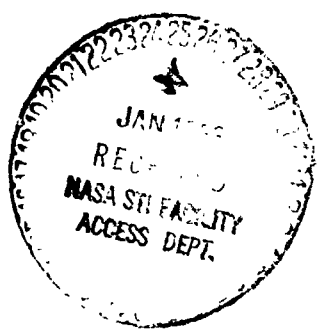
NASA TECHNICAL MEMORANDUM

NASA TM-82504

FY 1982 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS

Compiled by Sarah S. Thacker
Management Operations Office



October 1982

NASA

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama

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16. ABSTRACT

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.

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FOREWORD

In accordance with the NASA Space Act of 1958 the MSFC has provided for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.

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 1982 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS

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NASA TECHNICAL MEMORANDA

TM-82444 October 1981

Firefighting Module Development. Ralph A. Burns. Structures and Propulsion Laboratory. N82-11311

The Firefighting Module development was sponsored by the United States Coast Guard and the Maritime Administration. The module is a lightweight, compact, self-contained, helicopter-transportable unit for fighting harbor and other specialty fires as well as for use in emergency water pumping applications. Units have been fabricated and tested. A production-type unit is now undergoing an inservice evaluation and demonstration program at the port of St. Louis. Its primary purpose is to promote enhanced harbor fire protection at inland and coastal ports. This paper describes the module and its development.

TM-92445 October 1981

FY 1981 Scientific and Technical Reports, Articles, Papers, and Presentations. Compiled by Sarah S. Thacker. Management Services Office. N82-16927

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY 81. 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-82446 August 1981

Passive Optical Sample Assembly (POSA): Final Report. Roger C. Linton, Edgar R. Miller, and Michael Susko. Space Sciences Laboratory. N82-12656

The Passive Optical Sample Assembly (POSA) is a passively deployed array of contamination-sensitive samples. A POSA unit was mounted and flown in the cargo bay of the Space Shuttle Columbia during the first Orbital Flight Test (OFT-1). A similar unit was mounted in a different location in the cargo bay at Dryden Flight Research Center during the postflight operations there prior to the ferry flight return of Columbia to Kennedy Space Center.

The samples in both POSA arrays were subjected to a series of optical and analytical measurements prior to delivery for installation in the cargo bay and after retrieval of the flight hardware. This report presents the final results of a comparison of the two series of measurements. These STS-1 results are based on data obtained from only a portion of one of the ten Induced Environment Contamination Monitor (IECM) instruments to be flown on several Shuttle flights beginning with STS-2. These limited results do not indicate Shuttle contamination levels in excess of those anticipated. Much more definitive data will be obtainable from planned flights of the full IECM.

TM-82447 September 1981

Analysis of SPAR VIII Single-Axis Levitation Experiment. J. E. Rush, C. F. Schafer, and R. L. Holland. Space Sciences Laboratory. N82-12093

The primary objectives of Experiment 74-42/2, which flew as part of the SPAR VIII payload on November 18, 1980, were melting and resolidification of a glass specimen in a containerless condition and the retrieval and examination of the specimen. The absence of container contact was to have been assured by use of a single-axis acoustic levitation system. However, the sample contacted a wire cage after being held without container contact by the acoustic field for only approximately 87 seconds. At this time, the sample was still molten and, therefore, flowed around the wire and continued to adhere to it. This report concentrates on an analysis of why the sample did not remain levitated free of container contact. The experiment is described, experimental observations are discussed and analyzed, and recommendations for future single-axis acoustic levitation experimentation are provided.

NASA TECHNICAL MEMORANDA

TM-82448 November 1981

Spacelab Mission 1 Experiment Descriptions – Second Edition. Edited by Paul D. Craven. Space Sciences Laboratory. N82-18234

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-78173, May 1978.

TM-82449 October 1981

Kohoutek Photometric Photography Experiment (S233) Final Report. C. A. Lundquist and P. D. Craven. Space Sciences Laboratory. N82-15007

This report presents the final results of the Skylab 4 experiment S233, Kohoutek Photometric Photography Experiment, which undertook a series of visible light photographs suitable for photometry and for a photographic history of Comet Kohoutek. The report explains the experiment concept, the data reduction method, and the results obtained.

TM-82450 October 1981

Adaptation of the TH$\epsilon\mu$ Formalism for the Analysis of the Equivalence Principle in the Presence of the Weak and Electroweak Interaction. A. J. Fennelly, NAS/NRC Postdoctoral Resident Research Associate. Space Sciences Laboratory. N82-13851

The TH$\epsilon\mu$ formalism, used in analyzing equivalence principle experiments of metric and nonmetric gravity theories, is adapted to the description of the electroweak interaction using the Weinberg-Salam unified SU(2) x U(1) model. The use of the TH$\epsilon\mu$ formalism is thereby extended to the weak interactions, showing how the gravitational field affects $W_\mu^{\pm}$ and Z_μ^{o} boson propagation and the rates of interactions mediated by them. The possibility of a similar extension to the strong interactions via SU(5) grand unified theories is briefly discussed. Also, using the effects of the potentials on the baryon and lepton wave functions, the effects of gravity on transition rates are determined for β-decay, K-capture, and parity nonconserving transitions mediated in high-A atoms which are electromagnetically forbidden. Three possible experiments to test the equivalence principle in the presence of the weak interactions, which are technologically feasible, are then briefly outlined: (1) K-capture by the ^{55}Fe nucleus (counting the emitted X-rays); (2) forbidden absorption transitions in high-A atoms' vapor; and (3) counting the relative β-decay rates in a suitable α-β decay chain, assuming the strong interactions obey the equivalence principle. The report concludes with an outline of future work concerning (1) Eötvös tests involving the weak-interaction part of nuclear binding energies; (2) (β^-, γ, β^+) decays of nuclear isotope triplets and (β-γ) angular correlation experiments as weak-interaction equivalence tests; and (3) strong interaction tests.

TM-82451 November 1981

A Quantitative Study of Factors Influencing Lamellar Eutectic Morphology During Solidification. W. F. S. Kaukler, Universities Space Research Association Visiting Scientist. N82-13218

The work was carried out to obtain a quantitative evaluation of the factors that influence the shape of the solid-liquid interface of a lamellar binary eutectic alloy. The experiments were performed using alloys of Carbon Tetrabromide and Hexachloroethane which serve as a transparent analogue of lamellar metallic eutectics. The experimental apparatus that was used was designed to permit direct observation of the so'id-liquid interface under very closely controlled conditions. The observed interface shapes were analyzed by computer-aided methods.

The solid-liquid interfacial free energies of each of the individual phases comprising the eutectic system were measured as a function of composition using a "grain boundary groove" technique. The solid-liquid interfacial free energy of the two phases could be evaluated directly

from the eutectic interface. Various data were measured: the phase diagram for the system, the heat of fusion as a function of composition, and the density as a function of composition.

It was concluded that the shape of the eutectic interface is controlled mainly by the solid-liquid and solid-solid interfacial free energy relationships at the interface and by the temperature gradient present, rather than by interlamellar diffusion in the liquid at the interface, over the range of growth rates studied.

TM-82452 November 1981

An Improved Stress Corrosion Test Medium For Aluminum Alloys. T. S. Humphries and J. E. Coston. Materials and Processes Laboratory. N82-13216

A laboratory test method that is only mildly corrosive to aluminum and discriminating for use in classifying the stress corrosion cracking resistance of aluminum alloys is presented along with the method used in evaluating the media selected for testing. The proposed medium is easier to prepare and less expensive than substitute ocean water.

TM-82453 November 1981

Numerical Stability of an Explicit Finite Difference Scheme for the Solution of Transient Conduction in Composite Media. Warren Campbell. Space Sciences Laboratory. N82-14476

A theoretical evaluation of the stability of an explicit finite difference solution of the transient temperature field in a composite medium is presented. The grid points of the field are assumed uniformly spaced, and media interfaces are either vertical or horizontal and pass through grid points. In addition, perfect contact between different media (infinite interfacial conductance) is assumed. A finite difference form of the conduction equation is not valid at media interfaces; therefore, heat balance forms are derived. These equations were subjected to stability analysis, and a computer graphics code was developed that permitted determination of a maximum time step for a given grid spacing.

TM-82454 December 1981

Environmental Durability of Electroplated Black Chromium. James R. Lowery. Materials and Processes Laboratory. N82-19357

A study was undertaken to determine the durability of nickel-black chromium plated aluminum in an outdoor rural, industrial, and seacoast environment. Test panels were exposed to these environments for 60, 36, and 13 months, respectively. The results of this study showed that no significant optical degradation occurred from exposure to either of these environments, although a considerable amount of corrosion occurred on the panels exposed to the seacoast environment. The rural and industrial atmosphere produced only a slight amount of corrosion on test panels.

TM-82455 January 31, 1982

Longwall Guidance and Control Development: Final Report for the Department of Energy. N82-19637

The Longwall Guidance and Control (G&C) Development Program was begun in 1974 with the aim of determining which systems and subsystems of the longwall system lent themselves to automatic control in the mining of coal. The upper coal/shale interface was identified as the reference for a vertical G&C system, with two sensors (the Natural Background and the sensitized pick) being used to locate and track this boundary. In order to insure a relatively smooth recession surface (roof and floor of the excavated seam), a last and present cut measuring instrument (acoustic sensor) was used. Potentiometers were used to measure elevations of the shearer arms. The integration of these components comprised the Vertical Control System (pitch control). Yaw and roll control were incorporated into a Face Alignment System which was designed to keep the coal face normal to its external boundaries. Numerous tests, in the laboratory and in the field, have confirmed the feasibility of automatic horizon control, as well as determining the face alignment.

TM-82456 December 1981

Characterization of ASEC BSR 2 Ohm-cm Silicon Solar Cells with Dielectric Wrap-around Contacts as a Function of Temperature and Intensity. A. F. Whitaker and S. A. Little. Materials and Processes Laboratory. N82-19668

Twenty high performance BSE 2 ohm-cm silicon solar cells manufactured by ASEC have been evaluated at 1 AU conditions and at low temperatures and low intensities representative of deep space. These cells showed evidence of series resistance at 1 AU conditions and approximately 50% had reduced power outputs under deep space conditions. Average efficiency of these cells was 12.4% at 1 AU conditions of 1 SC/+25°C.

TM-82457 January 1982

STS-2 Induced Environment Contamination Monitor (IECM) – Quick-Look Report. Edited by E. R. Miller. Space Sciences Laboratory. N82-18870

The STS-2/Induced Environment Contamination Monitor (IECM) mission is described. The IECM system performance is discussed, and IECM mission time events are briefly described. Quick-look analyses are presented for each of the 10 instruments comprising the IECM on the flight of STS-2. Finally, a short summary is presented and plans are discussed for future IECM flights providing more extreme thermal environments, longer on-orbit durations (important for determining offgassing decay rates), and opportunities for direct mapping of Orbiter effluents using the Remote Manipulator System.

TM-82458 December 1981

Propulsion System Ignition Overpressure for the Space Shuttle. R. S. Ryan, J. H. Jones, S. H. Guest, H. G. Struck, M. H. Rheinfurth, and V. S. Verderaime. Systems Dynamics Laboratory. N82-19299

Liquid and solid rocket motor propulsion systems create an overpressure wave during ignition, caused by the accelerating gas particles pushing against or displacing the air contained in the launch pad or launch facility and by the afterburning of the fuel-rich gases. This wave behaves as a blast or shock wave characterized by a positive triangular-shaped first pulse and a negative half-sine wave second pulse. The pulse travels up the space vehicle and has the potential of either overloading individual elements or exciting overall vehicle dynamics. The latter effect results from the phasing difference of the wave from one side of the vehicle to the other. This overpressure phasing, or ΔP environment, because of its frequency content as well as amplitude, becomes a design driver for certain panels (e.g., thermal shields) and payloads for the Space Shuttle. This paper deals with the history of overpressure effects on the Space Shuttle, the basic overpressure phenomenon, Space Shuttle overpressure environment, scale model overpressure testing, and techniques for suppressing the overpressure environments.

TM-82459 April 1982

Solution Potentials of Several Aluminum Alloys as a Function of Aging Time. Merlin D. Danford. Materials and Processes Laboratory. N82-22345

This report covers the use of solution potentials as a means for determining the tempers of several aluminum alloys. In general, the curves obtained in this study are characterized by a rather sharp drop in solution potential during the first few hours of aging, followed by an inflection or knee, where the shape of the curve changes fairly abruptly and the potentials decrease very slowly with further aging. Times of aging reported in the literature are fairly consistent with the positions of the knees of the curves so obtained, and solution potentials obtained for the various tempers are generally in good agreement with values reported in the literature.

TM-82460 February 1982

Management and Control of Self-Replicating Systems: A Systems Model. Georg von Tiesenhausen. Program Development. N82-25892

In 1980, a conceptual engineering approach to self-replicating systems was achieved by von Tiesenhausen and Freitas. Their designs are based on von Newmann's kinematic version of self-replicating automata. This report expands on the

systems management and control and the organization of the control elements. After developing the functional requirements of such a system, a hierarchy of three management and control levels is described. These are an autonomous, an external, and an intelligent management and control system. Systems recycling, systems specialization, and information replication are discussed.

TM-82461 January 1982

Space Shuttle STS-1 SRB Damage Investigation Final Report. Clyde D. Nevins. Structures and Propulsion Laboratory. N82-20235

The physical damage incurred by the Solid Rocket Boosters during reentry on the initial Space Shuttle flight raised the question of whether the hardware, as designed, would yield the low cost per flight desired. An ad hoc committee of technical specialists was chartered to quantify the damage, determine its cause, and recommend specific design changes which would preclude recurrence. Flight data, post-flight analyses, and laboratory hardware examinations were used during the course of the investigation. The resultant findings pointed to two principal causes: (1) failure of the aft skirt thermal curtain at the onset of reentry aerodynamic heating, and (2) overloading of the aft skirt stiffening rings during water impact. Design changes were recommended on both the thermal curtain and the aft skirt structural members to prevent similar damage on future missions.

TM-82462 April 1982

Lagrangian Least-Squares Prediction of Solar Activity. Robert L. Holland, C. A. Rhodes, and Harold C. Euler, Jr. Space Sciences Laboratory. N82-27211

This report presents the results of comparison studies on various applications of statistical prediction methods for short-term (months) and long-term (years) forecasting of solar activity. The comparisons indicate that better predictions, in a chi-square sense, are possible by "lining up" the maximum (or minimums, or both) by cycle number. Evidence is also presented to support the existence of an aperiodic variation in the periods as well as the amplitudes.

TM-82463 December 1981

Atmospheric Environment for Space Shuttle (STS-2) Launch. D. L. Johnson and S. C. Brown. Space Sciences Laboratory. N82-20805

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-2 launch time on November 12, 1981, 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-2 vehicle ascent and SRB descent have been constructed. The STS-2 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.

TM-82464 December 1981

Atmospheric Observations for STS-2 Landing. Robert E. Turner, James E. Arnold, and Gregory S. Wilson. Space Sciences Laboratory. N82-20806

A summary of synoptic weather conditions existing over the western United States is given for the time of Shuttle descent into Edwards Air Force Base, California. The techniques and methods used to furnish synoptic atmospheric data at the surface and aloft for flight verification of the STS-2 Orbiter during its descent into Edwards Air Force Base are specified. Examples of the upper-level data set are given.

TM-82465 January 1982

Statistical Aspects of the 1980 Solar Flares – I. Data Base, Frequency Distributions, and Overview Remarks. Robert M. Wilson. Space Sciences Laboratory. N82-21135

All 1349 Hα flares occurring in 1980 which have known start, maximum brightness, and end times, latitudes, and associated Hα importance

and X-ray classes have been used to perform a statistical study of flare Hα rise time, decay time, duration, latitude, importance (areal and relative intensity), and X-ray class. Frequency distributions of these parameters are tabulated and plotted. Other comparative studies using this data base are in progress.

TM-82466 March 15, 1982
Materials Processing in Space Bibliography. Compiled by Elizabeth Pentecost. Space Sciences Laboratory. N82-22287

This report is a bibliographic listing of current literature dealing with flight experiments utilizing a low-gravity environment to elucidate and control various processes or with ground-based activities that provide supporting research. Included are Government reports, contractor reports, conference proceedings, and journal articles. Subdivisions of the bibliography include the five categories: Crystal Growth; Metals, Alloys, and Composites, Fluids and Transport; Glasses and Ceramics; and Ultrahigh Vacuum and Containerless Processing Technologies, in addition to a list of patents and appendices providing a compilation of anonymously authored collections and reports and a cross reference index.

TM-82467 January 1982
Microelectrophoresis of Selected Mineral Particles. Blair J. Herren, Ruby W. Tipps, and Kathleen D. Alexander. Space Sciences Laboratory. N82-22328

Particle mobilities of ilmenite, labradorite plagioclase, enstatite pyroxene, and olivine were measured with a Rank microelectrophoresis system to evaluate indicated mineral separability. Sodium bicarbonate buffer suspension media with and without additives (0.0001 M DTAB and 5 percent v/v ethylene glycol) were used to determine differential absorption by mineral particles and modification of relative mobilities. Good separability between some minerals was indicated; additives did not enhance separability.

TM-82468 March 1982
Solid Rocket Booster Water Impact Test. Frank Bugg. Systems Dynamics Laboratory. N82-22454

Water impact drop tests have been performed at the MSFC Tennessee River Drop Test Facility. Peak water impact pressures and pressure/time traces were measured for various impact velocities using a two-dimensional, full-scale SRB aft skirt internal ring model. Passive burst disc-type pressure transducers were calibrated for use on flight SRB's. The effects on impact pressure of small ring configuration changes and application of thermal protection system cork layers were found to be negligible.

TM-82469 March 1982
An Evaluation of Grease Type Ball Bearing Lubricants Operating in Various Environments (Status Report No. 6). E. L. McMurtrey. Materials and Processes Laboratory. N82-22365

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, 118 test sets have been completed and 24 test sets are underway. In the three 5-year tests previously started in (1) continuous operation and (2) start-up operation, with both in vacuum at ambient temperatures, and (3) continuous vacuum operation at 93.3°C, tests (1) and (2) 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-82470 March 1982
Past Performance Analysis of HPOTP Bearings. B. N. Bhat and F. J. Dolan. Materials and Processes Laboratory. N82-24495

The past performance analysis conducted on three High Pressure Oxygen Turbopump (HPOTP) bearings from the Space Shuttle Main Engine (SSME) is presented. Metallurgical analysis

of failed bearing balls and races, and wear track and crack configuration analyses were carried out. In addition, one bearing was tested in laboratory at very high axial loads. The results showed that the cracks were surface initiated and propagated into subsurface locations at relatively small angles. Subsurface cracks were much more extensive than was apparent on the surface. The location of major cracks in the races corresponded to high radial loads rather than high axial loads. There was evidence to suggest that the inner races were heated to elevated temperatures.

A failure scenario was developed based on the above findings. According to this scenario the HPOTP bearings are heated by a combination of high loads and high coefficient of friction (poor lubrication). Very high internal radial loads can be generated by loss of bearing internal clearance resulting from localized heating. These internal radial loads are apparently responsible for the bearing failures. Different methods of extending the HPOTP bearing life are also discussed. These include reduction of axial loads, improvements in bearing design, lubrication and cooling, and use of improved bearing materials.

TM-82471 April 1982

Thermal Monitoring, Measurement, and Control System for a Volatile Condensable Materials (VCM) Test Apparatus. R. E. Ives. Materials and Processes Laboratory. N82-24472

This report describes a unique thermal monitoring and control concept for a Volatile Condensable Materials (VCM) test apparatus where electric resistance heaters are employed per VCM test specification JSC SP-R-0022A or ASTM standard test method E-595-77. The technique is computer-based, but requires only proportioning ON/OFF relay control signals supplied through a programmable scanner and simple quadrac power controllers.

System uniqueness is derived from automatic temperature measurements and the averaging of these measurements in discrete overlapping temperature zones.

Overall control tolerance proves to be better than ±0.5°C from room ambient temperature to 150°C. Using precisely calibrated thermocouples, the method provides excellent temperature control of a small copper VCM heating plate at 125 ± 0.2°C over a 24 hr test period. For purposes of unattended operation, the programmable computer/controller provides a continual data printout of system operation. Real-time operator command is also provided for, as is automatic shutdown of the system and operator alarm in the event of malfunction.

This system has been incorporated into the MSFC Materials and Processes Laboratory VCM Test Facility located in Building 4711.

TM-82472 February 1982

Water Absorption and Desorption in Shuttle Ablator and Insulation Materials. A. F. Whitaker, C. F. Smith, V. A. Wooden, B. E. Cothren, and H. Gregory. Materials and Processes Laboratory. N82-24299

Shuttle systems ablator and insulation materials have undergone water soak with subsequent water desorption in vacuum. Water accumulation in these materials after a soak for 24 hours ranged from +1.1% for orbiter tile to +161% for SRB MSA-1. After 1 minute in vacuum, water retention ranged from none in the orbiter tile to +70% for SRB cork.

TM-82473 June 1982

Terrestrial Environment (Climatic) Criteria Guidelines for Use in Aerospace Vehicle Development, 1982 Revision. Compiled by Robert E. Turner and C. Kelly Hill. N82-28317

This document provides guidelines on terrestrial environment data specifically applicable for NASA aerospace vehicles and associated equipment development. The primary geographic areas encompassed are the John F. Kennedy Space Center, Florida; Vandenberg AFB, California; Edwards AFB, California; Michoud Assembly Facility, New Orleans, Louisiana; National Space Technology Laboratory, Bay St. Louis, Mississippi; Lyndon B. Johnson Space Center, Houston, Texas; and the White Sands

Missile Range, New Mexico. In addition, a section has been included to provide information on the general distribution of natural environmental extremes in the conterminous United States that may be needed to specify design criteria in the transportation of space vehicle subsystems and components. Although not considered as a specific vehicle design criterion, a section on atmospheric attenuation has been added since certain Earth orbital experiment missions are influenced by the Earth's atmosphere. A summary of climatic extremes for worldwide operational needs is also included. This document presents the latest available information on probable climatic extremes and succeeds information presented in TM X-64589, TM X-64757, and TM X-78118. Information is included on atmospheric chemistry, seismic criteria, and on a mathematical model to predict atmospheric dispersion of aerospace engine exhaust cloud rise and growth. There is also a section on atmospheric cloud phenomena. The information in this report is recommended for use in the development of aerospace vehicle and associated equipment design and operational criteria, unless otherwise stated in contract work specifications.

The environmental data in this report are primarily limited to information below 90 km. Environmental criteria for 90 km and above are being documented in a NASA Technical Memorandum entitled "Space and Planetary Environment Criteria Guidelines for Use in Space Vehicle Development (1982 Revision) (report in process).

TM-82474 February 1982

Sunspot Variation and Selected Associated Phenomena: A Look at Solar Cycle 21 and Beyond. Robert M. Wilson. Space Sciences Laboratory. N82-25069

This report gives a brief review of solar sunspot cycles 8 through 21. Mean-time intervals are calculated for maximum-to-maximum, minimum-to-minimum, minimum-to-maximum, and maximum-to-minimum phases for cycles 8 through 20 and 8 through 21. Simple cosine functions with a period of 132 years are compared to, and found to be representative of, the variation of smoothed sunspot numbers at solar maximum ($\bar{R}_{MAX}$) and minimum ($\bar{R}_{MIN}$). A comparison of cycles 20 and 21 is given, leading to a projection for activity levels during the Spacelab 2 era (tentatively, November 1984). A prediction is made for cycle 22 (i.e., occurrence dates of $\bar{R}_{MIN}$ and $\bar{R}_{MAX}$ and their corresponding values). Major flares (importance class ≥ 1) are observed to peak several months subsequent to $\bar{R}_{MAX}$ during cycle 21 and to be at minimum level several months after $\bar{R}_{MIN}$. Additional remarks are given for flares, gradual-rise-and-fall (GRF) radio events and 2800-MHz radio emission. The major thrust of this report is to estimate certain solar activity parameters, especially as they relate to the near-term Spacelab 2 time frame. This report should not be construed to represent a detailed, highly accurate, predictive scheme.

TM-82475 February 1982

Statistical Aspects of the 1980 Solar Flares: II. Solar Cycle Activity Relationships and Additional Remarks. Robert M. Wilson. Space Sciences Laboratory. N82-25070

Based on 1349 Hα flares with X-ray counterparts, an investigation into the relationship between rise time, decay time, duration, latitude, Hα importance, and X-ray class with 2800-MHz radio emission (F_{2800}) has been accomplished. An important finding is that during 1980 both the number of Hα importance class 1 and number of X-ray class M (and M+X) flares appeared to be rather strongly related to F_{2800}, in a positive sense; i.e., number of class 1 and class M events increased as F_{2800} increased. This is the second part of a three-part study of the 1980 solar flares. This series gives associational aspects as related to flares occurring in 1980. No effort has been made to model flare frequency correlation and distribution based on more advanced statistical techniques.

TM-82476 March 1982

The Marshall Space Flight Center KC-135 Zero Gravity Test Program for FY1981. Edited by R. E. Shurney. Systems Analysis and Integration Laboratory. N82-26350

During FY81, researchers from Marshall Space Flight Center (MSFC) conducted seven

separate investigations during 23.5 hours 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 objectives were met or exceeded. This Technical Memorandum compiles all results achieved by MSFC users during FY81, a year universally 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-82477 January 1982

Spacelab Mission 2 Experiment Descriptions – Second Edition. Edited by K. Stuart Clifton. Space Sciences Laboratory.

A brief description is presented of the Spacelab 2 Mission and the 12 multidisciplinary experiments selected to fly on board. These experiments include the following: Vitamin D Metabolities and Bone Demineralization, Interaction of Oxygen and Gravity Influenced Lignification, Ejected Plasma Diagnostics Package, Plasma Depletion Experiments for Ionospheric and Radio Astronomical Studies, Small Helium-Cooled IR Telescope, Elemental Composition and Energy Spectra of Cosmic Ray Nuclei, Hard X-Ray Imaging of Clusters of Galaxies and Other Extended X-Ray Sources, Solar Magnetic and Velocity Field Measurement System, Solor Coronal Helium Abundance Spacelab Experiment, Solar UV High Resolution Telescope and Spectrograph, Solar UV Spectral Irradiance Monitor, and Properties of Superfluid Helium in Zero-G. This report supersedes NASA TM-78198.

TM-82479 May 1982

Computerized Data Collection and Reduction From an X-Ray Diffractometer. John C. McClure. Materials and Processes Laboratory. N82-25809

A series of computer programs has been written for use with a Philips X-ray Diffractometer and a Hewlett Packard 9825A Desk Top Computer. These programs permit the collection and storage on disk of the number of X-ray counts and the associated 2-theta angles across line profiles. Automatic background subtraction, integrated intensity, correction for the angular dependance of the Lorentz, polarization, and atomic scattering factors, peak location, K-alpha 2 removal, and calculation of Fourier coefficients are performed. This technical note is documentation for these programs and should provide a guide to their use. The programs are written in HPL which is a Hewlett Packard variation of BASIC. The programs are written for a computer configured with a disk drive, but they can be easily modified to run from the cassette tape drive that is integral to the 9825A Computer.

Copies of these programs are available on cassette from the author.

TM-82480 April 1982

Atmospheric Environment for Space Shuttle (STS-3) Launch. D. L. Johnson, S. C. Brown, and G. W. Batts. Space Sciences Laboratory. N82-27913

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-3 launch time on March 22, 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 consist of wind and thermodynamic parameters versus altitude, for STS-3 vehicle ascent and SRB descent have been constructed. The STS-3 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.

TM-82481 June 1982

Atmospheric Observations for STS-3 Landing. Robert E. Turner, James E. Arnold, Gregory S. Wilson, and Wade Batts. Space Sciences Laboratory. N82-29827

A summary of synoptic weather conditions existing over the western United States is given for the time of Shuttle descent into White Sands Missile Range, New Mexico. The techniques and methods used to furnish synoptic atmospheric data at the surface and aloft for flight verification of the STS-3 Orbiter during its descent into White Sands Missile Range are specified. Examples of the upper-level data set are given.

TM-82482 April 1982

The Human Role In Space. Stephen B. Hall, George von Tiesenhausen, and Gary W. Johnson. Program Development. N82-27987

This report describes a limited Marshall Space Flight Center in-house study on the human role in space. This study was performed during 1980 and its procedures and results were only available in chart form. Since the methodology and findings could be of interest to a larger circle of people the report form was chosen as an efficient way to disseminate the study results for future reference. It should be noted that the mission model used in this study has changed; however, the approach taken and the general conclusions have remained valid.

TM-82483 July 1982

A Bivariate Gamma Probability Distribution with Application to Gust Modeling. O. E. Smith, S. I. Adelfang, and J. D. Tubbs. Space Sciences Laboratory. N82-29094

A five-parameter gamma distribution (BGD) having two shape parameters, two location parameters, and a correlation parameter is investigated. This general BGD is expressed as a double series and as a single series of the modified Bessel function. This general BGD reduces to the known special case for equal shape parameters. Practical functions for computer evaluations for the general BGD and for special cases are presented. Applications of the general BGD are to be found in reliability theory, signal noise, and meteorology. In this paper, applications to wind gust modeling for the ascent flight of the Space Shuttle are illustrated.

TM-82484 May 1982

Instrument Manual for the Retarding Ion Mass Spectrometer on Dynamics Explorer-1. S. A. Fields, C. R. Baugher, C. R. Chappell, D. L. Reasoner, H. D. Hammack, W. W. Wright, and J. H. Hoffman. Space Sciences Laboratory. N82-30527

The Retarding Ion Mass Spectrometer (RIMS) for Dynamics Explorer-1 is an instrument designed to measure the details of the thermal plasma distribution. It combines the ion temperature determining capability of the retarding potential analyzer with the compositional capabilities of the mass spectrometer and adds multiple sensor heads to sample all directions relative to the spacecraft ram direction. This manual provides a functional description of the RIMS, the instrument calibration, and a description of the commands which can be stored in the instrument logic to control its operation.

TM-82485 June 1982

Space Telescope Neutral Buoyancy Simulations – The First Two Years. Fred G. Sanders. Systems Analysis and Integration Laboratory. N82-30942

This brief illustrated report of neutral buoyancy simulations conducted to validate the crew systems interface as it relates to space telescope on-orbit maintenance and contingency operations begins with the initial concept validation tests using low-fidelity mockups in August 1979, and progresses through the entire spectrum of proposed space telescope refurbishment and selected contingencies using upgraded mockups which reflect flight hardware as of August 1981. It contains findings which may be applicable to future efforts of a similar nature.

TM-82486 June 1982

Phase Linear Interferometer Experiment Maintenance and Calibration Manual. Steven J. Goodman. Space Sciences Laboratory. N82-29581

The Phase Linear-Interferometer Experiment (PLIE) Maintenance and Calibration Manual describes the necessary procedures for assuring continuous lightning sferics data collection at

Marshall Space Flight Center. A sister station is operating continuously at Southwest Research Institute. The PLIE is being evaluated as a candidate RF sensor to support the space-based optical lightning mapper system.

TM-82487 May 1982

An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth: One-Dimensional Analysis, Computer Program Users Manual. Ernestine Cothran. Space Sciences Laboratory. N82-30106

This work documents the computer program written in support of R. J. Naumann's "An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth: One-Dimensional Analysis" (accepted for publication in The Journal of Crystal Growth 1982).

The program listing and flow charts are included, along with the complete thermal model. Sample problems include detailed comments on input and output to aid the first-time user.

This report will be of particular value to the scientific community desiring a one-dimensional analysis of crystal growth to guide more complicated numerical analysis

TM-82488 May 1982

Torques on the Gyro in the Gyro Relativity Experiment. Peter Eby. Space Sciences Laboratory. N82-30526

A discussion and calculation of all the important torques on the Gyro in the Gyro Relativity Experiment is given. This is a similar but independent analysis from that of Everitt. It reaches the same conclusions but includes many of the details left out in previous documentation. It also extends previous analysis of electrical torques. The report gives the conditions under which gyro drifts can be kept well below the relativistic effects predicted by General Relativity.

TM-82489 June 1982

STS-3 Induced Environment Contamination Monitor (IECM) – Quick-Look Report. Edited by E. R. Miller and J. A. Fountain. Space Sciences Laboratory. N82-31825

The STS-3/Induced Environment Contamination Monitor (IECM) mission is described. The IECM system performance is discussed, and IECM mission time events are briefly described. Quick-look analyses are presented for each of the 10 instruments comprising the IECM on the flight of STS-3. Finally, a short summary is presented and plans are discussed for future IECM flights, and opportunities for direct mapping of Orbiter effluents using the Remote Manipulator System.

TM-82490 June 1982

STS-3 Main Parachute Failure. Roy Runkle and Keith Henson. Structures and Propulsion Laboratory. N82-29349

March 22, 1982, at 11:00 a.m. Eastern Standard Time (EST), the third launch of the United States Space Shuttle (STS-3) took place. During the reentry phase of the two Solid Rocket Boosters (SRBs), one 115-ft diameter main parachute failed on the right-hand SRB (A12). This parachute caused the SRB to impact the ocean at 110 ft/sec in lieu of the expected "3 parachute" impact velocity of 88 ft/sec. This higher impact velocity relates directly to more SRB aft skirt and more motor case damage. A parachute failure team was formed to assess the cause of the parachute failure, the potential risks of losing an SRB as a result of this failure, and to recommend fixes to ensure that the probability of chute failures of this type in the future will be low. The team s members were from Marshall Space Flight Center, the parachute subsystem contractor, and industry-recognized parachute experts from Sandia Laboratories.

TM-82491 July 1982

Shuttle VLBI Experiment: Technical Working Group Summary Report. Samuel H. Morgan and David H. Roberts (editors). Advanced Systems Office.

This report provides a quantitative description of the gain in interferometric resolution of extragalactic sources at radio frequencies which can be achieved by placing a Very Long Baseline Interferometry (VLBI) antenna in space. The

report describes in some detail a VLBI demonstration experiment using a large deployable antenna, which will, if realized, be a very acceptable first venture for VLBI in space. The material presented in this report was compiled by a Shuttle VLBI Experiment Working Group which was chartered in 1981 by the Office of Space Science and Applications to develop the rational and a technical plan for the experiment. The report also includes a tutorial on VLBI, a summary of the technology available for the experiment and a preliminary mission scenario.

TM-82493 July 1982

Variable Reluctance Proximity Sensors for Cryogenic Valve Position Indication. R. A. Cloyd, Structures and Propulsion Laboratory.

This test was conducted to determine the performance of a variable reluctance proximity sensor system when installed in an External Tank vent/relief valve. The sensors were used as position indicators. The valve and sensors were cycled through a series of thermal transients; while the valve was being opened and closed pneumatically, the sensor's performance was being monitored. During these thermal transients, the vent valve was cooled 10 times by liquid nitrogen and 2 times by liquid hydrogen. It was concluded that the sensors were acceptable replacements for the existing mechanical switches. However, the sensors need a mechanical override for the target similar to what is presently used with the mechanical switches. This override could insure contact between sensor and target and eliminate any problems of actuation gap growth caused by thermal gradients.

TM-82494 June 1982

Optical Studies of a Model Binary Miscibility Gap System. L. L. Lacy, W. K. Witherow, B. R. Facemire, and G. M. Nishioka, Space Science Laboratory.

In order to develop a better understanding of separation processes in binary miscibility gap metal alloys, model transparent fluid systems are being studied. The system selected was diethylene glycol-ethyl salicylate (DEG/ES) which has convenient working temperatures (288-350K), low toxicity, and is relatively easy to purify. The system is well characterized with respect to its phase diagram, density, surface and interfacial tensions, viscosity and other pertinent physical properties. Studies of migration of the dispersed phase in a thermal gradient were performed using conventional photo microscopy. Velocities of the droplets of the dispersed phase were measured and compared to calculated rates which included both Stokes and thermal components. A holographic microscopy system was used to study growth, coalescence, and particle motions. Sequential holograms allowed determination of particle size distribution changes with respect to time and temperature. Holographic microscopy is capable of recording particle densities up to 10^7 particles/cm^3 and is able to resolve particles of the order of 2 to 3 μm in diameter throughout the entire volume of the test cell. Holography offers advantages over other optical techniques. The reconstructed hologram produces a wavefront that is identical to the original wavefront as it existed when the hologram was made. The reconstructed wavefront is analyzed using a variety of conventional optical methods.

TM-82495 July 1982

Atmospheric Observations for STS-4 Landing. Robert E. Turner, James E. Arnold, and Wade Batts, Space Science Laboratory.

A summary of synoptic weather conditions existing over the western United States is given for the time of Shuttle descent into Edwards Air Force Base, California. The techniques and methods used to furnish synoptic atmospheric data at the surface and aloft for flight verification of the STS-4 Orbiter during its descent into Edwards Air Force Base are specified. Examples of the upper-level data set are given.

TM-82496 September 1982

Materials Processing in Space Program Tasks. Compiled by Elizabeth Pentecost, Space Science Laboratory.

This report is a compilation of the active research tasks as of the end of the fiscal year 1982 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-82497 August 1982

Tolerance Requirements to Prevent Fluid Leakage in the Crucible/Plunger MEA Experiment MPS 770030. Thomas J. Rathz. Space Science Laboratory.

The work described was motivated by the unexpected leakage of molten Al-In out of the crucible of a proposed MEA materials processing in space experiment. The molten metals use a spring-loaded plunger to eliminate most free surfaces. The critical criteria necessary to initiate flow and the rate of fluid flow into the crucible/plunger annulus is calculated. Experimental in situ X-radiographs are interpreted according to the calculations. Also presented is a short note on possible effects of capillary flow if wetting occurs between crucible/plunger and liquids.

TM-82498 July 1982

Atmospheric Environment for Space Shuttle (STS-4) Launch. D. L. Johnson, C, K. Hill, and G. W. Batts. Space Science Laboratory.

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-4 launch time on June 27, 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 consist of wind and thermodynamic parameters versus altitude, for STS-4 vehicle ascent and SRB descent have been constructed. The STS-4 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.

TM-82499 July 1982

Refurbishment of SRB Aluminum Components by Walnut Hull Blast Removal of Protective Coatings. Wendell R. Colberg, Gail H. Gordon, and Charles H. Jackson. Materials and Processes Laboratory.

A test program was conducted to develop, optimize, and scale-up an abrasive blasting procedure for refurbishment of specific SRB components: Aft Skirt, Forward Skirt, Frustrum, and painted piece parts.

Test specimens utilizing 2219 T87 aluminum substrate of varying thicknesses were prepared and blasted at progressively increasing pressures (2.76×10^5 - 5.52×10^5 N/m^2) with selected abrasives. Specimens were then analyzed for material response. The optimum blasting parameters were determined on panel specimens and verified on a large cylindrical Integrated Test Bed (ITB). This report presents findings and conclusions of that study.

TM-82500 September 1982

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

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 for a Foam-Copper Experiment, Space Processing Applications Rocket (SPAR) Experiment 77-9, in a sounding rocket having a low-g period of 5 min.

TP-1932 November 1981

Space Shuttle Main Engine Controller. Russell M. Mattox and J. B. White. Data Systems Laboratory. N82-11784

A technical description of the Space Shuttle Main Engine Controller, which provides engine checkout prior to launch, engine control and monitoring during launch, and engine safing and monitoring in orbit, is presented. Each of the major controller subassemblies, the central processing unit, the computer interface electronics, the input electronics, the output electronics, and the power supplies are described and discussed in detail along with engine and orbiter interfaces and operational requirements.

The controller represents a unique application of digital concepts, techniques, and technology in monitoring, managing, and controlling a high performance rocket engine propulsion system. The operational requirements placed on the controller, the extremely harsh operating environment to which it is exposed, and the reliability demanded, result in the most complex and ruggedized digital system ever designed, fabricated, and flown.

TP-1933 November 1981

The Aerodynamics of Bodies in a Rarefied Ionized Gas With Applications to Spacecraft Environmental Dynamics. Nobie H. Stone. Space Sciences Laboratory. N82-15116

This study consists of two parts: an experimental parametric investigation and an in-depth critical review of knowledge in the field derived from previous experimental investigations, theoretical treatments, and ionospheric satellite data. The objectives are to provide a parametric description of the electrostatic interaction of a mesosonic, collisionless plasma with conducting bodies on the order of 1 to 10 Debye lengths in size, and to extend this description to the satellite-ionospheric interaction, where possible.

New experimental findings include: (1) converging ion streams in the near wake whose inclination to the wake axis and crossing point location depend on Φ_b and $(SR_d^{0.24}/|\Phi_b|^{1/2}]$, respectively, where Φ_b is the normalized body potential, S, the ion acoustic Mach number, and R_d, the Debye ratio; (2) that two mechanisms with different Φ_b dependences create the mid-wake axial ion peak whose maximum amplitude and width depend on $[S/|\Phi_b|^{1/2}]$ and $|\Phi_b|^{-1/2}$, respectively; (3) the morphology and amplitude of the axial ion peak depend on the geometry of the plasma sheath, which varies with thickness (and therefore R_d and Φ_b) for bodies with square cross sections, but is independent of thickness for spherical and long cylindrical bodies; (4) the wake of the geometrically complex body appears to be a linear superposition of the wakes of its simple geometric components; (5) previously observed electron heating may be explained by a wave-particle interaction resulting from a two-stream instability produced by fast, plasma stream ions passing through slow, charge exchange ions; and (6) vector ion flux measurements show converging ion streams at the wake axis and direct evidence of ion streams deflected from the wake axis by the positive space charge potential associated with the axial ion peak.

The extension to the satellite-ionospheric interaction utilizes qualitative scaling and indicates that similar, but smaller amplitude, wake structures may be expected for small or highly charged bodies. However, for large bodies at small potentials, the structure may be diffused by the thermal ion motion and the dispersion resulting for space charge potentials.

TP-1939 November 1981

Concept for a Power System Controller for Large Space Electrical Power Systems. Louis F. Lollar, John R. Lanier, Jr., and James R. Graves. Electronics and Control Laboratory. N82-11109

A need for autonomous control of large electrical power systems has emerged. A Marshall Space Flight Center Director's Discretionary Fund task is undertaken to develop technology for a fail-operational Power System Controller (PSC) utilizing microprocessor technology for managing the

distribution and power processor subsystems of a large multi-kW space Electrical Power System. The task involved determining the specific functions which must be performed by the PSC, determining the best microprocessor available to do the job, and determining the feasibility, cost savings, and applications of a PSC. A limited function breadboard version of a PSC was developed to demonstrate the concept and potential cost savings.

TP-1949 December 1981

Systems Analysis Approach to Deriving Design Criteria (Loads) for Space Shuttle and Its Payloads, Volume I – General Statement of Approach. Robert S. Ryan, Tulon Bullock, Wayne B. Holland, Dennis A. Kross, and Larry A. Kiefling. Systems Dynamics Laboratory. N82-14203

Derivation of a set of design loads criteria for a space system that provides a specified launch or operational probability, adequate lifetime, and safety factors and, at the same time, meet low-cost, high-performance (low weight in general) requirements is the major problem facing engineering and program personnel. Stated another way, how do you achieve an optimized design from the system standpoint under the low-cost, high risk constraints of the present day environment? The answer to this question is compounded by the complex mission models and structural configurations which have strong interaction or coupling between structures, control, propulsion, thermal, aeroelastic, and performance. Basic to this question is how to treat vehicle system parameters and environment uncertainties. Space Shuttle, the most complex transportation system designed to date, illustrates the requirement for an analysis approach that considers all major disciplines simultaneously. Its unique cross coupling and high sensitivity to aerodynamic uncertainties and high performance requirements dictated a less conservative approach than those taken in prior programs. Analyses performed for the Space Shuttle and certain payloads, Space Telescope and Spacelab, are used as examples in Volume 2. These illustrate the requirements for system analysis approaches and criteria, including dynamic modeling requirements, test requirements, control requirements, and the resulting design verification approaches. A survey of the problem, potential approaches available as solutions, implications for future systems, and projected technology development areas are addressed in this report. This report is divided into two independent volumes. Volume 1 deals with the philosophy and general loads analysis approaches. Volume 2 gives the Shuttle examples. Readers can read both or choose either, since they are written to be independent.

TP-1950 December 1981

System Analysis Approach to Deriving Design Criteria (Loads) for Space Shuttle and Its Payloads, Volume II – Typical Examples. Robert S. Ryan, Tulon Bullock, Wayne B. Holland, Dennis A. Kross, and Larry A. Kiefling. Systems Dynamics Laboratory. N82-15106

Derivation of a set of design loads criteria for a space system that provides a specified launch or operational probability, adequate lifetime, and safety factors and, at the same time, meet low-cost, high-performance (low weight in general) requirements is the major problem facing engineering and program personnel. Stated another way, how do you achieve an optimized design from the system standpoint under the low-cost, high risk constraints of the present day environment? The answer to this question is compounded by the complex mission models and structural configurations which have strong interaction or coupling between structures, control, propulsion, thermal, aeroelastic, and performance. Basic to this question is how to treat vehicle system parameters and environment uncertainties. Space Shuttle, the most complex transportation system designed to date, illustrates the requirement for an analysis approach that considers all major disciplines simultaneously. Its unique cross coupling and high sensitivity to aerodynamic uncertainties and high performance requirements dictated a less conservative approach than those taken in prior programs. Analyses performed for the Space Shuttle and certain payloads, Space Telescope and Spacelab, are used as examples in Volume 2. These illustrate the requirements for system analysis approaches and criteria, including

dynamic modeling requirements, test requirements, control requirements, and the resulting design verification approaches. A survey of the problem, potential approaches available as solutions, implications for future systems, and projected technology development areas are addressed in this report. This report is divided into two independent volumes. Volume 1 deals with the philosophy and general loads analysis approaches. Volume 2 gives the Shuttle examples. Readers can read both or choose either, since they are written to be independent.

TP-1987 March 1982

Damping Seals for Turbomachinery. George L. von Pragenau. Systems Dynamics Laboratory. N82-20183

A rotor seal is proposed that restricts leakage like a labyrinth seal, but extends the stabilizing speed range beyond twice the first critical speed. The dynamic parameters are derived from bulk flow equations without requiring a dominant axial flow. The flow is considered incompressible and turbulent. Damping seals are shown to be feasible for extending the speed range of high performance turbomachinery beyond the limit imposed by conventional seals.

TP-1988 March 1982

Sensitivity Analysis of the Space Shuttle to Ascent Wind Profiles. Orvel E. Smith and Lambert D. Austin, Jr. Space Sciences Laboratory. N82-20236

This report presents a parametric sensitivity analysis of the Space Shuttle ascent flight to the wind profile. Engineering systems parameters are obtained by flight simulations using wind profile models and samples of detailed (Jimsphere) wind profile measurements. The wind models used are the synthetic vector wind model, with and without the design gust, and a model of the vector wind change with respect to time. From these comparison analyses an insight is gained on the contribution of winds to ascent subsystems flight parameters.

TP-1998 December 1981

Application of a Computerized Vibroacoustic Data Bank for Random Vibration Criteria Development. Robin C. Ferebee. Systems Dynamics Laboratory. N82-20238

A computerized data bank system has been developed for utilization of large amounts of vibration and acoustic data to formulate component random vibration design and test criteria. This system consists of a computer, graphics tablets, and a dry-silver hard copier which are all desk-top type hardware and occupy minimal space. Currently, the data bank contains data from the Saturn V and Titan III flight and static test programs. The vibration and acoustic data are stored in the form of power spectral density and one-third octave band plots over the frequency range from 20 to 2000 Hz. The data were stored by digitizing each spectral plot by tracing with the graphics tablet. The digitized data were statistically analyzed, and the resulting 97.5 percent confidence levels were stored on tape along with the appropriate structural parameters. Standard extrapolation procedures were programmed for prediction of component random vibration test criteria for new launch vehicle and payload configurations.

A user's manual is included to guide potential users through the programs.

TP-2045 April 1982

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

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-2069 August 1982

Atmospheric Constraint Statistics for the Space Shuttle Mission Planning. O. E. Smith, G. W. Batts, and J. A. Willett. Space Sciences Laboratory.

This report presents the procedures used to establish statistics of atmospheric constraints of interest to the Space Shuttle mission planning. The statistics considered are for the frequency of occurrence, runs, and time conditional probabilities of several atmospheric constraints for each of the Space Shuttle mission phases. The mission phases considered are (1) prelaunch, (2) launch, (3) return to launch site, (4) abort once around landing, and (5) end of mission landing.

TP-2086 June 1982

Nonlinear Optimization with Linear Constraints Using a Projection Method. Thomas Fox. Systems Dynamics Laboratory.

This report examines and discussed nonlinear optimization problems that are encountered in science and industry. A new method of projecting the gradient vector onto a set of linear constraints is developed, and a program that uses this method is presented. The algorithm that generates this new projection matrix is based on the Gram-Schmidt method and overcomes some of the objections to the Rosen projection method. This should make the projection method of optimization with linear constraints more attractive to users.

TP-2089 July 1982

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

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.

NASA CONFERENCE PUBLICATIONS

CP-2192 December 1981
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems. Edited by Dennis W. Camp and Walter Frost. Marshall Space Flight Center. N82-21139

CP-2199 November 1981
Spacecraft Dynamics as related to Laboratory Experiments in Space. Edited by G. H. Fichtl, B. N. Antar, and F. G. Collins. Marshall Space Flight Center. N82-12109

CP-2200 November 1981
The Numerical Studies Program for the Atmospheric General Circulation Experiment (AGCE) for Spacelab Flights. Edited by William W. Fowlis and M. H. Davis. Marshall Space Flight Center. N82-12715

CP-2204 December 1981
NASA/MSFC FY-81 Atmospheric Processes Research Review. Compiled by Robert E. Turner. Space Sciences Laboratory. N82-16660

CP-2212 November 1981
The Third International Cloud Condensation Nuclei Workshop. Edited by W. C. Kocmond, C. F. Rogers, and S. W. Rea. Space Sciences Laboratory. N82-15383

CP-2213 December 1981
Space Power Subsystem Automation Technology. Compiled by James R. Graves. Marshall Space Flight Center. N82-21254

CP-2226 September 1981
Float Zone Workshop. Edited by E. L. Kern and E. K. Cothran. Space Sciences Laboratory. N82-26330

CP-2227 April 1982
Meteorological Satellites – Past, Present, and Future. William W. Vaughan, Session Chairman. Marshall Space Flight Center. N82-24781

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

CR-3480 November 1981
Feasibility Study of a Procedure to Detect and Warn of Low-Level Wind Shear. Barry S. Turkel, Philip A. Kessel, and Walter Frost. NAS8-33458. FWG Associates. N82-13621

CR-3481 December 1981
Design of Prototype Charged Particle Fog Dispersal Unit. Frank G. Collins, Walter Frost, and Philip Kessel. NAS8-33541. FWG Associates. N82-16659

CR-3486 January 1982
Study to Perform Preliminary Experiments to Evaluate Particle Generation and Characterization Techniques for Zero-Gravity Cloud Physics Experiments. Ulrich Katz. NAS8-32313. Desert Research Institute. N82-16657

CR-3497 January 1982
Effects of Diabatic Heating on the Ageostrophic Circulation of an Upper Tropospheric Jet Streak. Dennis Arthur Keyser and Donald R. Johnson. NAS8-33222. University of Wisconsin. N82-16658

CR-3500 January 1982
Numerical and Flight Simulator Test of the Flight Deterioration Concept. John McCarthy and Vern Norviel. NAS8-33458. MCS, Inc. N82-16655

CR-3527 March 1982
1981 Current Research on Aviation Weather (Bibliography). Joel Daniel and Walter Frost. NAS8-32692. The University of Tennessee Space Institute. N82-21827

CR-3532 March 1982
Theoretical Design Study of the MSFC Wind-Wheel Turbine. Walter Frost and Philip A. Kessel. NAS8-34387. FWG Associates. N82-20667

CR-3541 April 1982
Advanced Space Shuttle Simulation Model. Frank B. Tatom and S. Ray Smith. NAS8-33818. Engineering Analysis, Inc. N82-22300

CR-3542 April 1982
Moisture Processes Accompanying Convective Activity. Meta E. Sienkiewicz and James R. Scoggins. NAS8-33776. Texas A&M University. N82-22852

CR-3564 June 1982
Correlation of Satellite Lightning Observations with Ground-Based Lightning Experiments in Florida, Texas, and Oklahoma. B. C. Edgar and B. N. Turman. NAS8-33885. The Aerospace Corporation. N82-26922

CR-3565 June 1982
Wind Tunnel Measurements of Three-Dimensional Wakes of Buildings. Earl Logan, Jr., and Shu Ho Lin. NAS8-32357. Arizona State University. N82-26921

CR-3571 March 1982
Analysis of Vibration Induced Error in Turbulence Velocity Measurements from an Aircraft Wing Tip Boom. Safwan H. Akkari and Walter Frost. NAS8-34627. University of Tennessee Space Institute. N82-28881

CR-3589 June 1982
Rawinsonde Sounding Data and Synoptic Conditions for the CCOPE-VAS Experiment, July 1981. Walter K. Henry. NAS8-31773. Texas A&M University. N82-31868

CR-3595 January 1982
A Frost Formation Model and Its Validation Under Various Experimental Conditions. Mark A. Dietenberger. NAS8-33369. University of Dayton.

CR-3638 July 1982
Atmospheric Backscatter Model Development for CO_2 Wavelengths. Adarsh Deepak, Geoffrey S Kent, and Glenn K. Yue. NAS8-34427. Institute for Atmospheric Optics and Remote Sensing.

CR-161867 1981
Analysis of Space Systems – Study for the Space Disposal of Nuclear Waste. NAS8-33847. The Boeing Co. N81-33011

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

CR-161868 August 31, 1981
Ice/Frost Detection Using Millimeter Wave Radiometry. NAS8-33800, Georgia Institute of Technology. N81-32176

CR-161869 August 1981
Coal/Rock Interface Detection by Sensitized Pick. NAS8-33064. General Electric Co. N81-32582

CR-161870 September 10, 1981
New Polymers for Phase Partitioning. NAS8-33978. The University of Alabama in Huntsville. N81-33291

CR-161871 September 4, 1981
Hazard Evaluation for Lithium/Carbon Monofluoride Cells and Batteries. NAS8-33993. Eagle-Picher Industries, Inc. N82-70131

CR-161872 September 24, 1981
SPAR VIII Experiment Report – Containerless Processing of Glass Experiment 74-42. NAS8-32023. Rockwell International. N82-10078

CR-161873 1981
Development of a Fault Tolerant Microprocessor Based Computer System for Space Flight. NSG-8053. Southern University. N81-33827

CR-161874 August 31, 1981
Space Shuttle Environmental Analysis Statistical Models, Final Report. NAS8-33224. University of Arkansas. X81-10366

CR-161875 September 18, 1981
The Effects of Clouds on the Light Produced by Lightning. NAS8-33718. Institute of Atmospheric Physics. N81-33738

CR-161876 September 25, 1981
Modify the Jacchia Model. NAS8-34004. Atsuko Computing International. N81-33836

CR-161877 September 30, 1981
Design, Fabrication, Test and Delivery of a High-Pressure Oxygen/RP-1 Injector 33651F. NAS8-33651. Aerojet Liquid Rocket Co. N82-10109

CR-161878 September 17, 1981
Further Study on the Near Solidus Intergranular Cracking of Inconel 718. NAS8-33805. University of Alabama in Birmingham. N82-10194

CR-161879 June 1981
Crystal Nucleation in Glass-Forming Alloy and Pure Metal Melts Under Containerless and Vibrationless Conditions. NAS8-32691. Harvard University. N82-70031

CR-161880 April 1, 1965
A Description of Guidance Error Analysis Programs NSL-EA-1 and NSL-EA-2, Research and Analysis Section Technical Memo 69. NAS8-11431. Northrop Space Laboratories. N82-70021

CR-161881 September 30, 1981
A Study of High Density Bit Transition Requirements Versus the Effect of BCH Error Correcting Coding. NAS8-33887. Mississippi State University. N82-10753

CR-161882 September 30, 1981
Digital Ultrasonics Signal Processing: Flaw Data Post Processing Use and Description. NAS8-33100. Intergraph Corp. N82-11862

CR-161883 January 1978
Research Study to Investigate Direct Solar-to-Microwave Energy Conversion Technology. ESD78-MSFC-2174. Teledyne Brown Engineering. N82-11544

CR-161884 1981
A Preliminary Analysis of the Data from Experiment 77-13 and Final Report on Glass Fining Experiment in Zero Gravity. NAS8-33017. Westinghouse R&D Center. N82-13154

NASA CONTRACTOR REPORTS

(Abstracts for these reports may be obtained from STAR.)

CR-161885 September 1981
Solid Rocket Booster Sting Interference Wind Tunnel Test Analysis. NAS8-33816. Northrop Services, Inc. N82-11040

CR-161886 October 1, 1981
Modal Analysis Using a Fourier Analyzer, Curve-Fitting, and Modal Tuning. NAS8-33980. The University of Texas at Austin. N82-11490

CR-161887 October 13, 1981
Flaw Growth of 7075, 7475, 7050 and 7049 Aluminum Alloy Plate in Stress Corrosion Environments, 4-Year Marine Atmosphere Results. NAS8-30890. Kaiser Aluminum and Chemical Corp. N82-11181

CR-161888 1981
Analysis of Space Systems Study for the Space Disposal of Nuclear Waste, Study Report, Volume 2, Technical Report. NAS8-33847. The Boeing Co. N82-11889

CR-161889 September 1, 1981
Feasibility Study – Atmospheric General Circulation Experiment. NAS8-34049. General Electric Co.

CR-161890* 1981
Advanced Shuttle Simulation Turbulence Tapes (SSTT) Users Guide. NAS8-33818. Engineering Analysis, Inc. N82-12106

CR-161891 October 1981
Growth of Solid Solution Single Crystals. NAS8-32994. Massachusetts Institute of Technology. N82-11958

CR-161892 September 28, 1981
Space Processing of Electronic Materials. NAS8-32920. Athens State College. N82-11094

CR-161893 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 1.0 – Summary. NAS8-29675. Martin Marietta. N82-70356

CR-161894 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 2.0 – Summary. NAS8-29675. Martin Marietta. N82-70357

CR-161895 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 3.0 – Summary. NAS8-29675. Martin Marietta. N82-70358

CR-161896 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 4.0 – Mission Accomplishment. NAS8-29675. Martin Marietta. N82-70359

CR-161897 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 5.0 – Section I, Systems. NAS8-29675. Martin Marietta. N82-70360

CR-161898 September 1981
Space Tug Systems Study (Storable) – Selection Option Data Dump, Volume 5.0 – Section II, Systems. NAS8-29675. Martin Marietta. N82-70361

CR-161899 September 1973
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 5.0 – Appendix A, Supporting Research and Technology. NAS8-29675. Martin Marietta. N82-70362

CR-161900 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 6.0 – Section I, Flight Operations. NAS8-29675. Martin Marietta. N82-70363

CR-161901 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 6.0 – Section II, Ground Operations. NAS8-29675 Martin Marietta. N82-70364

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

CR-161902 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 6.0 – Appendix, Ground Operation. NAS8-29675. Martin Marietta. N82-70365

CR-161903 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 7.0 – Safety. NAS8-29675. Martin Marietta. N82-70366

CR-161904 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 8.0 – Section I, Programmatics and Cost. NAS8-29675. Martin Marietta. N82-70367

CR-161905 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 8.0 – Section II, Programmatics and Cost. NAS8-29675. Martin Marietta. N82-70368

CR-161906 September 1981
Space Tug Systems Study (Storable) – Selected Option Data Dump, Volume 8.0, Appendix, Programmatics and Cost. NAS8-29675. Martin Marietta. N82-70369

CR-161907 August 1981
Evaluation of the Effects of Solar Radiation on Glasses, IITRI. NAS8-33388. N82-11207

CR-161908 August 1981
Technology and Development Requirements for Advanced Coal Conversion Systems. NAS8-34264. Spectra Research Systems.

CR-161909 1981
Shuttle Range Safety Command Destruct System Handbook. NAS8-32804. Northrop Services, Inc. X81-10358

CR-161910 September 1981
IUS Guidance Gamma Guide Assessment for the Tracking and Data Relay Satellite System Mission A. NAS8-33729. Northrop Services, Inc. N82-71043

CR-161911 September 1981
IUS Guidance Interrelated Computer Programs to Generate Reference Trajectories. NAS8-33729. Northrop Services, Inc. N82-71044

CR-161912* October 1981
Hardware Synthesis from DDI. – Extensions and Logic Minimization. NAS8-33096. University of Alabama in Huntsville.

CR-161913 November 1981
Statistical Energy Analysis Computer Program User's Guide. NAS8-33191. McDonnell Douglas Astronautics Co. N82-13764

CR-161914 October 15, 1981
Solar Array Technology Development for SEP (Solar Electric Propulsion) – Design Support and System Level Testing Report. NAS8-31352. Lockheed Missiles & Space Co. X82-10045

CR-161915 May 15, 1981
SEPAC Software Configuration Control Plan and Procedures, Rev. 1. NAS8-33806. Intermetrics, Inc. N82-13765

CR-161916 November 25, 1981
Study of Methods for Applying and Enhancing Transfer Film Coations of Polyetra-Fluoroethylene (PTFE) to Space Shuttle Main Engine (SSME) High Pressure Oxygen Turbo Pump (HPOTP) Bearings. NAS8-33576. Battelle Columbus Laboratories. N82-13428

CR-161917 December 1981
Storable Space Tug Systems Study – Volume 2. NAS8-29675. Grumman. N82-71798

CR-161918 December 1981
Space Tug Systems Study (Storable) Volume 3: Executive Summary. NAS8-29675. Martin Marietta. N82-14211

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

CR-161919 December 1981
Space Tug Systems Study (Storable) – Volume 1: Overview Presentation. NAS8-29675. Martin Marietta. N82-14209

CR-161920 December 1981
Space Tug Systems Study – Volume 2: Compendium. NAS8-29675. Martin Marietta. N82-14210

CR-161921 1981
Plume Technology Handbook. NAS8-32489. Remtech, Inc.

CR-161922 October 15, 1981
Solar Cell Modules for Plasma Interaction Evaluation. NAS8-34026. Lockheed Missiles & Space Co. N82-14281

CR-161923 December 1981
Reliability Study of Opto-Coupled Semiconductor Devices. NAS8-30777. McDonnell Douglas Astronautics Co. N82-14444

CR-161924 November 1981
Parametric Analysis of Diffuser Requirements for High Expansion Ratio Space Engine. NAS8-33981. Lockheed Missiles & Space Co. N82-14280

CR-161925 October 1981
Large Spacecraft Interaction with Ambient Environment at G. E. O. NAS8-32636. Utah State University. N82-71048

CR-161926 August 6, 1980
Technology Demonstration Measurement for the Molecular Wake Shield. NAS8-32689. Texas University. N82-14212

CR-161927 August 1981
Coal/Rock Interface Detection by Sensitized Pick – Part A. NAS8-33064. General Electric Co.

CR-161928 1981
Defect Chemistry and Characterization of (Hg,Cd)Te. NAS8-33254. Honeywell Electro-Optics Operations. N82-14308

CR-161929 1981
Design Study of a Non-Immersion Acousto-Optical Imaging NDT System. NAS8-32604. Lumin, Inc. N82-71109

CR-161930 1981
Space Tug System Study (Cryogenic) Data Dump Program 2 Summary, Volume 2 Chg. NAS8-29676. General Dynamics. N82-71799

CR-161931
Space Tug Systems Study (Cryogenic) Data Dump, Volume 3 Chg. NAS8-29676. General Dynamics. N82-71800

CR-161932 1981
Space Tug Systems Study Data Dump Mission Accomplishment, Volume 4.0. NAS8-29676. General Dynamics. N82-71801

CR-161933 1981
Space Tug Systems Study Data Dump Volume 5 Book 1 Program 1 – Volume 5 Chg. NAS8-29676. General Dynamics. N82-71802

CR-161934 1981
Space Tug Systems Study Data Dump Book 2 Program 2 – Volume 5. NAS8-29676. General Dynamics. N82-72190

CR-161935 1981
Space Tug Systems Study Data Dump Book 3 – Program 3. NAS8-29676. General Dynamics. N82-71803

CR-161936 1981
Space Tug Systems Study Data Dump Operations Book 1, Program 1, Volume 6.0. NAS8-29676. General Dynamics. N82-72191

CR-161937 1981
Space Tug Systems Study Data Dump Volume 6.0 Operations Book 2, Program 2, Volume 6 Chg. NAS8-29676. General Dynamics. N82-71784

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

CR-161938 1981
Space Tug Systems Data Dump Volume 6.0 Operations Book 3, Program 3, Volume 6.0, Chg. NAS8-29676. General Dynamics. N82-71785

CR-161939 1981
Space Tug Systems Study Data Dump Safety, Volume 7. NAS8-29676. General Dynamics. N82-71786

CR-161940 1981
Space Tug Systems Study Data Dump Book 1, Program 1, Volume 8. NAS8-29676. General Dynamics. N82-71787

CR-161941 1981
Space Tug Systems Study Data Dump Book 2, Program 2, Volume 8, Supplement. NAS8-29676. General Dynamics. N82-71804

CR-161942 1981
Space Tug Systems Study Data Dump Book 3, Program 3, Volume 8 Supplement. NAS8-29676. General Dynamics. N82-71805

CR-161943 November 10, 1981
Lightweight Moving Radiators for Heat Rejection in Space. NAS8-34191. Astro Research Corp. N82-15366

CR-161944 November 13, 1981
Detection of Amblyopia Utilizing Generated Retinal Reflexes. NAS8-33819. Elector-Optics Consultants, Inc. N82-16732

CR-161945 December 1981
Structural Dynamic Analysis of the Space Shuttle Main Engine. NAS8-33808. Lockheed Missiles & Space Co. N82-19302

CR-161946 December 23, 1981
Analysis of Field Usage Failure Rate Data for Plastic Encapsulated Solid State Devices. NAS8-33079. Boeing Aerospace Co. N82-16343

CR-161947 December 23, 1981
Development of Design, Qualification, Screening, and Application Requirements for Plastic Encapsulated Solid-State Devices for Space Applications. NAS8-33079. Boeing Aerospace Co. N82-16344

CR-161948 November 1981
X-Ray Astronomy Instrumentation Studies. NAS8-33977. The University of Alabama in Huntsville. N82-17001

CR-161949 September 30, 1981
Advance Methods for Preparation and Characterization of Infrared Detector Materials. NAS8-33107. McDonnell Douglas Research Laboratories. N82-16848

CR-161950* August 7, 1981
Capability Enhancement of Artwork – Interactive Design System (AIDS). Part I: Summary of Accomplishments. NAS8-33985. ESPEE, Inc.

CR-161951* August 7, 1981
Capability ENHA Cement of Artwork – Interactive Design System (AIDS). Part II: AIDS Redesign for VLSI Application. NAS8-33985. ESPEE, Inc.

CR-161952* August 7, 1981
Capability Enhancement of Artwork – Interactive Design System (AIDS). Part III: User's Manual and Program Description. NAS8-33985. ESPEE, Inc.

CR-161953 August 1, 1981
Breadboard Stellar Tracker System Test Report – Volume I. NAS8-34263. Ball Aerospace Systems Division. N82-16170

CR-161954 August 1, 1981
Breadboard Stellar Tracker System Test Report – Volume II. NAS8-34263. Ball Aerospace Systems Division. N82-16171

CR-161955 1981
Space Fabrication Demonstration. Quarterly Progress Report No. 18. NAS8-32472. Grumman Aerospace. N82-71464

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

CR-161956 December 23, 1981
REEDS Computer Code. NAS8-31806. Science Applications, Inc. N82-16760

CR-161957 1981
A Study of High Density Bit Transition Requirements Versus the Effects on BCH Error Correcting Coding. NAS8-33887. Mississippi State University. N82-17884

CR-161958 January 11, 1982
Advanced Space Shuttle Simulation Model. NAS8-33818. Engineering Analysis Inc. N82-16143

CR-161959 1982
The Detection of the Coal Roof Interface by Use of High Pressure Water. NSF-8055. Missouri University. N82-17555

CR-161960 February 19, 1981
Baseline Studies on the Feasibility of Detecting a Coal/Share Interface With a Self-Powered Sensitized Pick. DEN8-000011. Wyle Laboratories. N82-17553

CR-161961 1981
Development of Sensitized Pick Coal Interface Detector System. NAS8-32538. Shaker Corp. N82-17560

CR-161962 1981
The Design of a Mechanical Referencing System for the Rear Drum of the Longwall Shearer Coal Miner. NCA8-00131. Engineering and Industrial Research Station. N82-17554

CR-161964 1981
Quantitative Determination of Zero-Effects on Electronic Materials Processing Entitled: Interface Marking in Crystals. NAS8-30576. Massachusetts Institute of Technology. N82-18044

CR-161965 1981
Crystal Growth from Vapor Phase in Zero Environment. NAS8-30578, Rensselear Polytechnic Institute. N82-18043

CR-161966 1981
Zero Solidification of a Sodium Chloride-Lithium Fluoride Eutectic Mixture. NAS8-30579. California University. N82-17299

CR-161967 March 1980
SPAR Reference Manual Update – SPAR Level 15. NAS8-32664. EISI Engineering Information Systems, Inc. N82-17520

CR-161968 January 14, 1982
Research Study: Spacelab Soil Mechanics Analysis. NAS8-33130. USRA/Boulder. N82-72278

CR-161969 January 1982
Automated Longwall Guidance and Control Vertical Control Subsystem, Volume I. NAS8-33591. Miller and Associates. N82-18658

CR-161970 January 1982
Automated Longwall Guidance and Control Vertical Control Subsystem, Volume II. NAS8-33591. Miller and Associates. N82-18659

CR-161971 June 30, 1979
Test Methods and Procedures for Microcircuit Line Certifications. NAS8-32638. Integrated Circuit Engineering Corp. N82-72248

CR-161972 December 21, 1981
Glass Shell Manufacturing in Space. NAS8-33103. KMS Fusion, Inc. N82-17233

CR-161973 1981
Improvements to an Exiting Ultrasonic Instrument. NAS8-31176. Panametrics, Inc. N82-72551

CR-161974 1981
Advanced Refrigeration System. NAS8-31371. AiResearch Mfg. Co. N82-72505

CR-161975 December 23, 1981
The Design, Fabrication and Installation of Cable Routing Mockups in Support of

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

Spacelab 2. NAS8-34127. Essex Corp. N82-18312

CR-161976 1981
Integrated Control/Display Station for Teleoperator and Experiments. NAS8-31147. Martin Marietta Corp. N82-72656

CR-161977* Auguat 1981
Development of Low Cost Custom Hybrid Microcircuit Technology. NAS8-33385. Rockwell International. N82-73226

CR-161978* December 1981
Development of a Qualification Standard for Adhesives Used in Hybrid Microcircuits. NAS8-33385. Rockwell International. N82-73225

CR-161979 1982
Analytical and Experimental Evaluation of Techniques for the Fabrication of Thermoplastic Hologram Storage Devices. NAS8-30618. Mississippi State University.

CR-161980 1982
Design, Fabrication, Test, and Delivery of a Thermal Control System Utilizing Variable-Conductance Heat Pipes. NAS8-31448. Dynatherm Corp. X82-73815

CR-161981 1982
Study of Heat Transfer Characteristics of a PCM Thermal Capacitor. NCA8-102. Tennessee Technological University. N82-72549

CR-161982 1982
Design, Fabrication, Testing, Delivery, Installation, and Checkout of an Optical Bench and Alignment System for an X-Ray Telescope Facility. NAS8-31297. Perkin-Elmer, Corp. N82-22030

CR-161983 1982
Magnetospheric Research. NAS8-30563. University of Alabama in Huntsville. N82-73669

CR-161984 December 7, 1981
Development of a Direct Experimental Test for Any Violation of the Equivalence Principle by the Weak Interaction. NAS8-33572. Yale University. N82-22078

CR-161985* February 5, 1982
Terrestrial Cooling and Solar Variability. NAS8-34010. Universities Space Research Administration. N82-21134

CR-161986 1982
The Cylindrical Fresnel Lens as a Solar Concentrator. NCA8-101. Ball State University. N82-73755

CR-161987 January 26, 1982
Hormone Purification by Isoelectric Focusing in Space. NAS8-32950. University of Arizona. N82-21232

CR-161988 January 1982
Characterization of Silicon-Gate CMOS/SOS Integrated Circuits Processed with Ion Implantation. NAS8-31986. RCA Corp. N82-73509

CR-161989 1982
Evaluation of Induction Motor Performance Using an Electronic Power Factor Controller. NCA8-00128. Auburn University.

CR-161990 February 19, 1982
Fabrication and Overspeed Test of a Prototype CMG Flywheel. NAS8-31236. Bendix. N82-73240

CR-161991 1982
Analysis of Space Systems for the Space Disposal of Nuclear Waste – Volume 1. NAS8-33847. The Boeing Co. N82-22016

CR-161992 1982
Analysis of Space Systems for the Space Disposal of Nuclear Waste – Volume 2. NAS8-33847. The Boeing Co. N82-22017

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

CR-161993 January 29, 1980
Uniform Dispersions of Crystallization Processing (74-15). NAS8-31350. Massachusetts Institute of Technology. N82-73439

CR-161994 1981
Phase Change Thermal Control Development, Final Report. NAS8-28360. Martin Marietta. N82-73147

CR-161995 March 10, 1982
Research Study: Severe Storms Doppler Lidar Signal Processing. NAS8-33834. Lassen Ir Research. N82-22851

CR-161996 1982
Aerospect Operations Criteria for Mercury Thresholds. NAS8-31546. IIT Research Institute. N82-22799

CR-161997 March 1981
Conversion of Spacelab to Packet Data Format (Flight Data Study). NAS8-32350. McDonnell Douglas Corp. N82-22893

CR-161998 March 8, 1982
Modular Design Attitude Control System. NAS8-33979. Bendix Guidance Systems Division. N82-22303

CR-161999 March 1982
Direct Observation of Interface Instability During Crystal Growth. NAS8-33110. Stanford University. N82-23033

CR-162000 August 14, 1981
Booster Separation Motor Final Documentation. NAS8-31672. United Technology Chemical Systems. N82-22307

CR-162001 February 1, 1982
Modal Vector Estimation for Closely-Spaced-Frequency Modes. NAS8-33980. The University of Texas at Austin. N82-22517

CR-162002 June 1981
Research of the Crystal Cavity Radiometer (CCR) Experiment. NAS8-34342. Atmospheric and Environmental Research, Inc.

CR-162003 April 12, 1982
Advanced Turbine Study. NAS8-33821. United Technologies, Pratt & Whitney Aircraft. N82-23249

CR-162004 1982
Integration and Software for Thermal Test of Heat Rate Sensors. NAS8-33522. Lockheed Missiles & Space Co. N82-23514

CR-162005* February 17, 1982
Defect Chemistry and Characterization of $Hg_{1-x}Cd_xTe$. NAS8-33245. Honeywell Electro-Optics. N82-24992

CR-162006 March 1982
Numerical Analysis of Thermal Environment Around the Space Shuttle with Vertical Hot Gas Jets on Mobile Launch Pad. NAS8-34352. CHAM of North America, Inc. N82-74420

CR-162007* January 1982
Physical Phenomena in Containerless Glass Processing. NAS8-32944. Clarkson College of Technology. N82-25466

CR-162008 March 1982
High Density Circuit Technology – Part 1. NAS8-33448. Mississippi State University. N82-74352

CR-162009 1982
Consideration of Cirrus Clouds as a Possible Sun-Weather Link. NAS8-32482. Universities Space Research Association. N82-74757

CR-162010 1982
Experimental Turbulence Measurements for Entrainment Studies. NAS8-32482. Universities Space Research Association. N82-75064

CR-162011 1982
H_2SO_4 Aerosol Generation by Photolysis. NAS8-32482. Universities Space Research Association. N82-75065

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

CR-162012 1982
Reevaluation of Ice and Condensation Nuclei Memory Experiments. NAS8-32482. Universities Space Research Association. N82-74744

CR-162013 1982
Vapor Diffusion in a Cloud Simulation Chamber. NAS8-32482. Universities Space Research Association. N82-74657

CR-162014 1982
ACPL Wall Temperature and Pressure Control for the Expansion Chamber. NAS8-32482. Universities Space Research Association. N82-74658

CR-162015 1982
Drop Charging Techniques for Use in the ACPL Aboard Spacelab. NAS8-32482. Universities Space Research Association. N82-74648

CR-162016 1982
The Influence of Mechanical Supports on the Vibrational behavior of Electrified and Unelectrified Water Drops. NAS8-32482. Universities Space Research Association. N82-75066

CR-162017 1982
Scavening Experiments for the Atmospheric Cloud Physics Laboratory, Justification for Experiments and Recommendations for Development. NAS8-32482. Universities Space Research Association. N82-75067

CR-162018 1982
The Utility of Low-g Environment in the Study of Drop Interactions and Vortex Ring Propagation. NAS8-32482. Universities Space Research Association. N82-74652

CR-162019 1982
A Brief Statistical Investigation of the Relation Between Solar Magnetic Sector Boundary Crossings. NAS8-32482. Universities Space Research Association. N82-74745

CR-162020 1982
Experiments on Raindrops and Cloud Electrification, Proposed for Performance in the ACPL. NAS8-32482. Universities Space Research Association. N82-74746

CR-162021 1982
The Effect of Solar Variability on Weather and Climate: Evidence, and Possible Physical Mechanisms. NAS8-32482. Universities Space Research Association. N82-74756

CR-162022 1982
Feasibility of Measuring a Surface Temperature to a Precision of 0.01K. NAS8-32482. Universities Space Research Association. N82-74917

CR-162023 1982
Thermal Convection in a Circular Enclosure Aboard Spacelab. NAS8-32482. Universities Space Research Association. N82-74653

CR-162024 1982
Cloud Microphysics. NAS8-32482. Universities Space Research Association. N82-74747

CR-162025 1982
The Influence of Turbulent Mixing on Cloud Droplet Evolution. NAS8-32482. Universities Space Research Association. N82-74748

CR-162026* 1982
Track Train Dynamics Analysis and Test Program – Methodology Development for Derailment Safety Analysis of Six-Axle Locomotives. NAS8-29882. Martin Marietta Corp. N82-26047

CR-162027* April 1982
Track Train Dynamics Analysis and Test Program – Locomotive Dynamic Characterization Summary. NAS8-29882. Martin Marietta Corp. N82-28224

CR-162028 February 28, 1982
Preliminary Risk Assessment for Nuclear Waste Disposal in Space, Volume I – Executive Summary of Technical Report. NAS8-34512. Battelle. N82-25272

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

CR-162029 February 28, 1982
Preliminary Risk Assessment for Nuclear Waste Disposal in Space – Volume II – Technical Report. NAS8-34512. Battelle.
N82-25273

CR-162030 May 15, 1982
Global Thunderstorm Activity Research Survey. NAS8-34587. Samuel C. Coronti, Inc. N82-26924

CR-162031 April 26, 1982
Shuttle Derived Vehicles (SDV) – Technology Requirements Study, Phase II Final Progress Review. NAS8-34183. Martin Marietta. X82-10262

CR-162032* 1982
Digital Systems Design Language. NAS8-33096. University of Alabama in Huntsville.
N82-76829

CR-162033 April 1982
Design Study for a Two-Color Beta Measurement System. NAS8-34337. Applied Research, Inc. N82-27123

CR-162034 February 28, 1982
Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Astrophysical Observatory. N82-26704

CR-162035 March 1982
Investigation of Electrodynamic Stabilization and Control of Long Orbiting Tethers. NAS8-33691. Smithsonian Astrophysical Observatory. N82-26705

CR-162036 May 21, 1982
Transverse Velocity Measurement. NAS8-34745. Technology Development Corp.
N82-26641

CR-162037 April 15, 1982
Space Shuttle Environment Analysis. NAS8-33435. Computer Services Corp.

CR-162038 May 14, 1982
The Phoretic Motion Experiment (PME) Definition Phase. NAS8-34319, TRW Defense and Space Systems Group.
N82-27329

CR-162039 March 1982
High Density Circuit Technology – Part II. NAS8-33448. Mississippi State University.
N82-75259

CR-162040 March 1982
High Density Circuit Technology – Part III. NAS8-33448. Mississippi State University.
N82-75260

CR-162041 March 1982
High Density Circuit Technology – Part IV. NAS8-33448. Mississippi State University.
N82-75261

CR-162042 May 24, 1982
Design and Fabrication or Geophysical Fluid Flow Model Apparatuses. NAS8-34553. Precision Devices, Ltd. N82-75638

CR-162043 May 1982
Evaluation and Prediction of Long-Term Environmental Effects on Nonmetallic Materials. NAS8-33578. Martin Marietta Corp. N82-27494

CR-162044 July 1, 1982
Evaluation of a Wind-Wheel Electric-Power Generator, Scaling Parameters for Wind-Wheel Turbine. NAG-8007. Tennessee Technological University.

CR-162045 June 1982
Internal Wave Motion. NAS8-33726. University of Alabama in Huntsville.

CR-162046 1982
Torque Tension Tests. NAS8-32525. Standard Pressed Steel Co. N82-30565

CR-162047 June 1982
Investigations in Cosmic and Gamma Ray Astronomy and Nuclear Instruments. NAS8-31895. University of Alabama in Huntsville. N82-31289

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

CR-162048 May 24, 1982
Theoretical Analyses of Baroclinic Flows. NAS8-33386. University of Tennessee Space Institutes. N82-29560

CR-162049* May 15, 1982
Transient and Diffusion Analysis of HgCdTe. NAS8-33698. Semtec Corp.

CR-162050 1982
Solar Concentration Properties of Flat Fresnel Lenses with Large F-Numbers. NCA8-129. Ball State University. N82-31109

CR-162051* August 1982
Research Reports 1982 – NASA/ASEE Summer Faculty Fellowship Program. NGT-01-002-099. University of Alabama.

CR-162052 November 16, 1981
AVE-SESAME Program for the REEDA System. NAS8-33844. Atsuko Computing International. N82-30964

CR-162053 June 21, 1982
Evaluation of Bearing Mounting Design and Excessive Wear Phenomena. NAS8-33576. Battelle of Columbus Laboratories. N82-29608

CR-162054 January 1982
Space Environmental Effects – Construction and Utilization of a System to Measure Low Thermal Strain in One Meter Graphite Epoxy Tubes. NAS8-33377. University of Alabama in Huntsville. N82-30524

CR-162055 1982
Power Module Control Moment Gyro. NAS8-31236. The Bendix Corp. N82-30329

CR-162056 1982
Analysis and Experimentation for Discrete Implementations of Control Networks Using Integrated Circuitry. NAS8-20163. Digital Systems Laboratory. N82-76179

CR-162057 1982
Digital Filter Specifications. NAS8-20163. Digital Systems Laboratory. N82-76177

CR-162058 June 1982
Teleoperator Maneuvering System/ Mark II Propulsion Module Study. NAS8-34581. Martin Marietta Aerospace. X82-10317

CR-162059 October 1981
Solar Terrestrial Observatory. NAS8-33795. University of California. N82-30214

CR-162060 July 1982
Fabrication of Essex EVA Ratchet Wrenches. NAS8-34925. Essex Corp. N82-30554

CR-162061 1982
Advanced Launch Vehicle Systems Simulation Modules. NAS8-28016. E. Wendorf & Associates. N82-76942

CR-162062 January 1982
Investigation of Degradation of Electrical Insulating Materials, a Test and Instrumentation System For. NAG8-5. Tuskegee Institute. N82-16341

CR-162063 July 22, 1982
Field Support for Solar Tracker. NAS8-34681. Bendix Guidance Systems Division. N82-31111

CR-162064 1982
Analytical Float Zone Experiments System (AFZES), Phase B Study, Final Report, Volume 1 – Technical, Materials Processing in Space/Spacelab (MPS/SL) Project. NAS8-32946. Arthur D. Little, Inc. N82-30317

CR-162065 1982
Apollo-Soyuz Test Project Service Module Breakup, Survival, Dispersion and Risk Hazard Analyses. NAS8-30377. Lockheed Missiles & Space Co. X82-77775

CR-162066 1982
High Energy Astronomy Observatory Breakup, Survival and Risk Hazard Analyses.

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

NAS8-30377. Lockheed Missiles & Space Co. X82-77774

CR-162067 August 19, 1982
Multi-100 kW – Final Review. NAS8-32981. Lockheed Missiles & Space Co. N82-31348

CR-162068 June 1982
Multi-100 kW – Final Report. NAS8-32981. Lockheed Missiles & Space Co. N82-31349

CR-162069 June 1982
Electrodeposition in Microgravity (Ground-Based Experiments). NAS8-33812. University of Alabama in Huntsville. N82-31341

CR-162070 August 19, 1982
OFT Planning Natural Environment Analysis. NAS8-32995. USRA/Boulder. X82-77906

CR-162071 July 1982
Testing and Failure Analysis to Improve Screening Techniques for Hermetically Sealed Metallized Film Capacitors for Low Energy Application. NAS8-33957. Union Carbide Corp.

CR-162072 July 30, 1982
Extended Range X-Ray Telescope: X-Ray Microscope Design. NAS8-34728. University of Alabama in Birmingham. N82-32208

CR-162073 March 1, 1982
Containerless Preparation of Advanced Optical Glasses. NAS8-32953. Rockwell International. N82-31531

CR-162074 1982
Study for Identification of Beneficial Uses of Space, Phase 3, Volume 1: Executive Summary. NAS8-28179.

CR-162075 July 1982
Crystal Nucleation in Glass-Forming Alloy and Pure Metal Melts Under Containerless and Vibrationless Condition. NAS8-32691. Harvard University.

CR-162076 July 1982
Development of an Autonomous Video Rendezvous and Docking System. NAS8-34679. Martin Marietta Aerospace.

CR-162077 June 1982
SPAR IX Technical Report for Experiment 76-22 – Directional Solidification of Magnetic Composites. Grumman Research and Development Center. N80-73855

CR-162078 May 21, 1982
AVE-SESAME Program for the REEDA System. NAS8-33844. Atsuko Computing International.

CR-162079* August 1982
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS), Volume I: Executive Summary, NAS8-34381. Massachusetts Institute of Technology.

CR-162080* August 1982
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS), Volume II: Space Projects Overview. NAS8-34381. Massachusetts Institute of Technology.

CR-162081* August 1982
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS), Volume III: ARAMIS Overview. NAS8-34381. Massachusetts Institute of Technology.

CR-162082* August 1982
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS), Volume IV: Application of ARAMIS Capabilities to Space Project Functional Elements. NAS8-34381. Massachusetts Institute of Technology.

CR-162083* August 1982
Space Applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS), Volume IV (Supplement):

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

Appendix 4.e: Candidate ARAMIS Capabilities: Comparison Charts and Application Forms. NAS8-34381. Massachusetts Institute of Technology.

CR-162084 August 1982
Solid Rocket Booster Sting Interference Wind Tunnel Test Analysis. NAS8-33816. Northrop Services, Inc.

CR-162085 April 30, 1982
SEPAC Flight Software, Volume I: Detailed Design Specifications. NAS8-34747. Intermetrics, Inc.

CR-162086 April 30, 1982
SEPAC Flight Software, Volume II: Program Listing. NAS8-34747. Intermetrics, Inc.

CR-162087 June 1982
Beta Experiment. NAS8-34337. Applied Research, Inc.

CR-162088 August 1982
GTI Furnace Facility Accommodation. NAS8-32712. Teledyne Brown Engineering.

CR-162089 1982
Hot Tensile Tests of Inconel 718. NAS8-33524. Clemson University.

CR-162090 July 1982
Analysis of Space Telescope Data Collection System. NAS8-33570. Mississippi State University.

CR-170621 March 22, 1982
Scientific Support for the Development and Operation of the Atmospheric Cloud Physics Laboratory. NAS8-32482. USRA/Boulder.

CR-170622 September 14, 1982
Beta Experiment Flight Report. Applied Research, Inc.

CR-170623 July 30, 1982
Ice Forming Experiment. NAS8-33150. University of Wyoming.

CR-170624 August 31, 1982
Containerless Processing Technology Analysis. NAS8-33731. University of Alabama in Huntsville.

CR-170625 April 1982
Study of Laser Heated Propulsion Devices Evaluation of Laser Devices, Fuels and Energy Coupling Mechanisms. NAS8-33974. Lockheed Missiles & Space Company, Inc.

CR-170626 April 1982
Study of Laser Heated Propulsion Devices – Part II, Assessment of Laser Propulsion Modeling and Simulation Requirements. NAS8-33974. Lockheed Missiles & Space Co.

CR-170627 June 1982
Ultimate Intrinsic Coercivity Samarium-Cobalt Magnet. NAS8-33607. The Charles Stark Draper Laboratory, Inc.

CR-170628 1982
Active Regions. NAS8-33525. The University of Alabama in Huntsville.

CR-170629 1982
Preliminary Study of Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170630 1982
Preliminary Study on Dispersed Applications of Solar Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170631 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170632 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

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

CR-170633 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170634 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170635 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170636 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170637 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170638 1982
Preliminary Study on Dispersed Applications of Solar Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170639 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170640 1982
Preliminary Study on Dispersed Applications of Solar and Wind Energy Systems. NAS8-33473. PRC Energy Analysis Co.

CR-170641 1982
The Modelling of the Solar Upper Photosphere and Lower Chromosphere Based Upon ATM Data. NAS8-33219. University of Hawaii.

CR-170642 March 1982
Space Fabrication Demonstration System Composite Beam Cap Fabricator. NAS8-32472. Grumman Aerospace Corp.

CR-170643 1982
A Study of High Density Bit Transition Requirements Versus the Effects on BCH Error Correcting Code. NAS8-33887. Mississippi State University.

*White cover reports printed at MSFC.

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

AUSTIN, ROBERT E. PS04
Orbital Vehicles: Enabling Capabilities for Full Scale Access to Space. For presentation at the AIAA 1982 Biennial Space Systems Conference, Washington, D.C., October 18-20, 1982.

ARNOLD, JAMES E. ES84
Characteristics of Ageostrophic Flow in the Vicinity of a Severe Weather Outbreak-AVE-SESAME I. For presentation at the AMS 12th Conference on Severe Local Storms, San Antonio, Texas, January 11-15, 1982.

ANTAR, B. N. ES82
FOWLIS, W. W.
Symmetric Baroclinic Instability of a Rotating Fluid Layer. For presentation at the Thirty-Fourth Meeting of the American Physical Society, Monterey, California, November 22-24, 1981.

BAUGHER, C. R. ES51
HORWITZ, J. L.
CHAPPELL, C. R.
SHELLEY, E. G.
YOUNG, D. T.
Conical Pitch Angle Distributions of Very Low-Energy Ion Fluxes Observed by ISEE-1. For publication in the Journal of Geophysical Research.

BAUGHER, CHARLES R. ES63
CHAPPELL, CHARLES R.
COMFORT, R. H.
University of Alabama in Huntsville
Use of the Thin Sheath Approximation for Obtaining Low Temperatures from ISEE-1. For publication in the Journal of Geophysical Research.

BAUGHER, C. R. ES53
GREEN, J. L.
CHAPPELL, C. R.
JOHNSON, J. F.
WAITE, J. H.
New Observations of Plasmasphere and Plasmapause. For presentation at the 24th Meeting of COSPAR/STP-International Symposium on Solar-Terrestrial Physics.

BAYUZICK, R. J. (Vanderbilt University) ES71
ROBINSON, M. B. ES71
RATHZ, T. J.
Effects of Undercooling on the Microstructure of Niobium-Germanium and Niobium-Aluminum Alloys. For presentation at the Materials Research Society, 1982 Annual Meeting, Boston, MA, November 1-4, 1982.

BECHTEL, ROBERT T. EC31
TRUPM, G. Xerox-EOS
JAMES, E. L. Xerox-EOS
Results of Mission Profile Life Test. For presentation at the AIAA 16th Electric Propulsion Conference, New Orleans, LA, November 17-19, 1982.

BECHTEL, ROBERT T. EC31
DULGEROFF, C. Hughes Res.
J Series Thruster Thermal Test Results. For presentation at the 16th AIAA Electric Propulsion Conference, New Orleans, LA, November 17-19, 1982.

BILBRO, J. EC32
FICHTI, G.
FITZJARRALD, D.
KRAUSE, M.
Airborne Doppler Lidar Wind Field Measurements. For publication in the Bulletin of the American Meteorological Society.

BILBRO, JAMES W. EC32
JONES, W. D.
KENNEDY, L. Z.
JEFFREYS, H. B.
Coherent Focal Volume Mapping of a Continuous Wave CO_2 Doppler Lidar. For publication in Applied Optics.

BILBRO, JAMES W. EC32
An Overview of the Marshall Space Flight Center's Doppler Lidar Development. For presentation at the Workshop on Optical and Laser Remote Sensing, Monterey, California, February 9-11, 1982.

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

BROWN, RICHARD L. LA41
Commercial Uses of Materials Processing in Low-Gravity (MPLG). For presentation at the American Ceramic Society, Inc., Cincinnati, OH, May 4-5, 1982.

BUCHANAN, H. J. ED15
SCHOCK, R. W.
WAITES, H. B.
An On-Orbit Experiment for Dynamics and Control of Large Structures. For publication in the AIAA Journal of Guidance and Control.

BURNETT, T. H. ES62
PARNELL, T. A.
WATTS, J.
Studies of the Energy Spectra, Charge Composition, and Nuclear Interactions of Primary Cosmic Rays in the Energy Range 10^{12} - 10^{15} eV. For presentation at the Cosmic Ray Workshop in High Energy Interactions and Related Phenomena, La Paz, Bolivia, July 10-23, 1982.

CAMP, DENNIS ES82
ALEXANDER, MARGARET
LOGAN, EARL
LIN, SHU-HO
Disturbed Boundary Layer Flow Downstream of Two Laterally Separated Obstacles. For presentation at the IUTAM Symposium, Berlin, Germany, March 29-31, 1982.

CAMP, D. W. ES82
FROST, W.
University of Tennessee Space Institute
GROSS, E. M.
National Oceanic & Atmospheric Administration
SOWAR, J. F. NEXRAD
TOBIASON, A. R. NASA Headquarters
Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems. For publication in the J. of American Meteorological Society.

CALVERT, JOHN A. EP36
The Evolution of a Release-Engage Mechanism for Use on the Orbiter. For presentation at the 17th Aerospace Mechanism Symposium at the Jet Propulsion Laboratory, Pasadena, California, May 5-6, 1982.

CAMPBELL, JONATHAN W. EC35
J-Series Thruster Isolator Failure Analysis. For presentation at the 16th AIAA/DGLR Conference, New Orleans, Louisiana, November 17-19, 1982.

CAPORALI, ALESSANDRO ES63
Response of a Doppler Cancelling System to Plan Gravitational Waves. For publication in Physical Review.

CARRUTH, MELVIN RALPH, JR. EC35
A Review of Studies of Ion Thruster Beam and Charge-Exchange Plasma. For presentation at the 16th AIAA/JSASS/DGLR International Electric Propulsion Conference, New Orleans, Louisiana, November 17-19, 1982.

CARRUTH, MELVIN R. JR. et al. EC35
Ion Thruster Charge-Exchange Plasma Flow. For presentation at the AIAA 20th Aerospace Sciences Meeting, Orlando, FL, January 11-14, 1982.

CARTER, THOMAS E. ED15
(Summer Faculty Program)
Fuel Optimal Maneuvers of Spacecraft About a Circular Orbit. For publication in the AIAA Journal of Guidance and Control.

CARUSO, SALVADORE V. EC45
Hybrid Microcircuits Used in the NASA Space Shuttle System. For publication in the Hybrid Industry Report.

CHAPPELL, C. R. ES51
OLSEN, R. C.
University of Alabama in Huntsville
GREEN, J. L.
The Discovery of Nitrogen Ions in the Earth's Magnetosphere. For publication in the Geophysical Research Letters.

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

CHAPPELL, C. R. ES51
WAITE, J. H.
JOHNSON, J. F. E.
SHAWHAN University of Iowa
OLSEN, R. University of Alabama in Huntsville
COMFORT, R.
University of Alabama in Huntsville
Dynamics Explorer Low-Energy Plasma Observations Using a Variable Aperture Bias. For presentation at the 1982 American Geophysical Union (AGU) Spring Meeting, Philadelphia, Pennsylvania, May 31 through June 4, 1982, and for publication in the EOS, Trans. AGU.

CHAPPELL, C. R. ES51/53
GREEN, J. L.
JOHNSON, J. F. E.
WAITE, J. H.
Pitch Angle Variations in Magnetospheric Thermal Plasma – Initial Observations from Dynamics Explorer-1. For publication in Geophysical Research Letters.

CHAPPELL, CHARLES R. ES51
Initial Observations of Thermal Plasma Composition and Energetics from Dynamic Explorer-1. For publication in Geophysical Research Letters.

CHAPPELL, CHARLES R. ES53
HORWITZ, J. L.
COBB, W. K.
BAUGHER, C. R.
FRANK, L. A.
EASTMAN, T. E.
ANDERSON, R. R.
SHELLEY, E. G.
On the Relationship of the Plasmapause to the Equaforward Boundary of the Auroral Oval and to the Inner Edge of the Plasma Sheet. For publication in Journal of Geophysical Research.

CHAPPELL, C. R. ES53
JOHNSON, J. F. E.
NAGAI, T.
Observations of Low Energy Ion Flows in the Magnetotail. For presentation at the 1982 AGU Spring Meeting, Philadelphia, Pennsylvania, May 31 through June 4, 1982, and for publication in the EOS, Trans. AGU.

CHAPPELL, CHARLES R. ES51
HORWITZ, J. L.
University of Alabama in Huntsville
Detached Plasma Regions. For presentation at the American Geophysical Union Spring Meeting, Philadelphia, Pennsylvania, May 31 through June 4, 1982.

CHAPPELL, C. R. ES51
Cold Plasma Distribution Above a Few Thousand Kilometers in the Auroral Zone. For presentation at the Nobel Symposium No. 54, Kiruna, Sweden, March 23-25, 1982.

CHAPPELL, C. R. ES51
The Plasmasphere as a Fundamental Link in the Evolution of Magnetospheric Plasmas. For presentation at the 1982 Yosemite Conference -- Origins of Plasmas and Electric Fields, Yosemite, California, January 25-29, 1982.

CHENG, C. ES01
TANDBERG-HANSSEN
HENZE, W
The Impulsive and Gradual Phases of a Solar Limb Flare as Observed from the Solar Maximum Mission Satellite. For publication in Solar Physics, D. Reidel Publ. Co.

CHRISTIAN, H. J. ES83
GOODMAN, S. J. USRA
Airborne Measurements of Lightning Generated Optical Emissions. For presentation at the 1982 Fall AGU Meeting, San Francisco, California, December 7-15, 1982, and for publication in EOS.

CLEMONS, J. M. EH33
LEDBETTER, F. E., III
PENN, B. G.
The Production of Silicon Carbide-Silicon Nitride Fiber Precursor Resin by a Technique Suitable for Large Scale Production. For publication in Industrial Engineering Chemistry Process Design and Development.

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

COBB, WILLIAM EP13
MALDONADO, JUAN
ENGLER, ERICH E.
Development of a Deployable Space Truss. For presentation at the 17th Aerospace Mechanism Symposium, Jet Propulsion Laboratory, Pasadena, California, May 5-6, 1982.

COMFORT, R. H.
University of Alabama in Huntsville
WAITE, J. ES51
CHAPPELL, C.
GREEN, J.
SHAWHAN, S. University of Iowa
Plasmasphere Temperature and Density from Dynamics Explorer-1 Observations. For presentation at the 1982 Spring Meeting of the American Geophysical Union (AGU), Philadelphia, Pennsylvania, May 31 through June 4, 1982, and for publications in the EOS, Trans. AGU

CRABTREE, W. L. EC12
PATTERSON, R. E.
Cassegrainian Concentrator Solar Array Exploratory Development Module. For presentation at the 17th IECEC, Los Angeles, California, August 8-13, 1982.

CRABTREE, WILLIAM L. EC12
Miniaturized Cassegrainian Concentrator Concept Demonstration. For presentation at the Space Research and Technolgy Conference, LeRC/Cleveland, Ohio, April 20-22, 1982.

DABBS, JOSEPH R. PS02
The Pinhole Occulter Facility: Concept Definition. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 1983.

DARWIN, CHARLES R. PD01
SPEARS, LUTHER T. PS01
Shuttle-Derived Vehicle Evolution. For presentation at the AIAA Biennial Space Systems, co-sponsored by the British, German, and Japanese Astron. Soc., Washington, D.C.. October 18-20, 1982.

DECHER, RUDOLF ES61
High-Accuracy Global Time and Frequency Transfer with a Space-Borne Hydrogen Maser Clock. For presentation at the 14th Annual PTTI Applications & Planning Meeting, Goddard Space Flight Center, November 30 through December 2, 1982.

DESSLER, A. J. ES01
Aurorae on Uranus. For presentation at the 14th Annual Meeting of the Division for Planetary Science of the AAS, Boulder, Colorado, October 19-22, 1982, and for publication in the Bull. AAS.

DOZIER, JAN D. EP42
Latch Fittings for the Scientific Instruments on the Space Telescope. For presentation at the Aerospace Mechanisms Symposium at the Jet Propulsion Laboratory, Pasadena, California, May 5-6, 1983.

EDWARDS, T. R. ES64
Correspondence: Two-Dimensional Convolute Integers for Analytical Instrumentation. For publication in Analytical Chemistry.

ELSNER, R. F. ES62
WEISSKOPF, M. C.
LEAHY, D. (NAS Fellow/ES62)
On Searches for Pulsed Emission with Application to Four Globular Cluster X-Ray Sources: NGC 1851, 6441, 6624, and 6712. For publication in The Astrophysical Journal.

ELSNER, R. F. ES62
DARBRO, W.
WEISKOPF, M. C.
LEAHY, D. (NRC)
X-Ray Observations of 4U1626-67 by the Monitor Counter in the Einstein (HEAO) Observatory. For publication in the Astrophysical Journal.

ELSNER, R. F. ES62
LEAHY, D.
WEISSKOPF, M. C.
SKINNER, G. K.

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

BEDFORD, D. K.
GRINDLAY, J.
HALPERN, J.
The Discovery of 69 Milliseconds Periodic X-Ray Pulsations in A0538-66. For publication in the McMillian Journals, London.

EMMIT, D. ES84
Conical Lidar Scanning from LEO – The Effects of Meso and Convective Scale Atmospheric Phenomena. For presentation at the 11th International Laser Radar Conference, Madison, Wisconsin, June 21-25, 1982.

FENNELLEY, A. J. ES63
SMALLEY, L. L.
Gravitation is Nonmetric: Experimental Evidence for Macroscopic Nonmetricity in Gravitation. For publication in the Physical Review Letters.

FERNANDEZ, K. EF42
NASA-MSFC Satellite Docking Simulator. For presentation at Southeastcon '82, Destin, Florida, April 4, 1982.

FICHTL, G. H. ES82
BILBRO, J. W.
Remote Measurement of Wind From CV-990 Airborne Platform -- Results of 1981 MSFC Doppler Lidar Flight Tests. For presentation at the 11th International Laser Radar Conference, Madison, Wisconsin, June 21-25, 1982.

FOWLIS, WILLIAM W. ES82
ROBERTS, GLYN O.
The Numerical Design of a Spherical Baroclinic Experiment for Spacelab Flights. For presentation at the International Conference on Computational Methods and Experimental Measurements, Washington, D.C., June 30-July 2, 1982.

FOWLIS, WILLIAM W. ES82
ANTAR, BASIL N.
Symmetric Baroclinic Instability of a Hadley Cell. For publication in the Journal of the Atmospheric Sciences.

FOWLIS, WILLIAM W. ES82
The Atmospheric General Circulation Experiment (AGCE) – A Spherical Baroclinic Atmospheric Flow Model Experiment for Spacelab Flights. For presentation at the Eleventh Southeastern Conference on Theoretical and Applied Mechanics (SECTAM XI), University of Alabama in Huntsville, April 8-9, 1982.

FROST, W. ES82
CAMP, D. W.
Technological Forecast for the 80's. For publication in the Journal of Aeronautics and Astronautics.

FROST, W. O. EF11
EMENS, F. H.
A Modular Data System for Spacelab Experiments, Abstract. For presentation at the 28th International Instrument Symposium, Instrument Society of America, Las Vegas, Nevada, May 3-6, 1982.

GRAVES, JAMES R. EC12
DECKER, K. D. TRW
FLECK, G. W.
Development of Management Technology for Large Power Systems. For presentation at the 17th Intersociety Energy Conversion Engineering Conference, Los Angeles, California, August 8, 1982.

GRAVES, JAMES R. EC12
DECKER, K. K. TRW
A Perspective of Power Management for Large Space Platforms. For presentation at the 17th Intersociety Energy Conversion Engineering Conference, Los Angeles, California, August 8, 1982.

GREEN, J. ES53
SAFLEKOS, N.
GURNETT, D.
POTEMRA, T.
A Correlation Between Auroral Kilometric Radiation and Field-Aligned Currents. For publication in the J. Geophysical Research.

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

GREEN, J. L. ES53
MENIETTI, J. D. SRI
SIX, F. University of Kentucky
GULKIS, S. JPL
GURNETT, D. University of Iowa
Ray Tracing of Jovian Decametric Arcs. For presentation at the Spring Meeting of AGU, Philadelphia, Pennsylvania, May 31 through June 4, 1982, and publication in EOS, Trans. AGU.

GREEN, JAMES L. ES53
GURNETT, D.
SIX, F.
MENIETTI, D.
GULKIS, S.
Model Decametric Raypaths in the Jovian Magnetospheric Medium: Voyager Confirmation. For presentation at the 1981 Fall Meeting of AGU, San Francisco, California, December 7-11, 1981, and for publication in EOS, Trans. AGU.

GREENWOOD, TERRY F. ED33
Development of Space Shuttle Base Heating Methodology and Comparison with Flight Data. For presentation at the JANNAF 13th Plume Technology Meeting, Johnson Space Center, Texas, March 23-25, 1982.

GUEST, S. H. ED24
Space Shuttle Ignition Overpressure and Acoustics. For publication in the AIAA Aeronautics and Astronautics Highlights.

GUEST, S. H. ED24
NESMAN, T. E.
DOUGHERTY, S.
Shuttle SRB Ignition Over Pressure Suppression. For presentation at the JANNAF 13th Plume Technology Meeting, Johnson Space Center, Texas, March 23-25, 1982.

GUEST, S. H. ED24
JONES, J. H.
6.4 Percent Space Shuttle Model Acoustic Overpressure Test Results. For presentation at the 102nd Acoustical Society of America Meeting, Miami Beach, Florida, November 30, 1981.

HAGYARD, M. J. ES52
Vertical Gradients of Sunspot Magnetic Fields. For publication in Solar Physics, D. Reidel, Dordrecht, Holland.

HAGYARD, M. J. ES52
Studies of Solar Magnetic Fields During the Solar Maximum Year. For presentation at the International Astronomical Union General Assembly, Patras, Greece, August 17-26, 1982.

HAGYARD, M. J. ES52
PATTY, S. R.
University of Alabama in Huntsville
Activity and Structure of Vector Magnetic Fields of Complex Sunspots Containing Magnetic Delta Classification. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 10-14, 1982.

HAGYARD, M. J. ES52
Vertical Gradients of Support Magnetic Fields. For publication in Solar Physics, Dordrecht, The Netherlands.

HAGYARD, M. J. ES52
CUMINGS, N. P.
WEST, E. A.
SMITH, J. E.
The MSFC Vector Magnetograph. I. Description and System Performance. For publication in Solar Physics. Dordrecht, The Netherlands.

HAGYARD, M. J. ES52
TANDBERG-HANSSEN, E.
HENZE, W.
WOODGATE, B. E.
Observations of the Longitudinal Magnetic Field in the Transition Region and Photosphere of a Sunspot. For publication in Solar Physics, Dordrecht, The Netherlands.

HAGYARD, M. J. ES52
West, E. A.
CUMINGS, N. P.
KRALL, K. R.
University of Alabama in Huntsville

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

SMITH, J. B. (NOAA)
Vector Magnetic Field Evolution and Associated Photospheric Velocity Shear Within a Flare-Productive Active Region. For publication in Solar Physics, Dordrecht, The Netherlands.

HAGYARD, M. J. ES52
WEST, E. A.
The MSFC Vector Magnetograph. II. Techniques for Quantitative Interpretation of Data. For publication in Solar Physics, Dordrecht, The Netherlands.

HASTINGS, LEON J. EP43
Cryogenic Fluid Transfer, OTV-Orbital Transfer Vehicle. For presentation at the Satellite Services Workshop, NASA/JSC, Houston, Texas, June 22-24, 1982.

HENDERSON, ARTHUR J., JR. EH22
A Study of a Solidification of Alloys in Zero-G. For presentation in the Space Coast (GAS) Conference, Melbourne, Florida, June 25-26, 1982.

HERREN, B. J. ES63
TIPPS, R. W.
SYNDER, R. S.
DUNNING, J. D. Indiana University
Fractionation of Mineral Species by Electrophoresis. For publication in the Journal of Geophysical Research.

HILDNER, E. ES52
SAWYER, C. B.
HYDER, C. L.
Frequency and Location of Coronal Transients Observed with the Coronagraph/Polarimeter Aboard the Solar Maximum Mission Satellite, Preliminary Results. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 11-14, 1981.

HORWITZ, J.
University of Alabama in Huntsville
BAUGHER, C. ES51
GREEN, J.
CRAVEN, P.
REASONER, D.
CHAPPELL, R.
Observations of Low-Energy Plasma Composition from the ISEE-1 and Scatha Satellites. For publication in the Proceedings of IAGA Conference, Edinburgh, Scotland, August 1981.

HYUN, JAE MIN ES82
Spin-Up of a Stratified Fluid in a Cylinder With a Conducting Sidewall. For publication in the Journal of Fluid Mechanics, in New York.

HYUN, J. M. ES82
LESLIE, F.
FOWLIS, W. W.
WARN-VARNAS, A.
Numerical Solutions for Spin-Up From Rest in a Cylinder. For publication in J. Fluid Mechanics.

HYUN, J. M. ES82
Spin-Up Flows in a Cylinder. For presentation at SECTAM XI, University of Alabama in Huntsville, April 8-9, 1982.

HORWITZ, J. (UAH) ES53
GREEN, J. L.
CHAPPELL, C. R.
JOHNSON, J. F.
BAUGHER, C. R.
Low-Energy Plasma Composition Results From ISEE. For presentation at the 24th Meeting of COSPAR/Symposium on Results from IMS Spacecraft, Ottawa, Canada, May 17-June 2, 1982.

HUGHES, JAMES F. PD11
DAVIS, ELDON E.
SRB-X – A Shuttle Derived Launch Vehicle Using SRBs. For presentation at the AIAA Biennial Space Systems Conference, Washington, D.C., October 18-20, 1982.

HUNG, R. J. (UAH) ES81
SMITH, R. E. (MSFC)
Remote Sensing of Convective Storms From Geosynchronous Satellite Infrared Digital Data. For publication in the International Journal of Remote Sensing, London.

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

JOHNSON, J. F. E. ES51
CHAPPELL, C. R.
GREEN, J. L.
WAITE, J. H.
Observations of the High Latitude Plasmapause Region. For presentation at the 1982 Spring Meeting of American Geophysical Union (AGU), Philadelphia, Pennsylvania, May 31-June 4, 1982, and for publication in the EOS, Trans. AGU.

JOHNSTON, M. H. ES22
OWEN, R. B.
Optical Observation of Unidirectional Solidification in Microgravity. For publication in Metallurgical Transactions.

JOHNSTON, M. H. EH22
PARR, R. A.
SCHAFER, C. F.
The Formation of Aligned Spheres in Miscibility Gap Systems. For publication in Metallurgical Transactions.

JONES, CLYDE S., III EH42
NASA's Use of Robotics in Materials Processing. For presentation at the Industry Applications Society Conference of the IEEE, San Francisco, California, October 2, 1982.

JONES, CLYDE S., JR. EC24
KOLLODGE, JERRY (BASD)
An Advanced Star Tracker Design for Pointing and Control of Space Vehicles Using the Charge Injection Device as a Sensor. For presentation at the Annual Rocky Mountain Guidance and Control Conference, Keystone, Colorado, February 2, 1982.

JONES, JESS H. ED21
Adaptive Digital Filtering Techniques. For publication in AIAA Highlights (December 1982).

JONES, JESS H. ED24
Scaling of Ignition Start-Up Pressure Transient in Rocket Systems. For presentation at the JANNAF 13th Plume Technology Meeting, Johnson Space Center, Texas, March 22-25, 1982.

JONES, WILLIAM D. EB23
Airborne Measurements of Atmospheric Backscatter at 10.6 um. For presentation at the Topical Meeting on Optical Techniques for Remote Probing of the Atmosphere in Incline Village, Nevada, January 10-12, 1982.

KRAMER, RICHARD D. EP22
Combustion Characteristics of Solvent Refined Coal (SRC) as a Solid Rocket Fuel. For publication in the AIAA Journal of Spacecraft and Rockets.

KUNTE, P. K. (NAS/NRC) ES62
DAMLE, S. V.
NARANAN, S.
VENKATESAN, D.
GALAS, C.
LIEU, R.
Hard X-Rays from the Gamma-Ray Source CG195+4. For presentation at the 159th AAS Meeting, Boulder, Colorado, January 10-14, 1982, and for publication in the Bulletin of AAS.

LEAHY, D. A. ES62
ELSNER, R. F.
WEISSKOPF, M. C.
On Searches for Pulsed Emission: The Rayleigh Test Compared to Epoch Folding. For publication in Nature.

LEAHY, D. (NAS/NRC) ES62
Search for Periodic Pulsation in Four Globular Cluster X-Ray Sources. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 10-14, 1982.

LANIER, J. R., JR. EC12
A Programmable Power Processor for High Power Space Applications. For presentation at the Power Electronics Specialist Conference, Cambridge, Massachusetts, June 15-17, 1982.

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

LAUE, JAY H. PS01
MANARINI, GIANFRANCO, DR.
Rome, Italy (CNR)
The Tethered Retrievable Platform Concept and Utilization. For presentation at the International Astronautical Federation XXXIIIrd International Congress, Paris, September 26-October 23, 1982.

LESLIE, F. ES82
HYUN, J.
FOWLIS, W.
WARN-VARNAS, A. L.
Numerical Solutions for the Spin-Up from Rest of a Homogeneous Fluid in a Cylinder. For presentation at the International Conference on Computational Methods and Experimental Measurements, Washington, D.C., June 20-July 2, 1982.

LESTER, R. C. JA11
Spacelab Experiment Integration. For presentation at the AIAA 21st Aerospace Science Meeting, Reno, Nevada, January 10-13, 1983.

McCAY, THURMAN D., DR. EP24
Diffusive Separation of Binary Mixtures of CO_2-H_2 in a Sonic Orifice Expansion. For publication in Physics of Fluids.

MCKANNAN, EUGENE C. ES01
Materials Processing in Space. For presentation at the Design and Production Engineering Technical Conference, ASME, Washington, D.C., September 15, 1982.

MARSHALL, WILLIAM R. PA01
U. S. Launch Systems Evolution. For presentation at the Twentieth Goddard Memorial Symposium, Goddard Space Flight Center, March 11-19, 1982.

MARSHALL, W. R. PA01,PS06
CAREY, W. T.
TAYLOR, K.
A Focus for Space Industrialization. For presentation at the Space Manufacturing Operations session of the Nineteenth Space Congress, Cocoa Beach, Florida, April 28-30, 1982.

MARTIN, CHARLES L. EP25
Evidence of Erosive Burning in Shuttle Solid Rocket Motor. For presentation at the 1982 JANNAF Propulsion Meeting, Las Vegas, Nevada, November 16-18, 1982.

MILLER, EDGAR R. ES61
Preliminary Results of the Induced Environment Contamination Monitor Measurements on STS-2. For presentation at the SPIE (Society for Photo-Instrumentation Engineers) 1982 Technical Symposium East, Washington, D.C., May 4-7, 1982.

MILLER, E. R. ES61
LEGER, L. J. JSC
EHLERS, H. K. JSC
JACOBS, S. JSC
Space Shuttle Contamination Measurements from Flight STS-1 and STS-2. For presentation at the 12th Space Simulation Conference, Pasadena, California, May 17-19, 1982.

MILLER, J. L. EC01
The Swing to Concentrator Arrays. For presentation at the Third European Symposium on Photovoltaic Generators in Space, Bath, England, May 2-7, 1982.

MOORE, R. L. ES52
HURFORD, G. J. (Cal Tech)
JONES, H. P. (GSFC)
KANE, S. R. (UCB)
Observations of Sudden Changes of Magnetic Structure in a Flare. For presentation at the 159th Meeting of the American Astronomical Society, Boulder, Colorado, January 10-15, 1982, and for publication in the Bulletin of the AAS.

MOORE, R. L. ES52
DOWDY, J. UAH
WU, S. T. UAH
Inhibition of Heat Conduction into the Transition Region by Magnetic Constriction. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 11-14, 1982.

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

NAGAI, F. (NAS Fellow) ES52
Transient Behavior of a Flare-Associated Solar Wind, I: Gas Dynamics in a Radial Open Field Region. For publication in the Astrophysical Journal.

NAGAI, F. (NRC Fellow) ES52
Transient Behavior of Flare-Associated Solar Wind, II: In a Non-Radial Open-Field Region. For presentation at the American Astronomical Society Meeting, Troy, New York, June 6-9, 1982, and for publication in the Bulletin of AAS.

NAGAI, T. ES53
JOHNSON, J. F. E.
CHAPPELL, C. R.
Low-Energy (100 eV) Ion Pitch Angle Distributions on the Magnetosphere by ISEE-1. For presentation in the 1982 AGU Fall Meeting, San Francisco, California, December 7-15, 1982, and for publication in EOS, Trans. AGU.

NAGAI, TSUGUNOBU ES53
Local Time Dependence of Electron Flux Changes During Substorms Derived from Multi-Satellite Observation at Synchronous Orbit. For publication in the J. of Geophysical Research.

NAGAI, TSUGUNOBU ES53
Observed Magnetic Substorm Signatures at Synchronous Altitude. For publication in the J. of Geophysical Research.

NARANAN, S. (NAS/NRC) ES62
A Study of Pulsing X-Ray Sources. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 10-14, 1982.

NAUMANN, ROBERT J. ES71
Scientific Results from the Materials Processing in Space Program. For publication in the Proceedings of the 84th Annual Meeting of the American Ceramic Society: Advances in Ceramics.

NAUMANN, R. J. ES71
An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth, I. One-Dimensional Analysis. For publication in the Journal of Crystal Growth, Amsterdam, The Netherlands.

NAUMANN, R. J. ES71
An Analytical Approach to Thermal Modeling of Bridgman-Type Crystal Growth, II: Two-Dimensional Analysis. For publication in the Journal of Crystal Growth, Amsterdam, The Netherlands.

NAUMANN, ROBERT J. ES71
Overview of Scientific Results from the Materials Processing in Space Program. For presentation at the American Ceramic Society (ACS), Cincinnati, Ohio, May 2-5, 1982.

NEIN, MAX E. PS02
Concepts for Large Interferometers in Space. For presentation at the AIAA/SPIE/OSA Technology for Space Astrophysics – The Next 30 Years Symposium, Danbury, Connecticut, October 4-6, 1982.

NEIN, M. E. PS02
Conceptual Design of a Coherent Optical System of Multiple Imaging Collectors (COSMIC). For presentation at the International Conference on Advanced Technology Optical Telescopes, Tucson, Arizona, March 11-13, 1982.

NUNES, ARTHUR C., JR. EH42
An Extended Rosenthal Weld Model. For publication in the Welding Journal – Research Supplement, American Welding Society, Miami, Florida.

NUNES, ARTHUR C., JR. EH42
THOMPSON, R. G.
CALLAGHAN, M.
Measuring the Near-Solidus Incipient Crack Strain in Inconel 718. For publication in the Welding Journal, Miami, Florida.

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

NUNES, ARTHUR C., JR. EH42
Energy: Arc and Beam Welding Processing. For presentation at the 1982 Meeting of The Southeastern Section of the American Society for Engineering Education, Huntsville, Alabama, April 6, 1982.

NURRE, G. S. ED11
RYAN, R. S.
SCOFIELD, H. N.
SIMS, J. L.
Dynamics and Control of Large Space Structures. For publication in the AIAA Journal of Guidance and Control.

NURRE, GERALD S. ED12
DOUGHERTY, H.
TOMPETRINI, K.
Space Telescope Pointing Control System. For presentation at the IEEE Eascon Conference, Washington, D.C., November 18, 1981.

O'Brien, C. J. Aerojet Liquid Rocket Company
Dual Nozzle Design Update. For presentation at the AIAA/SAE/ASME 18th Joint Propulsion Conference, Cleveland, Ohio, June 22, 1982.

O'DELL, C. R. EA01
FOUNTAIN, W. R.
GARY, G. A.
A Study of Hα Radial Velocities in NGC 1499, NGC 7000, and IC 1318B/C. For publication in the Astrophysical Journal.

O'DELL, C. R. EA01
The Space Telescope Observatory. For presentation at the International Astronomical Union General Assembly, Patras, Greece, August 17-26, 1982.

O'DELL, C. R. EA01
The Space Telescope Program. For presentation at the Twenty-Fourth Plenary Meeting of COSPAR, Ottawa, Canada, May 20-22, 1982.

OMENYL, S. N. ES73
SNYDER, R. S.
ABSOLOM, D. R.
VAN OSS, C. J.
NEUMANN, A. W.
Enhanced Erythrocyte Suspension Layer Stability Achieved by Surface Tension Lowering Additives. For publication in the J. Dispersion Sci. Technology.

OWEN, ROBERT B. ES74
Interferometric Measurements of Unidirectional Solidification in Microgravity. For presentation at the Optical Society of America 1982 Annual Meeting, Tuscon, Arizona, October 18-22, 1982.

OWEN, R. B. ES74
Interferometry and Holography in a Low Gravity Environment. For publication in Applied Optics.

PARNELL, T. A. ES62
Direct Measurement of Cosmic Ray Chemical Composition at E 20 TeV/Nucleus. For presentation at the Spring Meeting of the American Physical Society, Washington, D.C., April 26-29, 1982.

PARNELL, T. A. ES62
Proton-Nucleus and Nucleus-Nucleus Interactions at Energies Above 10 TeV. For presentation at the Spring Meeting of the American Physical Society, Washington, D.C., April 26-29, 1982.

PARNELL, T. A., et al. ES62
New Event Types in a Balloon-Borne Cosmic Ray Experiment. For publication in the Proceedings of "pp Collider Conference," AIP, New York.

PATTY, S. R. ES52
Analysis of the Vector Magnetic Fields of Complex Sunspots. For publication in the Proceedings of Sunspot Workshop, Sunspot, New Mexico.

PAUL, J. E. ED21
JEWELL, RONALD E.
JONES, JESS H.
Diagnostic Analysis of Vibration Signals

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

Using Adaptive Digital Filtering Techniques. For presentation at the 24th SDM Conference, Lake Tahoe, Nevada, May 2-4, 1983.

PEACOCK, JR., C. L. EH12
Effects of Long Duration Exposure to Simulated Space Environment on Nonmetallic Materials Properties. For presentation at the AGARD Meeting in Space Environmental Effects on Materials, Toronto, Canada, 1982.

PENN, B. G. EH33
LEDBETTER, F. E., III
CLEMONS, J. M.
A Commercial Process for Preparing Tris (N-Methylamino) Methylsilane Monomer for Use in Producing Silicon Carbide-Silicon Nitride Fibers. For publication in the Industrial and Engineering Chemistry Process Design and Development.

POWELL, LUTHER E. PM01
The Space Platform: A Permanent Presence in Space. For presentation at the AIAA SSTC Biennial Space Systems Conference, Cosponsored by British Interplanetary Soc., Washington, D.C., October 18-20, 1982.

POWELL, L. E. PM01
Space Platform. For presentation at EASCON '81 – IEEE, Washington, D.C., November 18, 1981.

POWELL, L. E. PM01
LEVINTHAL, J. Bendix
MORATA, L. MDAC
Space Platform Attitude Control System. For presentation to the Joint IFAC/ESA Symposium on Automatic Control in Space, Noorjwijk ER Hour, Netherlands, July 5-9, 1982.

PRIEST, CLAUDE C. PS04
Space Platform/Stations. For presentation at the Space Utilization and Future Development Symposium, Rome, Italy, December 9, 1981.

RAY, JOHN R. ES63
REID, JAMES L.
CULLEN, JOHN J.
LIE and Noether Symmetry Groups of Nonlinear Equations. For publication in the Journal of Physics A, England.

REASONER, DAVID L., DR. ES53
Shuttle-Orbiter-Induced Plasma Modifications. For presentation at the American Geophysical Union Fall Meeting, San Francisco, December 7-15, 1982.

REASONER, D. ES53
CRAVEN, P.
CHAPPEL
Low-Energy Ions in the Plasmasphere and Plasma Trough. For presentation at the 1982 Yosemite Conference, Origins of Plasmas and Magnetic Fields in the Magnetospheric, Yosemite, California, January 25-29, 1982.

ROBERTS, WILLIAM T. PS02
The Solar Terrestrial Observatory as a Payload for Space Platform. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 1982.

ROBERTS, WILLIAM T. PS02
The Advanced Solar Observatory: Concept Definition. For presentation at the AIAA 21st Aerospace Sciences Meeting, Reno, Nevada, January 10-13, 1983.

ROBINSON, M. B. ES74
RATHZ, T. J. ES74
EVANS, N. A. Vanderbilt University
HOFMEISTER, W. H. Vanderbilt University
BAYUZICK, R. J. Vanderbilt University
The Preparation of Nb-Ge and Nb-Al Alloys By Containerless Solidification in Long Drop Tubes. For presentation at the Materials Research Society, 1982 Annual Meeting, Boston, Massachusetts, November 1-4, 1982.

RYAN, R. S. ED21
JEWELL, R. E.

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

A Preliminary Look at Control Augmented Dynamic Response of Structures. For presentation at the 24th SDM Conference, Lake Tahoe, Nevada, May 2-4, 1983.

SANDERS, FRED G. EL15
Working in Space. For presentation at the AIAA/SPIE/OSA Technology for Space Astrophysics, Danbury, Connecticut, October 4-6, 1982.

SCHAFER, C. EH22
JOHNSTON, M. H.
PARR, R. A.
The Formation of Aligned Spheres in Miscibility Gap Systems. For publication in the Acta Metallurgia, Schenectady, New York.

SCHAFER, C. F. ES82
Fluid Mechanics of Some Low Gravity Experiments. For presentation at the UAH Department of Mechanical Engineering Colloquium, Huntsville, Alabama, October 16, 1981.

SCHMAHL, E. J. ES52
KUNDU, M. R.
STRONG, K. T.
BENTLEY, R. D.
SMITH, JR., J. B.
KRALL, K. R.
Active Region Magnetic Fields Inferred from Simultaneous VLA Microwave Maps, X-Ray Spectroheliograms, and Magnetograms. For publication in Solar Physics, Utrecht, Holland.

SHELTON, HARVEY L. EE01
AGS Performance and the Effects of Flexibility. For presentation at the IEEE Control Society, Redstone Arsenal, April 23, 1982.

SHELTON, HARVEY L. EE01
Dynamics and Control of the AGS. For presentation at the 1982 AIAA Guidance and Control Conference, San Diego, California, August 9-11, 1982.

SHELTON, HARVEY L. EE01
SELTZER, SHERMAN
Effects of Flexibility on AGS Performance. For presentation at the American Astronautical Society Annual Rocky Mountain G&C Conference, Keystone, Colorado, January 30-February 3, 1982.

SMALLEY, LARRY L. ES61
RAY, JOHN R.
Improved Perfect Fluid Energy-Momentum Tensor with Spin in Einstein-Cartan Spacetime. For publication in Physical Review Letters.

SMALLEY, LARRY L. ES63
RAY, JOHN R.
Spinning Fluids in the Einstein-Cartan Theory. For publication in The Physical Review.

SMALLEY, LARRY L. ES63
RAY, JOHN R.
Spinning Fluids in General Relativity. For publication in The Physical Review.

SMALLEY, LARRY L. ES63
An Apparent Incompatibility of Gauge Field Theories and Gravitation. For publication in Physical Review Letters.

SMALLEY, LARRY L. ES63
RAY, JOHN R.
Perfect Fluids in the Einstein-Cartan Theory. For publication in Physical Review.

SMALLEY, LARRY L. ES63
A Simplified Calculation of the Riemann Curvature Tensor Using Generalized Geometrical Notation for Parallel Transport. For publication in the American Journal of Physics.

SMALLEY, LARRY L. ES63
Incompatibility of Gauge Field Theories and Gravitation. For presentation at the Gravity Research Foundation Essay Contest, Gloucester, Massachusetts.

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

SMITH, J. B., JR. ES52
HAGYARD, M. J.
Sheared Magnetic Fields and Flare Occurrence. For presentation at the International Astronomical Union General Assembly, Patras, Greece, August 17-26, 1982.

SMITH, R. E. ES81
ADELFANG, S. I. CSC
TUBBS, J. D. University of Arkansas
A Bivariate Gamma Probability Distribution. For presentation at the Annual Joint Statistical Meetings, American Statistical Association, Cincinnati, Ohio, August 16-19, 1982.

SMITH, R. E. ES81
HUNG, R. J.
University of Alabama in Huntsville
Fluid Mechanics Simulation of the Effect of Combustion-Related Pollutants on Fog Formation. For presentation at the Eleventh Southeastern Conference on Theoretical and Applied Mechanics, Huntsville, Alabama, April 8-9, 1982.

SMITH, R. E. ES81
HUNG, R. J.
University of Alabama in Huntsville
Satellite Infrared Imagery, Rawinsonde Data, and Gravity Wave Remote Sensing of Severe Convective Storms. For publication in the International Journal of Infrared and Millimeter Waves.

SNYDER, ROBERT S. ES73
Continuous Flow Electrophoretic Separations of Biomaterials on Earth and in Space. For presentation at the Gordon Conference on Separation and Purification, New London, New Hampshire, August 15, 1982.

SPEER, F. A. TA01
Space Telescope Design Status and Operations For presentation at the AAS 20th Goddard Memorial Symposium, GSFC, Greenbelt, Maryland, March 17-18, 1982.

STONE, NOBIE H. ES53
Preliminary Results from the Map-1 and Map-2 Differential Ion Flux Probes. For publication at the American Geophysical Union Fall Meeting, San Francisco, December 7-15, 1982.

STONE, NOBIE H. ES53
SAMIR, URI University of Michigan
WRIGHT, K. H.
University of Alabama in Huntsville
Laboratory Studies of Bodies in Collisionless Mesosonic Plasma Streams. For presentation at the 1982 Conference on Plasma Physics, Gothenburg, Sweden, June 9-15, 1982.

TANDBERG-HANSSEN, EINAR A. ES01
The Behavior of Transition-Region Lines During Impulsive Solar Flares. For presentation at the Joint U.S.-Japan Seminar/Workshop on the Recent Advances in the Understanding of Solar Flares, Tokyo, Japan, October 5-8, 1982.

TANDBERG-HANSSEN, EINAR A. ES01
Studies with the Pinhole/Occulter Facility. For presentation at the 21st Aerospace Sciences Meeting of the AIAA, Reno, Nevada, January 10-13, 1982.

TANDBERG-HANSSEN, E. ES01
POLAND, A. I.
Physical Conditions in a Quiescent Prominence Derived from UV Spectra Obtained with the UVSP Instrument on the SMM. For publication in Solar Physics, the Netherlands.

TANDBERG-HANSSEN, EINAR ES01
WU, S. T. University of Alabama in Huntsville
WANG, J. F.
University of Alabama in Huntsville
Numerical Simulation of Evolution of Solar Magnetic Fields in Active Regions. For presentation at the IAU Commission 10th Scientific Session, 28th General Assembly of the IAU, Patras, Greece, August 17-26, 1982.

TANDBERG-HANSSEN, E. ES01
NAGAI, F. (NAS)
WU, S. T. University of Alabama in Huntsville

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

Evolution of Electron and Proton Temperatures in a Flaring Loop – I. A Case of Thermal Heating of Electrons. For publication in Solar Physics, Dordrecht, The Netherlands.

TANDBERG-HANSSEN, E. ES01
WU, S. T.
MEIN, N.
SCHMIEDER, B.
SIMON, G.
Dynamics of the Eruptive Prominence of 6 May 1982 and Its Relationship to the Coronal Transient. For publication in Astronomy and Astrophysics for European Southern Observ., Springer-Verlag, Berlin.

TANDBERG-HANSSEN, E. ES01
WU, S. T.
HU, Y. Q.
NAKAGAWA, Y.
Induced Mass and Wave Motions in the Lower Solar Atmosphere. I. Effects of Shear Motion of Flux Tubes. For publication in Solar Physics, The Netherlands.

TANDBERG-HANSSEN, E. ES01
Time Series of Radio, UV, Soft and Hard X-Ray Data From Flare of November 1, 1980. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 11-14, 1982.

TANDBERG-HANSSEN, E. ES52
NAGAI, F. ES53
WU, S. T. University of Alabama in Huntsville
Evolution of Electron and Proton Temperatures in a Flaring Loop: I. A Case of Thermal Heating of Electrons. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 11-14, 1982.

THOMPSON, JERRY EE21
Space Shuttle Main Engine – Development and Light Results. For presentation at the 1982 ASME Annual Symposium, American Soc. of Mech. Engineers, Scottsdale, Arizona, May 15, 1982.

TOMLIN, DONALD D. ED13
Control Techniques to Improve Space Shuttle Solid Rocket Booster (SRB) Separation. For publication in the AIAA Journal of Guidance and Control.

TRUCKS, H. F. TA71
Space Telescope, Man's Eye In Space. For presentation at the WATTec Conference, Knoxville, Tennessee, February 24-26, 1982.

TRUCKS, H. F. TA71
Space Telescope Maintenance and Refurbishment. For presentation at the 7th Aerospace Testing Seminar, Los Angeles, California, October 13-15, 1982.

TURNER, J. R. PS04
AGAN, W. E. Vought Corporation
FRENCH, R. J.
Teleoperator Maneuvering System. For presentation at the AIAA 1982 Biennial Space Systems Conference, Washington, D.C., October 18-20, 1982.

TURNER, ROBERT E. ES84
VAUGHAN, WILLIAM W. ES81
NASA's Needs for Transport and Diffusion Information for Research and Operations. For publication in the Proceedings of Workshop on the Parameterization of Mixed Layer Diffusion, Las Cruces, New Mexico.

VANDERHOFF, J. E. ES73
KORNFELD, D. M.
Preparation of Large-Particle-Size Monodisperse Latexes in Microgravity. For presentation at the AIAA 33rd International Astronautical Congress, Paris, October 1, 1982.

VANDERHOFF, J. E. ES73
KORNFELD, D. M.
Preparation of Large-Particle-Size Monodisperse Latexes in Microgravity. For publication in Science.

VANDERHOFF, J. W. Lehigh University
Preparation of Large-Particle-Size Monodisperse Latexes in Microgravity. For publication in Science.

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

VAUGHAN, O. H. ES83
VONNEGUT, BERNARD (SUNY)
BROOK, MARX (NMT)
Observation of Thunderstorms from Space Shuttle. For presentation at the American Geophysical Union Fall Meeting, San Francisco, December 7-15, 1982.

VAUGHAN, O. H., JR. ES83
VONNEGUT, B.
Lightning to the Ionosphere? For publication in Weatherwise.

VAUGHAN, OTHA H. ES82
BROOK. M.
VONNEGUT, B.
Observation of Thunderstorms from Space Shuttle. For presentation at the AGU Fall Meeting, San Francisco, California, December 7-11, 1981.

VAUGHAN, O. H. ES83
VONNEGUT, B.
BROOK, M.
ORVILLE, R. E.
Thunderstorm Overflight Program. For presentation at the 12th Space Simulation Conference, Pasadena, California, May 17-19, 1982.

WAITE, JACK H., JR. ES53
Polar Ion Streams. For presentation at the American Geophysical Union Fall Meeting, San Francisco, California, December 7-15, 1982.

WAITE, JACK H., JR. ES53
ATREYA, S. K.
CRAVENS, T. E.
The Saturn Ionosphere: A Current Perspective. For publication in the Journal of Geophysical Research.

WAITE, JACK H., JR. ES53
Electron Precipitation and Related Aeronomy of the Jovian Thermosphere and Ionosphere. For publication in the J. of Geophysical Research.

WAITE, J. H. ES51
CHAPPELL, C. R.
JOHNSON, J. F. E.
GREEN, J. L.
CONFORT, R. H.
University of Alabama in Huntsville
DE/RIMS Observations of the Polar Wind. For presentation at the 1982 Spring Meeting of American Geophysical Union (AGU), Philadelphia, Pennsylvania, May 31-June 4, 1982, and for publication in EOS, Trans. AGU.

WAITE, J. H., DR. ES53
Calculations of the Atomic Hydrogen Distribution in the Upper Atmosphere of Jupiter. For presentation at the XXIVth COSPAR Meeting, Ottawa, Canada, on May 17-June 2, 1982.

WEISSKOPF, MARTIN C., DR. ES62
ELSNER, R. F.
The Period History of the X-Ray Pulsar in MSH1 5-52, For publication in The Astrophysical Journal.

WEISSKOPF, M. C. ES62
A0538-66, Discovery of Periodic Pulsations in the X-Ray Emission From the Transient Optical and X-Ray Source A0538-66. For publication in the Central Bureau for Astronomical Telegrams.

WEISSKOPF, M. C. ES62
Microsecond Time Resolution Observations of Cygnus X-1. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 10-14, 1982.

WEST, E. A. ES52
HAGYARD, M. J.
Intepretation of Vector Magnetograph Data Including Magneto-Optic Effects: I. Azimuth Angle of the Transverse Field. For publication in Solar Physics, Dordrecht, Holland.

WEST, E. A. ES52
HAGYARD, M. J.
Interpretation of Vector Magnetography

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

Data Including Magneto-Optic Effects: I. Azimuth Angle of the Transverse Field. For publication in Solar Physics, Dordrecht, Holland.

WHITAKER, ANN F. EH12
Silicon Solar Cell Characterization at Low Temperatures and Low Illuminations as a Function of Particulate Irradiation. For presentation at the AGARD Meeting in Space Environmental Effects on Materials, Toronto, Canada, 1982.

WILSON, GREGORY S. ES84
Medium-Range Objective Predictions of Thunderstorms on the McIDAS/CSIS Interactive Computer Systems. For presentation at the Ninth AMS Conference on Weather Forecasting and Analysis, Seattle, Washington, June 28-July 1, 1982.

WILSON, GREGORY S. ES81
The Development and Utilization of Space Measurements for Studying and Modeling Severe Environmental Studies. For presentation at the CIMMS Symposium on Mesoscale Modeling, Norman, Oklahoma, June 1-4, 1984.

WOO, JOHN Gamma Research Corp.
GUEST, STANLEY H.
JONES, JESS H.
A Study of Effects of Water Addition on Supersonic Gas Streams. For presentation at the JANNAF 13th Plume Technology Meeting, Johnson Space Center, Texas, March 23-24, 1982.

WU, S. T. University of Alabama in Huntsville
HAGYARD, M. J. ES52
SMITH, J. B., JR.
Space Environment Laboratory/NOAA
HU, Y. Q. University of Alabama in Huntsville
KRALL, KENNETH
University of Alabama in Huntsville
Modeling of Energy Buildup for a Flare-Productive Active Region. For presentation at the 159th Meeting (Bull. AAS) American Astronomical Society, Boulder, Colorado, January 11-14, 1982.

ZRNIC, National Severe Storms Lab. EC32
BILBRO, J. W. EC32
Probing of Optically Clear Air at NSSL. For presentation at the National Radio Science Meeting, University of Colorado, January 1982.

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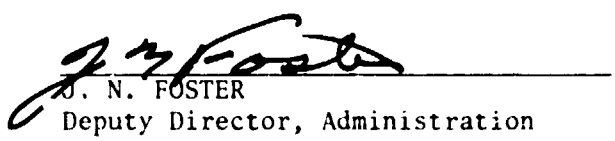
The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.



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