's) of the three selected science payloads, in addition to the engineering report as documented by the Marshall Space Flight Center (MSFC). This combined effort also describes pertinent portions of ground-based research leading to the ultimate selection of the flight sample composition, including design, fabrication and testing, all of which are expected to contribute to an improved comprehension of materials processing in space.

The SPAR project is coordinated and managed by MSFC as part of the Materials Processing in Space (MPS) program of the Office of Space and Terrestrial Applications (OSTA) of NASA Headquarters.

This technical memorandum is directed entirely to the payload manifest flown in the seventh of a series of SPAR flights conducted at the White Sands Missile Range (WSMR) and includes the experiments entitled, "Containerless Processing Technology," "Containerless Processing Bubble Dynamics," and "Comparative Alloy Solidification."

TM-82536 June 1983

Instrumental Effects on the Temperature and Density Derived from the Light Ion Mass Spectrometer. Paul D. Craven and David L. Reasoner. Space Science Laboratory. N83-30294

An expression for the flux into an RPA is derived which takes into account the instrumental effect of a dependence on energy of the solid angle of the acceptance cone. A second instrumental effect of a limited bandpass is briefly discussed. Using the characteristics of the LIMS instrument on SCATHA, it is shown that temperatures and densities derived without considering the effect of the solid angle dependence on energy will be too low, dramatically so for $E_t > E_1$, where E_1 is the e folding distance of the solid angle dependence and E_t is the thermal energy of the plasma. For $E_t << E_1$, there is effectively no impact on the derived temperatures and densities if the solid angle effect is ignored.

TM-82537 August 1983

Spacelab Mission 1 Experiment Descriptions – Third Edition. Edited by Paul D. Craven. Space Science Laboratory.

This document presents brief descriptions of experiments and facilities planned for Spacelab 1. These experiments and facilities were selected from the responses to the Announcement of Opportunity for the first Spacelab mission. The experiments described here have been selected for flight.

This edition supersedes NASA TM-82448, November 1981.

TM-82538 July 1983

Image Motion Compensation by Area Correlation and Centroid Tracking of Solar Surface Features. M. E. Nein, W. R. McIntosh, and N. P. Cumings. Advanced Systems Office. N83-32690

An experimental solar correlation tracker has been tested and evaluated on a ground-based solar magnetograph. Using sunspots as fixed targets, tracking error signals were derived by which the telescope image was stabilized against wind induced perturbations. Two methods of stabilization were investigated; mechanical stabilization of the image by controlled two-axes motion of an active optical element in the telescope beam, and electronic stabilization by biasing of the electron scan in the recording camera. Both approaches have demonstrated telescope stability of about 0.6 arc sec under random perturbations which can cause the unstabilized image to move up to 120 arc sec at frequencies up to 30 Hz.

TM-82539 July 1983

Ocular Screening Tests of Elementary School Children. John Richardson. Technology Utilization Office.

This report presents an analysis of 507 abnormal retinal reflex images taken of Huntsville kindergarten and first grade students.

The retinal reflex images were obtained by using an MSFC-developed Generated Retinal Reflex Image System (GRRIS) photorefractor. The system uses a 35 mm camera with a telephoto lens with an electronic flash attachment. Slide images of the eyes were examined for abnormalities.

Of a total of 1835 students screened for ocular abnormalities, 507 were found to have abnormal retinal reflexes. The types of ocular abnormalities detected were hyperopia, myopia, astigmatism, esotropia, exotropia, strabismus, and lens obstructions.

The report shows that the use of the photorefractor screening system is an effective low-cost means of screening school children for abnormalities.

TM-82540 July 1983

Materials Investigation of STS-3 Parachute Failure. Ronald L. Nichols. Materials and Processes Laboratory.

Main parachute, No. 2 of SRB A-12 on STS-3, sustained damage during deployment or initial inflation that resulted in its collapse and failure to sustain load. During an investigation of the materials from this parachute, optical and scanning electron microscope analyses were conducted. This examination identified stains and abrasions on vent lines that appear to have been a result of friction contact with its flotation bag lanyard. Mechanical testing of the vent band indicated a reduction in strength of 37 percent obviously due to structural overload, heat, and ocean water exposure. It is concluded from this and other available data that entanglement of parachutes No. 1 and No. 2 during deployment caused adequate structural damage to main parachute No. 2 to render it unable to carry load.

TM-82541 May 1983

The Marshall Space Flight Center KC-135 Zero Gravity Test Program for FY 1982. Edited by R. E. Shurney. Systems Analysis and Integration Laboratory.

During FY82, researchers and experimenters from Marshall Space Flight Center (MSFC) conducted 11 separate investigations during 26.3 hr of testing aboard the KC-135 zero-gravity aircraft, based at Ellington Air Force Base, Texas. Although this represented fewer hours than initially projected, all experiment and test objectives were met or exceeded. This Technical Memorandum compiles all results achieved by MSFC users during FY82, a year considered to be highly productive.

We thank the aircraft operations people at Johnson Space Center for their enthusiastic support this year and in years past.

TM-82542 July 1983

Atmospheric Environment for Space Shuttle (STS-7) Launch. D. L. Johnson, C. K. Hill, and G. W. Batts. Systems Dynamics Laboratory.

This report presents a summary of selected conditions observed near Space Shuttle STS-7 launch time on June 18, 1983, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are wind and thermodynamic parameters representative of surface and aloft conditions in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-7 vehicle ascent and Acoustic/SRB descent have been constructed. The STS-7 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center.

TM-82543 August 1983

Time-Dependent Response of Filamentary Composite Spherical Pressure Vessels. Jan D. Dozier. Structures and Propulsion Laboratory.

A filamentary composite spherical pressure vessel is modeled as a pseudo-isotropic (or transversely isotropic) composite shell, with the effects of the liner and fill tubes omitted. Equations of elasticity, macromechanical and micromechanical formulations, and laminate properties are derived for the application of an internally pressured spherical composite vessel. Viscoelastic properties for the composite matrix are used to characterize time-dependent behavior. Using the maximum strain theory of failure, burst pressure and critical strain equations are formulated, solved in the Laplace domain with an associated elastic solution, and inverted back into the time domain using the method of collocation. Viscoelastic properties of HBFR-55 resin are experimentally determined and a Kevlar/HBFR-55 system is evaluated with a FORTRAN program. The computed reduction in burst pressure with respect to time indicates that the analysis employed may be used to predict the time-dependent response of a filamentary composite spherical pressure vessel.

TM-82544 July 1983

Development of Low Viscosity Alkane-Based Urethane for Connector Potting Applications. Donald E. Morris. Materials and Processes Laboratory.

Two series of saturated hydrocarbon-based urethanes were prepared with isophorone diisocyanate and one series with methyl bis (4-cyclohexyl isocyanate). The urethanes with molecular weights as great at 2500 had viscosities low enough and a working life long enough to be used in potting, molding, and coating applications. Specimens were prepared and mechanical properties such as hardness, tensile strength elongation, and tear strength were determined. Thermomechanical properties (glass transition and expansion coefficient) and thermogravimetric properties were determined.

TM-82545 August 1983

NASA Thunderstorm Overflight Program — Research in Atmospheric Electricity from an Instrumentated U-2 Aircraft Platform. Otha H. Vaughan, Jr. Systems Dynamics Laboratory.

This report presents an overview of the NASA Thunderstorm Overflight Program (TOP) being conducted by the Marshall Space Flight Center and university researchers in atmospheric electricity. Discussed in this report are the various instruments flown on the NASA U-2 aircraft, as well as the ground instrumentation used in 1982 to collect optical and electronic signatures from the lightning events. Samples of some of the photographic and electronic signatures are presented. Approximately 6400 electronic data samples of optical pulses were collected and are being analyzed by the NASA and university researchers. A number of research reports are being prepared for future publication. These reports will provide more detailed data analysis and results from the 1982 spring and summer program.

TM-82546 September 1983

Solid Rocket Booster Thrust Vector Control Subsystem Description. Compiled by John Redmon, Jr. Structures and Propulsion Laboratory.

This document identifies major Solid Rocket Booster-Thrust Vector Control (SRB-TVC) subsystem components and subcomponents used in the Space Transportation System (STS). Simplified schematics, detailed schematics, figures, photographs, and data are included to acquaint the reader with the operation, performance, and physical layout as well as the materials and instrumentation used.

TP-2045 November 1982

A Stability Analysis of AVE-IV Severe Weather Soundings. Dale L. Johnson. Space Science Laboratory. N83-14824

An investigation was made to determine whether the stability and vertical structure of an average severe storm sounding, consisting of both thermodynamic and wind vertical profiles, could be distinguished from an average lag sounding taken 3 to 6 hours prior to severe weather occurrence. The term "average" is defined here to indicate the arithmetic mean of a parameter, as a function of altitude, determined from a large number of available observations taken either close to severe weather occurrence, or else more than 3 hours before it occurs. The investigative computations were also done to help determine if a severe storm forecast scheme or index could possibly be used or developed.

The study presents these mean vertical profiles of thermodynamic and wind parameters as a function of severity of the weather, determined from manually digitized radar (MDR) categories observed during the National Aeronautics and Space Administration (NASA) Atmospheric Variability Experiment IV (AVE-IV) which took place on April 24-25, 1975. Profile differences and stability index differences are presented along with the development of the Johnson Lag Index (JLI) which is determined entirely upon environmental vertical parameter differences between conditions 3 hours prior to severe weather, and severe weather itself.

All of the stability indices tested were then used on a separate and independent data sample (AVE-SESAME-I) consisting of individual soundings taken during April 10-11, 1979. The AVE-SESAME-I data profiles are presented along with stability index computations for each. All of the stability indices tested appeared to do a reasonable job in indicating both the severe weather as well as the nonsevere weather environment. As a pre-severe weather lag (3 to 6 hours) index, only the JLI appears to show promise as a potential forecast index. More testing of this index, however, is needed.

TP-2089 October 1982

The Pinhole/Occulter Facility -- Executive Summary. J. R. Dabbs, E. A. Tandberg-Hanssen, and H. S. Hudson. N83-13048

The outer solar atmosphere exhibits a great variety of dynamic and energetic plasma phenomena, from the catastrophic energy release of solar flares to the steady acceleration of the solar wind. Observations from space in the past two maxima of the solar activity cycle have more than whetted the appetite for understanding the physics of the solar corona. The Pinhole/Occulter Facility contains the instruments necessary for achieving fuller knowledge: broad-band X-ray imaging, combined with simultaneous ultraviolet and white-light spectroscopy and imaging.

X-ray astronomy has progressed, through the surveys by small satellites and the "deep" observations of soft X-rays by the Einstein Observatory, to a level at which it has become a major component of astronomical investigation. The Pinhole/Occulter represents the first serious effort to broaden the spectral band available to X-ray astronomers at high angular resolution (below one arc second), and it is thus an effective complement at AXAF and other future soft X-ray facilities.

TP-2105 October 1982

Generation of Pseudo-Random Numbers. Leonard W. Howell and Mario H. Rheinfurth. Systems Dynamics Laboratory. N83-16095

The generation of pseudo-random numbers from specified probability distributions has found extensive application in Monte Carlo simulations. Because these simulations often require a large number of calculations, the time required to generate pseudo-random numbers has become a major factor. At the same time it is essential to guarantee accuracy and statistical randomness of the sequence of generated numbers. This report provides practical methods for generating acceptable random numbers from a variety of probability distributions which are frequently encountered in engineering applications.

TP-2110 October 1982

Optical Observations of Unidirectional Solidification in Microgravity. Mary H. Johnston, Robert B. Owen, and Robert E. Shurney. Materials and Processes Laboratory. N83-16492

Optical interferometric, shadowgraph, and streak photographic methods are used to obtain temperature profiles, concentration gradients, and fluid velocities in NH_4Cl-H_2O metal-model solution during unidirectional solidification in microgravity. This study elucidates earlier low-gravity suborbital rocket experiments and lays the groundwork for future Space Shuttle experiments. The design and operation of the optical units are presented, and results are detailed and compared to ground based experiments. The low-gravity experiments were conducted using a NASA KC-135 aircraft flying a parabolic trajectory.

TP-2113 November 1982

An Electrochemical Method for Determining Hydrogen Concentrations in Metals and Some Applications. Merlin D. Danford. Materials and Processes Laboratory. N83-16491

An electrochemical method has been developed for the determination of hydrogen in metals using the EG&G-PARC Model 350A Corrosion Measurement Console. The method has been applied to hydrogen uptake, both during electrolysis and electroplating, and to studies of hydrogen elimination and the effect of heat treatment on elimination times. Results from these studies are presented.

TP-2115 October 1982

Flow in a Torsionally Oscillating Filled Cylinder. Charles F. Schafer. Space Science Laboratory. N83-16674

The flow of a liquid in a completely filled cylinder undergoing torsional oscillations about its logitudinal symmetry axis was studied analytically and experimentally. The objective of the studies was to determine the efficacy of the torsional oscillations in mixing the confined liquid. Flow was found to be confined primarily to toroidal cells at the ends of the cylinder. Cell thickness was about equal to the cylinder radius. The use of baffles at the end walls was shown to enhance the mixing process.

TP-2117 October 1982

Identification and Management of Filament-Wound Case Stiffness Parameters. V. Verderaime and M. Rheinfurth. Systems Dynamics Laboratory. N83-16400

The high specific strength and the high specific modules made graphite-epoxy laminate an expedient material substitute for the Shuttle Solid Rocket Motor steel case to substantially increase the payload performance without increasing the composite case axial growth during thrust build-up which was constrained to minimize liftoff excitation effects on existing structural elements and interfaces. Parameters associated with axial growth were identified for quality and manufacturing controls. Included is an innovative method for experimentally verifying extensional elastic properties on a laminate pressurized test bottle.

TP-2124 October 1982

Mechanics of Liquid Helium in a Partially Filled Rotating Dewar in Low Gravity — With Application to Gravity Probe-B. C. F. Schafer and S. A. Lowry. Space Science Laboratory. N83-16680

The Gravity Probe-B (GP-B) spacecraft is composed largely of a liquid helium dewar containing an experiment package. It is shown that an unsymmetric liquid helium distribution in the dewar can cause unacceptably high forces, gravitational and gravity gradient forces, at the experiment location. It is further shown that for the planned spacecraft configuration and operational parameters, it is very likely that the liquid helium distribution in the dewar will be unsymmetric. The required symmetry can be attained by using higher operational spacecraft rotation rates. An alternative solution to this problem will be discussed in a later report.

TP-2144 February 1983

A Study of Production of Miscibility Gap Alloys with Controlled Structures. R. A.

Parr, M. H. Johnston, J. A. Burka, J. H. Davis, and J. A. Lee. Materials and Processes Laboratory. N83-21991

Composite materials were directionally solidified using a new technique to align the constituents longitudinally along the length of the specimen. In some instances a tin coating was applied and diffused into the sample to form a high transition temperature superconducting phase. The superconducting properties were measured and compared with the properties obtained for powder composites and re-directionally solidified powder compacts. The samples which were compacted and re-directionally solidified showed the highest transition temperature and widest transition range. This indicates that both steps, powder compaction and resolidification, determine the final superconducting properties of the material.

TP-2168 March 1983

The Pinhole/Occulter Facility. Edited by E. A. Tandberg-Hanssen, H. S. Hudson, J. R. Dabbs, and W. A. Baity. N83-25646

The outer solar atmosphere exhibits a great variety of dynamic and energetic plasma phenomena, from the catastrophic energy release of solar flares to the steady acceleration of the solar wind. Observations from space in the past two maxima of the solar activity cycle have more than whetted the appetite for understanding the physics of the solar corona. The Pinhole/Occulter Facility contains the instruments necessary for achieving fuller knowledge: broad-band X-ray imaging, combined with simultaneous ultraviolet and white-light spectroscopy and imaging.

X-ray astronomy has progressed, through the surveys by small satellites and the "deep" observations of soft X-rays by the Einstein Observatory, to a level at which it has become a major component of astronomical investigation. The Pinhole/Occulter represents the first serious effort to broaden the spectral band available to X-ray astronomers at high angular resolution (below one arc second), and it is thus an effective complement to AXAF and other future soft X-ray facilities.

TP-2173 February 1983

An Efficient Algorithm for Generating Random Number Pairs Drawn from a Bivariate Normal Distribution. C. Warren Campbell. Space Science Laboratory. N83-27679

An efficient algorithm for generating random number pairs from a bivariate normal distribution was developed. Any desired value of the two means, two standard deviations, and correlation coefficient can be selected. Theoretically the technique is exact and in practice its accuracy is limited only by the quality of the uniform distribution random number generator, inaccuracies in computer function evaluation, and arithmetic. A FORTRAN routine was written to check the algorithm and good accuracy was obtained. Some small errors in the correlation coefficient were observed to vary in a surprisingly regular manner. A simple model was developed which explained the qualitative aspects of the errors.

TP-2185 April 1983

Development of a Simplified Optical Technique for the Simultaneous Measurement of Particle Size Distribution and Velocity. James Lee Smith. Information and Electronic Systems Laboratory. N83-27846

In an effort to develop a low cost, simplified optical technique for measuring particle size distributions and velocities in fluidized bed combustors and gasifiers, a two-phase research project was initiated at the University of Tennessee at Chattanooga. Phase One, the object of this report, consisted of the following:

1) Existing techniques were surveyed.

2) An experimental procedure was developed.

3) A laboratory test model was fabricated.

4) Limited data was recovered for proof of principle.

5) The relationship between particle size distribution and amplitude measurements was illustrated.

A He-Ne laser illuminated Ronchi Rulings (range 10 to 500 lines per inch). Various samples of known particle size distributions were passed through the fringe pattern produced by the rulings. A photomultiplier tube converted light from the fringe volume to an electrical signal which was recorded using an oscilloscope and camera. The signal amplitudes were correlated against the known particle size distributions. The correlation holds true for various samples.

TP-2192 March 1983

A Conceptual Framework for Using Doppler Radar Acquired Atmospheric Data for Flight Simulation. Warren Campbell. Systems Dynamics Laboratory. N83-27977

A concept is presented which will permit turbulence simulation in the vicinity of microbursts. The method involves a large data base, but should be fast enough for use with flight simulators. The model will permit any pilot to simulate any flight maneuver in any aircraft. The model will simulate a wind field with three-component mean winds and three-component turbulent gusts, and gust variation over the body of an aircraft so that all aerodynamic loads and moments can be calculated. The time and space variation of mean winds and turbulent intensities associated with a particular atmospheric phenomenon such as a microburst is used in the model. In fact, Doppler radar data such as provided by JAWS is uniquely suited for use with the proposed model. The concept is completely general and is not restricted to microburst studies. Reentry and flight in terrestrial or planetary atmospheres could be realistically simulated if supporting data of sufficient resolution were available.

TP-2198 May 1983

Modal Analysis of a Nonuniform String with End Mass and Variable Tension. Mario H. Rheinfurth and Zachary J. Galaboff. Systems Dynamics Laboratory.

Modal synthesis techniques for dynamic systems containing strings describe the lateral displacements of these strings by properly chosen shape functions. This report provides an iterative algorithm to calculate the natural modes of a nonuniform string and variable tension for some typical boundary conditions including one end mass. Numerical examples are given for a uniform string in a constant and a gravity gradient force field.

TP-2216 June 1983

Analysis of Random Signal Combinations for Spacecraft Pointing Stability. Leonard Howell. Systems Dynamics Laboratory.

Methods for obtaining the probability density function of random signal combinations are discussed. These methods provide a realistic criteria for the design of control systems subjected to external noise with several important applications for aerospace problems.

NASA CONFERENCE PUBLICATIONS

CP-2257 October 1982
The Conception, Growth, Accomplishments and Future of Meteorological Satellites. William W. Vaughan, Organizer. Atmospheric Sciences Division. N83-14825

CP-2259 November 1982
NASA/MSFC FY-82 Atmospheric Processes Research Review. Compiled by Robert E. Turner. Space Science Laboratory. N83-19391

CP-2270 February 1983
Summary Proceedings of a Special 1-Day Workshop on Wind Shear. John H. Enders, William W. Melvin, Walter Frost, and Dennis W. Camp. Marshall Space Flight Center N83-25265

CP-2274 April 1983
Proceedings: Sixth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems. Edited by Walter Frost and Dennis W. Camp. Marshall Space Flight Center.

CP-2281 June 1983
NASA/MSFC FY-83 Atmospheric Processes Research Review. Compiled by Robert E. Turner. Systems Dynamics Laboratory.

NASA Reference Publication

RP-1104 March 1983
Perfect Bell Nozzle Parametric and Optimization Curves. J. L. Tuttle and D. H. Blount. Structures and Propulsion Laboratory. N83-24549

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-3646 October 1982
User's Manual for the REEDM (Rocket Exhaust Effluent Diffusion Model) Computer Program. J. R. Bjorklund, R. K. Dumbauld, C. S. Cheney, and H. V. Geary. NAS8-34132. H. E. Cramer Company, Inc. N83-17014

CR-3647 October 1982
Program Listing for the REEDM (Rocket Exhaust Effluent Diffusion Model) Computer Program. J. R. Bjorklund, R. K. Dumbauld. C. S. Cheney, and H. V. Geary. NAS8-34132. H. E. Cramer Company, Inc. N83-17015

CR-3654 November 1982
Preliminary Test Results of Electrical Charged Particle Generator for Application to Fog Dispersal. Walter Frost. NAS8-33541. FWG Associates, Inc. N83-14823

CR-3674 January 1983
Test Results of Modified Electrical Charged Particle Generator for Application to Fog Dispersal. Walter Frost and Kao-Huah Huang. NAS8-34729. FWG Associates, Inc. N83-20490

CR-3678 February 1983
Flight in Low-Level Wind Shear. Walter Frost. NAS8-33458. FWG Associates, Inc. N83-21711

CR-3702 May 1983
Contributions of Divergent and Nondivergent Winds to the Kinetic Energy Balance of a Severe Storm Environment. Peter A. Browning and Henry E. Fuelberg. NAS8-33370. Saint Louis University. N83-28823

CR-3733 July 1983
A Model for Nocturnal Frost Formation on a Wing Section – Aircraft Takeoff Performance Penalties. Mark A. Dietenberger. NAS8-33369. University of Dayton Research Institute.

CR-3734 June 1983
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS) – Phase II, Volume 1: Telepresence Technology Base Development. D. L. Akin, M. L. Minsky, E. D. Thiel, and C. R. Kurtzman. NAS8-34381. Massachusetts Institute of Technology.

CR-3735 June 1983
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS) – Phase II, Volume 2: Telepresence Project Applications. D. L. Akin, M. L. Minsky, E. D. Thiel, C. R. Kurtzman. NAS8-34381. Massachusetts Institute of Technology.

CR-3736 June 1983
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS) – Phase II, Volume 3: Executive Summary. D. L. Akin, M. L. Minsky, E. D. Thiel, and C. R. Kurtzman. NAS8-34381. Massachusetts Institute of Technology.

CR-3737 May 1983
Statistical Analysis of Turbulence Data From the NASA Marshall Space Flight Center Atmospheric Boundary Layer Tower Array Facility. Walter Frost and Ming-Chang Lin. NAS8-34627. University of Tennessee Space Institute.

CR-170644 December 17, 1981
Materials Experiment Carrier Concepts Definition Study Part 2, Volume I: Executive Summary. NAS8-33688. TRW Defense and Space Systems Group. N83-11154

CR-170645 December 17, 1981
Materials Experiment Carrier Concepts Definition Study Part 2, Volume II: Technical Report. NAS8-33688, TRW Defense and Space Systems Group. N83-11155

CR-170646 December 17, 1981
Materials Experiment Carrier Concepts Definition Study Part 2, Volume III: Programmatics. NAS8-33688. TRW Defense and Space Systems Group. N83-11156

CR-170647 April 9, 1981
Materials Experiment Carrier Concepts Definition Study, Volume I: Executive Summary. NAS8-33688. TRW Defense and Space Systems Group.

CR-170648 January 30, 1981
Materials Experiment Carrier Concepts Definition Study, Volume II: Materials Experiment Carrier Payloads Handbook. NAS8-33688. TRW Defense and Space Systems Group.

CR-170649 February 27, 1981
Materials Experiment Carrier Concepts Definition Study, Volume III: Technical Report. NAS8-33688. TRW Defense and Space Systems Group.

CR-170650 October 20, 1980
Materials Experiment Carrier Concepts Definition Study, Volume IV: Interface Requirements. NAS8-33688. TRW Defense and Space Systems Group.

CR-170651 November 12, 1980
Materials Experiment Carrier Concepts Definition Study, Volume V: Materials Experiment Carrier Systems Requirements. NAS8-33688. TRW Defense and Space Systems Group.

CR-170652 September 30, 1982
Countercurrent Distribution of Biological Cells. NAS8-33575. University of British Columbia. N83-11330

CR-170653 September 28, 1982
Space Processing of Electronic Materials. NAS8-34432. Athens State College. N83-11157

CR-170654 October 1982
Thermocapillary Flows and Their Stability: Effects of Surface Layer and Contamination. NAS8-33881. Northwestern University. N83-11462

CR-170655 October 1982
Space Shuttle Main Engine Powerhead Operational Loads and Fatigue Life Analysis, Volume I – SSME Powerhead Model Developments and Analysis. NAS8-34339. Lockheed Missiles & Space Company, Inc. N83-70023

CR-170656 October 1982
Space Shuttle Main Engine Powerhead Operational Loads and Fatigue Life Analysis, Volume II – HPFTP First Stage Turbine Blade Startup/Shutdown Transient Thermal Analyses. NAS8-34339. Lockheed Missiles & Space Company, Inc. N83-70024

CR-170657 October 1982
Space Shuttle Main Engine Powerhead Operational Loads and Fatigue Life Analysis, Volume III – SSME Turbopump Flow Models – User's Manual. NAS8-34399. Lockheed Missiles & Space Company, Inc. N83-70025

CR-170658 August 1982
Adaptation of Multipurpose Insulation for Space Shuttle External Tank Application. NAS8-33724. Acurex Corporation. X83-10012

CR-170659 May 1974
The Orbital Decay and Lifetime (LIFTIM) Prediction Program. NAS8-21810. Northrop Services, Inc. X83-71102

CR-170660 November 21, 1979
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems, Task V, Implementation Plans: Plan for Proposed Project in Las Placetas, Dominican Republic. NAS8-33473. PRC Energy Analysis Company. N83-70773

CR-170661 November 21, 1979
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems: Task V, Implementation Plans; Plan for Proposed Project in San Lucas Toliman, Guatemala. NAS8-33473. PRC Energy Analysis Company. N83-70774

CR-170662 November 21, 1979
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems, Task V, Implementation Plans: Plan for Proposed Project in Kaunakakai and Kualapuu Molokai, Hawaii. NAS8-33473. PRC Energy Analysis Company. N83-70775

CR-170663 November 21, 1979
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems, Task V, Implementation Plans: Plan for Proposed Project in Sweetwater, Arizona. NAS8-33473. PRC Energy Analysis Company. N83-70776

CR-170664 October 31, 1979
Suncalli – A Joint Solar Village Project of Mexico and the United States of America. NAS8-33473. PRC Energy Analysis Company. N83-70777

CR-170665 April 1982
A Study of the Effects of Water Addition on Supersonic Gas Streams. NAS8-34626. Gamma Research, Inc.

CR-170666* November 1982
Wakes from Arrays of Building. NAS8-34318. Arizona State University. N83-14430

CR-170667 April 1982
NASA Airborne Doppler Lidar Program: Data Characteristics of 1981 Wind Field Measurements. NAS8-34768. Lassen 1 Research. N83-13706

CR-170668* June 17, 1982
Bread Board Float Zone Experiment System for High Purity Silicon. NAS8-34542. Westech Systems, Inc. N83-14145

CR-170669 1981
Liquid Crystal Convection: A Novel Accelerometer. NAS8-32813. California University. N83-70751

CR-170670 November 1978
Research Study: Aerodynamic Analysis of Solid Propellant Booster Decelerator Subsystem Test. NAS8-32811. Northrop Services. N83-70686

CR-170671 December 1979
Preliminary Study of the Diffuser Design Requirements for Sea Level Testing of the ASE 200:1 and 175:1 Engines. NAS8-32982. Lockheed Huntsville Research and Engineering Center. N83-70678

CR-170672 September 30, 1982
GP-B Error Modeling and Analysis. NAS8-34426. University of Tennessee. N83-13873

CR-170673 February 12, 1982
Solid Rocket Motor Filament Wound Case Feasibility Study. NAS8-34356. Hercules Incorporated Aerospace Division. X83-10022

CR-170674 February 12, 1982
Solid Rocket Motor Filament Wound Case Feasibility Study. NAS8-34356. Hercules Aerospace Division. X83-10023

CR-170675 February 17, 1982
Study of Filament Wound Composite Case Feasibility for the Space Shuttle Solid Rocket Motor. NAS8-34355. Thiokol/Wasatch Division. X83-10024

CR-170676 September 15, 1982
High-Speed Machining of Space Shuttle External Tank (ET) Panels. NAS8-34508. Lockheed Missiles & Space Company, Inc. N83-13291

CR-170677 September 30, 1982
Meteors and Meteor Spectra Analysis. H-43052B. National Research Council Canada. N83-14040

CR-170678 1982
The Distribution of Baroclinity Within the Atmosphere. NAS8-32694. Oregon State University. N83-14821

CR-170679 August 1980
Methodology Assessment Report – Structural Dynamics Payload Loads Estimates.

NAS8-33556. Martin-Marietta Corporation. N83-13494

CR-170681 September 1982
Structural Dynamics Payload Loads Estimates. NAS8-33556. Martin-Marietta Corporation. N83-13495

CR-170682 September 1982
User Guide — Structural Dynamics Payload Loads Estimates. NAS8-33556. Martin-Marietta Corporation. N83-13496

CR-170683 October 1982
Containerless High Temperature Property Measurement by Atomic Fluorescence. NAS8-34383. Yale University. N83-14176

CR-170684 June 26, 1975
Space Shuttle SRM Propellant Dynamic Properties. NAS8-30490. Thiokol/Wasatch Division. N83-70988

CR-170685 October 1978
Space Shuttle SRM Inert Propellant Dynamic Properties. NAS8-30490. Thiokol/Wasatch Division. N83-70989

CR-170686 May 11, 1982
Teleoperator Maneuvering System — Mission Requirements and System Definition Study Volume I — Executive Summary Final Report. NAS8-33903. Vought Corporation. X83-10043

CR-170687 May 11, 1982
Teleoperator Maneuvering System Mission Requirements and System Definition Study Volume II — Technical Report. NAS8-33903. Vought Corporation. X83-10044

CR-170688 July 30, 1982
Composite Beam Cap Fabricator Flight Experiment Definition Study — Volume I. NAS8-32472. Grumman Aerospace Corporation. N83-14305

CR-170689 August 1982
Development of Deployable Structures for Large Space Platform Systems. NAS8-34677. Rockwell International. X83-10021

CR-170690 October 25, 1982
Development of Deployable Structures for Large Space Platform Systems. NAS8-34678. Vought Corporation. N83-15346

CR-170691* December 1982
AVE/VAS II: 25 MB Sounding Data. NAS8-34133. Texas A&M University. N83-17013

CR-170692* December 1982
AVE/VAS III: 25 MB Sounding Data. NAS8-34133. Texas A&M University. N83-15997

CR-170693 March 1978
Space Shuttle SRM Propellant Dynamic Properties. NAS8-30490. Thiokol/Wasatch Division. N83-70990

CR-170694 May 1972
Review and Development of Modal Synthesis Techniques. NAS8-26192. J. H. Wiggins Co. N83-71528

CR-170695 May 1973
Model Optimization Using Statistical Estimation. NAS8-27331. J. H. Wiggins Co. N83-71537

CR-170696 September 1982
Supersonic and Subsonic Wind Tunnel Heat-Transfer Measurements in the Base Cavity Region of the Shuttle Solid Rocket Booster During Simulated Reentry. H-59388B. Arnold Engineering Development Center. N83-72376

CR-170697 December 1982
Composite Material Application to Liquid Rocket Engines. NAS8-34623. Aerojet Liquid Rocket Company. N83-15360

CR-170698 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study — Phase II Final Report Volume I Part A Executive Summary. NAS8-34183. Martin Marietta.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170699 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study – Phase II Final Report – Volume I Part B Study Results. NAS8-34183. Martin Marietta. X83-10007

CR-170700 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study – Volume II Phase II Final Report – Supporting Research and Technology Report. NAS8-34183. X83-10008

CR-170701 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study – Phase II Final Report – Volume III Program Cost and Work Breakdown Structure/Dictionary. NAS8-34183. Martin Marietta. X83-10009

CR-170702 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study – Phase II Final Report – Volume IV Shuttle Derived Cargo Vehicle Trade Study. NAS8-34183. Martin Marietta. X83-10010

CR-170703 May 1982
Shuttle Derived Vehicles (SDV) Technology Requirements Study – Phase II Final Report – Volume V – External Tank Aft Cargo Carrier Study. NAS8-34183. Martin Marietta. X83-10011

CR-170704 May 30, 1982
Design and Feasibility Study for a Portable Oil Recovery Turbopump. NAS8-34538. IMA Resources, Inc. N83-15628

CR-170705 October 1982
Wind Tunnel Tests of Space Shuttle External Tank Insulation Material in the Aerothermal Tunnel at Elevated (1440F) Total Temperatures. H-54986B. Arnold Engineering Development Center. N83-15334

CR-170706 September 1982
Shuttle Derived Cargo Launch Vehicle Concept Evaluation Study. NAS8-34599. Boeing Aerospace Co. X83-10006

CR-170707 December 1982
Composite Material Application for Liquid Rocket Engines. NAS8-34509. Rockwell International. N83-16382

CR-170708 November 1, 1980
Laser Propulsion Support Program – An Assessment of Available High Energy Laser Technologies for NASA Propulsion and Power Beaming Applications. NAS8-33973. Braddock, Dunn and McDonald Corp. N83-74580

CR-170709 April 1980
Hazard and Operational Analysis of Facility for Electronic Development. NAS8-32812. Integrated Circuit Engineering Corp. X83-10122

CR-170710 December 17, 1982
Research Study: Advanced X-Ray Astrophysics Facility (AXAF) Pointing Control System Study. NAS8-34624. Electro-Optics Consultants, Inc. N83-72394

CR-170711 1982
Dynamic Balance Improvement Program – Phase I. NAS8-34423. Rockwell International. N83-17881

CR-170712 December 8, 1981
Lightning Detection from Space. NAS8-33718. University of Arizona. N83-72642

CR-170713 January 6, 1983
A Study of High Density Bit Transition Requirements Versus the Effects of BCH Error Correcting Codes. NAS8-33887. Mississippi State University. N83-18305

CR-170714 January 1983
The Study of the Use of Tethers for Payload Orbital Transfer – Continuation of Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Institution Astrophysical Observatory. N83-17569

CR-170715 January 15, 1983
Precision Machining Technology and Metrology for AXAF Study. NAS8-33699. Lawrence Livermore National Laboratory. N83-17744

CR-170716 March 1982
Human Operator Performance of Remotely Controlled Tasks: A Summary of Teleoperator Research. NAS8-31848. Essex Corporation. N83-18251

CR-170717 March 1982
Human Operator Performance of Remotely Controlled Tasks: A Summary of Teleoperator Research. NAS8-31848. Essex Corporation. N83-18252

CR-170718 January 1981
Earth Orbital Teleoperator Systems Evaluation – 1979-1980 Test Report. NAS8-31848. Essex Corporation. N83-18253

CR-170719 November 1982
Space Stable Thermal Control Coatings. NAS8-31906. IIT Research Institute. N83-17711

CR-170720 August 1981
Study of Certain Tether Safety Issues and the Use of Tethers for Payload Orbital Transfer – Continuation of Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Institution Astrophysical Observatory. N83-17573

CR-170721 October 1982
Study of Tethered Satellite Active Attitude Control – Continuation of Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Institution Astrophysical Observatory. N83-17570

CR-170722 May 10, 1976
External Operations, Maintenance and Repair (OMR) Mode Selection Criteria. NAS8-31454. Essex Corporation. N83-73388

CR-170723 February 10, 1983
Aft Cargo Carrier (ACC) Definition Study Part A. NAS8-34183. Martin Marietta. X83-73286

CR-170724 February 10, 1983
Shuttle Derived Cargo Vehicle (SDCV) Definition Study Part B. NAS8-34183. Martin Marietta. X83-73287

CR-170725 January 15, 1983
Payload Missions Integration Progress Report. NAS8-32712. Teledyne Brown Engineering. N83-19800

CR-170726 February 1983
Assessment of the Solar-Terrestrial Data Base Management System. NAS8-34534. The University of Alabama in Huntsville. N83-20814

CR-170727 April 1982
Feasibility Analyses of Electroepitaxial R&D Accommodations – Volume I – Accommodations Assessment. NAS8-34743. Teledyne Brown Engineering. N83-20790

CR-170728 April 1982
Feasibility Analyses of Electroepitaxial R&D Accommodations – Volume II – Electroepitaxial Growth of GaAs. NAS8-34743. Teledyne Brown Engineering. N83-20791

CR-170729 November 1982
Low Concentration Ration Solar Array for Low Earth Orbit Multi-100 KW Application. NAS8-34214. Rockwell International. N83-20360

CR-170730 November 1982
Wind Tunnel Tests of Space Shuttle Solid Rocket Booster Insulation Material in the Aerothermal Tunnel C. H-59376B. Arnold Engineering Development Center.

CR-170731 September 19, 1980
Study of Multi-KW Solar Arrays for Earth Orbit Final Report. NAS8-32986. TRW Defense and Space Systems Group. N83-73554

CR-170732 October 15, 1982
An Investigation of Equilibrium Concepts. NAS8-34946. Continuum, Inc. N83-23351

CR-170733 July 1970
Survival Analysis of Skylab Program Vehicles. NAS8-24249. Lockheed Missiles & Space Company. X83-74089

CR-170734 September 1982
A Technical Audit of the GPSS Model of External Tank Manufacturing. NAS8-35912. Texas A&M University. X83-74733

CR-170735* March 1983
AVE/VAS I: 25 mb Sounding Data. NAS8-34133. Texas A&M University. N83-24047

CR-170736 March 18, 1983
Modular Design Attitude Control System. NAS8-33979. The Bendix Corporation. N83-24541

CR-170737 March 1983
Intumescent Coating Development. NAS8-34544. The University of Dayton. N83-24694

CR-170738 February 25, 1983
High-Speed Machining (HSM) Of Space Shuttle External Tank (ET) Panels. NAS8-34508. Lockheed Missiles & Space Company, Inc. N83-24727

CR-170739 March 1983
AVE/VAS IV: 25-mb Sounding Data. NAS8-34133. Texas A&M University. N83-25266

CR-170740 March 1983
AVE/VAS V: 25-mb Sounding Data. NAS8-34133. Texas A&M University. N83-25267

CR-170741 December 1982
Ascent Trajectory Dispersion Analysis. NAS8-34431. Dynetics, Inc. N83-24529

CR-170742 March 1983
AXAF Technology Mirror Assembly Project Report —AXAF/TMA Parabola and Hyperbola Generating Report. NAS8-34579. Perkin-Elmer Optical Group. N83-25537

CR-170743 May 14, 1982
Analysis of SSME HPOTP Rotordynamics Subsynchronous Whirl. NAS8-34924. Control Dynamics Company. N83-90425

CR-170744 1983
Mass Flow Velocity Distribution in the Solar Chromosphere. Weber State College. N83-24453

CR-170745 1982
BIE Study Part I: Two-Dimensional BIE Analysis. NAS8-32835. University of Central Florida. N83-76754

CR-170746 December 1982
NASA/AEDC External Tank Interference Heating Test. H-54986B, Arnold Engineering Development Center. N83-90373

CR-170747 October 30, 1982
Review of Propellant Structural Integrity Analysis for Thiokol Filament Wound Space Shuttle Solid Rocket Motor. H-67590B. J. E. Fitzgerald & Associates. N83-90347

CR-170748 October 1982
AXAF Technology Program Support. NAS8-34591. Alabama A&M University. N83-75515

CR-170749 November 1981
Reduction of the One-Dimensional X-Ray Scattering Data on Mirror Flats at NASA/MSFC. NAS8-34591. Alabama A&M University. N83-25543

CR-170750 January 1982
Relations Between Mirror Flats Geometry and X-Ray Data. NAS8-34591. Alabama A&M University. N83-25544

CR-170751 April 15, 1983
High-Speed Machining of Space Shuttle External Tank (ET) Panels. NAS8-34508. Lockheed Missiles & Space Company. N83-24537

CR-170752 December 1982
Calibration of the Active Radiation Detector for Spacelab-One. NAS8-31170. University of Alabama in Huntsville. N83-24833

CR-170753 April 15, 1983
Design and Fabrication of Conventional and Unconventional Superconductors. NAS8-33722. Battelle Memorial Institute. N83-24765

CR-170754 March 31, 1983
Spectrophotovoltaic Orbital Power Generation (Phase III). NAS8-33511. Honeywell Inc. N83-25040

CR-170755 April 15, 1983
Metal Matrix Composites for Space Exploration – Mechanically Fastened Lap Joint Tests. NAS8-34625. Lockheed Missiles & Space Co. X83-10197

CR-170756 February 1976
IUS/TUG Auxiliary Stage Study. Final Report, Vol. 1, Executive Summary. NAS8-31436. Battelle Columbus Laboratories.

CR-170757 March 16, 1983
Conceptual Design of a Data Reduction System. NAS8-32564. New Technology, Inc. N83-25379

CR-170758 December 1982
Feasibility Study of an Optically Coherent Telescope Array in Space. NAS8-33893. Smithsonian Institution Astrophysical Observatory. N83-25545

CR-170759 January 1983
Design Synthesis of Digital Systems. NAS8-33096. University of Alabama in Huntsville. X83-10226

CR-170760 April 19, 1983
Range Safety Signal Attenuation by the Space Shuttle Main Engine Exhaust Plumes. NAS8-34956. Aeronautical Research Associates. N83-25431

CR-170761 October 1982
Pressure-Scaled Water Impact Test of a 12.5 Inch-Diameter Model of the STS-1 Space Shuttle Solid Rocket Booster (SRB). NAS8-33879. Chrysler Corporation. N83-24538

CR-170762 April 1983
Vector Wind Profile Gust Model. NAS8-33433. Computer Sciences Corporation. N83-25320

CR-170763 May 1, 1983
Definition of Forces on Turbomachinery Rotors Task B. Report: Dynamic Analysis of Rotors. NAS8-34505. Texas A&M University. N83-24507

CR-170764 March 1983
CARS Temperature Measurements in the Fuel Preburner of the Space Shuttle Main Engine: A Feasibility Study. NAS8-34907. Mississippi State University. N83-25778

CR-170765 August 31, 1982
Electron Lithography Star Design Guidelines: Part I of IV: The Star User Design Manual. NAS8-33450. Mississippi State University. X83-10227

CR-170766 August 31, 1982
Electron Lithography Star Design Guidelines: Part II of IV: The Design of a Star for Space Applications. NAS8-33450. Mississippi State University. X83-10228

CR-170767 August 31, 1982
Electron Lithography Star Design Guidelines: Part 3 of 4, The Mosaic Transistor Array Applied to Custom Microprocessors; Part 4 of 4, Stored Logic Arrays – SLAs. NAS8-33450. Mississippi State University. X83-10229

CR-170768 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume I Executive Summary. NAS8-32853. Ball Aerospace Systems Division. X83-90178

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170769 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Part I, Study Results Preliminary Design Document. NAS8-32853. Ball Aerospace Systems Division. X83-90179

CR-170770 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Part II, Study Results Preliminary Interface Control Document. NAS8-32853. Ball Aerospace Systems Division. X83-90180

CR-170771 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Part III, Study Results System Specification. NAS8-32853. Ball Aerospace Systems Division. X83-90181

CR-170772 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Part IV, Study Results Programmatic Analyses and Planning. NAS8-32853. Ball Aerospace Systems Division. X83-90182

CR-170773 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Part V, Study Results SR&T Report. NAS8-32853. Ball Aerospace Systems Division. X83-90183

CR-170774 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Appendix A, BASD Dynamics Analyses. NAS8-32853. Ball Aerospace Systems Division. X83-90184

CR-170775 February 1979
Shuttle/Tethered Satellite System Definition Study – Volume II, Appendix B, Study Results Subcontractor Dynamics Analyses. NAS8-32853. Ball Aerospace Systems Division. X83-90185

CR-170776 June 30, 1980
Shuttle/Tethered Satellite System Definition Study Extension. NAS8-32853. Ball Aerospace Systems Division. X83-90186

CR-170777 April 30, 1983
Added Scope. NAS8-34337. Applied Research, Inc. N83-28797

CR-170778 December 1982
Teleoperator Maneuvering System Mark II Propulsion Module Study (Servicing and Orbital Basing. NAS8-34581. Martin Marietta Denver Aerospace. X83-10266

CR-170779 February 28, 1983
Orbital Transfer and Release of Tethered Payloads Continuation of Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Institution Astrophysical Observatory. N83-25751

CR-170780 February 17, 1983
Definition of Forces on Turbomachinery Rotors, Task A. NAS8-34505. Texas A&M University. N83-28541

CR-170781 April 30, 1983
Large Diameter Astromast Development, Phase I. NAS8-34547. Astro Research Corp. N83-28066

CR-170782 April 1983
Wind Tunnel Tests of Space Shuttle External Tank Insulation Material in the Aerothermal Tunnel at Elevated (1440°F) Total Temperature. H-61304B. Arnold Engineering Development Center. N83-76458

CR-170783 April 15, 1983
Advanced Turbine Study – Technical Progress Report No. 4. NAS8-33821. Pratt & Whitney Aircraft Group. X83-75178

CR-170784 1983
BIE Study Part 2: Three-Dimensional BIE Analysis. NAS8-32835. University of Central Florida. N83-76755

CR-170785 1983
BIE Study Part 3: Crack Growth BIE Analysis. NAS8-32835. University of Central Florida. N83-76756

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170786 May 1983
Executive Summary – Definition of Technology Development Missions for Early Space Station – Satellite Servicing – Volume I. NAS8-35042. Martin Marietta Aerospace. N83-26850

CR-170787 May 1983
Definition of Technology Development Missions for Early Space Station Satellite Servicing – Volume II. NAS8-35042. Martin Marietta Aerospace. N83-26851

CR-170788 April 1979
Shuttle/Tethered Satellite System Definition Study Final Study Report Volume I Executive Summary and System Description. NAS8-32854. Martin Marietta Denver Division. X83-10247

CR-170789 January 1979
Shuttle/Tethered Satellite System Definition Study Volume II, Parts I, II, and III, Final Study Report. NAS8-32854. Martin Marietta. X83-10248

CR-170790 March 1979
Shuttle/Tethered Satellite System Definition Study, Volume II, Part IV, Program Analysis and Planning for Phase C/D. NAS8-32854. Martin Marietta. X83-10249

CR-170791 May 27, 1983
Design, Fabrication and Installation of SL-2 Mockups. NAS8-34952. Essex Corp.

CR-170792 May 15, 1980
Study of Multi-KW Solar Arrays for Earth Orbit Applications. NAS8-32985. Rockwell International. N83-76635

CR-170793 April 1983
Electrical Resistivity of Composite Superconductors. NAS8-33810. University of Alabama in Huntsville. N83-28330

CR-170794 June 1983
Development of an Autonomous Video Rendezvous and Docking System, Phase 2. NAS8-34679. Martin Marietta Aerospace. N83-28065

CR-170795 April 1983
Teleoperator Maneuvering System (TMS) Benefits Assessment Study, Volume 1: Executive Summary. NAS8-34888. Rockwell International Corp. N83-30034

CR-170796 April 1983
Teleoperator Maneuvering System Benefits Assessment, Volume II: Technical Report. NAS8-34888. Rockwell International Corp. N83-30035

CR-170797 June 10, 1983
Advanced Turbine Study – Technical Progress Report No. 5. NAS8-33811. United Technologies Pratt & Whitney. X83-10262

CR-170798 February 15, 1983
Advanced Methods for Preparation and Characterization of Infrared Detector Materials. NAS8-33107. McDonnell Douglas Research Laboratories. N83-30271

CR-170799 June 1983
Investigation of the Feasibility of Temperature Profiling Optical Diagnostics in the SSME Fuel Pre-Burner. NAS8-34774. United Technologies Research Center. N83-29308

CR-170800 May 9, 1983
Development of Deployable Structures for Large Space Platform Systems – Volume 2 Technical Final Report. NAS8-34678. Vought Corporation. N83-29305

CR-170801 June 1, 1983
PDSS/IMC Requirements and Functional Specifications. NAS8-33825. Intermetrics, Inc. N83-30055

CR-170802* June 13, 1983
USRA Workshop Report on Electrostatic Fog Dispersal. NAS8-33730. Universities Space Research Association.

CR-170803 December 1982
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170804 May 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77385

CR-170805 June 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77386

CR-170806 July 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77387

CR-170807 August 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77388

CR-170808 September 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77389

CR-170809 September 9, 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77390

CR-170810 September 13, 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77391

CR-170811 October 13, 1983
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77392

CR-170812 November 13, 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77384

CR-170813 December 7, 1978
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77393

CR-170814 January 8, 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77394

CR-170815 February 8, 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77396

CR-170816 March 5, 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77395

CR-170817 April 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77397

CR-170818 June 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77398

CR-170819 July 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77399

CR-170820 August 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77400

CR-170821 September 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77401

CR-170822 October 1979
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77402

CR-170823 December 1979
ACPL Monodisperse Cloud Experiment. NAS8-31976. University of Missouri.
N83-77403

CR-170824 January 10, 1980
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77404

CR-170825 February 1980
ACPL Monodisperse Cloud Experiment. NAS8-32976. University of Missouri.
N83-77405

CR-170826 March 1980
ACPL Monodisperse Cloud Experiment. NAS8-31976. University of Missouri.
N83-77406

CR-170827 May 1982
Evolutionary Space Platform Concept Study – Volume 1, Executive Summary. NAS8-33592. McDonnell Douglas Astronautics Co. N83-25745

CR-170828 May 1982
Evolutionary Space Platform Concept Volume II – Technical Report, Part A – SASP Special Emphasis Trade Studies. NAS8-33592. McDonnell Douglas Astronautics Co.

CR-170829 May 1982
Evolutionary Space Platform Concept Study Volume II – Technical Report, Part B – Manned Space Platform Concepts. NAS8-33592. McDonnell Douglas Astronautics Co. N83-29306

CR-170830 May 1982
Evolutionary Space Platform Concept Study Volume III – Programmatics for Manned Space Platform Concepts. NAS8-33592. McDonnell Douglas Astronautics Co.
N83-25746

CR-170831 June 1983
X-Ray Diffraction Analysis of Nb_3Ge. NAS8-33548. The University of Alabama in Huntsville. N83-31744

CR-170832 May 9, 1983
Rocket Engine Power Balance and Optimization Code User's Manual. NAS8-34642. Rockwell International.

CR-170833 May 6, 1983
Rocket Engine Power Balance and Optimization Code User's Manual. NAS8-34642. Rockwell International Rocketdyne Div.

CR-170834 May 1983
Acoustic and Gravity Waves in the Neutral Atmosphere and the Ionosphere, Generated by Severe Storms. NAS8-33378. Lamont-Doherty Geological Observatory of Columbia University.

CR-170835 June 1983
Containerless High Temperature Property Measurements by Atomic Fluorescence. NAS8-34383. Midwest Research Institute.

CR-170836 July 7, 1983
Evaluation of Outer Race Tilt and Lubrication on Ball Wear and SSME Bearing Life Reductions. NAS8-34908. Battelle Columbia Laboratories.

CR-170837 July 1983
Design and Test Program for a Magnetic Bearing for LO_2/HO_2 Turbomachinery. NAS8-35005. SKF Technology Services.

CR-170838 May 9, 1983
Development of Deployable Structures for Large Space Platform Systems Volume 1 – Executive Summary. NAS8-34678. Vought Corporation.

CR-170839 May 31, 1983
Development Program – SRB TVC Hydraulic Reservoir 1711016. NAS8-31727. Arkwin Industries, Inc.

CR-170840 July 1983
System Analysis for the Huntsville Operational Support Center Distributed Computer System. NAS8-34906. Mississippi State University.

CR-170841 1982
SINDA User's Manual with Sinflo Addition. NAS8-34643. Sperry Systems Management.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170842 May 20, 1983
Space Shuttle Propulsion Parameter Estimation Using Optimal Estimation Techniques Monthly Progress Report No. 1. NAS8-35324. System Dynamics Inc.

CR-170843 May 31, 1983
Definition of Satellite Servicing Technology Development Missions for Early Space Stations, Volume I – Executive Summary. NAS8-35081. TRW Space & Technology Group.

CR-170844 May 31, 1983
Definition of Satellite Servicing Technology Development Missions for Early Space Stations, Volume II – Technical. NAS8-35081. TRW Space & Technology Group.

CR-170845 July 1983
Preliminary Engineering Study Quick Opening Valve MSFC High Reynolds Number Wind Tunnel. NAS8-35056. FluiDyne Engineering Corp.

CR-170846 July 1983
Analysis and Calculation of Macrosegregation in a Casting Ingot Exhibit "D", MPS Solidification Model. NAS8-33573. General Electric.

CR-170847 July 20, 1983
Space Shuttle Propulsion Parameter Estimation Using Optimal Estimation Techniques – Monthly Progress Report No. 3. NAS8-35324. SDI System Dynamics Incorporated.

CR-170848 June 23, 1983
Mercury-Cadmium-Telluride Crystal Growth Investigation: Solidification Simulation. NAS8-35049. Continuum, Inc.

CR-170849 July 1983
Preliminary Engineering Study Quick Opening Valve MSFC High Reynolds Number Wind Tunnel. NAS8-35056. FluiDyne Engineering Corp.

CR-170850 January 1, 1983
PDSS Configuration Control Plan and Procedures. NAS8-33825. Intermetrics, Inc.

CR-170851 July 15, 1983
SSME HPFTP Interstage Seals: Analysis and Experiments for Leakage and Reaction-Force Coefficients. NAS8-33716. Texas A&M University.

CR-170852 March 1983
Space Power Distribution System Technology, Volume 1: Reference EPS Design. NAS8-33198. TRW Defense and Space System Group.

CR-170853 March 1983
Space Power Distribution System Technology, Volume 2: Autonomous Power Management. NAS8-33198. TRW Defense and Space System Group.

CR-170854 May 19, 1983
Impact Reactivity of Materials at Very High Oxygen Pressure. NAS8-35135. Scientific Services, Inc.

CR-170855 August 1983
Coronal Sources of the Intrastream Structure of the Solar Wind. NAS8-33137. Massachusetts Institute of Technology.

CR-170856 August 10, 1983
Bearing Tester Data Compilation, Analysis and Reporting and Bearing Math Modeling Annual Report. NAS8-34686. Spectra Research Systems.

CR-170857 August 12, 1983
Ultrapure Glass Optical Waveguide: Development in Microgravity by the Sol Gel Process. NAS8-34894. Battelle Columbus Labs.

CR-170858 February 28, 1983
The Influence of Gravity on the Solidification of Monotectic Alloys. NAS8-33727. Michigan Technological University.

CR-170859 May 9, 1978
Payload Model for Low Energy Missions. NAS8-32924. Battelle Columbus Labs.

NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR-170860 December 1977
Nozzle Erosion Prediction for DM-2 Duty Cycle. NAS8-32833. Software and Engineering Associates, Inc.

CR-170861 June 25, 1976
Orbital Service Manipulators. NAS8-31812. Sperry Support Services.

CR-170862 June 1983
Definition of Technology Development Missions for Early Space Station – Orbit Transfer Vehicle Servicing, Volume 1: Executive Summary. NAS8-35039. General Dynamics/Convair.

CR-170863 June 1983
Definition of Technology Development Missions for Early Space Station – Orbit Transfer Vehicle Servicing, Volume 1: Technical Report. NAS8-35039. General Dynamics/Convair.

CR-170864 February 1976
Earth Orbital Teleoperator Manipulator System Evaluation Program. NAS8-30545. Essex Corp.

CR-170865 August 26, 1983
Evaluation of Feasibility of Measuring EHD Film Thickness Associated with Cryogenic Fluids. NAS8-34908. Battelle Columbus Labs.

CR-170866 August 1983
Mercury Cadmium Telluride Solide and Liquid Solution and Their Preparation. NAS8-34957. University of Alabama in Huntsville.

CR-170867 August 1983
Computer Studies of Baroclinic Flow. NAS8-33815. University of Arizona.

CR-170868 August 20, 1983
Space Shuttle Propulsion Parameter Estimation Using Optimal Estimation Techniques – Monthly Progress Report No. 4. NAS8-35324. SDI System Dynamics Inc.

CR-170869 July 1983
Low Concentration Ratio Solar Array for Low Earth Orbit Multi-100kW Application – Volume 1 – Design, Analysis and Development Tests. NAS8-43214. Rockwell International.

CR-170870 July 1983
Low Concentration Ratio Solar Array for Low Earth Orbit Multi-100kW Application – Volume 2 – Drawings. NAS8-34212. Rockwell International.

CR-170871 September 1983
Stress Analysis and Design of the Spartan REM Hardware "Exhibit A". NAS8-35013. Lockheed Missiles & Space Company, Inc.

CR-170872 August 4, 1983
Altitude Switch Assembly. NAS8-31853. Clifton Precision.

*White cover reports printed at MSFC.

ADELFANG, S. I. ES81
TUBBS, J. D. University of Arkansas
SMITH, O.E. ES81
A Five-Parameter Bivariate Gamma Probability Distribution with Application to Gust Modeling. For publication in Technometrics.

AINSWORTH, R. ED12
HOWELL, L.W.
The Generalized Euler-Mascheroni Constants. For publication in the American Mathematical Society Journal of Computation.

ALEXANDER, M. B. ES82
LOGAN, E. Arizona State
LIN, S. H.
Wakes from Arrays of Buildings. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology, Omaha, Nebraska, June 1983.

ANDERSON, B. J. ES83
KELLER, V. W. ES83
An Application of Model Testing for the Study of Rocket Exhaust Cloud Properties. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology, Omaha, Nebraska, June 6-9, 1983.

ANTAR, B. N. (UTSI) ES82
FOWLIS, WILLIAM W.
Symmetric Baroclinic Instability of a Hadley Cell. For presentation at the Thirty-Fifth Meeting of the American Physical Society, Division of Fluid Dynamics, Rutgers University, New Brunswick, New Jersey, November 21-23, 1982.

ANTAR, BASIL ES82
FOWLIS, WILLIAM W.
Baroclinic Instability of a Hadley Cell at Low Richardson Number. For presentation at the Fourth Conference on Atmospheric and Oceanic Waves and Stability. March 22-25, 1983, Boston, Massachusetts.

ANTAR, B. N. ES82
FOWLIS, W. W. ES82
Three-dimensional Baroclinic Instability of a Hadley Cell for Small Richardson Number. For publication in the Journal of Fluid Mechanics.

ATREYA, S. K. University of Michigan
WAITE, J. H., JR. ES53
DONAHUE, T. M. University of Michigan
NAGY, A. F. University of Michigan
MCCONNELL, J. C. York University
Theory, Measurements, and Models of the Upper Atmosphere and Ionosphere of Saturn. For publication in a chapter for Saturn, University of Arizona Press, Tucson, Arizona, editor T. Gehrels.

AUSTIN, ROBERT E. PS03
Orbit Transfer Vehicle: The Communications Satellite Influence. For presentation and publication at the proceedings of the 10th Annual AIAA Communications Satellite Systems Conference, Orlando, Florida, March 19-22, 1984.

BACCHUS, DAVID L. ED32
The Aerodynamic Challenges of SRB Recovery. For presentation at the Space Shuttle Program Technical Conference, Houston, Texas, June 28-30, 1983.

BACHTEL, F. D. EP44
Thermal Design of the Space Shuttle External Tank. For presentation at "From Challenge to Achievement – The Shuttle Program" in Houston, Texas, on June 28-30, 1983.

BAILEY, C. R. EP23
High Pressure Lox/Natural Gas Staged Combustion Technology. For presentation at the 1984 JANNAF Propulsion Meeting, New Orleans, LA, February 5-7, 1984.

BHAT, BILIYAR N. EH23
Analysis of Cryogenic Turbopump Bearing Service Life. For presentation at the 24th Structures, Structural Dynamics and Materials Conference to be held at Lake Tahoe, Nevada on May 2-4, 1983.

BLAIR, J. C. ED01
Space Station Control Technology Development: Challenges and Requirements. For publication in the AIAA's Journal of Aeronautics and Astronautics, March 1983 issue.

BUCHANAN, H. J. ED15
Practical Approaches to Design of Control Systems for Large Space Structures. For presentation at the Large Space Antenna Systems Technology Conference at Langley Research Center, Hampton, VA, on December 2-3, 1982.

BUCHANAN, H. J. ED15
Planning for Long Term Control of Space Station. For presentation at the Rocky Mountain Annual Guidance and Control Conference, Keystone, Colorado, February 5-9, 1983.

BUGG, FRANK M. ED22
Structural Dynamics of Filament Wound Space Shuttle Booster Rockets. For presentation at the AIAA/ASME/ASCE/AHS 24th Structures and Structural Dynamics and Materials Conference, Lake Tahoe, Nevada, May 2-4, 1983.

BURNETT, T. H. ES62
Extremely High Multiplicities in High Energy Nucleus-Nucleus Collisions. For publication in Physical Review Letters.

BURNETT, T. H., et al. ES62
Primary Cosmic Ray Proton and Helium Spectra Above 1 TeV, The JACEE Collaboration. For publication in Physical Review Letters.

BURNETT, T. H., et al. ES62
Nucleus-Nucleus Interactions Above 1 TeV/N in the JACEE Emulsion Chamber. For presentation at the 18th International Cosmic Ray Conference in Bangalore, India, August 22- September 3, 1983.

BURNETT, T. H., et al. ES62
Anomolous Events Observed in the JACEE Emulsion Chambers. For presentation at the 18th International Cosmic Ray Conference, Bangalore, India, August 22-September 3, 1983.

BURROWS, ROGER B. EL23
Example SEPS Asteroid Tours Using Variational Calculus. For publication in the Journal of Spacecraft and Rockets, New York, NY.

CAMP, D. ES82
CAMPBELL, W.
FROST, W.
MURROW, H.
PAINTER, W.
B57B Gust Gradient Program. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 1983.

CAMP, D. W. ES82
CAMPBELL, W. ES82
FROST, W. ES82
Analysis of Spanwise Gust Gradient Data. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, Nebraska, June 6-9, 1983.

CAMP, DENNIS W. ED42
PHILLIPS, MEL
GREGORY, RHONDA
CAMPBELL, WARREN
DOW, CARL
FROST, WALTER
Utilization of Gust Gradients and Aircraft Response as Measured by the NASA B-57B Aircraft. For presentation at the AIAA 22nd Aerospace Sciences Meeting, Reno, Nevada, January 9-12, 1984.

CAMP, DENNIS W. ED42
FROST, WALTER
COONS, FRANK
EVANICH, PEGGY
SPRINKLE, CHARLES H.
Sixth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems. For publication in the Bulletin of the American Meteorological Society.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

CARRUTH, M. R., JR. EB12
SAFE II – Large Systems Space Plasma Evaluation Experiment. For presentation at Large Space Antenna Systems Technology Conference, NASA-LaRC, Hampton, VA, November 30-December 3, 1982, and for publication in proceedings.

CARRUTH, M. R., JR. EB12
Space Test Program of High Voltage Solar Array/Space Plasma Interactions. For presentation at the USAF/NASA Spacecraft Environmental Interaction Technology Meeting, Colorado Springs, CO, October 4-6, 1983.

CARRUTH, M. R., JR. EB12
Multi-KW Solar Array Development Program. For presentation at the Sixth Space Photovoltaic Research and Technology Meeting, NASA-LeRC, Cleveland, Ohio, October 18-20, 1983.

CHANDLER, M. O. (NRC) ES53
CHAPPELL, C. R.
Thermal Plasma Velocities in the Plasmasphere Measured by DE/RIMS. For presentation at the Fall Meeting of the American Geophysical Union, San Francisco, CA, December 5-10, 1983, and for publication in EOS.

CHANDRA, DIPANKAR ES72
HOLLAND, LAWRENCE R.
Densities of $Hg_{1-x}Cd_xTe$ Melts. For presentation at the 1983 MCT Workshop, Dallas, TX, January 8-10, 1983.

CHANDRA, DIPANKAR ES72
HOLLAND, L. R.
Density of Liquid $Hg_{1-x}Cd_xTe$. For publication in proceedings of the 1983 U.S. Workshop on the Physics and Chemistry of Mercury Cadmium Telluride, February 8-10, 1983, and for publication in Journal of Vaccum Science and Technology.

CHAPPELL, C. R. ES51
Plasma Characteristics of the Inner Magnetosphere. For presentation at the Gordon Conference in Space Plasma Physics, Plymouth, New Hampshire, June 13-17, 1983.

CHAPPELL, CHARLES R. ES51
An Overview of Low Energy Plasma Origins in the Inner Magnetosphere. For presentation at the Fundamental Magnetospheric Processes in the Plasmapause Region, Huntsville, AL, October 25-27, 1983.

CHUNG-CHIEH CHENG (NRL)
EINAR TANDBERG-HANSSEN ES01
Correlated Observation of Impulsive UV and Hard X-Ray Bursts in Solar Flares from the Solar Maximum Mission. For publication in the Astrophysical Journal.

CHRISTIAN, H. J. ES83
FROST, R. L.
Measurements of the Optical Characteristics of Lightning From Above Cloud Tops. For publication in EOS.

CLEMONS, J. M. EH33
LEDBETTER, F. E., III
PENN, B. G.
WHITE, W. T.
For publication in Polymer Composites.

COMFORT, R. H. ES53
HORWITZ, J. L. UAH
CHAPPELL, C. R. ES53
WAITE, J. H. ES53
Thermal Equilibrium Among Plasmaspheric Ions as Observed by DE/RIMS. For presentation at the spring meeting of the American Geophysical Union and for publication in the EOS

CRAMBLIT, D. C. PS04
TURNER, J. R. PF01
Teleoperator Maneuvering System Missions Applications and Benefits. For presentation at the Twentieth Space Conference, Cocoa Beach, FL, April 26-28, 1983.

DAILEY, CARROLL C. PS01
WYMAN, CHARLES
WEISSKOPF, MARTIN
DAVIS, BILLY
McKINNON, P.

The Advanced X-Ray Astrophysics Facility. For presentation at the 22nd Aerospace Sciences Meeting (AIAA), Reno, Nevada, January 9-12, 1984.

DAVIS, M. H. USRA
CHRISTIAN, H. J. ES83
et al.
Some Scientific Objectives of a Satellite-Borne Lightning Mapper. For publication in the Bulletin of the American Meteorological Society, Boston, Massachusetts, February 1983.

DAVIS, MILFORD H. (USRA) ED41
SMITH, R. E.
WEST, G. S.
Space and Planetary Environment Criteria Guidelines for Use in Space Vehicle Development. For presentation at the 22nd AIAA Aerospace Sciences Meeting, Reno, Nevada, January 12, 1984.

DeLOACH, A. C. ES51
HAGYARD, M. J.
MOORE, R. L.
WEST, E. A.
TANDBERG-HANSSEN, E.
Comparison of Photospheric Electric Current Distributions with Transition Region Enhancements. For presentation at the Kunming Workshop, Yunnan Observatory, Kunming, China, November 21-25, 1983.

DeSANCTIS, CARMINE E. PS02
Future Scientific Payloads for STS Missions (Abstract Only). For presentation at the 20th Space Conference of the Canaveral Council of Technical Societies, "Space — The Next Twenty Years," Cocoa Beach, FL, April 26-28, 1983.

DESSLER, A. J. ES01
Magnetospheric Power Sources. For presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, December 7-11, 1982, and for publication in EOS.

DESSLER, A. J. ES01
Early Arguments Regarding the Existence of Field-Aligned Currents. For presentation at the AGU Chapman Conference on Magnetospheric Currents, Irvington, VA, April 5-6, 1983.

DESSLER, A. J. ES01
The Magnetosphere of Uranus: Theoretical Expectations. For presentation at the Fifth Conference on the Physics of the Jovian and Saturnian Magnetosphere.

DESSLER, A. J. ES01
Birkeland, Chapman, and Alfven: Early Arguments Regarding the Existence of Field-Aligned Currents. For publication in the Proceedings of the American Geophysical Union Chapman Conference on Magnetospheric Currents.

DESSLER, A. J. ES01
Magnetospheric Power Sources. For presentation at the International Union of Geodesy and Geophysics 18th General Assembly, Hamburg, Germany, August 14-27, 1983.

DESSLER, A. J. ES01
The Magnetosphere of Jupiter. For publication in "Advances in Space Research", Pergamon Press Ltd., Oxford, England.

DILL, CHARLIE C. ED32
The Space Shuttle Launch Vehicle Aerodynamic Challenges Configuration Design and Data Base Development. For presentation at the Space Shuttle Program Technical Conference, Houston, Texas, June 28-30, 1983.

DOANE, GEORGE ED12
WAITES, HENRY B.
Definition of Ground Test for Large Space Structures Control Verification. For presentation at the AIAA Guidance and Control Conference, Gatlinburg, TN, August 15-17, 1983.

DOWDY, J. F. ES52
MOORE, R. L.
WU, S. T.
Inhibition of Conduction Heat Flow By

Magnetic Constriction in the Corona and Transition Region: Dependence on the Shape of the Constriction. For publication in Solar Physics, The Netherlands.

DOZIER, J. EP42
KAELBER, E. Perkin-Elmer
ROSENTHAL, M. TA61 (COR)
Latch Fittings for the Scientific Instruments on the Space Telescope. For presentation at the 17th Aerospace Mechanisms Symposium, JPL, May 5-6, 1983.

DOZIER, JAN D. EP42
HACKETT, ROBERT M. EP42
A Model for the Time-Dependent Failure of Filament-Wound Spherical Storage Pressure Vessels. For presentation at the 12th Southeastern Conference on Theoretical and Applied Mechanics, Pine Mountain, GA, May 10-11, 1984.

DOZIER, JAN D. EP42
HACKETT, ROBERT M. EP42
A Basic Model for the Creep Rupture of Filament-Wound Spherical Pressure Vessels. For presentation at the 25th Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, May 14-16, 1984.

DURRETT, R. PS06
RAMLER, J. LeRC
NASA's Geostationary Communications Platform Program. For presentation at and publication in the proceedings of the Tenth Annual AIAA Communications Satellite Systems Conference, Orlando, Florida, March 19-22, 1984.

ETHRIDGE, E. D. ES74
CURRERI, P. A. ES74
Containerless Electromagnetic Levitation Melting in Microgravity Conditions. For publication in Electromagnetic Moldless Casting.

FELIX, A. R. ED35
Force Balance Gage Failure. For presentation at the 59th Meeting of Supersonic Tunnel Association, Air Force Academy, Colorado Springs, Colorado, April 6-7, 1983.

FENNELLY, A. J. ES63
General Relativistic Gravitational Field of an Aligned Magnetic Rotator: The Vacuum Pulsar Magnetosphere. For publication in the Physical Review Letters.

FENNELLY, A. J. ES63
Magnetohydrodynamic Mixmaster Universe. For publication in Physical Review, Ridge, NY.

FEREBEE, ROBIN C. ED23
Application of a Computerized Vibroacoustic Data Bank for Random Vibration Criteria Development. For publication in Astronautics and Aeronautics Structural Dynamics Highlights.

FERNANDEZ, K. R. EB44
JONES, C. EH42
ROBERTS, M. EH43
For publication in the International Symposium of Industrial Robotics, Chicago, Illinois.

FICHTL, G. H. ES82
TANG, C. M. USRA
Non-Quasigeostrophic Effects in Baroclinic Waves with Latent Heat Release. For presentation at the AMS Fourth Conference on Atmospheric & Ocean Waves and Stability, Boston, MA, March 22-25, 1983.

FICHTL, G. H. ES82
BROWN, C. ES82
Procedure for Generating Ground Wind Environments for Monte Carlo Shuttle Lift-Off Studies. For publication in the Journal of Spacecraft and Rockets.

FISHMAN, G. J. ES62
MEEGAN, C. A.
PARNELL, T. A.
WILSON, R. B.
The Burst and Transient Source Experiment for the Gamma-Ray Observatory. For presentation at the Workshop on High Energy

Transients, Santa Cruz, CA, July 11-22, 1983.

FISHMAN, G. J. ES61
MEEGAN, C. A.
WILSON, R. B.
Gamma-Ray Burst Observations with a Large-Area, Balloon-Borne Detector Array. For presentation at the Workshop on High Energy Transients, Santa Cruz, CA, July 11-22, 1983.

FITZJARRALD, D. E. ES82
ROTHERMEL, J. (USRA Visiting Scientist)
Dual Doppler Lidar Measurements of Winds in the JAWS Experiments. For presentation at the 21st Conference on Radar Meteorology, Edmonton, Alberta, Canada, September 19-23, 1983.

FITZJARRALD, D. E. ES82
DiMARZIO, C. A. ES82
Aviation-Related Wind Data Obtained with an Airborne and Ground-Based Doppler Lidar System. To be presented at the Ninth Conference on Aerospace and Aeronautical Meteorology, Omaha, Nebraska, June 1983.

FOUNTAIN, W. F. ES52
GARY, G. A. ES52
O'DELL, C. R. ES62
An Hα Velocity Study of S252. For publication in the Astrophysical Journal.

FOUNTAIN, WALTER F. ES63
GARY, GILMER A. ES63
MSFC Microdensitometry. For presentation at the Astronomical Microdensitometry Conference, Goddard Space Flight Center, Greenbelt, Maryland, May 11-13, 1983.

FOSTER, L. D. ED33
GREENWOOD, T. F.
LEE, D. B. JSC
Shuttle System Ascent Aerodynamic and Plume Heating. For presentation at the Space Shuttle Program Technical Conference, Houston, Texas, June 28-30, 1983.

FOWLIS, WILLIAM W. ES82
ROBERTS, GLYN O.
Numerical Studies Related to the Design of a Spherical Baroclinic Experiment for Spacelab Flights. For presentation at the Thirty-Fifth Meeting of the American Physical Society, Division of Fluid Dynamics, Rutgers University, New Brunswick, New Jersey, November 21-23, 1982.

FOWLIS, W. W. ES82
ROBERTS, G. ES82
MILLER, T. ES82
KOPECKY, K. ES82
Numerical Studies of Baroclinic Flows in Spherical Geometry. For presentation at the Fourth Conference on Atmospheric and Oceanic Waves and Stability, Boston, MA, March 22-25, 1983.

FRITZ, C. G. PD22
Advanced X-Ray Astrophysics Facility Thermal Control Study. For presentation at the Intersociety Conference on Environmental Systems, San Francisco, CA, July 11-13, 1983.

FROST, A. L. ED32
Wind Tunnel Investigation of Aerodynamic Effects Induced by Propulsion System Exhaust Plumes on the Space Shuttle Launch Vehicle Using Solid Body Plume Simulation. For presentation at the AIAA Applied Aerodynamics Conference, Danvers, MA, July 13-15, 1983.

GLAESE, J. R.
RHEINFURTH, M. H. ED01
Modal Synthesis Simulation of a Tethered Satellite System. For presentation at the 4th VPI & SU/AIAA Symposium on Dynamics and Control of Large Structures, Blacksburg, VA, June 6-8, 1983.

GREEN, J. L. ES53
MENIETTI, D.
SIX, F.
GULKIS, S.
GURNETT, D.
Decametric Radio Emissions from Jupiter:

A New Look. For presentation at the URSI Conference, Boulder, Colorado, January 4-7, 1983.

GREEN, JAMES L. ES53
The IO Decametric Emission Cone. For publication in Radio Science.

GREEN, J. L. ES53
THOMAS, DOUG
WAITE, HUNTER
Delivery, Management, Analysis, and Presentation of Major Data Bases. For presentation at the Third Annual Computer User's Conference, Boulder, Colorado, September 20-21, 1983.

GREENWOOD, T. F. ED33
Space Shuttle Base Heating. For presentation at the AIAA 18th Thermophysics Conference in Montreal, Canada, June 1-4, 1983.

GREENWOOD, T. F. ED33
Calculation of Shuttle Base Heating Environments and Comparison with Flight Data. For presentation at a meeting on Shuttle Performance: Lessons Learned, Hampton, VA, March 8-10, 1983.

GRINDLAY, J. E. ES62
BAND, D. ES62
LEAHY, D. ES62
WEISSKOPF, M. ES62
X-Ray Variability of SS433. For publication in the Astrophysical Journal, Chicago, IL, November 23, 1982.

GUEST, STANLEY H. ED24
DOUGHERTY, S. RI
Shuttle Ignition Overpressure Environments and Suppression Techniques from Scale Model Tests and Flight Data. For publication at the AIAA Meeting on Shuttle Environment and Operations, Washington, D.C., October 31-November 2, 1983.

HAGYARD, M. J. ES52
Utilizing Vector Magnetic Field Observations to Determine Lorentz Forces Within an Active Region. For presentation at the Meeting of Solar Physics Division of the American Astronomical Society, Pasadena, CA, June 22-24, 1983. For publication in the Bulletin AAS.

HAMILTON, E. G. PD01
Antenna Technology for Orbital Very Long Baseline Interferometry (VLBI). For presentation at the Large Space Antenna Systems Technology Conference to be held at Hampton, VA, November 30-December 3, 1982.

HARDEE, P. E. ES62
(NASA/ASEE Summer Faculty Fellow)
Effects of the Kelvin-Helmholtz Surface Instability on Supersonic Jets. For publication in the Astrophysical Journal.

HARRINGTON, R. G. Martin Marietta
POLEN, R. W. Martin Marietta
ODOM, J. SA31
Computerized Ultrasonic Multiple Array Real-Time Inspection System for Space Shuttle Aluminum Welds. For presentation and publication by the American Society for Non-Destructive Testing in the Material Evaluation Publication, January 1983.

HARRIS, J. M. UAH
CASE, M. G. UAH
SNYDER, R. S. ES73
HERRMANN, F. T. ES73
Cell Separation on the Countercurrent Chromatograph. For presentation at the Pittsburgh Conference and Exposition on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, March 7-12, 1983.

HENZE, W. ES52
TANDBERG-HANSSEN, E.
REICHMANN, E. J.
ATHAY, R. G.
SMM/UVSP Observations of the Distribution of Transition Region Oscillations and Other Properties in a Sunspot. For publication in Solar Physics, The Netherlands.

HILDNER, ERNEST ES52
BECKERS, J. M. (not MSFC)
Measurements of the Solar Shape and Diameter Using the Solar Beacon. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, NV, January 1983.

HILDNER, E. ES52
WU, S. T. UAH
Parametric Study of Solar Coronal Perturbations. For presentation at the Annual Meeting of the Solar Physics Div. of the American Astronomical Society, Pasadena, CA, June 22-24, 1983. For publication in the Bulletin AAS.

HILL, C. K. ES84
BROWN, S. C. ES84
The Effect of Wind Variability on Space Shuttle Flight. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, NE, June 6-9, 1983.

HILL, C. KELLY ED44
TURNER, ROBERT E.
NASA's AVE/VAS Program. For publication in the bulletin American Meteorological Society, Boston, MA.

HILL, T. W. ES01
DESSLER, A. J.
RASSBACH, M. E.
Aurora on Uranus: A Faraday Disc Dynamo Mechanism. For publication in Planetary and Space Science, Northern Ireland.

HOLLADAY, A. M. EB13
Effectiveness of Surge Current Screening of Solid Tantalum Capacitors. For presentation at the Capacitor and Resistor Technology Symposium, Phoenix, Arizona, March 7-10, 1983.

HOLLADAY, A. M. EB13
Potential Increase in Ripple Current Ratings of CLR79 Capacitors. For presentation at the Capacitor and Resistor Technology Symposium, Phoenix, Arizona, March 7-10, 1983.

HOLLAND, LAWRENCE ROZIER ES72
TAYLOR, RAYMOND E.
Measured Thermal Diffusivity of $Hg_{1-x}Cd_x$ Te Solids and Melts. For presentation at the 1983 MCT Workshop, Dallas, TX, January 8-10, 1983.

HOLLAND, L. R. ES72
HARRIS, R. P. ES72
SMITH, R. E. ES72
High Temperature, High Pressure Optical Cells. For publication in the Review of Scientific Instruments, Argonne National Laboratory, Argonne, IL.

HOLLAND, R. L. ES81
VAUGHAN, W. W. ES82
Lagrangian Least-Squares Prediction of Solar Flux (F10.7). For publication in the Journal of Geophysical Research.

HOLLAND, L. R. ES72
TAYLOR, R. E. ES72
Measured Thermal Diffusivity of $Hg_{1-x}Cd_x$ Te Solids and Melts. For publication in The Journal of Vacuum Science and Technology.

HORWITZ, J. L. ES51/ES53
PENDERGRASS, M.
COMFORT, R. H. UAH
CHAPPELL, C. R.
Plasmapause and Plasmasphere Structure from DE-1 Observations. For presentation of the fall meeting of the American Geophysical Union, San Francisco, CA, December 5-10, 1983, and for publication in EOS.

HSU, J. P. (NAS Associate) ES63
Four-Dimensional Symmetry from a Broad Viewpoint. II. Invariant Distribution of Quantized Field-Oscillators and Questions on Infinities. For publication in Il Nuovo Cimento, Bologna, Italy.

HUETER, U. PD22
BENZ, F. J. JSC-WSTF/RF
Alternate Thermal Control Coolant Fluid Investigation for the NASA Space Transportation System. For presentation at the AIAA 18th Thermophysics Conference, Montreal, Canada, June 1-3, 1983.

HUGHES, ROBERT W. EP33
The Solid Rocket Booster Auxiliary Power Unit – Meeting the Challenge. For presentation at the NASA Space Shuttle Program Technical Conference, Houston, Texas, June 28-30, 1983, and for publication in the Proceedings.

HUMPHRIES, WILLIAM R. EP45
Thermal Design and Analysis in the Orbiter Bay. For presentation at the AIAA Shuttle Environment Conference, Washington, D.C. October 31-November 2, 1983.

HUNG, J. C. (UAH) PD12
HOWELL, J. T., JR.
Modeling and Design of an Antenna Pointing Control for a Satellite Power Station. For presentation at the International Federation for Information Processing/System Modeling and Optimization, Copenhagen, Denmark, July 25-29, 1983.

HUNG, R. J. ES81
LIU, J. M.
TSAO, D. Y.
SMITH, R. E.
Relationship Between Convective Clouds and Precipitation Over the Qinghai-Xizang Plateau Area from Satellite and Ground-based Observations. For publication in Annales Geophysicae, Switzerland, April 11, 1983.

HUNG, R. S. (UAH) ES81
DODGE, J. C. (NASA Headquarters)
SMITH, R. E. ES81
The Life Cycle of a Ringwood, Oklahoma Tornadic Cloud as Seen from a Satellite and a Balloon. For publication in the AIAA Journal.

IMAMURA, M. S. Martin Marietta
MOSER, R. Martin Marietta
AICHELE, D. EB41
LANIER, R. EB41
Automation Concepts for Large Space Power Systems. For presentation at the 18th Intersociety Energy Conversion Engineering Conference, Orlando, FL, August 21-26, 1983.

JEWELL, R. E. ED21
AIAA TAC Note. For publication in Astronautics and Aeronautics.

JOHNSON, D. L. ES84
SMITH, R. E. ES84
Sensitivity Study of Orbital Atmospheric Density Models. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, NE, June 6-9, 1983.

JOHNSON, J. F. E. ES53
SUGIURA, M.
WAITE, J. H. JR.
OLSEN, R. C.
CAHILL, L. J.
CHAPPELL, C. R.
SHAWHAN, S. D.
Analysis of a Pulsation Event Using Particle, Magnetic Field, and Electric Field Data. For presentation at the IAGA Meeting, Hamburg, Germany, August 1983.

JOHNSTON, MARY H. EH22
OWEN, ROBERT B. ES72
Optical Observation of Unidirectional Solidification in Microgravity. For publication in the Journal of Crystal Growth, Amsterdam, The Netherlands.

JONES, CLYDE S. EH42
Vision-Based Robotic Welding Development System. For presentation and publication at the Robotics International of the Society of Manufacturing Engineers, Detroit, Michigan, June 4, 1984.

JONES, JESS H. ED24
Space Shuttle Main Engine Vibration Data Base. For publication in Astronautics and Aeronautics Structural Dynamics Highlights.

JONES, W. D. EB23
Airborne Measurements of Atmospheric Backscatter at 10.6 um. For presentation at the Technical Symposium East '83 and Instrument Exhibit: Coherent Infrared Radar Systems and Applications II, Arlington, VA, April 4-8, 1983.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

JONES, WILLIAM D. EB23
Airborne and Ground Based Measurements of Atmospheric Aerosol Backscatter. For presentation at the Coherent Laser Radar Conference, Aspen, CO, August 1-4, 1983.

KAUFMAN, J. W. ES82
HILL, K. ES82
Inphase Characteristics of Winds to 150 Meters. For publication in Geophysical Research Letters.

KELLER, V. W. ES83
ANDERSON, B. J. ES83
Microphysical Properties of the Shuttle Exhaust Cloud. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, NE, June 6-9, 1983.

KORZENIOWSKY, E. S. Sperry Flight Systems
GALEY, J. JA51
The Design and Development of a Mounting and Jettison Assembly for the Shuttle Orbiter Advanced Gimbal System. For presentation at the 17th Aerospace Mechanisms Symposium, Jet Propulsion Lab, Pasadena, CA, May 5-6, 1983.

KOS, LAWRENCE D. ED23
CHRISTIAN, DAVID C. ED23
Structural Response Analysis of Unlatched Shuttle Payloads During Reentry and Landing. For presentation at the AIAA Meeting on Shuttle Environment and Operations, Washington, D.C., October 31-November 2, 1983.

KROES, R. L. ES72
REISS, D. A. ES72
Triglycine Sulfate Crystal Growth Kinetics. For presentation at the 1983 March meeting of the American Physical Society, Los Angeles, CA, March 21-25, 1983. For publication in Bulletin APS.

KROSS, DENNIS A. ES22
KIEFLING, LARRY A.
Space Shuttle Solid Rocket Booster Water Impact Loads and Dynamics, Analysis, Model Test, and Flight Experience. For presentation at the 24th SDM Conference, Lake Tahoe, Nevada, May 2-4, 1983.

KROSS, D. A. ED22
Water Impact Laboratory and Flight Test Results for the Space Shuttle Solid Rocket Booster Aft Skirt. For presentation at the 54th Shock and Vibration Symposium, Pasadena, CA, October 10-20, 1983.

LADNER, D. R. ES63
A Review of Superfluid Critical Velocities. For presentation at the Space Helium Dewar Workshop and Conference, UAH/Huntsville Hilton, Huntsville, AL, August 24, 1983.

LEDBETTER, F. E., III EH33
DANIELS, J. G.
CLEMONS, J. M.
HUNDLEY, N. H.
PENN, B. G.
Thermogravimetric Analysis of Silicon Carbide-Silicon Nitride Polycarbosilazane Precursor During Pyrolysis from Ambient to 1000°C. For publication in the Journal of Materials Science Letters.

LEHOCZKY, S. L. ES72
SZOFRAN, F. R. ES72
NAUMANN, R. J. ES72
Crystal Growth of Homogeneous $Hg_{1-x}Cd_x$ Te Crystals from Pseudobinary Melts. For presentation at the 1983 Meeting of the American Physical Society in Los Angeles, CA, March 21-25, 1983. For publication in Bulletin APS.

LESLIE, FRED ED42
SCHAFER, CHARLES
GANS, ROGER
Liquid Helium Management for Gravity Probe-B. For presentation at the Space Helium Dewar Conference and Workshop, Huntsville, AL, August 24-26, 1983.

LESTER, R. C. JA11
The Utilization of Spacelab. For presentation at the 34th International Astronautical Federation (IAF) Congress, Budapest, Hungary, October 9-15, 1983.

LOVINGOOD, J. A. SA51
LIANG, P. Y. Rockwell International
Aerothermodynamic Analysis of the Space Shuttle Main Engine Hot Gas Manifold. For presentation at the AIAA 18th Thermophysics Conference, Montreal, Canada, June 1-3, 1982.

LYONS, L. R. ES53
DUSENBERY, P. B.
A Simple Expression for Kilometric Radiation Growth Rates and Analytical Applications. For publication in the Journal of Geophysical Research.

LYONS, L. R. ES53
EVANS, D. S. NOAA
An Association Between Discrete Aurora and Energetic Particle Boundaries. For presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, December 5-10, 1983. For publication in EOS.

McBRAYER, R. O. JA11
Launch Processing of Spacelab 1. For presentation at the AIAA Shuttle Environment and Operations Conference, Washington, D.C., October 31-November 2, 1983.

McCARTY, JOHN P. EP21
Space Shuttle Main Engine – Interactive Design Challenges. For publication in the proceedings of the Space Shuttle Technical Conference, Johnson Space Center, Houston, TX, June 28-30, 1983.

McCAY, T. D. EP24
Numerical Modeling of Laser Thermal Propulsion Flows. For publication in AIAA Progress in Astronautics & Aeronautics.

McKANNAN, EUGENE C. ES01
The Growth of Commercial Materials Processing in Space. For presentation at the 15th National SAMPE Technical Conference and for publication in the Preprint Volume of the proceedings.

MARSHALL, W. R. PA01
U. S. Launch Vehicles for the Future. For presentation at the 20th Space Conference of the Canaveral Council of Technical Societies, Cocoa Beach, FL, April 26-28, 1983.

MARSHALL, W. R. PA01
A Program Answer to Space Station Mission Requirements. For presentation at the 20th Space Congress of the Canaveral Council of Technical Societies, Cocoa Beach, FL, April 26-28, 1983.

MELVIN, W. M. ES82
ENDERS, J. H.
FROST, W. EB01
CAMP, D. W. ED42
Summary of a Wind Shear Workshop. For publication in the Journal of Astronautics & Aeronautics.

MIDDLETON, ROBERT PS04
WALTZ, D. TRW
SCHROCK, S. MMC
Satellite Servicing Technology Development Missions. For presentation at the Twentieth Space Congress, Cocoa Beach, FL, April 26-28, 1983.

MILLER, EDGAR R. ES61
Summary and Implications of the Induced Environment Contamination Monitor Results from STS-2, 3 and 4. For presentation at the AIAA 18th Thermophysics Conference, Montreal, Canada, June 1-3, 1983.

MILLER, EDGAR R. ES61
Update of Induced Environment Contamination Monitor Results. For presentation at the AIAA Meeting on Shuttle Environment and Operations, Washington, D. C., October 31-November 2, 1983.

MILLER, J. L. EB11
Electrical Utility for Space Station. For publication in Astronautics and Aeronautics, March 1983.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

MILLER, JOHN Q. EP25
KILMINSTER, JOE C. Thiokol
Solid Rocket Motor Certification to Meet Space Shuttle Requirements: From Challenge to Achievement. For presentation at the Space Shuttle Technical Conference, Houston, TX, June 28-30, 1983.

MILLER, TIMOTHY L. ES74
The Structures and Energetics of Fully Nonlinear Symmetric Baroclinic Waves. For publication in the Journal of Fluid Mechanics, Cambridge, England.

MITCHELL, WALTER T. EB42
SEARLE, RICHARD F. EB42
SSME Digital Control Design Characteristics. For presentation at the Space Shuttle Program Technical Conference, JSC, TX, June 28-30, 1983.

MOBLEY, THOMAS B. PS03
HUGHES, JAMES E.
External Tank Aft Cargo Carrier. For presentation at the 20th Space Conference of the Canaveral Council of Technical Societies "Space – The Next Twenty Years," Cocoa Beach, FL, April 26-28, 1983, and for publication in the proceedings.

MOORE, RONALD L. ES52
Magnetic Changes Observed in a Flare: True and False Transients and True Permanent Changes. For presentation at the 161st Meeting of the American Astronomical Society (ASS), Boston, MA, January 8-12, 1983, and for Publication in the AAS Bulletin.

MOORE, R. L. ES52
HURFORD, G. J.
California Institute of Technology
JONES, H. P. NASA/Goddard
KANE, S. R. University of California, Berkeley
Magnetic Changes Observed in a Flare. For publication in The Astrophysical Journal, Chicago, IL.

MOORE, R. L. ES52
The Impulsive Phase of a Simple Flare. For presentation at the Annual Meeting of the Solar Physics Division (SPD) of the American Astronomical Society. For publication in the Bulletin AAS, Pasadena, CA, June 22-24, 1983.

MOORE, R. L. ES53
HORWITZ, J. L.
GREEN, J. L.
Implications of Solar Flare Dynamics for Reconnection in Magnetospheric Substorms. For presentation at the Chapman Conference on Magnetic Reconnection, Los Alamos, NM, October 3-7, 1983.

MORRIS, L. J. ES51
HORWITZ, J. L.
COMFORT, R. H. (UAH)
CHAPPELL, C. R.
Satellite Observations of the Formation of the Outer Plasmasphere. For presentation at the fall meeting of the American Geophysical Union, San Francisco, CA, December 5-10, 1983, and for publication in EOS.

NAGAI, T. (NAS) ES53
KAMIDE, Y. (NOAA) ES53
Multiple-Satellite Observations of Field-Aligned Current Signatures in the Inner Magnetosphere During the Substorm on July 5, 1979. For presentation at the Chapman Conference on Magnetospheric Currents, Irvington, Virginia, April 5-8, 1983.

NAGAI, F. (NAS Fellow) ES01
Transient Behavior of Flare-Associated Solar Wind II, Gas Dynamics in a Nonradial Open-Field Region. For publication in the Astrophysical Journal.

NAGAI, T. (NAS)
JOHNSON, J. F. E. (NAS)
CHAPPELL, C. R. ES53
Low-Energy (100eV) Ion Pitch Angle Distributions in the Magnetosphere by ISEE-1. For publication in the Journal of Geophysical Research, Washington, D.C.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

NAGAI, T. (NAS) ES53
BAKER, D. N. Los Alamos National Lab.
HIGBIE, P. R. Los Alamos National Lab.
Development of Substorm Activity in Multiple-Onset Substorms at Synchronous Orbit. For publication in the Journal of Geophysical Research, Washington, D.C.

NAGAI, T. (NAS) ES53
Plasmapause Structure from ISEE-1 Low-Energy Ion and Plasma Wave Observations. For presentation at the 1983 AGU Spring Meeting, Baltimore, MD, May 30-June 3, 1983, and for publication in EOS.

NARANAN, S. ES62
ELSNER, R. F.
DARBRO, W.
HARDEE, P. E.
WEISSKOPF, M. C.
WILLIAMS, A. C.
SUTHERLAND, P. G.
X-Ray Observations of the Fast Rotator LMC X-4 with the Monitor Proportional Counter on the HEAO-2 (Einstein) Observatory. For publication in Astrophysical Journal, Chicago, IL.

NAUMANN, ROBERT J. ES71
RHODES, PERCY H.
Thermal Considerations in Continuous Flow Electrophoresis. For publication in Separation Science & Technology, New York, NY.

NAUMANN, ROBERT J ES71
Microgravity Science with the Space Shuttle. For presentation at the American Chemical Society, Washington, D.C., August 31, 1983.

NAUMANN, ROBERT J. ES71
One-Dimensional Thermal Modeling of Vertical Bridgman-Type Crystal Growth. For publication in the Journal of Crystal Growth, North-Holland Publishing Co., Amsterdam.

NICOLAS, D. P. EB13
The SEM and Electronic Parts Analysis. For presentation at the Alabama Electron Microscopy Society – 2nd Annual Meeting, University of Alabama, Huntsville, Alabama, March 4, 1983.

OLSEN, R. C. ES53
CHAPPELL, C. R.
SHAWHAN, S. D.
Hydrogen Heating at the Magnetic Equator. For presentation at the Chapman Conference on "Waves in Magnetospheric Plasmas", Kona, Hawaii, February 7-11, 1983, and for publication in EOS.

OLSEN, R. C. ES51
SHAWHAN, S. D.
GALLAGHER, D. L.
GREEN, J. L.
CHAPPELL, C. R.
Observations of Plasma Heating at the Earth's Magnetic Equator. For publication in the Journal of Geophysical Research, Hanover, NH.

OLSEN, R. C. ES51/ES53
SHAWHAN, S. D.
CHAPPELL, C. R.
GALLAGHER, D. L.
Plasma Heating at the Equatorial Plasmapause. For presentation at the Fundamental Magnetospheric Processes in the Plasmapause Region Conference, Huntsville, AL, October 25-27, 1983.

OMENYI, S. N. ES73
SNYDER, R. S.
Vertical Ascending Electrophoresis of Cells in the Absence of a Stabilizing Medium. For publication in Preparative Biochemistry, Buffalo, NY.

OWEN, ROBERT B. ES74
RILEY, C.
COBLE, H. D.
ALTER, W. S.
Interferometric Studies of CU and CO Electrodeposition in Low Gravity. For presentation at the 1983 Annual Meeting Optical Society of America, New Orleans, LA, October 17-20, 1983.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

PETERS, P. N. ES61
LINTON, R. C. ES61
MILLER, E. R. ES61
Results of Apparent Atomic Oxygen Reactions on Ag, C, and OS Exposed During the Shuttle STS-4 Orbits. For publication in the Journal of Geophysical Research.

PORTER, D. ITT Electro-Optical Products Div.
THOMAS, D. T. EB32
A High Speed Fiber Optic Data Bus for Local Data Communications. For publication in "Fiber Optics Systems", a special IEEE Publication, February 1983.

POWELL, LUTHER E. PM01
From Skylab to Space Station (Abstract only). For presentation at the 20th Space Congress of the Canaveral Council of Technical Societies, "Space – The Next Twenty Years," Cocoa Beach, FL, April 26-28, 1983.

POWELL, L. E. PM01
The Role of Space Station in the High Technology World. For presentation at the Thirty-Fourth International Astronautical Federation (IAF) Congress, in Budapest, Hungary, October 9-15, 1983.

RABIN, D. J. (NAS/NRC) ES52
MOORE, R. L.
Structure of the Lower Transition Zone in an Active Region. For presentation at the 161st Meeting of the American Astronomical Society and for publication in the Bulletin of the AAS (Abstract only).

RABIN, D. M. (NRC)
MOORE, R. L. ES52
On Heating the Lower Transition Region with Fine-Scale Currents. For presentation at the Annual Meeting of the Solar Physics Division of the American Astronomical Society and for publication in the Bulletin AAS, Pasadena, CA, June 22-24, 1983.

RAMIREZ, C. Martin Marietta Aerospace
ODOM, J. B. SA31
Robot Selfprogramming. For presentation and publication at the 13th Symposium on Industrial Robots and Robots 7 Conference and Exposition, Chicago, Illinois, April 19-21, 1983.

RAMIREZ, C. Martin Marietta Aerospace
ODOM, J. B. SA31
Accuracy Enhancement for a Cincinnati Milacron HT3. For presentation and publication at the 13th Symposium on Industrial Robots and Robots 7 Conference and Exposition, Chicago, Illinois, April 19-21, 1983.

RAMIREZ, C. Martin Marietta Aerospace
ODOM, J. B. SA31
Robotics in the Space Shuttle Manufacturing. For presentation and publication at the 13th Symposium on Industrial Robots and Robots 7 Conference and Exposition, Chicago, Illinois, April 19-21, 1983.

RAO, G. V. R. Rockwell International
LOVINGOOD, J. A. SA51
Flow Induced Vibrations on Bluff Bodies. For presentation to the Department of Aeronautical Engineering at the Indian Institute of Science, Bangalore, India, January 4, 1983.

REASONER, D. L. ES53
CRAVEN, P. D.
CHAPPELL, C. R.
Characteristics of Low-Energy Plasma in the Plasmasphere and Plasma Trough. For publication in the Journal of Geophysical Research.

ROBERTS, WILLIAM T. PS02
EMANUEL, WILLIAM A.
Evolutionary Development of the Space Plasma Laboratory. For presentation at the 22nd AIAA Aerospace Sciences Meeting, Reno, Nevada, January 9-12, 1984.

ROBERTSON, F. R. ES81
CHRISTIAN, H. J. JR.
WILSON, G. S.
FICHTL, G. H.
VAUGHAN, W. W.

Experiment Concepts for a Space Shuttle/ Spacelab Atmospheric Science Mission. For publication in the Bulletin of American Meteorological Society.

ROBINSON, MICHAEL B. ES73
WILLS, FRED D.
Solution to the Differential Equation for Combined Radiative and Convective Cooling for a Heated Sphere with Application. For publication in the Journal of Applied Physics, Argonne, IL.

ROSENTHAL, M. E. TA61
McMAHAN, L. L. Boeing Aerospace Co.
Microyield Development Testing for the Flight Focal Plane Structure of the Space Telescope. For presentation at the Spring SAMPE Conference, Los Angeles, CA, April 12-14, 1983.

ROTHERMEL, JEFFREY (USRA) ED42
FITZJARRALD, DANIEL E.
Dual Doppler Lidar Measurements of Winds in the JAWS Experiment. For presentation at the 21st Conference on Radar Meteorology, Edmonton, Alberta, Canada, September 19-23, 1983.

RUPP, CHARLES C. PD12
Tether Fundamentals. For presentation at the Workshop on Applications of Tethers in Space (OSF), Williamsburg, VA, June 15-17, 1983.

RYAN, ROBERT S. ED21
JEWELL, RONALD E.
Space Shuttle Payload Integrated Loads Analysis. For publication in the Journal of Aeronautics and Astronautics, February 1983.

RYAN, R. ED21
SALTER, L.
YOUNG, G.
MUNAFO, P.
SSME Lifetime Prediction and Verification, Integrating Environments, Structures, Materials: The Challenge. For presentation and publication at the From Challenge to Achievement Shuttle Symposium, JSC, TX, June 28-30, 1983.

SAMIR, U. ES53
WRIGHT, K. H. ES53
STONE, N. H. ES53
The Expansion of a Plasma Into a Vacuum-Basic Phenomena and Processes and Applications to Space Plasma Physics. For publication in the Reviews of Geophysics and Space Physics.

SCHWINGHAMER, R. J. EH01
Materials and Processes for the Space Shuttle Engine, External Tank and Solid Rocket Boosters. For presentation at the 1983 Pacific Northwest Materials Conference, Seattle, Washington, May 16, 1983.

SHELTON, H. L. EE91
Image Motion Compensation for OSS-3/7 Telescopes. For presentation at the American Astronautical Society Annual Rocky Mountain G&C Conference, Keystone, CO, February 5-9, 1983.

SMALLEY, LARRY L. ES63
Rastall's and Related Theories are Conservative Gravitational Theories Although Physically Inequivalent to General Relativity. For publication in the Journal of Physics A: Mathematic and General, Bristol, England.

SMALLEY, LARRY L. ES63
A Variational Principle for Rastall's Theory of Gravitation. For publication in The Physical Review, Ridge, New York.

SMALLEY, L. L. ES63
RAY, J. R. ES63
Geometrization of Spin and the Proof of the Weyssenhoff Fluid Conjecture. For publication in Gravity Research Foundation, Gloucester, MA.

SMALLEY, LARRY L. ES63
Variational Principle for a Prototype Rastall Theory of Gravitation. For publication in

Il Nuovo Cimento A: Mathematical & General, Bologna, Italy.

SMALLEY, LARRY L. ES63
RAY, JOHN R.
Geometrization of Spin and the Proof of the Weyssenhoff Fluid Conjecture. For publication in Physics Letters A, Amsterdam, The Netherlands.

SMALLEY, LARRY L. ES63
An Apparent Incompatibility of Gauge Field Theories and Gravitation. For publication in the Journal of Physics A: Mathematics and General Institute of Physics, Bristol BS1 6NX, England.

SMITH, DAVID R. ED42
LESLIE, FRED, W. ED42
Error Determination of a Barnes-Type Objective Analysis Scheme for Surface Meteorological Data. For publication in the Journal of Climate and Applied Meteorology.

SMITH, GERALD W. SA51
Debris Control Design Achievements of the Booster Separation Motors. For presentation at the Space Shuttle Technical Conference, Houston, Texas (JSC), June 28-30, 1983.

SMITH, O. E. ES81
Atmospheric Constraint Statistics for the Space Shuttle Mission Planning. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, NE, June 6-9, 1982.

SMITH, O. E. ES81
Short Term Density Variability Using a Planned Rendezvous Target for a Shuttle Mission. For presentation at the 9th Conference on Aerospace and Aeronautical Meteorology, Omaha, NE, June 6-9, 1983.

SMITH, ORVEL E. ES81
Range Reference Atmosphere Models. For publication in AMS Bulletin and for presentation at the 8th Conference on Probability and Statistics in Atmospheric Sciences, Hot Springs, Arkansas, November 16-18, 1983.

SMITH, RALPH R. CM11
From Virginia Electric to Tinker Air Force Base: Free Speech and Representation Elections in the Federal Sector. For publication in the Labor Law Journal, Commerce Clearing House, Inc., Chicago, IL.

SNYDER, R. S. ES73
OMENYI, S. N. USRA Visiting Scientist
Settling of Fixed Erythrocyte Suspension Droplets. For publication in Biorheology, Pergamon Press.

SNYDER, ROBERT S. ES73
Separation Experiments in the Reduced Gravity Environment of Space. For presentation at the Third International Conference on Partitioning in Two Polymer Systems, Vancouver, B.C., July 3-8, 1983.

SNYDER, ROBERT S. ES73
SEAMAN, GEOFFREY V. F.
Behavior of Blood in a Low Gravity Environment. For publication in Blood, Seattle, WA.

SOJKA, J. J. ES53
SCHUNK, R. W.
JOHNSON, J. F. E.
WAITE, J. H.
CHAPPELL, C. R.
Characteristics of Thermal and Suprathermal Ions Associated with the Dayside Plasma Trough as Measured by the Dynamics Explorer Retarding Ion Mass Spectrometer. For publication in the Journal of Geophysical Research.

STEPHENS, J. C. EB44
AD10 Simulation of Space Shuttle Launch. For presentation at the Applied Dynamics International User's Society Annual Meeting, Lakeway, TX, May 8-11, 1983.

STONE, N. H. ES53
WRIGHT, JR., (UAH)
SAMIR, URI (NRC)
The Expansion of Space Plasmas Into Vacuum: Evidence from Laboratory and In Situ Data. For presentation at the spring meeting of the American Geophysical Union, and publication in EOS.

STONE, N. H. ES53
SAMIR, U.
WRIGHT, K. H.
REASONER, D. L.
SHAWHAN, S. D.
Multiple Ion Streams in the Near Vicinity of the Space Shuttle. For publication in Geophysical Research Letters, Washington, D. C.

STRAESSLE, R. C. Hughes Aircraft Co.
EWELL, G. J. Hughes Aircraft Co.
BOMBARA, W. EG02
The 85C-85% Relative Humidity-1.5 Vdc Bias Test: Can Ceramic Capacitors Pass This New Screen? For presentation at the 3rd Capacitor and Resistor Technology Symposium,CTI/IEEE,Phoenix, AZ, March 8-10, 1983.

SZOFRAN, F. R. ES72
LEHOCZKY, S. L.
Homogeneous, Directionally-Solidified $Hg_{1-x}Cd_xTe$. For presentation at the 1983 U.S. Workshop on the Physics and Chemistry of Mercury Cadmium Telluride, Dallas, TX, February 8-10, 1983.

SZOFRAN, F. R. ES72
LEHOCZKY, S. L.
Liquidus Temperatures of Hg-Rich Hg-Cd-Te Alloys. For publication in Journal of Electronic Materials, Lexington, MA.

TANDBERG-HANSSEN ES01
HUDSON, H. S. Univ. of California S.D.
Studies with the Pinhole/Occulter Facility. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 1982, and for publication in AIAA Bulletin.

TANDBERG-HANSSEN, E. ES01
KAUFMAN, P.
REICHMANN, E. J.
TEUBER, D. L.
MOORE, R. L.
ORWIG, L. E.
ZIRIN, H.
Observation of the Impulsive Phase of a Simple Flare. For publication in Solar Physics, The Netherlands.

TELESCO, CHARLES M. ES63
Infrared Mapping of the Outstanding Starburst Galaxy NGC 3310. For presentation at the Edinburgh Workshop on Star Formation, Royal Observatory, Edinburgh, Scotland, October 4-6, 1983.

TUBBS, J. D. Univ. of Arkansas
SMITH, O. E. ES81
A Note on the Ratio of Correlated Gamma Variates. Publication in Communication in Statistics.

TURNER, JAMES R. PS04
CRAMBLIT, D. C.
TMS Mission Applications and Benefits (Abstract only). For presentation at the 20th Space Conference of the Canaveral Council of Technical Societies, "Space — The Next Twenty Years," Cocoa Beach, FL, April 26-28, 1983.

TURNER, R. E. ES84
BROWN, S. C. ES84
VAUGHAN, W. W. ES84
Environmental Criteria Guidelines Development for Aerospace Vehicle Design. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology Meeting, Omaha, NE, June 6-9, 1983.

TURNER, R. E. ES84
VAUGHAN, W. W.
Environmental Criteria Guidelines for Aerospace Vehicle Design. For publication in the Journal of Environmental Sciences, Mt. Prospect, IL.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

TURNER, ROBERT E. ES84
GILCHRIST, LUKE P. ES84
Comments on Standard Radiosonde System. For publication in the Geophysical Research Letters, Washington, D.C.

URBAN, E., et al. ES63
Cryogenic Performance Testing of the Infrared Telescope (IRT) For Spacelab 2. For presentation at the Space Helium Dewar Conference and Workshop, Huntsville, AL, August 24-26, 1983.

URBAN, E., et al. ES63
The Gravity Probe-B (GPB) Dewar. For presentation at the Space Helium Dewar Conference and Workshop, Huntsville, AL, August 24-26, 1983.

VANDERHOFF, J. W., et al.
Emulsion Polymers Institute
KORNFELD, D. M. ES73
VICENTE, F. A. ES73
Preparation of Large-Particle Size Monodisperse Latexes in Space: Polymerization Kinetics and Process Development. For presentation at the Houston '83 National AICHE Meeting, Houston, Texas, March 27-31, 1983.

VANIMAN, J. L. EP44
Thermal Design of the Space Shuttle Solid Rocket Booster. For presentation at The Shuttle Program, "From Challenge to Achievement," at Houston, TX, June 28-30, 1983.

VAN ZANDT, DAVID M. EP24
McCAY, THURMAN D. EP23
An Experimental Investigation of Laser Sparks in Hydrogen. For presentation at the AIAA 22nd Aerospace Sciences Meeting, Reno, Nevada, January 9, 1984.

VAUGHAN, O. H. JR. ES83
CHRISTIAN. H. J. ES83
FROST, R. L. ES83
GILLASPY, P. H. ES83
GOODMAN, S. J. ES83
Observations of Optical Lightning Emissions from Above Thunderstorms Using U-2 Aircraft. For publication in the Bulletin of the American Meteorological Society, Boston, Massachusetts, February 1983.

VAUGHAN, WILLIAM W. ES81
BROWN, S. CLARK ES81
Effects of Natural Environment Design Inputs on Shuttle Launch/Landing Actions. For presentation at the AIAA Meeting on Shuttle Environment and Operations, Washington, D.C., October 31-November 2, 1983.

VAUGHAN, WILLIAM W. ED41
BROWN, S. CLARK
Natural Environment Consideration for Shuttle System Development Support. For publication in the AIAA Journal of Spacecraft and Rockets.

VICK, H. G. EB44
HAMPTON, P. W. Rocketdyne
Space Shuttle Main Engine Hardware Simulation Laboratory. For presentation at the Space Shuttle Program Technical Conference, Johnson Space Center, Texas, June 28-30, 1983.

VONNEGUT, B. ES83
VAUGHAN, O. H. ES83
BROOK, M. ES83
Photographs of Lightning from Space Shuttle. For publication in the Bulletin of American Meteorological Society, Boston, Massachusetts.

Von TIESENHAUSEN, G. PS01
Self-Replicating Machines. For presentation at the Sixth Annual Conference Southern Future Society, University of Alabama in Huntsville, AL, March 3-5, 1983.

WAITE, J. H. JR. ES53
HORWITZ, J. L.
COMFORT, R. H.
Diffusive Equilibrium Distributions of He^+ in the Plasmasphere. For publication in Planetary and Space Science, April 1983.

WATTERS, H. H. EL15
ROGERS, J. G. UAH
Display Technology for Space Station: A Theoretical and Development Approach. For publication in Society for Information Display Journal, April 1983.

WEISSKOPF, M. C.
DARBRO, W.
ELSNER, R.
NARANAN, S.
WILLIAMS, A.
GRINDLAY, J. E.
SUTHERLAND, P. G.
WHITE, N. ES62
X-Ray Pulse Timing Measurements of X-Perseus. For presentation at the 161st American Astronomical Society Meeting to be held in Boston, MA, January 9, 1982, and for publication in the AAS Bulletin.

WEISSKOPF, M. C. ES62
ELSNER, R. F. ES62
DARBRO, W. A. ES62
NARANAN, S.
WEISSKOPF, V. J.
WILLIAMS, A.
WHITE, N. E.
GRINDLAY, J. E.
SUTHERLAND, P. G.
X-Ray Observations of X Persei. For publication in the Astrophysical Journal, Chicago, IL.

WEISSKOPF, M. C. ES62
KAHN, S. M.
DARBRO, W. D.
ELSNER, R. F.
GRINDLAY, J. E.
NARANAN, S.
SUTHERLAND, P. B.
WILLIAMS, A. C.
X-Ray Observations of LMC X-3 with the Monitor Proportional Counter Aboard the HEAO-2 (Einstein) Observatory: A Comparison with Cygnus X-1. For publication in the Astrophysical Journal Letters.

WHITAKER, ANN F. EH12
LEO Atomic Oxygen Effects on Spacecraft Materials. For presentation at the AIAA Meeting on Shuttle Environment and Operations, Washington, D.C., October 31-November 2, 1983.

WHITAKER, ANN F. EH12
LEO Atomic Oxygen Effects on Spacecraft Materials. For presentation at the AIAA Shuttle Environment and Operations Conference, Washington, D.C., October 31-November 2, 1983.

WILLIAMS, A. C. ES62
ELSNER, R. F. ES62
WEISSKOPF, M. C. ES62
DARBRO, W. ES62
Comptonization of X-Rays in a Semi-Infinite Plane Parallel Medium. For publication in the Astrophysical Journal, Tucson, AZ.

WILLIAMS, A. C. ES62
Polarization of Comptonized Photons. For publication in The Astrophysical Journal, Tucson, AZ, April 1983.

WILLIAMS, ALTON C. ES62
REILY, JACK C. ES62
Experimental Results for the Scattering of X-Rays from Smooth Surfaces. For publication in Optical Engineering, Billerica, MA.

WILLS, FRED D. ES55
Exact Solution to the Temperature-Time Heat Transfer Equation with Second and Third Degree Perturbations. For publication in the Journal of Applied Physics, Argonne, IL.

WILSON, G. S. ES83
NASA's AVE/VAS Satellite-Ground Truth Field Experiment. For presentation at the Ninth Conference on Aerospace and Aeronautical Meteorology, Omaha, Nebraska, June 6-9, 1983.

MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

WILSON, R. B. ES62
FISHMAN, G. J.

The Pulse Profile of the Crab Pulsar in the Energy Range 45 keV - 1.2 MeV. For publication in the Astrophysical Journal.

WILSON, ROBERT M.
HILDNER, ERNEST ES52

Are Interplanetary Magnetic Clouds 1-AU Manifestations of Coronal Transients? For publication in Solar Physics, Utrecht, Netherlands.

WOJTALIK, FRED S. TA01

Space Telescope. For presentation at the International Federation of Automatic Control (IFAC), 9th World Congress, Budapest, Hungary, July 2-6, 1984.

WU, S. T. ES52
HU, Y. Q.
KRALL, K. R.
HAGYARD, M. J.
SMITH, J. B., JR.

Modeling of Energy Buildup for a Flare-Productive Region. For publication in Solar Physics, Dordrecht, Holland.

WU, S. T.
WANG, J. F.
TANDBERG-HANSSEN, E. ES01

MHD Analysis of the Evolution of Solar Magnetic Fields and Currents in an Active Region. For publication in the Proceedings of IAU Symposium No. 107: Unstable Current Systems and Plasma Instabilities in Astrophysics, Reidel Publishing Co., The Netherlands.