NASA/TM—1999-209149

FY 1998 Scientific and Technical Reports, Articles, Papers, and Presentations

Compiled by
J.E. Turner Waits
Marshall Space Flight Center, Marshall Space Flight Center, Alabama

National Aeronautics and
Space Administration

Marshall Space Flight Center

March 1999

Available from:

NASA Center for AeroSpace Information
800 Elkridge Landing Road
Linthicum Heights, MD 21090–2934
(301) 621–0390

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487–4650

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."

The N number shown for the reports listed is assigned by the Center for AeroSpace Information (CASI), Hanover, MD, indicating that the material is unclassified and unlimited and is available for public use. These publications can be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The N number should be cited when ordering.

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

FY 1998 SCIENTIFIC AND TECHNICAL REPORTS
ARTICLES, PAPERS, AND PRESENTATIONS

TABLE OF CONTENTS

TM—97–206310 November 1997

Investigation of the Springback Associated With Composite Material Component Fabrication (MSFC Center Director's Discretionary Fund Final Report, Project No. 94–09). M.A. Benzie. Materials and Processes Laboratory. 19980007549N

The objective of this research project was to examine processing and design parameters in the fabrication of composite components to obtain a better understanding and attempt to minimize springback associated with composite materials. To accomplish this, both processing and design parameters were included in a Taguchi-designed experiment. Composite angled panels were fabricated, by hand layup techniques, and the fabricated panels were inspected for springback effects. This experiment yielded several significant results. The confirmation experiment validated the reproducibility of the factorial effects, error recognized, and experiment as reliable. The material used in the design of tooling needs to be a major consideration when fabricating composite components, as expected. The factors dealing with resin flow, however, raise several potentially serious material and design questions. These questions must be dealt with up front in order to minimize springback: viscosity of the resin, vacuum bagging of the part for cure, and the curing method selected. These factors directly affect design, material selection, and processing methods.

TM—97–206317 November 1997

The Impact Response of Carbon/Epoxy Laminates (MSFC Center Director's Discretionary Fund Final Report, Project No. 94–13). A.T. Nettles and A.J. Hodge. Materials and Processes Laboratory. 19980009327N

Low velocity dropweight impact tests were conducted on carbon/epoxy laminates under various boundary conditions. The composite plates were 8-ply (+45,0,–45,90)s laminates supported in a clamped-clamped/free-free configuration with varying amounts of in-plane load, Nx, applied. Specimens were impacted at energies of 3.4, 4.5, and 6 Joules (2.5, 3.3, and 4.4 ft-lb). The amount of damage induced into the specimen was evaluated using instrumented impact techniques, x-ray inspection, and cross-sectional photomicroscopy. Some static identation tests were performed to examine if the impact events utilized in this study were of a quasi-static nature and also to gain insight into the shape of the deflected surface at various impact load combinations. Load-displacement curves from these tests were compared to those of the impact tests, as was damage determined from x-ray inspection. The finite element technique was used to model the impact event and determine the stress field within the laminae.

Results showed that for a given impact energy level, more damage was induced into the specimen as the external in-plane load, Nx, was increased. The majority of damage observed consisted of back face splitting of the matrix parallel to the fibers in that ply, associated with delaminations emanating from these splits. The analysis showed qualitatively the results of impact conditions on maximum load of impact, maximum transverse deflection, and first failure mode and location.

TM—1998–206528 March 1998

ISWE: A Case Study of Technology Utilization. M.P. Benfield, D.P. Mitchell, M.T. Vanhooser, and D.B. Landrum. Systems Analysis and Integration Laboratory. 19980027602N

The International Space Welding Experiment is a joint project between the E.O. Paton Welding Institute of Kiev, Ukraine and the George C. Marshall Space Flight Center in Huntsville, Alabama. When an international partner is involved in a project, differences in design and testing philosophy can become a factor in the development of the hardware. This report addresses selected issues that arose during the ISWE hardware development as well as the solutions the ISWE team made.

TM—1998–206953 January 1998

Damping Mechanisms for Microgravity Vibration Isolation (MSFC Center Director's Discretionary Fund Final Report, Project No. 94–07). M.S. Whorton, J.T. Eldridge, R.C. Ferebee, J.O. Lassiter, and J.W. Redmon, Jr. Structures and Dynamics Laboratory. 19980017169N

As a research facility for microgravity science, the *International Space Station* (*ISS*) will be used for numerous investigations such as protein crystal growth, combustion, and fluid mechanics experiments which require a quiescent acceleration environment across a broad spectrum of frequencies. These experiments are most sensitive to low-frequency accelerations and can tolerate much higher accelerations at higher frequency. However, the anticipated acceleration environment on *ISS* significantly exceeds the required acceleration level. The ubiquity and difficulty in characterization of the disturbance sources precludes source isolation, requiring vibration isolation to attenuate the anticipated disturbances to an acceptable level. This memorandum reports the results of research in active control methods for microgravity vibration isolation.

TM—1998–206956/VOL1 January 1998
Living Together in Space: The Design and Operation of the Life Support Systems on the *International Space Station*, VOL1. P.O. Wieland. Structures and Dynamics Laboratory. 19980037427N

The *International Space Station* (*ISS*) incorporated elements designed and developed by an international consortium led by the United States (U.S.), and by Russia. For this cooperative effort to succeed, it is crucial that the designs and methods of design of the other partners are understood sufficiently to ensure compatibility. Environmental Control and Life Support (ECLS) is one system in which functions are performed independently on the Russian Segment (RS) and on the U.S./international segments. This document describes, in two volumes, the design and operation of the ECLS Systems (ECLSS) on board the *ISS*. Volume I is divided into three chapters. Chapter I is a general overview of the *ISS*, describing the configuration, general requirements, and distribution of systems as related to the ECLSS, and includes discussion of the design philosophies of the partners and methods of verification of equipment. Chapter II describes the U.S. ECLSS and technologies in greater detail. Chapter III described the ECLSS in the European Attached Pressurized Module (APM), Japanese Experiment Module (JEM), and Italian Mini-Pressurized Logistics Module (MPLM). Volume II describes the Russian ECLSS and technologies in greater detail. These documents present thorough, yet concise, descriptions of the *ISS* ECLSS.

TM—1998–207195 February 1998
Database for the Tribological Properties of Self-Lubricating Materials. T.R. Jett and R.L. Thom. Materials and Processes Laboratory. 19980039325N

A test program to determine the tribological properties of several self-lubricating composites was performed. Testing was done using an LFW–1 Friction and Wear machine. Each material was tested at four load levels (66 N, 133 N, 266 N, and 400 N) under ambient conditions. The coefficient of friction and wear rate was determined for each material, and a relative ranking of the composites was made.

TM—1998–207685 March 1998
Measurement of Damping of Composite Materials for Turbomachinery Applications (MSFC Center Director's Discretionary Fund Final Report, Project No. 94–05). D.L. Harris. Structures and Dynamic Laboratory.

The scientific community has felt that ceramic matrix composite (CMC) materials possess more material damping than the superalloys used in the production of rocket engine turbomachinery turbine-end components. The purpose of this NASA/MSFC study is to quantify the damping in CMC's as compared to a typical superalloy, Inconel 718. It was observed through testing of beam coupons and disk specimens that the CMC's do indeed possess more material damping than the baselined alloy Inconel 718.

TM—1998–207891 April 1998
Third United States Microgravity Payload: One Year Report. P.A. Curreri, D. McCauley,* and C. Walker,** Editors, Space Sciences Laboratory, University of Alabama in Huntsville.* Universities Space Research Association.**

This document reports the one year science results for the Third United States Microgravity Payload (USMP-3). The USMP-3 major experiments were on a support structure in the Space Shuttle's payload bay and operated almost completely by the Principal Investigators through telescience. The mission included a Glovebox where the crew performed additional experiments for the investigators. Together about seven major scientific experiments were performed advancing the state of knowledge in fields such as low temperature physics, solidification, and combustion. The results demonstrate the range of quality science that can be conducted utilizing orbital laboratories in microgravity and provide a look forward to a highly productive space station era.

TM—1998–207945 May 1998
High Performance, Robust Control of Flexible Space Structures (MSFC Center Director's Discretionary Fund Final Report, Project No. 96–23). M.S. Whorton. Structures and Dynamics Laboratory. 19980137576N

Many spacecraft systems have ambitious objectives that place stringent requirements on control systems. Achievable performance is often limited because of difficulty of obtaining accurate models for flexible space structures. To achieve sufficiently high performance to accomplish mission objectives may require the ability to refine the control design model based on closed-loop test data and tune the controller based on the refined model. A control system design procedure is developed based on mixed H_2/H_∞ optimization to synthesize a set of controllers explicitly trading between nominal

performance and robust stability. A homotopy algorithm is presented which generates a trajectory of gains that may be implemented to determine maximum achievable performance for a given model error bound. Examples show that a better balance between robustness and performance is obtained using the mixed H_2/H_∞ design method than either H_2 or mu-synthesis control design. A second contribution is a new procedure for closed-loop system identification which refines parameters of a control design model in a canonical realization. Examples demonstrate convergence of the parameter estimation and improved performance realized by using the refined model for controller redesign. These developments result in an effective mechanism for achieving high-performance control of flexible space structures.

TM—1998–207979 May 1998

An Assessment of Molten Metal Detachment Hazards for Electron Beam Welding in the Space Environment: Analysis and Test Results. A.C. Nunes, Jr., J.M. Fragomeni,* C. Russell, and B. Bhat. Materials and Processes Laboratory, and *Ohio University. 19980119852N

Conditions under which molten metal detachments might occur in a space welding environment are analyzed. A weld pool detachment parameter specifying conditions for pool detachment by impact is derived and corroborated by experimental evidence. Impact detachment for the pool is unlikely. Impact detachment for a drop of metal on the end of the weld wire may be possible under extreme conditions. Other potential causes of molten metal detachment considered, vaporization pressure forces and wire flickout from the pool, did not appear to present significant detachment threats.

TM—1998–208181 May 1998

Mirror Material Properties Compiled for Preliminary Design of the Next Generation Space Telescope (30 to 249 Kelvin). P.L. Luz and T. Rice. Preliminary Design Office. 19980201336N

This technical memorandum reports on the mirror material properties that were compiled by NASA Marshall Space Flight Center (MSFC) from April 1996 to June 1997 for preliminary design of the Next Generation Space Telescope (NGST) study. The NGST study began in February 1996, when the Program Development Directorate at NASA MSFC studied the feasibility of the NGST and developed the prephase A program for it. After finishing some initial studies and concepts development work on the NGST, MSFC's Program Development Directorate handed this work to the Observatory Projects Office at MSFC and then to NASA Goddard Space Flight Center (GSFC). This technical memorandum was written by MSFC's Preliminary Design Office and Materials and Processes Laboratory for the NGST Optical Telescope Assembly (OTA) team, in support of NASA GSFC. It contains material properties for 9 mirror substrate materials, using information from at least 6 industrial suppliers, 16 textbooks, 44 technical papers, and 130 technical abstracts.

TM—1998–208194 May 1998

Thruster Injector Faceplate Testing in Support of the Aerojet Rocket-Based Combined Cycle (RBCC) Concept. M.M. Fazah and J.M. Cramer. Propulsion Laboratory. 19980201177N

To satisfy RBCC rocket thruster requirements of high performance and a minimum amount of free hydrogen at plume boundary, a new impinging injector element using gaseous hydrogen and gaseous oxygen as the propellants has been designed. Analysis has shown that this injector design has potential to provide a high specific impulse (Isp) while minimizing the amount of free hydrogen that is available to be burned with incoming secondary flow. Past studies and test programs have shown that gas/gas-impinging elements typically result in high injector face temperatures due to combustion occurring close to the face. Since this design is new, there is no hot fire experience with this element. Objectives of this test program were to gain experience and hot fire test data on this new rocket thruster element design and injector faceplate pattern.

Twenty-two hot fire tests were run with maximum mixture ratio (MR) and chamber pressure (Pc) obtained at 7.25 and 1,822 psia, respectively. Posttest scanning microscope (SEM) images show only slight faceplate erosion during testing. This injector element design performed well and can be operated at design conditions: (1) Pc of 2,000 psia and MR of 7.0 and (2) Pc of 1,000 psia of 1,000 psia and MR of 5.0.

TM—1998–208418 June 1998

NASA's Microgravity Research Program 1997 Annual Report. D. Woodard, Editor. Microgravity Research Program Office.

The Fiscal Year 1997 Annual Report describes key elements of the NASA Microgravity Research Program. The Program's goals, approach taken to achieve those goals, and program resources are summarized. A review of the Program's status at the end of FY97 and highlights of the ground- and flight-based research are provided.

TM—1998–208472 June 1998

Preliminary In-Flight Loads Analysis of In-Line Launch Vehicles Using the VLOADS 1.4 Program. J.B. Graham and P.L. Luz. Preliminary Design Office. 19980201045N

To calculate structural loads of in-line launch vehicles for preliminary design, a very useful computer program is VLOADS 1.4. This software may also be used to calculate structural loads for upper stages and planetary transfer vehicles. Launch vehicle inputs such as aerodynamic coefficients, mass properties, propellants, engine thrusts, and performance data are compiled and analyzed by VLOADS to produce distributed shear loads, bending moments, axial forces, and vehicle line loads as a function of X-station along the vehicle's length. Interface loads, if any, and translational accelerations are also computed. The major strength of the software is that it enables quick turnaround analysis of structural loads for launch vehicles during the preliminary design stage of its development. This represents a significant improvement over the alternative—the time-consuming and expensive chore of developing finite element models. VLOADS was developed as a Visual BASIC macro in a Microsoft Excel 5.0 workbook on a Macintosh. VLOADS has also been implemented on a PC computer using Microsoft Excel 7.0a for Windows 95. VLOADS was developed in 1996, and the current version was released to COSMIC, NASA's Software Technology Transfer Center, in 1997. The program is a copyrighted work with all copyright vested in NASA.

TM—1998–208473 June 1998

Development of a Probabilistic Dynamic Synthesis Method for the Analysis of Nondeterministic Structures. A.M. Brown. Structures and Dynamics Laboratory.

Accounting for variability of structures in analysis has been a topic of considerable research, with one of the primary goals being able to determine quantifiable measures of statistical probability of a desired response variable to replace experience-based "safety factors." Several problems with the satisfactory application of this research to realistic structures, though, include accurate definition of the input random variables, the large size of finite element models, and accurate generation of the Cumulative Distribution Function (CDF) of the response variable. A new method called "probabilistic dynamic synthesis" (PDS) is presented here that addresses these problems. The PDS method uses dynamic characteristics of substructures measured from modal test as input random variables, which accurately account for the entire random character of the substructure, rather than "primitive" random variables representing material or geometric uncertainties. Using the residual flexibility method of component mode synthesis, these dynamic characteristics are used to generate reduced-size sample models of the substructures, which are then used in a Monte Carlo simulation or in the response surface reliability method to obtain the CDF. Both free and forced analyses have been performed, and the results indicate that the method produces usable and more representative solutions for the design of realistic structures with a substantial savings in computer time.

TM—1998–208529 July 1998

A Case Study for Probabilistic Methods Validation (MSFC Center Director's Discretionary Fund Final Report, Project 94–26). J.M. Price and R. Ortega. Structures and Dynamics Laboratory. 19980211463N

Probabilistic method is not a universally accepted approach for the design and analysis of aerospace structures. The validity of this approach must be demonstrated to encourage its acceptance as a viable design and analysis tool to estimate structural reliability. The objective of this study is to develop a well characterized finite population of similar aerospace structures that can be used to (1) validate probabilistic codes, (2) demonstrate the basic principles behind probabilistic methods, (3) formulate general guidelines for characterization of material drivers (such as elastic modulus) when limited data is available, and (4) investigate how the drivers affect the results of sensitivity analysis at the component/failure mode level.

TM—1998–208532 July 1998

NASA's Microgravity Technology Report—Summary of Activities 1997. D. Woodard, Editor. Microgravity Research Program.

The purpose of the 1997 NASA Microgravity Technology Report is to update the Microgravity Research Program's technology development policy and to present and assess current technology related activities and requirements identified within its research and technology disciplines.

TM—1998–208533 July 1998

Interplanetary Mission Design Handbook: Earth-to-Mars Mission Opportunities and Mars-to-Earth Return Opportunities 2004–2024. L.E. George* and L.D. Kos. *U.S. Air Force Academy, Preliminary Design Office. 19980210557N

This paper provides information for trajectory designers and mission planners to determine Earth-Mars and Mars-Earth mission opportunities for the years 2009–2024. These studies were performed in support of a human Mars mission scenario that will consist of two cargo launches followed by a piloted mission during the next opportunity approximately 2 years later. "Porkchop" plots defining all of these mission opportunities are provided which include departure energy, departure excess speed, departure declination arrival excess speed, and arrival declinations for the mission space surrounding each opportunity. These plots are intended to be directly applicable for the human Mars mission scenario described briefly herein. In addition, specific trajectories and several alternate trajectories are recommended for each cargo and piloted opportunity. Finally, additional studies were performed to evaluate the effect of various thrust-to-weight ratios on gravity losses and total time-of-flight tradeoff, and the resultant propellant savings and are briefly summarized.

TM—1998–208534 July 1998

Space Sciences Laboratory Publications and Presentations January 1–December 31, 1997. F.G. Summers, Compiler. Space Sciences Laboratory.

This document lists the significant publications and presentations of the Space Sciences Laboratory during the period January 1–December 31, 1997. Entries in the main part of the document are categorized according to NASA Reports (arranged by report number), Open Literature, and Presentations (arranged alphabetically by title). Also included for completeness is an Appendix (arranged by page number) listing preprints issued by the Laboratory during this reporting period. Some of the preprints have not been published; those already published are so indicated. Most of the articles listed under Open Literature have appeared in refereed professional journals, books, monographs, or conference proceedings. Although many published abstracts are eventually expanded into full papers for publication in scientific and technical journals, they are often sufficiently comprehensive to include the significant results of the research reported. Therefore, published abstracts are listed separately in a subsection under Open Literature. Questions or requests for additional information about the entries in this report should be directed to Gregory S. Wilson (ES01; 544–7579) or to one of the authors. The organizational code of the cognizant SSL branch or office is given at the end of each entry.

TM—1998–208538 July 1998

International Space Station Electrodynamic Tether Reboost Study. L. Johnson and M. Herrmann. Program Development Directorate.

The *International Space Station* (*ISS*) will require periodic reboost due to atmospheric aerodynamic drag. This is nominally achieved through the use of thruster firings by the attached Progress M spacecraft. Many Progress flights to the *ISS* are required annually. Electrodynamic tethers provide an attractive alternative in that they can provide periodic reboost or continuous drag cancellation using no consumables, propellant, nor conventional propulsion elements. The system could also serve as an emergency backup reboost system used only in the event resupply and reboost are delayed for some reason.

TM—1998–208539 August 1998

Final Report on Life Testing of the Vapor Compression Distillation/Urine Processing Assembly (VCD/UPA) at the Marshall Space Flight Center (1993 to 1997). P. Wieland, C. Hutchens, D. Long, and B. Salyer,* Structures & Dynamics Laboratory, Science and Engineering Directorate, *Ion Electronics. 19980211458N

Wastewater and urine generated on the *International Space Station* will be processed to recover pure water using vapor compression distillation (VCD). To verify the long-term reliability and performance of the VCD Urine Processor Assembly (UPA), life testing was performed at the Marshall Space Flight Center (MSFC) from January 1993 to April 1996. Two UPA's, the VCD-5 and VCD-5A, were tested for 204 days and 665 days, respectively. The compressor gears and the distillation centrifuge drive belt were found to have operating lives of approximately 4,800 hours, equivalent to 3.9 years of operation on *ISS* for a crew of three at an average processing rate of 1.76 kg/h (3.87 lb/h). Precise alignment of the flex-splines of the fluids and purge pump motor drives is essential to avoid premature failure after about 400 hours of operation. Results indicate that, with some design and procedural modifications and suitable quality control, the required performance and operational life can be met with the VCD/UPS.

TM—1998–208594 August 1998

Comprehensive Structural Dynamic Analysis of the SSME/AT Fuel Pump First-Stage Turbine Blade. A.M. Brown. Structures and Dynamics Laboratory. 19980217661N

A detailed structural dynamic analysis of the Pratt & Whitney high-pressure fuel pump first-stage turbine blades has been performed to identify the cause of the tip cracking found in the turbomachinery in November 1997. The analysis was also used to help evaluate potential fixes for the problem. Many of the methods available in structural dynamics were applied, including modal displacement and stress analysis, frequency and transient response to tip loading from the first-stage blade outer gas seals (BOGS), fourier analysis, and shock spectra analysis of the transient response. The primary findings were that the BOGS tip loading is impulsive in nature, thereby exciting many modes of the blade that exhibit high stress at the tip cracking location. Therefore, a proposed BOGS count change would not help the situation because a clearly identifiable resonance situation does not exist. The recommendations for the resolution of the problem are to maintain the existing BOGS count, eliminate the stress concentration in the blade due to its geometric design, and reduce the applied load on the blade by adding shiplaps in the BOGS.

TM—1998–208697/VOL1 August 1998

Second United States Microgravity Laboratory. One Year Report, Volume 1. M. Vlasse, D. McCauley, and C. Walker.

This document reports the one year science results for the important and highly successful Second United States Microgravity Laboratory (USML–2). The USML–2 mission consisted of a pressurized Space lab module where the crew performed experiments. The mission also included a Glovebox where the crew performed additional experiments for the investigators. Together, about 36 major scientific experiments were performed, advancing the state of knowledge in fields such as fluid physics, solidification of metals, alloys, and semiconductors, combustion, and the growth of protein crystals. The results demonstrate the range of quality science that can be conducted utilizing orbital laboratories in microgravity and provide a look forward to a highly productive Space Station era.

TM—1998–208697/VOL2 August 1998

Second United States Microgravity Laboratory. One Year Report, Volume 2. M. Vlasse, D. McCauley, and C. Walker.

This document reports the one year science results for the important and highly successful Second United States Microgravity Laboratory (USML–2). The USML–2 mission consisted of a pressurized Space lab module where the crew performed experiments. The mission also included a Glovebox where the crew performed additional experiments for the investigators. Together, about 36 major scientific experiments were performed, advancing the state of knowledge in fields such as fluid physics, solidification of metals, alloys, and semiconductors, combustion, and the growth of protein crystals. The results demonstrate the range of quality science that can be conducted utilizing orbital laboratories in microgravity and provide a look forward to a highly productive Space Station era.

TM—1998–208801 August 1998

FY 1997 Scientific and Technical Reports, Articles, Papers, and Presentations. J.E. Turner Waits, Compiler. Technical Information and Operations Services Office.

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY97. 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—1998–208804 September 1998

Model-Based Diagnosis in a Power Distribution Test-Bed. E. Scarl* and K. McCall. Astrionics Laboratory. *The Boeing Company, Huntsville, AL.

The Rodon model-based diagnosis shell was applied to a breadboard test-bed, modeling an automated power distribution system. The constraint-based modeling paradigm and diagnostic algorithm were found to adequately represent the selected set of test scenarios.

TP—97–206238 November 1997

Inherent Conservatism in Deterministic Quasi-Static Structural Analysis. V. Verderaime. Structures and Dynamics Laboratory. 19980006779N

The cause of the long-suspected excessive conservatism in the prevailing structural deterministic safety factor has been identified as an inherent violation of the error propagation laws when reducing statistical data to deterministic values and then combining them algebraically through successive structural computational processes. These errors are restricted to the applied stress computations, and because mean and variations of the tolerance limit format are added, the errors are positive, serially cumulative, and excessively conservative. Reliability methods circumvent these errors and provide more efficient and uniform safe structures. The document is a tutorial on the deficiencies and nature of the current safety factor and of its improvement and transition to absolute reliability.

TP—97–206239 November 1997

The Corrosion Protection of Magnesium Alloy AZ31B. M.D. Danford, M.J. Mendrek, M.L. Mitchell, and P.D. Torres. Materials and Processes Laboratory. 19980006782N

Corrosion rates for bare and coated Magnesium alloy AZ31B have been measured. Two Coatings, Dow-23™ and Tagnite,™ have been tested by electrochemical methods and their effectiveness determined. Electrochemical methods employed were the scanning reference electrode technique (SRET), the polarization resistance technique (PR) and the electrochemical impedance spectroscopy technique (EIS). In addition, general corrosion and stress corrosion methods were employed to examine the effectiveness of the above coatings in 90 percent humidity. Results from these studies are presented.

TP—97–206311 November 1997

SEDS Tether M/OD Damage Analyses. K.B. Hayashida, J.H. Robinson, and S.A. Hill. Structures and Dynamics Laboratory. 19980006778N

The Small Expandable Deployer System (SEDS) was designed to deploy an endmass at the end of a 20-km-long tether which acts as an upper stage rocket, and the threats from the meteoroid and orbital debris (M/OD) particle environments on SEDS components are important issues for the safety and success of any SEDS mission. However, the possibility of severing the tether due to M/OD particle impacts is an even more serious concern, since the SEDS tether has a relatively large exposed area to the M/OD environments although its diameter is quire small. The threats from the M/OD environments became a very important issue for the third SEDS mission, since the project office proposed using the shuttle orbiter as a launch platform instead of the second stage of a Delta II expendable rocket, which was used for the first two SEDS mission.

A series of hypervelocity impact tests were performed at the Johnson Space Center and Arnold Engineering Development Center to help determine the critical particle sizes required to sever the tether. The computer hydrodynamic code or hydrocode called CTH, developed by the Sandia National Laboratories, was also used to simulate the damage on the SEDS tether caused by both the orbital debris and test particle impacts. The CTH hydrocode simulation results provided the much needed information to help determine the critical particle sizes required to sever the tether. The M/OD particle sizes required to sever the tether were estimated to be less than 0.1 cm in diameter from these studies, and these size particles are more abundant in low-Earth orbit than larger size particles. Finally, the authors performed the M/OD damage analyses for the three SEDS missions: i.e., SEDS–1, –2, and –3 missions, by using the information obtained from the hypervelocity impact test and hydrocode simulations results.

TP—1998–206952 January 1998

Corrosion Studies of 2195 Al-Li Alloy and 2219 Al Alloy with Differing Surface Treatments. M.D. Danford and M.J. Mendrek. Materials and Processes Laboratory. 19980019510N

Corrosion studies of 2195 Al-Li and 2219 Al alloys have been conducted using the scanning reference electrode technique (SRET) and the polarization resistance (PR) technique. The SRET was used to study corrosion mechanisms, while corrosion rate measurements were studied with the PR technique. Plates of Al_2O_3 blasted, soda blasted and conversion coated 2219 Al were coated with Deft primer and the corrosion rates studied with the EIS technique. Results from all of these studies are presented.

TP—1998–206959 March 1998

Tether Transportation System Study. M.E. Bangham,* E. Lorenzini,** and L. Vestal. Program Development Directorate. *Boeing, Huntsville, AL. **Smithsonian Astrophysical, Cambridge, MA. 19980048417N

The projected traffic to geostationary earth orbit (GEO) is expected to increase over the next few decades. At the same time, the cost of delivering payloads from the Earth's surface to low earth orbit (LEO) is projected to decrease, thanks in part to the Reusable Launch Vehicle (RLV). A comparable reduction in the cost of delivering payloads from LEO to GEO is sought. The use of in-space tethers, eliminating the requirement for traditional chemical upper stages and thereby reducing the launch mass, has been identified as such an alternative.

Spinning tethers are excellent kinetic energy storage devices for providing the large delta vee's required for LEO to GEO transfer. A single-stage system for transferring payloads from LEO to GEO was proposed some years ago. The study results presented here contain the first detailed analyses of this proposal, its extension to a two-stage system, and the likely implementation of the operational system.

TP—1998–207194 March 1998

Probability and Statistics in Aerospace Engineering. M.H. Rheinfurth and L.W. Howell. Systems Analysis and Integration Laboratory. 19980045313N

This monograph was prepared to give the practicing engineer a clear understanding of probability and statistics with special consideration to problems frequently encountered in aerospace engineering. It is conceived to be both a desktop reference and a refresher for aerospace engineers in government and industry. It could also be used as a supplement to standard texts for in-house training courses on the subject.

TP—1998–207399 March 1998

A Study of Friction Stir Welded 2195 Al-Li Alloy by the Scanning Reference Electrode Technique. M.D. Danford and M.J. Mendrek. Materials and Processes Laboratory. 19980046577N

A study of the corrosion of friction stir welded 2195 Al-Li alloy has been carried out using the scanning reference electrode technique (SRET). The results are compared to those obtained from a study of heterogeneously welded samples.

TP—1998–207686 April 1998

Comparative Stress Corrosion Cracking and General Corrosion Resistance of Annealed and Hardened 440C Stainless Steel—New Techniques in Stress Corrosion Testing. M.J. Mendrek, B.E. Hurless, P.D. Torres, and M.D. Danford. Materials and Processes Laboratory. 19980053568

The corrosion and stress corrosion cracking (SCC) characteristics of annealed and hardened 440C stainless steel were evaluated in high humidity and 3.5-percent NaCl solution. Corrosion testing consisted of an evaluation of flat plates, with and without grease, in high humidity, as well as electrochemical testing in 3.5-percent NaCl. Stress corrosion testing consisted of conventional constant strain, smooth bar testing in high humidity in addition to two relatively new techniques under evaluation at MSFC. These techniques involve either incremental or constant rate increases in the load applied to a precracked SE(B) specimen, monitoring the crack-opening-displacement response for indications of crack growth. The electrochemical corrosion testing demonstrated an order of magnitude greater general corrosion rate in the annealed 440C. All techniques for stress corrosion testing showed substantially better SCC resistance in the annealed material. The efficacy of the new techniques for stress corrosion testing was demonstrated both by the savings in time and the ability to better quantify SCC data.

TP—1998–208396 May 1998

Application of Rapid Prototyping Methods to High-Speed Wind Tunnel Testing (MSFC Center Director's Discretionary Fund Final Report, Project No. 96–21). A.M. Springer. Structures and Dynamics Laboratory. 19980201248 N

This study was undertaken in MSFC's 14-Inch Trisonic Wind Tunnel to determine if rapid prototyping methods could be used in the design and manufacturing of high speed wind tunnel models in direct testing applications, and if these methods would reduce model design/fabrication time and cost while providing models of high enough fidelity to provide adequate aerodynamic data, and of sufficient strength to survive the test environment. Rapid prototyping methods utilized to construct wind tunnel models in a wing-body-tail configuration were: fused deposition method using both ABS plastic and PEEK as building materials, stereolithography using the photopolymer SL–5170, selective laser sintering using glass reinforced nylon, and laminated object manufacturing using plastic reinforced with glass and "paper."

This study revealed good agreement between the SLA model, the metal model with an FDM–ABS nose, and SLA nose, and the metal model for most operating conditions, while the FDM–ABS data diverged at higher loading conditions. Data from the initial SLS model showed poor agreement due to problems in post-processing, resulting in a different configuration. A second SLS model was tested and showed relatively good agreement.

It can be concluded that rapid prototyping models show promise in preliminary aerodynamic development studies at subsonic, transonic, and supersonic speeds.

TP—1998–208475 June 1998

Electrodynamic Tether Propulsion and Power Generation at Jupiter. D.L. Gallagher, L. Johnson, J. Moore,* Program Development Directorate, SRS Technologies,* and F. Bagenal.** University of Colorado.**

19980203952N

The results of a study performed to evaluate the feasibility and merits of using an electrodynamic tether for propulsion and power generation for a spacecraft in the Jovian system are presented. The environment of the Jovian system has properties which are particularly favorable for utilization of an electrodynamic tether. Specifically, the planet has a strong magnetic field and the mass of the planet dictates high orbital velocities which, when combined with the planet's rapid rotation rate, can produce very large relative velocities between the magnetic field and the spacecraft. In a circular orbit close to the planet, tether propulsive forces are found to be as high as 50 N and power levels as high as 1 MW.

TP—1998–208528 July 1998

An Assessment of the Technology of Automated Rendezvous and Capture in Space. M.E. Polites. Astrionics Laboratory. 19980219470N

This paper presents the results of a study to assess the technology of automated rendezvous and capture (AR&C) in space. The outline of the paper is as follows. First, the history of manual and automated rendezvous and capture and rendezvous and dock is presented. Next, the need for AR&C in space is established. Then, today's technology and ongoing technology efforts related to AR&C in space are reviewed. In light of these, AR&C systems are proposed that meet NASA's future needs, but can be developed in a reasonable amount of time with a reasonable amount of money. Technology plans for developing these systems are presented; cost and schedule are included.

TP—1998–208530 July 1998

Reusable Rocket Engine Operability Modeling and Analysis. R.L. Christenson and D.R. Komar. Propulsion Laboratory. 19980218686N

This paper described the methodology, model, input data, and analysis results of a reusable launch vehicle engine operability study conducted with the goal of supporting design from an operations perspective. Paralleling performance analyses in schedule and method, this requires the use of metrics in a validated operations model useful for design, sensitivity, and trade studies. Operations analysis in this view is one of several design functions.

An operations concept was developed given an engine concept and the predicted operations and maintenance processes incorporated into simulation models. Historical operations data at a level of detail suitable to model objectives were collected, analyzed, and formatted for use with the models, the simulations were run, and results collected and presented. The input data used included scheduled and unscheduled timeline and resource information collected into a Space Transportation System (STS) Space Shuttle Main Engine (SSME) historical launch operations database. Results reflect upon the importance not only of reliable hardware but upon operations and corrective maintenance process improvements.

TP—1998–208591 August 1998

On the Correlation Between Maximum Amplitude and Smoothed Monthly Mean Sunspot Number During the Rise of the Cycle (From t=0–48 Months Past Sunspot Minimum). R.M. Wilson, D.H. Hathaway, and E.J. Reichmann. Space Sciences Laboratory.

During the rise from sunspot minimum to maximum, the observed value of smoothed monthly mean sunspot number at maximum RM is found to correlate with increasing strength against the current value of smoothed monthly mean sunspot number R(t), where t is the elapsed time in months from minimum. On the basis of the modern era sunspot cycles (i.e., cycles 10–22), the inferred linear correlation is found to be statistically important (i.e., at the 95-percent level of confidence) from about 11 mo past minimum and statistically very important (i.e., at the 99-percent level of confidence) from about 15 mo past minimum; ignoring cycle 19, the largest cycle of the modern era, the inferred linear correlation is found to be statistically important from cycle onset. On the basis of $R(t)$, estimates of RM can be gauged usually to within about ±30 percent during the first 2 yr and to within about ±20 percent (or better) after the first 2 hr of a cycle's onset. For cycle 23, because controversy exists regarding the placement of its minimum (i.e., its onset), being either May 1996 or perhaps August 1996 (or shortly thereafter), estimates of its RM are divergent, being lower (more like a mean size cycle) when using the earlier epoch of minimum

and higher (above average in size) when using the later-occurring minimum. For smoothed monthly mean sunspot number through October 1997 (t = 17 or 14 mo, respectively), having a provisional value of 32.0, the earlier minimum date projects an RM of 110.3 ± 33.1, while the later minimum date projects one of 137.2 ± 41.2. The projection is slowly decreasing in size using the earlier onset date, while it is slowly increasing in size using the later onset date.

TP—1998–208592 August 1998

Volcanism, Cold Temperature, and Paucity of Sunspot Observing Days (1818–1858): A Connection? R.M. Wilson. Space Sciences Laboratory.

During the interval of 1818–1858, several curious decreases in the number of sunspot observing days per year are noted in the observing record of Samuel Heinrich Schwabe, the discoverer of the sunspot cycle, and in the reconstructed record of Rudolf Wolf, the founder of the now familiar relative sunspot number. These decreases appear to be nonrandom in nature and often extended for 1–3 yr (or more). Comparison of these decreases with equivalent annual mean temperature (both annual means and 4-yr moving averages), as recorded at Armagh Observatory (Northern Ireland), indicates that the temperature during the years of decreased number of observing days trended downward near the start of each decrease and upward (suggesting some sort of recovery) just before the end of each decrease. The drop in equivalent annual mean temperature associated with each decrease, as determined from the moving averages, measured about 0.1–0.7 °C. The decreases in number of observing days are found to be closely related to the occurrences of large, cataclysmic volcanic eruptions in the tropics or northern hemisphere. In particular, the interval of increasing number of observing days at the beginning of the record (i.e., 1818–1819) may be related to the improving atmospheric conditions in Europe following the 1815 eruption of Tambora (Indonesia: 8°S), which previously has been linked to "the year without a summer" (in 1816) and which is the strongest eruption in recent history, while the decreases associated with the years of 1824, 1837, and 1847 may be linked, respectively, to the large, cataclysmic volcanic eruptions of Galunggung (Indonesia: 7°S) in 1822, Cosiguina (Nicaragua) in 1835, and, perhaps, Hekla (Iceland: 64°N) in 1845. Surprisingly, the number of observing days per year, as recorded specifically by Schwabe (from Dessau, Germany), is found to be linearly correlated against the yearly mean temperature at Armagh Observatory (r = 0.5 at the 2 percent level of significance); thus, years of fewer sunspot observing days in the historical record seem to indicate years of probable cooler climate, while years of many sunspot observing days seem to indicate years of probable warmer climate (and vice versa). Presuming this relationship to be real, one infers that the observed decrease in the number of observing days near 1830 (i.e., during "the lost record years" of 1825 to 1833) provides a strong indication that temperatures at Armagh (and, perhaps, most of Europe, as well) were correspondingly cooler. If true, then, the inferred cooling may have resulted from the eruption of Kliuchevskoi (Russia; 56°N) 1829.

CP—1998–206899/Vol. 1 January 1998
General Public Space Travel and Tourism—Volume 1 Extreme Summary. Daniel O'Neil, Compiler, Ivan Bekey,* John Mankins,* Tom Rogers,** and Eric Stallmer,** Editors. *NASA Headquarters, **Space Transportation Association.

Volume One of the General Public Space Travel and Tourism Workshop is a summary of the findings of the participants. This document provides an overview of the infrastructure requirements, policy and regulation needs, and potential near term activities.

Volume II contains the detailed findings of the multi-day workshop conducted at Georgetown University, Washington, DC.

CP—1998–206900 January 1998
Tether Technology Interchange Meeting, J.K. Harrison, Compiler. Program Development Directorate.

19980202346N

This is a compilation of 25 papers presented at a tether technical interchange meeting in Huntsville, AL, on September 9–10, 1997. After each presentation, a technical discussion was held to clarify and expand the salient points. A wide range of subjects was covered including tether dynamics, electrodynamics, space power generation, plasma physics, ionospheric physics, towing tethers, tethered reentry schemes, and future tether missions.

CP—1998–206960 February 1998
Life and Microgravity Spacelab (LMS) Final Report. J.P. Downey, Compiler.

19980206462N

This document reports the results and analyses presented at the Life and Microgravity Spacelab (LMS) One Year Science Review meeting. The science conference was held in Montreal, Canada, on August 20–21, 1997, and was hosted by the Canadian Space Agency. The LMS payload flew on the Space Shuttle Columbia (STS–78) from June 20–July 7, 1996. The LMS investigations were performed in a pressurized Spacelab module and the Shuttle middeck. Forty scientific experiments were performed in fields such as fluid physics, solidification of metals, alloys, and semiconductors, the growth of protein crystals, and animal, human, and plant life sciences. The results demonstrate the range of quality science that can be conducted utilizing orbital laboratories in microgravity.

CP—1998–208536 July 1998
The 1997 NASA Aerospace Battery Workshop. J.C. Brewer, Compiler. NASA Aerospace Flight Battery Systems Program.

This document contains the proceedings of the 30th annual NASA Aerospace Battery Workshop, hosted by the Marshall Space Flight Center on November 18–20, 1997. The workshop was attended by scientists and engineers from various agencies of the U.S. Government, aerospace contractors, and battery manufacturers, as well as international participation in like kind from a number of countries around the world.

The subjects covered included nickel-cadmium, nickel-hydrogen, nickel-metal hydride, lithium, lithium-ion, and silver-zinc technologies, as well as various aspects of nickel electrode design.

CR—97–205192 July 1997
Standardized Methods for Electronic Shearography—Final Technical Report for Period June 14, 1996 through June 14, 1997. NAS8–38609, D.O. #167. University of Alabama in Huntsville.

CR—97–205193 November 1996
FNAS/Cosmic Ray-Air Shower Measurement From Space Cosmic Ray Research—Final Report, January 18, 1996–November 17, 1996. NAS8–38609, D.O. #161. University of Alabama in Huntsville.

CR—97–205194 January 1995
FNAS/Production Cross Sections of Hadronic Resonances—Final Report, September 20, 1994–January 1, 1995. NAS8–38609, D.O. #124. University of Alabama in Huntsville.

CR—97–205195 June 1997
Replicated Composite Optics Development—Final Report, May 15, 1995–June 30, 1997. NAS8–38609, D.O. #143. University of Alabama in Huntsville.

CR—97–205196 June 1997
Ion Figuring of X-Ray Mirror Mandrels—Final Report, June 14, 1996–June 5, 1997. NAS8–38609, D.O. #166. University of Alabama in Huntsville.

CR—97–205197 April 1997
Analysis Supporting MSFC Cryostat Testing Unit—Final Report. NAS8–39131, D.O. #32. Auburn University.

CR—1998–205198 December 1997
Study Acoustic Emissions from Composites—Final Report. NAS8–38609, D.O. #182. University of Alabama in Huntsville.

CR—1998–205199 April 1998
Analysis of Hard Thin Film Coating—Final Report. NAS8–38609, D.O. #59. University of Alabama in Huntsville.
19980214885N

CR—1997–205200 June 1997
Optical Fabrication and Measurement: AR&C and NGST—Final Report. September 11, 1996–June 30, 1997. NAS8–38609, D.O. #176. University of Alabama in Huntsville.

CR—1998–205201 May 1997
Development of Software to Model AXAF–I Image Quality—Final Report. NAS8–38609, D.O. #181. University of Alabama in Huntsville.

CR—1998–205202 April 1998
Radiactive Transfer Models for Saturn and Titan—Final Report, January 20, 1995–September 29, 1996. NAS8–38609, D.O. #134. University of Alabama in Huntsville.

CR—1998–205203 November 1997
Affordable In-Space Transportation Phase II, An Advanced Concepts Project, Technical Interchange Meeting, October 16–17, 1996, Executive Summary—Final Report. NAS8–38609, D.O. #175. University of Alabama in Huntsville.

CR—1998–205204 November 1997
Current Collection in a Magnetic Field—Final Report. NAS8–38609, D.O. #183. University of Alabama in Huntsville.

CR—1998–205205 October 1996
Research Reports—1996 NASA/ASEE Summer Faculty Fellowship Program. NGT8–52819. University of Alabama, Tuscaloosa, and University of Alabama in Huntsville.
19980206153N

CR—1998–207400 March 1998
Electrical Bonding: A Survey of Requirements, Methods, and Specifications. Computer Sciences Corp.
19980201283N

CR—1998–207893 May 1997
Development of Tripropellant CFD Design Code—Final Report. NAS8–40583, SECA, Inc.

CR—1998–207894 May 1997
Vacuum Gas Tungsten Arc Welding—Final Report. NAS8–39932. Boeing North American.

CR–1998—207895 May 1997
Design Study—Rocket Based MHD Generator—Final Report. H–13047D. ERC Incorporated.

CR–1998—207896 June 1997
Guidelines for Proof Test Analysis—Final Report. NAS8–39380. Southwest Research Institute.

CR–1998—207897 May 1997
Evaluation of Optimum HgZnTe Crystal Growth Parameters and USML–2 Flight Support—Final Report, December 2, 1996–December 1, 1996. NAS8–40429. University of Alabama in Birmingham.

CR—1998–207898 April 1998
Measured Residual Stressses in CYL S/N 53 Fretted Area—Final Report for ETP–0492. NAS8–38100. Thiokol.

CR—1998–207899 February 1998
Cosmic Ray Energy Determination by the Reduced-Opening Angle Method—Final Report. NAS8–38609, D.O. #163. University of Alabama in Huntsville.

CR—1998–207900 March 1998
Evaluation of Chemical Coating Processes for AXAF—Final Report, December 11, 1995–March 31, 1997. NAS8–38609, D.O. #160. University of Alabama in Huntsville.

CR—1998–207901 May 1998
Acceptance Data Package
A–Engineering Drawings and Associated Lists
B–Acceptance Data Package
C–Qualification Test Report
D–Strength Analysis
Final Report. NAS8–39409. Aeroflex.

CR—1998–207902 May 1998
An Experimental Study of Characteristic Combustion-Driven Flow for CFD Validation—Final Report, April 16, 1991–September 30, 1996. NAS8–38862. Pennsylvania State University.

CR—1998–207946 May 1998
The Marshall Engineering Thermosphere (MET) Model Volume I: Technical Description. Physitron, Inc.

19980201847N

CR—1998–208182 October 1997
Evaluation of Electroless Nickel Coatings to Achieve Interference Fit in the RSRM Without Fretting—Final Report for ETP–0474. NAS8–38100. Thiokol.

CR—1998–208183 May 1998
Residual Stress Measurements After Proof and Flight—Final Report for ETP–0403. NAS8–38100. Thiokol.

CR—1998–208184 February 1998
Midcourse Space Experiment Data Certification and Technology Transfer—Final Report, June 26, 1996–June 30, 1997. NAS8–38609, D.O. #171. University of Alabama in Huntsville.

19980200837N

CR—1998–208185 March 1998
Structural Analysis of Components of the Students for the Exploration and Development of Space Satellite (SEDSAT) for the Small Expendable Deployer System (SEDS) Project Office—Final Report April 1, 1996 through September 29, 1996. NAS8–38609, D.O. #164. University of Alabama in Huntsville.

19980213230N

CR—1998–208186 May 1998
F/NAS/Pressure Temperature Retrieval Techniques—Final Report. NAS8–38609, D.O. #155. University of Alabama in Huntsville.

CR—1998–208187 April 1998
Airborne/Space-Based Doppler Lidar Wind Sounders Sampling the PBL and Other Regions of Significant B and U Inhomogeneities—Final Report, April 1994–March 1998. Simpson Weather Associates, Inc.

19980218160N

CR—1998–208474 June 1998
Development of Tailorable Electrically Conductive Thermal Control Material Systems. IIT Research Institute.

19980210013N

CR—1998–208535 July 1998
Spread Spectrum Receiver Electromagnetic Interference (EMI) Test Guide. Georgia Tech Research Institute.

CR—1998–208593 August 1998
Space Environment Effects: Low-Altitude Trapped Radiation Model. The Boeing Company.

CR—1998–208800 September 1998
Comparison of Spacecraft Contamination Models With Well-Defined Flight Experiment. Boeing Information Space & Defense Systems.

CR—1998–208803 September 1998
Research Reports—1997 NASA/ASEE Summer Faculty Fellowship Program. University of Alabama in Huntsville and University of Alabama, Tuscaloosa.

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

ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES76
PALEY, M.S. USRA
Excited State and Reverse Saturable Absorption in Polydiacetylene Using Z-Scan Technique. For publication in Optics Communication Journal, Philadelphia, PA.

ABDELDAYEM. H.A. USRA
FRAZIER, D.O. ES76
PENN, B.G. ES76
SMITH, D.D. ES76
BANKS, C.E. ES76
Nonlinear Optothermal Properties of Metal-Free Phthalocyanine. For publication in Journal of Thin Solid Films, Oxford, United Kingdom, 1998.

ABDELDAYEM. H.A. ES76
PALEY, M.S. ES76
WITHEROW, W. ES76
FRAZIER, D.O. ES76
Image Processing by Holographic Gratings in Polydiacetylene. For presentation at Conference on Advances in Optical Imaging and Photon Migration, Orlando, FL, March 8–12, 1998.

ABDELDAYEM. H.A. USRA
PALEY, M.S. ES76
WITHEROW, W. ES76
FRAZIER, D.O. ES76
Photodeposition Technique for Storing Holographic Images on Thin Films of Polydiacetylene. For presentation at 1998 Summer Topical Meetings, Kailua-Kona, Hawaii, June 8–12, 1998.

ADAMS, M.L. ES82
HAGYARD, M.J. ES82
WEST, E.A. ES82
An Investigation of Magneto-Optical Effects. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

ADAMS, M.L. ES82
SEVER, T.L. ES82
BERO, E. ES82
The Sun in Time. For presentation at American Geophysical Union Fall Meeting, San Francisco, CA, December 1998.

ADAMS, M.L. ES82
The Sun in Time. For presentation at NSTA, Birmingham, AL, November 20, 1998.

AGENA, S. University College
SMITH, L. UAH
KARR, L.J. ES76
PUSEY, M.L. ES76
Green Fluorescent Protein as a Model for Protein Crystal Growth Studies. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

AGENA, S. University College
BOGLE, D. ES76
PUSEY, M.L. ES76
Studies of Protein Solution Properties Using Osmotic Pressure Measurements. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

ALEXANDER, D. Lockheed Martin
GARY, G.A. ES82
THOMPSON, B.J. Space Applications
Analysis of Active Regions Via 3D Rendering Techniques. For publication in Astronomical Society of the Pacific, San Francisco, CA, 1997/1998.

ALEXANDER, D. EB12
EDGE, T.M. EB12
WILLOWBY, D. EB12
AXAF-I Low Intensity–Low Temperature (LILT) Testing of the Development Verification Test (DVT) Solar Panel. For presentation at 33rd Intersociety Energy Conversion Engineering Conference (IECEC), Colorado Springs, CO, August 2–6, 1998.

ALEXANDER, D. UAH
DEPAOLA, A. Gulf Coast Seafood Lab
YOUNG, R.B. ES76
Enhanced Detection of Vibrio Cholerae in Oyster Homogenate Based on Centrifugal Removal of Inhibitory Agents. For publication in Journal of Microbiological Methods, 1998.

ALEXANDER, R.A. PD21
STANLEY, T.T. International Space Sys., Inc.
Collaborative Analysis Tool for Thermal Protection Systems for Single Stage to Orbit Launch Vehicles. For presentation at International Symposium Atmospheric Reentry Vehicles and Systems, Arcachon, France, March 1999.

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

ALHORN, D.C. EB23
An Overview of Microgravity Vibration Isolation Technology with Information About the g-LIMIT Project. For presentation at International Space University, Cleveland, OH, July 28, 1998.

ALSHIBLI, K.A. ES71
STURE, S. University of Colorado
COSTES, N.C. ES71
Effect of Inclusions on Plane Strain Behavior of Sand. For publication in Proceedings of 12th ASCE Engineering Mechanics Conference, La Jolla, CA, May 17, 1998.

ANDERSON, B.J. EL23
COOKE, W.J., JR. Computer Sciences
Calculation of Area Loss Due to Meteoroid Penetration. For presentation at AIAA Leonid Meteoroid Storm and Satellite Threat Conference, Manhattan Beach, CA, April 27–28, 1998.

ANGELOPOULOS, V. ES83
PHAN, T.D. ES83
LARSON, D.E. ES83
MOZER, F.S. ES83
LIN, R.P. ES83
PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
Magnetotail Flow Bursts: Association to Global Magnetospheric Circulation, Relationship to Ionospheric Activity and Direct Evidence for Localization. For publication in Geophysical Research Letters, 1998.

ANTAR, B.N. University of Tennessee
ETHRIDGE, E.C. ES75
Utilization of Low Gravity Environment for Measuring Liquid Viscosity. For presentation at 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 12–18, 1998.

ANTAR, B.N. University of TN Space Institute
ETHRIDGE, E.C. ES75
MAXWELL, D. University of TN Space Institute
Viscosity Measurement of Highly Viscous Liquids Using Drop Coalescence in Low Gravity. For presentation at 37th AIAA Aerospace Sciences Meeting, Reno, NV, January 11–14, 1999.

ASCHWANDEN, M.J. University of Maryland
NEWMARK, J. GSFC
DELABOUDINIERE, J.-P. GSFC
NEUPERT, W.M. Hughes SXT Corp.
PORTIER-FOZZANI, F. Laboratoire
GARY, G.A. ES82
ZUCKER, A. Inst. Astronomy
3D-Stereoscopic Analysis of Solar Active Region Loops: SoHO/EIT Observations at Temperatures of 1.0–1.5 MK. For publication in The Astrophysical Journal, Chicago, IL, 1998.

AUSTIN, R.E. RA20
RISING, J.J. Lockheed Martin
The X–33 Program, Proving Single Stage to Orbit. For presentation to 49th International Astronautical Congress, Melbourne, Australia, September 28–October 2, 1998.

BACHMANN, K.T. Birmingham-Southern
HATHAWAY, D.H. ES82
KHATRI, G. Birmingham-Southern
PETTITO, J.M. Birmingham-Southern
Mesogranulation as a Distinct Scale of Convection in the Sun. For presentation at American Astronautical Society Meeting, Washington, D.C., January 6, 1998.

BALOGH, A. The Blackett Lab, UK
BURGER, R.A. Potchefstroom, US
CUMMINGS, A.C. California Institute of Technology
EVENSON, P. University of Delaware
HEBER, B. Universitat Kiel
JOKIPII, J.R. University of Arizona
KRAINEV, M.B. Russian Academy of Sciences
MCDONALD, F.B. University of Maryland
SUESS, S. ES82
ET AL.
Global Processes That Determine Cosmic Ray Modulation. For publication in Space Science Reviews, The Netherlands, 1998.

BARRET, C. EP62
Lifting Body Flight Vehicles. For presentation at 1998 Society of Women Engineers Conference, Houston, TX, June 16–20, 1998.

BASKARAN, S. Ratheon
RAMACHANDRAN, N. USRA
NOEVER, D. ES76
Probabilistic and Other Neural Nets in Multi-Hole Probe Calibration and Flow Angularity Pattern Rec-

ognition. For presentation at International Conference on Advances in Pattern Recognition, Plymouth, United Kingdom, November 23, 1998.

BAYUZICK, R.J. Vanderbilt University
HOFMEISTER, W.H. Vanderbilt University
MORTON, C.M. Vanderbilt University
ROBINSON, M.B. ES75

Experiments on Nucleation in Different Flow Regimes. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 14, 1998.

BENDER, M.W. ES76
SMITH, D.D. ES76
XIAO, R. University of Science & Tech., Hong Kong
SARKISOV, S. Alabama A&M University
GREGORY, D.A. UAH
BOYD, R.W. University of Rochester

Z-Scan Measurements on Au/SiO2 Composite Films. For presentation at Nonlinear Optics 1998, Kauai, Hawaii, August 10–14, 1998.

BILBRO, J.W. EB51

Advanced Lightweight Optics Development for Space Applications. For presentation at Space Technology & Applications International Forum (STAIF-98), Albuquerque, NM, January 25–29, 1998.

BILBRO, J.W. EB01

Next Generation Space Telescope Ultra-Lightweight Mirror Program. For presentation at Tenth School on Quantum Electronics Laser Physics & Applications, Varna, Bulgaria, September 21–25, 1998.

BILDSTEN, L. University of California
CHAKRABARTY, D. MIT
CHIU, J. California Institute of Technology
FINGER, M.H. USRA
KOH, D.T. California Institute of Technology
NELSON, R.W. California Institute of Technology
ET AL.
RUBIN, B.C. ES84
WILSON, C.A. ES84
WILSON, R.B. ES84

Observations of Accreting Pulsars. For publication in Astrophysical Journal, Chicago, IL, 1997/1998.

BJORKMAN, G. Lockheed Martin
CHO, A. Reynolds Metals
RUSSELL, C.K. EH23
ZIMMERMAN, F.R. EH23

Filler Wire Development for 2195 Aluminum-Lithium. For presentation at 1998 Advanced Aerospace Materials and Processes Conference, Washington, D.C., June 15–19, 1998.

BOCCIPPIO, D.J. HR20
WONG, C. MIT
WILLIAMS, E.R. MIT
BOLDI, B. MIT
CHRISTIAN, H.J. HR20
GOODMAN, S.J. HR20

Global Validation of Single-Station Schumann Resonance Lightning Location. For publication in Journal of Atmospheric and Solar-Terrestrial Physics, 1998.

BOLDI, B. HR20
HODANISH, S. HR20
SHARP, D. HR20
WILLIAMS, E. HR20
GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
MATLIN, A. HR20
WEBER, M. HR20

The Design and Evaluation of the Lightning Imaging Sensor Data Applications Display (LISDAD). For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

BOROWSKI, O. HR20
HOWELL, B.F. HR20
SEVER, T.L. HR20

Communication by Fire (and Smoke) Signals in the Kingdom of Judah. For publication in Archaeology Magazine, 1998.

BRIDGE, K.Y. ES76
SMITH, C.K., II Lilly Research Labs
YOUNG, R.B. ES76

Beta-Adrenergic Receptor Gene Expression in Bovine Skeletal Muscle Cells in Culture. For publication in Journal of Animal Science, 1998.

BRIDGE, K.Y. ES71
YOUNG, R.B. ES71
VAUGHN, J.R. ES71

Beta-Adrenergic Receptor Population is Up-Regulated in Chicken Skeletal Muscle Cells Treated with Forskolin. For presentation at American Society for Gravitational and Space Biology, Houston, TX, October 26, 1998.

BRIGGS, M.S. ES84
PENDLETON, G.N. ES84
KIPPEN, R.M.
BRAINERD, J.J.
HURLEY, K.
CONNAUGHTON, V.
MEEGAN, C.A. ES84

The Error Distribution of BATSE GRB Locations. For publication in The Astrophysical Journal, Chicago, IL, 1998.

BRITTNACHER, M.J. ES83
GERMANY, G.A. ES83
FILLINGIM, M.O. ES83
PARKS, G.K. ES83
SPANN, J.F., JR. ES83

Polar Cap Area and Boundary Motion During Substorms. For publication in Journal of Geophysical Research, 1998.

BRITTNACHER, M.J. ES83
ELSEN, R.K. ES83
PARKS, G.K. ES83
FILLINGIM, M.O. ES83
CHUA, D. ES83
GERMANY, G.A. ES83
LUMMERZHEIM, D. ES83
SPANN, J.F., JR.

Global Ultraviolet Imaging of the Aurora from Space. For presentation at Yosemite Conference Toward Solar Max 2000, Yosemite National Park, CA, February 11, 1998.

BRITTNACHER, M.J. ES83
ELSEN, R.K. ES83
PARKS, G.K. ES83
SPANN, J.F., JR. ES83
GERMANY, G.A. ES83

UVI Auroral Observations During the January 10, 1997 Magnetic Cloud Event. For presentation at 1997 Spring AGU Meeting, Baltimore, MD, May 1997.

BRITTNACHER, M.J. ES83
FILLINGIM, M.O. ES83
ELSEN, R.K. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

Global Auroral Energy Deposition Compared with Magnetic Indices. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
CHUA, D. ES83
ELSEN, R. ES83
FILLINGIM, M.O. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR.

Characteristics of Dynamic Activity in the Dayside Aurora. For presentation at 32nd COSPAR—Advances in Auroral Plasma Physics, Nagoya, Japan, July 12–19, 1998.

BRITTNACHER, M.J. ES83
SPANN, J.F., JR. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83

Auroral Observations by the Polar Ultraviolet Imager UVI. For publication in Advances in Space Research, 1998.

BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
FILLINGIM, M.O. ES83
ELSEN, R. ES83
CHUA, D. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

Unloading Versus Driven Processes Derived From Auroral Energy Deposition and Polar Cap Size. For presentation at Fourth International Conference on Substorms, Lake Hamana, Japan, March 9–13, 1998.

BRITTNACHER, M.J. ES83
ELSEN, R. ES83
PARKS, G.K. ES83
FILLINGIM, M.O. ES83
CHUA, D. ES83
GERMANY, G.A. ES83
LUMMERZHEIM, D. ES83
SPANN, J.F., JR. ES83

Global Ultraviolet Imaging of the Aurora From Space. For presentation at Fourth International Conference on Substorms, Lake Hamana, Japan, March 9–13, 1998.

BRITTNACHER, M.J. ES83
GERMANY, G.A. ES83
FILLINGIM, M.O. ES83
PARKS, G.K. ES83
SPANN, J.F., JR. ES83

Observations of the Polar Cap Area During Substorms. For publication in Geophysical Research Letters, 1998.

BROWN, A.M. ES23
FERRI, A.A. Georgia Tech
Application of the Probabilistic Dynamic Synthesis Method to the Analysis of a Realistic Structure. For presentation at 4th International Conference on Stochastic Structural Dynamics, Notre Dame, Indiana, August 6–8, 1998.

BUNE, A.V. ES75
GILLIES, D.C. ES75
LEHOCZKY, S.L. ES75
3-D Modeling of Directional Solidification of a Non-Dilute Alloy with Temperature and Concentration Fields Coupling via Materials Properties Dependence and via Double-Diffusive Convection. For presentation at Materials Research Society Spring Meeting, San Francisco, CA, April 13, 1998.

BUNE, A.V. ES75
GILLIES, D.C. ES75
LEHOCZKY, S.L. ES75
3-D Modeling of Double-Diffusive Convection During Directional Solidification of a Non-Dilute Alloy with Application to the HgCdTe Growth Under Microgravity Conditions. For presentation at 12th International Conference on Crystal Growth, Jerusalem, Israel, July 27, 1998.

BURDINE, R. EB52
MSFC Optical Metrology—A National Resource. For presentation at and publication in Proceedings of the NASA Metrology & Calibration Working Group Meeting, Pasadena, CA, February 3–7, 1998.

BURDINE, R. EB52
MSFC Optical Metrology—A National Resource. For presentation at and publication in Proceedings of the NASA Non-Destructive Testing & Evaluation Conference, Langley, VA, February 17–21, 1998.

CAMPBELL, J.W. PS02
Orbital Debris Removal Using Ground Based Lasers. For presentation at and publication in Proceedings of the SPIE's Optical Science, Engineering & Instrumentation, San Diego, CA, July 19–24, 1998.

CARRUTH, M.R., JR. EH11
WILKES, D.R. AZ Technology
ZWIENER, J.M. EH11
NAUMOV, S. Russian Space
KAMENETZKY, R.R. EH11
Space Portable Spectroreflectometer (SPSR) Investigation on Mir Space Station. For presentation at 37th AIAA Aerospace Sciences Meeting & Exhibit, Reno, NV, January 11–14, 1999.

CARRUTH, M.R., JR. EH11
CLIFTON, K.S. EH11
VANHOOSER, M.T. EH11
Development of an Environmental Monitoring Package for the International Space Station. For presentation at 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 11–14, 1999.

CARUSO, S.V. EH42
COX, J.A. EH52
McGEE, K.A. EH52
Precision Cleaning and Verification Processes Used at Marshall Space Flight Center for Critical Hardware Applications. For presentation at Aerospace Environmental Technical Conference III, Huntsville, AL, June 1–3, 1998.

CHAKRABARTY, D.
BILDSTEN, L.
GRUNSFELD, J.M.
KOH, D.T.
PRINCE, T.A.
VAUGHN, B.A.
FINGER, M.H. USRA
SCOTT, D.M. ES84
WILSON, R.B. ES84
Torque Reversal and Spin-Down of the Accretion-Powered Pulsar 4U 1626-67. For publication in The American Astronomical Society, The Astrophysical Journal, Chicago, IL, 1997/1998.

CHAKRABARTY, D.
BILDSTEN, L.
FINGER, M.H. USRA
GRUNSFELD, J.M.
KOH, D.T.
NELSON, R.W.
PRINCE, T.A.
VAUGHAN, B.A.
WILSON, R.B. ES84
On the Correlation of Torque and Luminosity in GX 1+4. For publication in The Astrophysical Journal Letters, Chicago, IL, 1997/1998.

CHAMPION, R.H., JR. EP72
DARROW, R.J., JR. Orbital
X–34 Main Propulsion System Design and Opera-

tion. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, Cleveland, OH, July 13–15, 1998.

CHANDLER, K.O. ED73
ANDERSON, J.B. ED73
COLEMAN, A.D. ED73
DRISKILL, T.C. ED73
Modal Testing of the *International Space Station* Resource Node. For presentation at International Modal Analysis Conference, Santa Barbara, CA, February 2–5, 1998.

CHANDLER, M.O. ES83
MOORE, T.E. GSFC
MOZER, F.S. University of California
RUSSELL, C.T. UCLA
Ion Signatures of Reconnection. For presentation at Toward Solar Max 2000 Conference, Yosemite, CA, February 9–14, 1998.

CHANDLER, M.O. ES83
MOORE, T.E. ES83
FUSELIER, S. ES83
LOCKWOOD, M.K. ES83
Observations of Ion Signatures of Magnetic Reconnection for Northward IMF. For publication in Journal of Geophysical Research, Washington, D.C., October 1998.

CHANDLER, M.O. ES83
CRAVEN, P.D. ES83
Clls During the May 98 CMEs. For presentation at Rutherford Appleton Lab, Oxfordshire, England, September 23, 1998.

CHANG, F.-C. UAH
JEDLOVEC, G.J. HR20
SUGGS, R.J. HR20
GUILLORY, A.R. HR20
Intercomparisons of Total Precipitable Water from Satellite and Other Long Term Data Sets. For presentation at Ninth Conference on Satellite Meteorology and Oceanography, Paris, France, May 25–29, 1998.

CHATTOPADHYAY, K. Fisk University
FETH, S. Fisk University
CHEN, H. Fisk University
BURGER, A. Fisk University
SU, C.-H. ES75
Characterization of Semi-Insulating CdTe Crystals Grown by Horizontal Seeded Physical Vapor Transport. For publication in Journal of Crystal Growth, 1998.

CHRISTL, M. ES84
Data Analysis for the Scintillating Optical Fiber Calorimeter (SOFCAL). For presentation at SCIFI 97, Scintillating and Fiber Detectors Conference, South Bend, IN, November 2–6, 1997.

CHRISTY, J.R. UAH
SPENCER, R.W. HR01
BRASWELL, W.D. Nichols Research Corp.
How Accurate Are Satellite "Thermometers?" For publication in Nature, Great Britain, 1997.

CHUA, D. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
Characterizing the Nightside Auroral Gap Using POLAR-UVI Images. For publication in Geophysical Research Letters, December 1998.

CLARK, T. EL23
Synopsis of Direct and Indirect Lightning Effects on Composite Materials. For presentation at NAVAIR E3 Progress Review/Lightning Conference, San Diego, CA, May 18–21, 1998.

CLAUER, C.R. ES83
BAKER, J.B. ES83
RIDLEY, A.J. ES83
SITAR, R.J. ES83
PAPITASHVILI, V.O. ES83
CUMNOCK, J.A. ES83
SPANN, J.F., JR. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
POLAR-UVI and Other Coordinated Observations of a Traveling Convection Vortex Event Observed on 24 July 1996. For presentation at 1997 AGU Fall Meeting, San Francisco, CA, December 8–12, 1998.

CLINTON, R.G., JR. EH31
LEVINE, S.R. LeRC
Key Issues for Aerospace Applications of Ceramic Matrix Composites. For presentation at Pacific Coast Regional Meeting of the American Ceramic Society, Irvine, CA, October 22–24, 1998.

COLBORN, B.L. ES84
DIETZ, K.L. ES84
RAMSEY, B.D. ES84
WEISSKOPF, M.C. ES84
Monte Carlo Simulations of Background Spectra in Integral Imager Detectors. For presentation at 3rd INTEGRAL (International Gamma-Ray Astrophysics Lab) Workshop, Taormina, Sicily, September 14–18, 1998.

COMFORT, R.H. ES83
MOORE, T.E. ES83
CRAVEN, P.D. ES83
POLLOCK, C.J. ES83
MOZER, F.S. ES83
WILLIAMSON, W.T. ES83
Spacecraft Potential Control by PSI on the Polar Spacecraft. For publication in Journal of Spacecraft and Rockets.

COMFORT, R.H. ES83
RICHARDS, P.G. ES83
LIAO, J.-H. ES83
CRAVEN, P.D. ES83
Effects of Convection Electric Fields on Modeled Plasmaspheric Densities and ccc Temperatures. For presentation at Fall American Geophysical Union Meeting, San Francisco, CA, December 1998.

CONNAUGHTON, V. ES84
PREECE, R.D. ES84
PENDLETON, G.N. ES84
GRB 970616. For publication in IAU Circular 6683, Cambridge, MA.

CONNAUGHTON, V. ES81
AKERLOF, C.W. ES81
BARTHELMY, S.D. ES81
BILLER, S. ES81
BOYLE, P. ES81
BUCKLEY, J. ES81
CARTER-LEWIS, D.A. ES81
FISHMAN, G.J. ES81
MEEGAN, C.A. ES81
ET AL.
A Search for TeV Counterparts to BATSE Gamma-Ray Bursts. For publication in The Astrophysical Journal, 1998.

COOKE, W.J., JR. Computer Sciences
ANDERSON, B.J. EL23
Estimates of Leonid Storm Probabilities and Fluxes from Historical Information. For presentation at AIAA Leonid Meteoroid Storm and Satellite Threat Conference, Manhattan Beach, CA, April 27–28, 1998.

COOPER, K.G. EH32
Rapid Prototyping Roadmapping. For presentation at 12th Annual NCMS Technical Conference, Orlando, FL. May 3–6, 1998.

COOPER, K.G. EH32
In-Space Rapid Manufacturing. For presentation at Committee on Microgravity Research Space Studies Board, Washington, DC, May 27–29, 1998.

COORAY, A.R. University of Chicago
GREGO, L. University of Chicago
HOLZAPFEL, W.L. University of Chicago
JOY, M. ES84
CARLSTROM, J.E. University of Chicago
Radio Sources in Galaxy Clusters at 28.5 GHz. For publication in The Astrophysical Journal, Chicago, IL, 1998.

COSTES, N.C. ES71
STURE, S. ES71
A Mobility Concept for Martian Exploration. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

CRAVEN, P.D. ES83
A Close Look at the Plasmasphere. For presentation at 1998 Spring American Geophysical Union Conference, Boston, MA, May 30, 1998.

CRAWFORD, K. EB33
WALLACE, S. EB33
GAMBLE, A. EB33
Design of a Low Cost Avionics System for Launch Vehicles. For presentation at Digital Avionics SD, Seattle, Washington, October 31–November 6, 1998.

CRAWFORD, K. EB33
PINKLETON, D. Boeing
Development of a Low Cost Data Acquisition System for the Solid Rocket Booster Program. For presentation at Digital Avionics SC, Seattle, WA, October 31–November 6, 1998.

CRAWFORD, L. University of Toledo
KARR, L. ES76

PUSEY, M.L. ES76
Tetragonal Lysozyme Interactions Studied by Site Directed Mutagenesis. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

CRISWELL, D.R. University of Houston
CURRERI, P.A. ES75
Photovoltaics Using In-Situ Resource Utilization for HEDS. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

CURRERI, P.A. ES75
CRISWELL, D.R. University of Houston
In-Situ Production of Solar Power Systems for Exploration. For presentation at STAIF–99, Albuquerque, NM, January 31–February 4, 1999.

DELAY, T. EH33
SMITH, B.H. EH33
ELY, K. Lockheed Martin
MACARTHUR, D. Lockheed Martin
Tooling Foam for Structural Composite Applications. For presentation at 43rd International SAMPE and Exhibition, Anaheim, CA, June 1–4, 1998.

DIETERS, S.W. ES84
WOODS, P. ES84
KOUVELIOTOU, C. USRA
VAN PARADIJS, J.
SRG 1621–47. For publication in International Astronomical Union Circular No. 6962, Cambridge, MA, 1998.

DISCHINGER, H.C., JR. EO66
LOUGHEAD, T.E. EO66
Comparison of Human Modelling Tools for Efficiency of Prediction of EVA Tasks. For presentation at NASA University Research Centers Technical Conference 1998, Huntsville, AL, February 22–26, 1998.

DOLD, P. University of Freiburg
CROLL, A. University of Freiburg
SCHWEIZER, M. University of Freiburg
KAISER, T. University of Freiburg
SZOFRAN, F.R. ES75
NAKAMURA, S. NEC Lab, Japan
HIBIYA, T. NEC Lab, Japan
BENZ, K.W. University of Freiburg
The Role of Marangoni Convection for the FZ-Growth of Silicon. For presentation at 49th IAF Congress, Melbourne, Australia, September 28–October 2, 1998.

DUGAL-WHITEHEAD, N. EB01
Artificial Intelligence and Spacecraft Power Systems. For presentation at University of Memphis Physics Department Colloquium, Memphis, TN, November 5, 1997.

DUKEMAN, G.A. ED13
GALLAHER, M.W. ED13
Guidance and Control Concepts for the X–33 Technology Demonstrator. For presentation at 1998 AAS Guidance and Control Conference, Breckenridge, CO, February 4–8, 1998.

DUMBACHER, D.L. RA20
Lessons Learned and Results of the DC-XA Program. For presentation at Space Technology & Applications International Forum (STAIF–98), Albuquerque, NM, January 25–29, 1998.

DUNN, M.C. EO66
HUTCHINSON, S.L. EO66
Applying Human Factors in Payload Display Design. For presentation at World Aviation Congress & Exposition, Anaheim, CA, September 28–30, 1998.

EDWARDS, D.L. EH12
ZWIENER, J.M. EH12
WERTZ, G.E. EH12
VAUGHN, J.A. EH12
KAMENETZKY, R.R. EH12
FINCKENOR, M.M. EH12
MESHISHNEK, M.J. The Aerospace Corporation
Radiation Induced Degradation of White Thermal Control Paint. For presentation at Twentieth IEA-NASA/ASTM/AIAA/CSA Space Simulation Conference, Annapolis, MD, October 21–26, 1998.

ELLIOTT, H.A. UAH
COMFORT, R.H. UAH
CRAVEN, P.D. ES83
CHANDLER, M.O. ES83
MOORE, T.E. GSFC
A Study of Ion Velocities Observed by TIDE and How It Relates to Magnetospheric Circulation. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26–29, 1998.

ELLIOTT, H.A. UAH
CRAVEN, P.D. ES83
COMFORT, R.H. UAH
CHANDLER, M.O. ES83
MOORE, T.E. GSFC
RUSSELL, C.T. University of CA
RUOHONIEMI, J.M. Johns Hopkins University

Polar Cap Plasma and Convection. For presentation at 1998 Huntsville Workshop, Guntersville, AL, October 26, 1998.

ELSEN, R.K. ES83
WINGLEE, R.M. ES83
SPANN, J.F., JR. ES83
GERMANY, G.A. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83

The Auroral Oval Boundaries on January 10, 1997: A Comparison of Global Magnetospheric Simulations with UVI Images. For publication in Geophysical Research Letters, 1998.

ELSEN, R.K. ES83
WINGLEE, R.M. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

Global MHD Magnetospheric Simulation of January 10, 1997 Encounter with Magnetic Cloud. For presentation at 1997 Spring AGU Meeting, Baltimore, MD, May 1997.

ELSEN, R.K. ES83
FILLINGIM, M.O. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

Comparisons of Solar Wind Coupling Parameter with Auroral Energy Deposition Rates. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

ELSEN, R.K. ES83
WINGLEE, R.M. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

A Substorm Triggered by a Sudden Drop in Dynamic Pressure. For presentation at Fourth International Conference on Substorms, Lake Hamana, Japan, March 9–13, 1998.

ELSNER, R.F. ES84
O'DELL, S.L. ES84
RAMSEY, B.D. ES84
TENNANT, A.F. ES84
WEISSKOPF, M.C. ES84
KOLODZIEJCZAK, J.J. ES84
SWARTZ, D.A. ES84
ENGELHAUPT, D. ES84
GARMIRE, G.P. ES84
ET AL.

Calibration Results for the AXAF Flux Contamination Monitor. For presentation and publication in Proceedings of SPIE Conference, San Diego, CA, July 19–24, 1998.

ELSNER, R.F. ES84
O'DELL, S.L. ES84
RAMSEY, B.D. ES84
TENNANT, A.F. ES84
WEISSKOPF, M.C. ES84
KOLODZIEJCZAK, J.J. ES84
SWARTZ, D.A. ES84
ENGELHAUPT, D. ES84
GARMIRE, G. ES84
ET AL.

Calibration Results for the AXAF Flux Contamination Monitor. For presentation at 1998 SPIE Conference, San Diego, CA, July 19–22, 1998.

EMMITT, G.D. Simpson Weather
MILLER, T.L. HR20

SPARCLE: Validation of Observing System Simulations (SPAce Readiness Coherent Lidar Experiment). For presentation at The European Symposium on Remote Sensing, Barcelona, Spain, September 21–25, 1998.

EMRICH, W.J., JR. PS01

Performance Optimization of the Gasdynamic Mirror Propulsion System. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, Cleveland, OH, July 13–15, 1998.

EVANS, S.W. ED13

Eclipses by the Earth and by the Moon as Constraints on the AXAF Mission. For presentation at AAS/AIAA Space Flight Mechanics Meeting, Monterey, CA, February 9–11, 1998.

EWING, F. USRA
WILSON, L. East TN St. University
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76

The Growth of Protein Crystals Using McDUCK. For presentation at 7th International Conference on the Crystallation of Biological Macromolecules, Granada, Spain, May 3, 1998.

FENG, X. American GNC Corp.
LIN, C.-F. American GNC Corp.
YU, T.-J. American GNC Corp.
WHORTON, M.S. ED12

Automatic Closed-Loop Identification and Robust Control Synthesis. For presentation at AIAA Guidance, Navigation, and Control Conference, Boston, MA, August 10–12, 1998.

FILLINGIM, M.O. ES83
BRITTNACHER, M.J. ES83
ELSEN, R.K. ES83
PARKS, G.K. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83

Global Auroral Energy Deposition Derived from Polar UVI Images. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

FINCKENOR, J.L. ED52
SPURRIER, M. ED24

Design Optimization and Analysis of a Composite Honeycomb Intertank. For presentation at 6th International Conference, OPTI 99, Computer Aided Optimum Design of Structures, Orlando, FL, March 16–18, 1999.

FINGER, M.H. USRA
BILDSTEN, L. University of California, Berkeley
CHAKRABARTY, D. MIT
PRINCE, T.A. CA Institute of Tech
SCOTT, D.M. USRA
WILSON, C.A. ES84
WILSON, R.B. ES84
ZHANG, S.N. USRA

The Outbursts and Orbit of the Accreting Pulsar GS 1843 02=2S 1845-024. For publication in Astrophysical Journal, Chicago, IL, 1998.

FINGER, M.H. USRA
DIETERS, S.W. UAH
WILSON, R.B. ES84

XTE J1550-564. For publication in International Astronomical Union Circular No. 7010, Cambridge, MA, 1998.

FISHER, M.F. EP72
KING, R.F. Stennis Space Center
CHENEVERT, D.J. Stennis Space Center

Low Cost Propulsion Technology Testing at the Stennis Space Center—Propulsion Test Article and the Horizontal Test Facility. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, Cleveland, OH, July 13–15, 1998.

FISHER, M.F. EP72
ISE, M.R. EP72

Low Cost Propulsion Technology at the Marshall Space Flight Center—Fastrac Engine and the Propulsion Test Article. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, Cleveland, OH, July 13–15, 1998.

FISHMAN, G.J. ES81

Observations of Gamma-Ray Bursts—An Update. For presentation at University of Missouri, O.M. Steward Special Lecture, Columbia, MO, October 17, 1997.

FISHMAN, G.J. ES81

The GLAST Mission: Using Scintillating Fibers as Both the Tracker and the Calorimeter. For presentation at SCIFI 97—Conference, South Bend, IN, November 2, 1997.

FISHMAN, G.J. ES81

Observations of Gamma-Ray Bursts. For presentation at American Physical Society (APS), Columbus, OH, April 18–21, 1998.

FISHMAN, G.J. ES81

Gamma Ray Bursts—Afterflows and Counterparts. For presentation at American Astronomical Society Meeting, San Diego, CA, June 7–12, 1998.

FISHMAN, G.J. ES01

Long-Term Variability and Transient Behavior of Some Galactic Hard X-Ray Sources as Observed with BATSE. For presentation at 3rd INTEGRAL Workshop, Taormina, Sicily, Italy, September 14–18, 1998.

FONTE, P. LIP/Coimbra University
PESKOV, V. ES84
RAMSEY, B.D. ES84

A Study of Breakdown Limits in Microstrip Gas Counters with Preamplification Structures. For publication in Nuclear Instruments and Methods for Phys. Res. A, 1998.

FONTE, P. LIP/Coimbra University
PESKOV, V. National Research
RAMSEY, B.D. ES84

Rate and Gain Limitations of MSGC's and MGC's Combined with GEM and Other Preamplification Structures. For publication in Nuclear Instrumentation & Methods in Physics Resources, 1998.

FORD, E.C. Columbia University
KAARET, P. Columbia University
CHEN, K. Columbia University
TAVANI, M. Columbia University
BARRET, D. Harvard Smithsonian
BLOSER, P. Harvard Smithsonian
GRINDLAY, J. Harvard Smithsonian
HARMON, B.A. ES84
PACIESAS, W.S. UAH
ZHANG, S.N. USRA

Energy Spectra and High Frequency Oscillations in 4U 0614+091. For publication in Astrophysical Journal, Chicago, IL, 1997/1998.

FORSYTHE, E.L. USRA
PUSEY, M.L. ES76

Crystallization of Chicken Egg White Lysozyme from Sulfate Salts. For presentation at 7th International Conference on Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

FORSYTHE, E.L. USRA
SNELL, E.H. ES76
MALONE, C.C. USRA
PUSEY, M.L. ES76

Crystallization of Chicken Egg White Lysozyme From Assorted Sulfate Salts. For publication in Journal of Crystal Growth, 1998.

FORSYTHE, E.L. USRA
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76

Growth of (101) Faces of Tetragonal Lysozyme Crystals: Measured Growth Rate Trends. For publication in Journal of Crystal Growth, 1998.

FOUNTAIN, W.F. ES84

Chemical Processing and Analysis of "JACEE" Circumpolar Flights 13 & 14. For presentation at Cosmic Ray JACEE Meeting, Hiroshima, Japan, December 5–14, 1997.

FRAGOMENI, J.M. University of Alabama
NUNES, A.C., JR. EH01

An Assessment of Molten Metal Detachment Hazards During Electron Beam Welding in Space. For presentation at 19th Southeastern Conference on Theoretical and Applied Mechanics, Deerfield, FL, May 1998.

FRAZIER, D.O. ES01
PENN, B.G. ES01
SMITH, D.D. ES01
WITHEROW, W.K. ES01
PALEY, M.S. ES01
ABDELDAYEM, H.A. ES01

Microgravity Processing and Photonic Applications of Organic and Polymeric Materials. For publication in Chapter 17, "Photonic Polymer Systems" by Marcel Dekker, Inc., 1998.

GALAMA, T.J. ES81
DE BRUYN, A.G. ES81
VAN PARADIJS, J. ES81
HANLON, L. ES81
GROOT, P.J. ES81
VAN DER KLIS, M. ES81
STROM, R. ES81
SPOELSTRA, T. ES81
FISHMAN, G.J. ES81
ET AL.

Two Variable Radio Sources Near the Position of GRB 940301. For publication in Astronomy and Astrophysics, 1998.

GALLAGHER, D.L. ES83
JOHNSON, L. PD01
BAGENAL, F. ES83
MOORE, J. ES83

An Overview of Electrodynamic Tether Performance in the Jovian System. For presentation at Advanced Propulsion Meeting, Los Angeles, CA, March 11–13, 1998.

GALLAGHER, D.L. ES83
BAGENAL, F. University of Colorado
MOORE, J. SRS Technologies
JOHNSON, L. PD01

An Overview of Electrodynamic Tether Performance in the Jovian System. For publication in American Institute of Aeronautics and Astronautics.

GALLAGHER, D.L. ES83
FOK, M.-C. USRA
FUSELIER, S. Lockheed-Martin
GLADSTONE, G.R. SwRI

GREEN, J.L. GSFC
FUNG, S.F. GSFC
PEREZ, J. Auburn University
REIFF, P. Rice University
ROELOF, E.C. Johns Hopkins
WILSON, G. Mission Research Corp.
IMAGE Mission Science. For presentation at Yosemite, CA Conference, February 9–14, 1998.

GALLAGHER, D.L. ES83
CARPENTER, D.L. ES83
Global Plasmaspheric Issues. For presentation at GEM Conference, Snowmass, CO, July 15–19, 1998.

GARCIA, R. ED32
WILLIAMS, R. ED32
FEARS, S. ED32
Hydrodynamic Design of the Fastrac Turbopump. For presentation at ASME Fluid Engineering Conference, Washington, DC, June 21–28, 1998.

GARCIA, R. ED32
The Role of Computational Fluid Dynamics at Marshall Space Flight Center. For presentation at Emerging Horizons in Turbomachinery Technology Conference, Wilder, Vermont, May 11–15, 1998.

GARY, G.A. ES82
ALEXANDER, D.A. ES82
Constructing the Coronal Magnetic Field: By Correlating Parameterized Magnetic Field Lines With Observed Coronal Plasma Structures. For publication in Solar Physics, 1998.

GERMANY, G.A. ES83
RICHARDS, P.G. ES83
PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
SPANN, J.F., JR. ES83
Global Auroral Imaging as a Remote Diagnostic of Geospace. For presentation at AIAA 28th Plasmadynamics and Lasers Conference, Atlanta, GA, June 1997.

GERMANY, G.A. ES83
SWIFT, W. ES83
RICHARDS, P.G. ES83
PARKS, G.K. ES83
BRITTNACHER, M. ES83
SPANN, J.F., JR. ES83
Changes in Thermospheric O/N2 Derived from UVI Auroral Images. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

GERMANY, G.A. ES83
PARKS, G.K. ES83
RANGANATH, H. ES83
ELSEN, R. ES83
RICHARDS, P.G. ES83
SWIFT, W. ES83
SPANN, J.F., JR. ES83
BRITTNACHER, M.J. ES83
Analysis of Auroral Morphology: Substorm Precursor and Onset on January 10, 1997. For publication in Geophysical Research Letters, 1998.

GERMANY, G.A. UAH
SWIFT, W.R. UAH
CREUTZBERG, F. National Research
EASTES, R. Air Force Research Lab
RICH, F. AFRL
SPANN, J.F., JR. ES83
BRITTNACHER, M.J. University of Washington
PARKS, G.K. University of Washington
Auroral Boundaries: Comparison Between UV Images, In Situ Precipitation, and Groundbased Optical Observations. For presentation at 1998 Fall American Geophysical Union Meeting, San Francisco, CA, December 1998.

GHADDAR, C.K. Cape Simulations, Inc.
LEE, C.K. Cape Simulations, Inc.
MOTAKEF, S. Cape Simulations, Inc.
GILLIES, D.C. ES75
Numerical Simulation of THM Growth of CdTe in Presence of Rotating Magnetic Fields. For publication in Journal of Crystal Growth, 1998.

GHOSH, K.K. NSA/NRC/MSFC
RAMSEY, B.D. ES84
Origin of Gamma-Ray Emissions From the MeV Blazars. For presentation at 3rd INTEGRAL (International Gamma-Ray Astrophysical Laboratory) Workshop, Taormina, Sicily, September 14–18, 1998.

GHOSH, K.K. NAS/NRC/ES84
IYENGER, K.V.K. Indian Institute of Technology
RAMSEY, B.D. ES84
AUSTIN, R.A. ES84
Near Simultaneous Spectroscopic and Polarimetric Observations of Be Stars. For publication in The Astronomical Journal, 1998.

GILLIES, D.C. ES75
The Influence of a Rotating Magnetic Field on Solidification from a Traveling Solvent Zone. For presentation at Science & Technical Advisory Council Meeting, Huntsville, AL, November 10, 1997.

GILLIES, D.C. ES75
NASA's Microgravity Materials Science Program. For presentation at 127th Annual TMS Meeting, San Antonio, TX, February 15–19, 1998.

GILLIES, D.C. ES75
Opportunities Within NASA's Microgravity Research Program. For presentation at NASA University Research Centers Technical Conference, Huntsville, AL, February 22, 1998.

GOODMAN, S.J. HR20
BUECHLER, D. HR20
RAGHAVAN, R. HR20
TRMM Observations of Lightning and Rainfall. For presentation at 6th International Conference of Precipitation, Mauna Lani Bay, Hawaii, June 26–July 3, 1998.

GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
BUECHLER, D.L. HR20
HODANISH, S. HR20
SHARP, D. HR20
WILLIAMS, E. HR20
BOLDI, B. HR20
MATLIN, A. HR20
WEBER, M. HR20
Total Lightning and Radar Storm Characteristics Associated with Severe Storms in Central Florida. For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
RAMACHANDRAN, N. HR20
BUECHLER, D.L. HR20
HODANISH, S. National Weather Service
SHARP, D. National Weather Service
WILLIAMS, E. MIT Lincoln Lab
BOLDI, B. MIT Lincoln Lab
MATLIN, A. MIT Lincoln Lab
WEBER, M. MIT Lincoln Lab
Total Lightning and Radar Storm Characteristics Associated with Severe Storms in Central Florida. For presentation at 19th Conference on Severe Storms, Minneapolis, MN, September 14–18, 1998.

GORDON, T. Applied Science
RANTANEN, R. ROR Enterprises, Inc.
PIPPIN, G. Boeing
FINCKENOR, M.M. EH15
Comparison of Contamination Model Predictions to LDEF Surface Measurements. For presentation at SPIE International Symposium, San Diego, CA, July 19–24, 1998.

GRINER, C. DD01
SCHNEIDER, M. EO27
Telescience Resource Kit Software Lifecycle. For presentation at 49th International Astronautical Congress, Melbourne, Australia, September 28–October 2, 1998.

GUILLORY, A.R. HR20
LECUE, J.M.
JEDLOVEC, G.J. HR20
WHITWORTH, B.N.
Cloud Filtering Using a Bi-Spectral Spatial Coherence Approach. For presentation at Ninth Conference on Satellite Meteorology and Oceanography, Paris, France, May 25–29, 1998.

GUILLORY, A.R. HR20
LECUE, J.M. NASA Deep Space
JEDLOVEC, G.J. HR20
WHITWORTH, B.N. UAH
Cloud Filtering Using a Bi-Spectral Spatial Coherence Approach. For presentation at Ninth Conference on Satellite Meteorology and Oceanography, Paris, France, May 25–29, 1998.

HAGOPIAN, J. EO46
MAXWELL, T. EO46
NAHAY, E. EO46
NASA/MIR Phase 1: A Lesson in Long Duration Mission Planning and Operations. For presentation at Space Ops 98, Fifth International Symposium on Space Mission Operations and Ground Data Systems, Tokyo, Japan, June 1–5, 1998.

HAGYARD, M.J. ES82
STARK, B.A. Nichols Research Corp.
VENKATAKRISHNAN, P. Indian Institute of Technology
A Search for Vector Magnetic Field Variations Associated with the M-Class Flares of 1991 June 10 in

AR 6659. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

HAGYARD, M.J. ES82
STARK, B.A. Nichols Research Corp.
VENKATAKRISHNAN, P. Indian Institute of Technology

A Search for Vector Magnetic Field Variations Associated with the M-Class Flares of 1991 June 10 in AR 6659. For publication in Solar Physics, February 1998.

HAGYARD, M.J. ES82
PEVTSOV, A.A. ES82
CANFIELD, R.C. ES82

Helicity of Photospheric Magnetic Fields in Solar Cycle 21. For presentation at Chapman Conference on Magnetic Helicity, Boulder, CO, July 28, 1998.

HALE, J.P., II EO66

Applied Virtual Reality in Reusable Launch Vehicle Design, Operations Development, and Training. For presentation at Autofact 1997, Detroit, MI, November 3–7, 1997.

HALL, C.E. ED13
GALLAHER, M.W. ED13
HENDRIX, N.D. ED13

X–33 Attitude Control System Design for Ascent, Transition, and Entry Flight Regimes. For presentation at AIAA GN&C Conference, Boston, MA, August 11, 1998.

HAMILTON, G.S. EO66
WILLIAMS, J.C. University of Texas

Conversion of IVA Human Computer Model to EVA Use and Evaluation and Comparison of the Result to Existing EVA Models. For presentation at URC-TC 1998 NASA URC Technical Conference, Huntsville, AL, February 22–26, 1998.

HANSON, J.M. ED13
COUGHLIN, D.J. ED13
DUKEMAN, G.A. ED13
MULQUEEN, J.A. ED13
MCCARTER, J.W. ED13

Ascent, Transition, Entry, and Abort Guidance Algorithm Design for the X–33 Vehicle. For presentation at AIAA GN&C Conference, Boston, MA, August 11, 1998.

HARMON, B.A. ES84
ZHANG, S.N. ES84
ROBINSON, C.R. ES84
PACIESAS, W.S. ES84
BARRET, D. Harvard/CFA
GRINDLAY, J. Harvard/CFA
BLOSER, P. Harvard/CFA
MONNELLY, C. Harvard/CFA

Near Real-Time Imaging of the Galactic Plane with BATSE. For presentation at High Energy Astrophysics Division (HEAD) 1997 Meeting, Estes Park, CO, November 3–7, 1997.

HARMON, B.A. ES84
ROBINSON, C.R. ES84

X1354-644=GS 1354-64. For publication in International Astronomical Union Circular No. 6774, Cambridge, MA, 1997/1998.

HARMON, B.A. ES84
FISHMAN, G.J. ES84
PACIESAS, W.S. UAH

XTE J0421+560 and CI Camelopardalis. For publication in International Astronomical Union (IAU) Circular No. 6874, Cambridge, MA, 1998.

HARMON, B.A. ES84
MCCOLLOUGH, M.L. ES84
WILSON, C.A. ES84
ZHANG, S.N. ES84
PACIESAS, W.S. ES84

XTE J1748-288. For publication in International Astronomical Union (IAU) Circular No. 6933, Cambridge, MA, 1998.

HARMON, B.A. ES84

Galactic Superluminal Sources. For presentation at The 3rd INTEGRAL Workshop, Taormina, Sicily, Italy, September 13–18, 1998.

HASTINGS, L. EP42
MARTIN, J. EP42

Large Scale Testing of a Foam/Multilayer Insulation Thermal Control System (TCS) for Cryogenic Upper Stages. For presentation at Space Technology & Applications International Forum, Albuquerque, NM, January 25–29, 1998.

HATHAWAY, D.H. ES82

Synoptic Datasets and Solar Activity Predictions. For publication in Synoptic Solar Physics, Sunspot, NM, 1997.

HATHAWAY, D.H. ES82

A Search for Giant Convection Cells on the Sun. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

HATHAWAY, D.H. ES82
WILSON, R.M. ES82

Comment on "The predicted size of cycle 23 based on the interred three-cycle quasi-periodicity of the planetary index Ap" by H.S. Ahluwalia. For publication in Journal of Geophysical Research (Space Physics), July 1998.

HERRMANN, R. ES81
MAGUN, A. ES81
KAUFMANN, P. ES81
CORREIA, E. ES81
COSTA, J.E.R. ES81
MACHADO, M.E. ES81
FISHMAN, G.J. ES81

Evidence for Highly Inhomogeneous mm-Wave Sources During the Impulsive Flare of May 9, 1991. For publication in Astronomy and Astrophysics, 1998.

HIRAHARA, M.
HORWITZ, J.L.
MOORE, T.E. ES83
GERMANY, G.A.
SPANN, J.F.
PETERSON, W.K.
SHELLEY, E.G.
CHANDLER, M.O.
CRAVEN, P.D. ES83
ET AL.

Relationship of Topside Ionospheric Ion Outflows to Auroral Forms and Precipitations, Plasma Waves, and Convection Observed by POLAR. For publication in Journal of Geophysical Research.

HIRAHARA, M. UAH
HORWITZ, J.L. UAH
MOORE, T.E. ES83
CHANDLER, M.O. ES83
GILES, B.L. ES83
CRAVEN, P.D. ES83
POLLOCK, C.L. SwRI

POLAR Observations of Properties of H+ and O+ Conics in the Cusp Near -5300 km Altitude. For publication in Proceedings of Monograph of 1996 Huntsville Workshop, Guntersville, AL, September 1996.

HO, J.X. ES76
SNELL, E.H. ES76
SISK, R.C. ES76
RUBLE, J.R. ES76
CARTER, D.C. ES76
OWENS, S.M. ES76
GIBSON, W.M. ES76

Stationary Crystal Diffraction with a Monochromatic Convergent X-Ray Source and Application for Macromolecular Crystal Data Collection. For publication in Acta Crystallographica Section D.

HODANISH, S. HR20
SHARP, D. HR20
WILLIAMS, E. HR20
BOLDI, B. HR20
GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
MATLIN, A. HR20
WEBER, M. HR20

Comparisons Between Total Lightning Data, Mesocylone Strength, and Storm Damage Associated with the Florida Tornado Outbreak of February 23, 1998. For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

HOFFMAN, C.R. Pratt & Whitney
PUGH, R. Pratt & Whitney
SAFIE, F.M. CR10

Methods and Techniques for Risk Prediction of Space Shuttle Upgrades. For presentation at AIAA Conference, Long Beach, CA, April 20–23, 1998.

HOOVER, R.B. ES82
ROZANOV, A.Y. Russian Academy
ZHMUR, S.I. Russian Academy
GORLENKO, V.M. Russian Academy

Further Evidence of Microfossils in Carbonaceous Meteorites. For presentation at SPIE's International Symposium, San Diego, CA, July 19–24, 1998.

HOOVER, R.B. ES82
ROZANOV, A.Y. Russian Academy
ZHMUR, S.I. Russian Academy
GORLENKO, V.M. Russian Academy

Evidence of Microfossils in Carbonaceous Chondrites. For publication in Proceedings for SPIE's International Symposium on Optical Science, Engineering & Instrumentation, Bellingham, WA, June 9, 1998.

HOOVER, R.B. ES82
Evidence for Microfossils in Ancient Rocks and Meteorites. For presentation at Goddard Space Flight Center Lecture, GSFC, MD, October 2, 1998.

HOPPE, D. EH33
High Pressure Water Stripping Using Multi-Orifice Nozzles. For presentation at Aerospace Environmental Technology Conference III, Huntsville, AL, June 1–3, 1998.

HORACK, J.M. ES01
TREISE, D. University of Florida
The Process of Science Communications at NASA/ Marshall Space Flight Center. For presentation at Public Communication of Science & Technology (PCST) Conference, Berlin, Germany, September 17–19, 1998.

HORWITZ, J.L. UAH
SU, Y.-J.
MOORE, T.E. ES83
GILES, B.L.
CRAVEN, P.D. ES83
CHANDLER, M.O.
HIRAHARA, M.
POLLOCK, C.J.
Survey of the Polar Wind Near 1 and 8Re with POLAR. For presentation at The Cambridge Symposium Workshop, Lisbon, Portugal, July 3, 1998.

HORWITZ, J.L. ES83
SU, Y.-J. ES83
DORS, E.E. ES83
MOORE, T.E. ES83
GILES, B.L. ES83
CHANDLER, M.O. ES83
CRAVEN, P.D. ES83
CHANG, S.-W. ES83
SCUDDER, J. ES83
Low-Energy Electron Effects on the Polar Wind Observed by the POLAR Spacecraft>spacecraft. For presentation at American Geophysical Union Fall Meeting, San Francisco, CA, December 5, 1998.

HOWARD, R.T. EB44
BRYAN, T.C. EB44
BOOK, M.L. EB44
Video Guidance Sensor Flight Experiment Results. For presentation at SPIE's Aerospace '98 Symposium, Orlando, FL, April 13–17, 1998.

HOWARD, S.G. Boeing
HUTCHENS, C.F. ED62
RETHKE, D.W. Hamilton Standard
SWARTLEY, V.L. Hamilton Standard
MARSH, R.W. Hamilton Standard
Urine Pretreatment Configuration and Test Results for Space Applications. For presentation at 28th International Conference on Environmental Systems (ICES), Danvers, MA, July 13–16, 1998.

HUDSON, S.T. ED34
COLEMAN, H.W. UAH
A Detailed Uncertainty Assessment of Methods Used to Determine Turbine Efficiency. For presentation at 20th Advanced Measurement & Ground Testing Technical Conference, Albuquerque, NM, June 15–18, 1998.

HUETER, U. RA10
Status of the Advanced Reusable Technologies Project. For presentation at AIAA 8th International Space Planes & Hypersonic System & Technological Conference, Norfolk, VA, April 27–30, 1998.

HUMPHRIES, W.R. ED01
VERDERAIME, V. ED01
Bridging Deterministic and Reliability Quasi-Static Structural Analyses. For publication in Journal of Spacecraft and Rockets.

HURLEY, K. ES81
HARTMANN, D.H. ES81
KOUVELIOTOU, C. ES81
FISHMAN, G.J. ES81
LAROS, J.G. ES81
CLINE, T.L. ES81
BOER, M. ES81
Are Abell Clusters Correlated with Gamma-Ray Bursts? For publication in The Astrophysical Journal, 1998.

HURLEY, K. ES84
BRIGGS, M.S. ES84
KIPPEN, R.M. ES84
KOUVELIOTOU, C. ES84
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
CLINE, T.L. ES84
BOER, M. ES84
The Uylsses Supplement to the BATSE 3B Catalog of Cosmic Gamma-Ray Bursts. For publication in Astrophysical Journal, 1998.

HURLEY, K. ES84
BRIGGS, M.S. ES84
KIPPEN, R.M. ES84
KOUVELIOTOU, C. ES84
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
CLINE, T.L. ES84
BOER, M. ES84

The Ulysses Supplement to the BATSE 4B Catalog of Cosmic Gamma-Ray Bursts. For publication in Astrophysical Journal, Berkeley, CA, 1998.

JAAP, J. EO47
MEYER, P.J. EO47
DAVIS, E. EO47

Using Common Graphics Paradigms Implemented in a Java Applet to Represent Complex Scheduling Requirements. For presentation at Workshop on Planning and Scheduling for Space, Pasadena, CA, October 28, 1997.

JACKSON, J.L. Micro Craft, Inc.
HOWARD, R.T. EB44
COLE, H.J. EB53

Automatic Docking System Sensor Design, Test, and Mission Performance. For presentation at SPIE's Aerospace '98 Symposium, Orlando, FL, April 13–17, 1998.

JACOBSON, D. EJ31
CRAIG, L. EJ31
SCHUNK, G. EJ31
SHAPIRO, A. EJ31
CLOYD, D. EJ31
RICKS, E. EJ31
VACARRO, M. EJ31
REDDING, D. JPL
HADAWAY, J. UAH
BELY, P. Space Telescope

Design of Large Lightweight Space Telescope Optical Systems for the Next Generation Space Telescope. For presentation at SPIE's Space Telescopes and Instruments V Conference, Kona, HI, March 20–28, 1998.

JARZEMBSKI, M.A. HR01
SRIVASTAVA, V. USRA

Earth Surface Backscatter Using a Focused Continuous Wave 9.1 um Lidar. For publication in Applied Optics: Lasers, Photonics and Environmental Optics.

JARZEMBSKI, M.A. HR20
SRIVASTAVA, V. USRA
ROTHERMEL, J. HR20

Vertical Aerosol Backscatter Variability From an Airborne Focused Continuous Wave CO2 Lidar. For publication in Applied Optics, 1998.

JEDLOVEC, G.J. HR01
CHANG, F.-C. UAH
SUGGS, R.J. HR01
GUILLORY, A.R. HR01

Variations in Atmospheric Water Vapor as Seen in Satellite Data and Model Reanalysis Fields. For presentation at 9th Symposium on Global Change Studies, Phoenix, AZ, January 11–16, 1998.

JEDLOVEC, G.J. HR20
ATKINSON, R.J. Lockheed Martin

The Marshall Automated Wind Algorithm for Geostationary Satellite Wind Applications. For presentation at Ninth Conference on Satellite Meteorology and Oceanography, Paris France, May 25–29, 1998.

JEDLOVEC, G.J. HR20
LERNER, J.A. University of Alabama
ATKINSON, R.J. Lockheed Martin

A Satellite-Derived Upper-Tropospheric Water Vapor Transport Index for Climate Studies. For publication in Journal of Applied Meteorology, American Meteorological Society, July 1998.

JERIUS, D. ES84
ZHAO, P. ES84
VAN SPEYBROECK, L. ES84
TENNANT, A.F. ES84
SWARTZ, D. ES84
SCHWARTZ, D.A. ES84
PODGORSKI, W.A. ES84
HARRIS, B. ES84
GRAESSLE, D.E. ES84
ET AL.

Predictions of the On-Orbit Performance of AXAF's Optics. For publication in Bulletin of the American Astronomical Society, Winston-Salem, NC, June 8–12, 1997.

JETT, T.R. EH13
THOM, R.L. EH13

Effect of Bearing Cleaning on Long Term Bearing Life. For presentation at Aerospace Environmental Technology Conference III, Huntsville, AL, June 1–3, 1998.

JOHNSON, D.L. EL23
PEARSON, S.D. EL23
VAUGHAN, W.W. EL23
BATTS, G.W. EL23
Assessment Regarding Impact of Atmospheric Conditions on Space Shuttle Launch Delays. For presentation at 36th AIAA Aerospace Sciences Meeting, Reno, NV, January 12–15, 1998.

JOHNSON, L. PS02
ESTES, R.D. Smithsonian
LORENZINI, E. Smithsonian
MARTINEZ-SANCHEZ, M. MIT
SANMARTIN, J. University of Madrid
VAS, I. Boeing
Electrodynamic Tethers for Spacecraft Propulsion. For presentation at 36th Aerospace Sciences Meeting, Reno, NV, January 12–15, 1998.

JOHNSON, L. PS02
GILCHRIST, B. University of Michigan
ESTES, R.D. Smithsonian
LORENZINI, E. Smithsonian
MARTINEZ-SANCHEZ, M. MIT
SANMARTIN, J. University of Madrid
Electrodynamic Tether Propulsion for Spacecraft and Upper Stages. For presentation at AIAA Joint Propulsion Conference, Cleveland, OH, July 13–16, 1998.

JOHNSON, L. PS02
GILCHRIST, B. University of Michigan
ESTES, R.D. Smithsonian
LORENZINI, E. Smithsonian
BALLANCE, J. EE61
Propulsive Small Expendable Deployer System (ProSEDS) Space Experiment. For presentation at Joint Army, Navy, NASA, Air Force Joint Propulsion Conference, Cleveland, OH, July 13–16, 1998.

JOHNSON, L. PS01
GILCHRIST, B. University of Michigan
ESTES, R.D. Smithsonian
LORENZINI, E. Smithsonian
Overview of Future NASA Tether Applications. For presentation at 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 12–19, 1998.

JOHNSON, L. PS01
HERRMANN, M. PS01
VAS, I. Boeing
ESTES, B. Smithsonian
Electrodynamic Tethers for Reboost of the *International Space Station*. For presentation at Space Technology and Applications International Forum (STAIF-99), Albuquerque, NM, January 31–February 4, 1999.

JOHNSTON, A.S. EP81
TYLER, T.R. EP81
Testing of the Automated Fluid Interface System. For presentation at and publication in Proceedings of the 32nd Aerospace Symposium, Kennedy Space Flight Center, FL, May 15, 1998.

JOHNSTON, A.S. EB44
RYDER, M. Moog Inc.
TYLER, T.R. EB44
Orbital Fluid Transfer System. For presentation at and publication in Proceedings of the AIAA Defense and Civil Space Programs Conference, Huntsville, AL, October 28–30, 1998.

JONES, C.S. EH23
VENABLE, R.A. Lockheed Martin
Friction Stir Welding of Large Scale Cryogenic Fuel Tanks for Aerospace Applications. For presentation at Trends in Welding Research Conference, Pine Mountain, GA, June 1–5, 1998.

JOY, M.K. ES84
BILBRO, J.W. ES84
ELSNER, R.F. ES84
JONES, W. ES84
KOLODZIEJCZAK, J.J. ES84
PETRUZZO, J. ES84
O'DELL, S.L. ES84
WEISSKOPF, M.C. ES84
Replicated Wolter-1 X-Ray Optics for Lightweight, High Angular Resolution, Large Collecting Area X-Ray Telescopes. For presentation at Structure and Evolution of the Universe Technology Working Group Meeting, Greenbelt, MD, April 1, 1997.

JUDGE, R.A. UAH
BAIRD, J.K. UAH
PUSEY, M.L. ES76
The Effect of Solution Conditions on the Nucleation Kinetics of Tetragonal Lysozyme Crystals. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

JUDGE, R.A. UAH
FORSYTHE, E.L. USRA
JOHNS, M.R. University of Queensland

PUSEY, M.L. ES76
WHITE, E.T. University of Queensland
The Feasibility of Bulk Crystallization as an Industrial Purification and Production Technique for Proteins. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

JUDGE, R.A. ES76
FORSYTHE, E.L. ES76
PUSEY, M.L. ES76
The Effect of Protein Impurities on Lysozyme Crystal Growth. For publication in Biotechnology and Bioengineering Journal, 1998.

JUDGE, R.A. ES76
SNELL, E.H. ES76
The Effect of Solution Parameters on Lysozyme Nucleation Rates and Crystal Quality. For presentation at The American Crystallographic Association Conference, Washington, DC, July 18–23, 1998.

JUDGE, R.A. ES76
JACOBS, R.S. UAH
FRAZIER, T. Michigan State
SNELL, E.H. ES76
PUSEY, M.L. ES76
The Effect of Temperature and Solution pH on Tetragonal Lysozyme Nucleation Kinetics. For publication in Biophysical Journal, 1998.

JURETZKO, F.R. University of Alabama
DHINDAW, B.K. University of Alabama
STEFANESCU, D.M. University of Alabama
SEN, S. USRA
CURRERI, P.A. ES75
Particle Engulfment and Pushing by Solidifying Interfaces Part I: Ground Experiments. For publication in Metallurgical Transactions, 1998.

JURETZKO, F.R. University of Alabama
CATALINA, A.V. University of Alabama
STEFANESCU, D.M. University of Alabama
DHINDAW, B.K. University of Alabama
SEN, S. USRA
CURRERI, P.A. ES75
MULLINS, J. University of Alabama
Particle Engulfment and Pushing by Solidifying Interfaces LMS Mission Results. For presentation at 1st Pan-Pacific Basin Workshop and 4th International Japan/China Workshop on Microgravity Science, Tokyo, Japan, July 8–11, 1998.

KARPOVA, E.A. NRC/MSFC
PUSEY, M. ES76
Peculiarities of Crystallization of the Restruction Endonuclease EcoRII. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

KAVAYA, M.J. HR20
EMMITT, G.D. HR20
The SPAce Readiness Coherent Lidar Experiment (SPARCLE) Space Shuttle Mission. For presentation at Lasar Radar Technology and Applications III, SPIE's Aerospace/Defense Sensing and Controls, Orlando, FL, April 13–17, 1998.

KAVAYA, M.J. HR20
EMMITT, G.D. Simpson Weather
Tropospheric Wind Measurements from Space. For presentation at 19th International Laser Radar Conference, Annapolis, MD, July 6–10, 1998.

KELLOGG, E. ES84
COHEN, L. ES84
EDGAR, R.J. ES84
EVANS, I. ES84
FREEMAN, M. ES84
GAETZ, T. ES84
JERIUS, D. ES84
MCDERMOTT, W.C. ES84
MCKINNON, P. ES84
ET AL.
Absolute Calibration of the AXAF Telescope Effective Area. For publication in Bulletin of the American Astronomical Society, American Institute of Physics, Bellingham, WA, 1997/1998.

KELLOGG, E. ES84
SCHWARTZ, D. ES84
VAN SPEYBROECK, L. ES84
WARGELIN, B. ES84
EVANS, I. ES84
MCDERMOTT, W.C. ES84
MURRAY, S.S. ES84
ZOMBECK, M. ES84
GAETZ, T. ES84
ET AL.
Absolute Calibration of the AXAF Telescope Effective Area. For publication in Bulletin of the American Astronomical Society, Winston-Salem, NC, June 8–12, 1997.

KEYS, A.S. EB52
JONES, D.K. UAH
FORK, R.L. UAH

Micro-Laser-Based Devices Allowing Optical Wavelength-Packing Densities. For presentation at Optical Society of America Annual Meeting, Baltimore, MD, October 4–9, 1998.

KEYS, A.S. EB52
JONES, D.K. UAH
FORK, R.L. UAH

Agile Diffractive-Optic Grating Using Electro-Optic Layered Media Elements. For presentation at Optical Society of American Annual Meeting, Baltimore, MD, October 4–9, 1998.

KEYS, A.S. EB52
JONES, D.K. UAH
FORK, R.L. UAH

Ultracompact High-Speed Electro-Optic Switch. For presentation at Optical Society of America Annual Meeting, Baltimore, MD, October 4–9, 1998.

KHAZANOV, G.V. ES83
LIEMOHN, M.W. ES83
KOZYRA, J.U. ES83
MOORE, T.E. ES83

Inner Magnetospheric Superthermal Electron Transport: Photoelectron and Plasma Sheet Electron Sources. For publication in Journal of Geophysical Research, Washington, DC, July 15, 1998.

KIPPEN, R.M. UAH/ES84
BRIGGS, M.S. ES84
KOMMERS, J.M. MIT
KOUVELIOTOU, C. USRA/ES84
HURLEY, K. University of California, Berkeley
ROBINSON, C.R. USRA/ES84
VAN PARADIJS, J. University of Amsterdam
HARTMANN, D.H. Clemson University
GALAMA, T.J. University of Amsterdam
VREESWIJK, P.M. University of Amsterdam

On the Association of Gamma-Ray Bursts with Supernovae. For publication in The Astrophysical Journal, Chicago, IL, 1998.

KLOSE, S. Germany
STECKLUM, B. Germany
EISLOFFEL, J. University of Hawaii
NASSIR, M.A. University of Hawaii
HURLEY, K. University of California, Berkeley
KOUVELIOTOU, C. USRA/ES84
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
BARTHELMY, S.D. GSFC
ET AL.

Rapid Search for a Near-Infrared Counterpart of GRB 960924. For publication in The Astronomical Journal, 1998.

KOH, D.T. California Institute of Tech.
BILDSTEN, L. California Institute of Tech.
CHAKRABARTY, D. California Institute of Tech.
NELSON, R.W. California Institute of Tech.
PRINCE, T.A. California Institute of Tech.
VAUGHAN, B.A. California Institute of Tech.
FINGER, M.H. ES84
WILSON, R.B. ES84
RUBIN, B.C. ES84

Rapid Spin-Up Episodes in the Wind-fed Accreting Pulsar GX 301-2. For publication in The Astrophysical Journal, Chicago, IL, 1998.

KOKAN, J. Georgia Institute of Tech.
GERHARDT, R. Georgia Institute of Tech.
SU, C.-H. ES75

Dielectric Spectroscopy Study of ZnSe Grown by Physical Vapor Transport. For presentation at 1997 Annual Fall MRS Meeting, Boston, MA, December 3, 1997.

KOKAN, J. Georgia Institute of Tech.
GERHARDT, R. Georgia Institute of Tech.
SU, C.-H. ES75

Dielectric Spectroscopy Study of ZnSe Grown by Physical Vapor Transport. For publication in Proceedings of MRS 1997 Fall Meeting, Boston, MA, December 1–5, 1997.

KOLODZIEJCZAK, J.J. ES84
AUSTIN, R.A. ES84
ELSNER, R.F. ES84
O'DELL, S.L. ES84
SULKANEN, M.E. ES84
SWARTZ, D.A. ES84
TENNANT, A.F. ES84
WEISSKOPF, M.C. ES84
ZIMSTEIN, G. ES84
ET AL.

Progress in Using Continuum Radiation for AXAF Calibration. For publication in Proceedings of SPIE Conference, San Diego, CA, July 1998.

KOMMERS, J.M. ES84
LEWIN, W.H.G. ES84
KOUVELIOTOU, C. USRA/ES84
VAN PARADIJS, J.
PENDLETON, G.N.
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
The Intensity Distribution of Faint Gamma-Ray Bursts Detected with BATSE. For publication in Astrophysical Journal, Chicago, IL, 1998.

KOS, L. PD31
The Human Mars Mission: Transportation Assessment. For presentation at Space Technology and Applications International Forum (STAIF–98), Albuquerque, NM, January 25–29, 1998.

KOSHAK, W.J. HR20
KRIDER, E.P. HR20
MURPHY, M.J. HR20
A Multipole Expansion Method for Analyzing Lightning Field Changes. For publication in Journal of Geophysical Research—Atmospheres, 1998.

KOSHAK, W.J. HR20
BLAKESLEE, R.J. HR20
BAILEY, J.C. Raytheon STX
Lightning Radio Source Retrieval Using Advanced Lightning Direction Finder (ALDF) Networks. For publication in Journal of Geophysical Research—Atmospheres, 1998.

KOSHAK, W.J. HR20
SOLAKIEWICZ, R.J. Chicago State University
Electro-Optic Lightning Detector. For presentation at American Geophysical Union 1998 Fall Conference, San Francisco, CA, December 6–10, 1998.

KOSHUT, T.M. USRA
KOUVELIOTOU, C. USRA
VAN PARADIJS, J. UAH
WOODS, P.M. UAH
FISHMAN, G.J. ES84
BRIGGS, M.S. UAH
LEWIN, W.H.G. MIT
KOMMERS, J.M. MIT
Pulse Delay Observations of GROJ1744–28. For publication in Astrophysical Journal Letters, 1998.

KOUVELIOTOU, C. USRA
FISHMAN, G.J. ES84
MEEGAN, C.A. ES84

WOODS, P. UAH
Possible New Soft Gamma-Ray Repeater. For publication in International Astronomical Union (IAU) Circular 6743, Cambridge, MA.

KOUVELIOTOU, C. USRA/ES84
DIETERS, S.W.
STROHMAYER, T.
VAN PARADIJS, J.
FISHMAN, G.J. ES84
MEEGAN, C.A. ES84
HURLEY, K.
KOMMERS, J.
SMITH, I.
ET AL.
An X-Ray Pulsar with a Superstrong Magnetic Field in the Soft Gamma Repeater SGR 1806-20. For publication in Nature, 1998.

KOUVELIOTOU, C. USRA/ES84
WOODS, P. UAH
KIPPEN, M. UAH
BRIGGS, M.S. UAH
HURLEY, K. ES84
SGR 1900+14. For publication in International Astronomical Union (IAU) Circular No. 6929, Cambridge, MA, 1998.

KOUVELIOTOU, C. USRA/ES84
FISHMAN, G.J. ES84
WOODS, P. UAH
KIPPEN, M. UAH
SGR 1900+14. For publication in International Astronomical Union (IAU) Circular No. 7003 (b), Cambridge, MA, 1998.

KROES, R.L. ES76
REISS, D.A. ES76
Mir Glovebox Facility. For presentation at Research Program Results Symposium, San Jose, CA. April 1, 1998.

LAPENTA, W.M. HR01
MCNIDER, R.T. UAH
SUGGS, R. HR01
JEDLOVEC, G.J. HR01
ROBERTSON, F.R. HR01
Assimilation of GOES-Derived Skin Temperature Tendencies into Mesoscale Models to Improve Forecasts of Near Surface Air Temperature and Mixing Ratio. For presentation at 12th Conference on Numerical Weather Prediction, Phoenix, Arizona, January 11–16, 1998.

LAPENTA, W.M. HR20
CROSSON, W. USRA
DEMBEK, S. USRA
LAKHTAKIA, M. Pennsylvania State University
The Use of Indirect Estimates of Soil Moisture to Initialize Coupled Models and Its Impact on Short-Term and Seasonal Simulations. For presentation at GCIP Mississippi River Climate Conference, St. Louis, MO, June 8–12, 1998.

LAPENTA, W.M. HR20
SUGGS, R. HR20
MCNIDER, R.T. UAH
JEDLOVEC, G.J HR20
A Technique for Assimilating GOES—Derived Land Surface Products into Regional Models to Improve the Representation of Land Surface Forcing. For presentation at GCIP Mississippi River Climate Conference, St. Louis, MO, June 8–12, 1998.

LAROS, J.G. ES81
BOYNTON, W.V. ES81
HURLEY, K. ES81
KOUVELIOTOU, C. ES81
MCCOLLOUGH, M.L. ES81
FISHMAN, G.J. ES81
MEEGAN, C.A. ES81
PALMER, D.M. ES81
CLINE, T.L. ES81
ET AL.
Gamma-Ray Burst Arrival Time Localizations: Simultaneous Observations by Mars Observer, Compton Gamma Ray Observatory, and Ulysses. For publication in The Astrophysical Journal, 1998.

LECLAIR, M. Cape Simulations, Inc.
WORLIKAR, A. Cape Simulations, Inc.
MOTAKEF, S. Cape Simulations, Inc.
GILLIES, D.C. ES75
Application of Rotating Magnetic Fields to THM Growth Process: Te-CdTe. For presentation at 12th International Conference on Crystal Growth, Jerusalem, Israel, July 26–31, 1998.

LEE, J.A. EH23
Feasibility Study for Casting of High Temperature Refractory Superalloy Composites. For presentation at 22nd Annual Conference on Composites, Materials and Structures, Cocoa Beach, FL, January 26–30, 1998.

LEHOCZKY, S.L. ES71
Crystal Growth of Solid Solution HgCdTe Alloys. For presentation at Science and Technical Advisory Council Meeting, Huntsville, AL, November 10, 1997.

LEON-TORRES, J. University of Alabama
STEFANESCU, D.M. University of Alabama
SEN, S. USRA
CURRERI, P.A. ES75
Gravitational Acceleration Effects on Macrosegregation—Experiments and Computational Modeling. For presentation at TMS Annual Meeting, San Diego, CA, February 28, 1999.

LERNER, J.A. UAH
JEDLOVEC, G.J. HR01
ATKINSON, R.J. Lockheed Martin
Observed Changes in Upper-Trospospheric Water Vapor Transport From Satellite Measurements During the Summers of 1987 and 1988. For presentation at 9th Symposium on Global Change Studies, Phoenix, AZ, January 11–16, 1998.

LERNER, J.A. UAH
JEDLOVEC, G.J. HR01
ATKINSON, R.J. Lockheed Martin
Variations in Upper-Level Water Vapor Transport Diagnosed from Climatological Satellite Data. For presentation at Ninth Conference on Satellite Meteorology and Oceanography, Paris, France, May 25–29, 1998.

LERNER, J.A. UAH
JEDLOVEC, G.J. HR01
ATKINSON, R.J. Lockheed Martin
The Use of a Satellite Climatological Data Set to Infer Large Scale Three Dimensional Flow Characteristics. For presentation at 9th Conference on Satellite Meteorology and Oceanography, Paris, France, May 25–29, 1998.

LI, D. NRC/MSFC
ROBINSON, M.B. ES75
RATHZ, T.J. UAH
WILLIAMS, G. UAH
Metastable Demixing of Supercooled Cu-Co and Cu-Fe Alloys in an Oxide Flux. For publication in Proceedings of 1998 TMS Annual Meeting, San Antonio, TX, February 15–19, 1998.

LI, D. NRC/MSFC
ROBINSON, M.B. ES75
RATHZ, T.J. UAH
WILLIAMS, G. UAH
On the Cu-Nb Phase Diabram and Solidified Microstructures. For publication in Metallurgical Transactions A, 1998.

LI, D. NRC/MSFC
ROBINSON, M.B. ES75
RATHZ, T.J. UAH
WILLIAMS, G. UAH
Direct Determination of the Metastable Liquid Miscibility Gap in Undercooled Cu-Co Alloys. For publication in Materials Letters, 1998.

LI, D. NRC/MSFC
ROBINSON, M.B. ES75
RATHZ, T.J. UAH
WILLIAMS, G. UAH
Liquidus Temperatures and Solidification Behavior in the Copper-Niobium System. For publication in Acta Materialia, 1998.

LI, H. University of Toledo
NADARAJAH, A. University of Toledo
KONNERT, J.H. Naval Research Lab
PUSEY, M.L. ES76
Determining the Molecular Growth Mechanisms of Tetragonal Lysozyme Crystals. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

LI, H. University of Toledo
NADARAJAH, A. University of Toledo
KONNERT, J.H. Naval Research Lab
PUSEY, M.L. ES76
New AFM Techniques for Investigating Molecular Growth Mechanisms of Protein Crystals. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

LI, H. University of Toledo
PEROZZO, M.A. Naval Research Lab
KONNERT, J.H. Naval Research Lab
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76
Determining the Molecular Packing Arrangements on Protein Crystal Faces by Atomic Force Microscopy. For publication in Acta Crystallographica D, 1998.

LI, H. University of Toledo
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76
Determining the Molecular Growth Mechanisms of Protein Crystal Faces by Atomic Force Microscopy. For publication in Acta Crystallographica D, 1998.

LI, M. University of Toledo
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76
Modeling the Growth Rates of Tetragonal Lysozyme Crystal Faces. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

LI, M. University of Toledo
NADARAJAH, A. University of Toledo
PUSEY, M.L. ES76
Growth of (101) Faces of Tetragonal Lysozyme Crystals: Determination of the Growth Mechanism. For publication in Journal of Crystal Growth, 1998.

LI, P. ES81
HURLEY, K. ES81
VRBA, F. ES81
KOUVELIOTOU, C. ES81
MEEGAN, C.A. ES81
FISHMAN, G.J. ES81
KULKARNI, S. ES81
FRAIL, D. ES81
ROSAT X-Ray Observation of the Second Error Box for SCR 1900+14. For publication in The Astrophysical Journal, 1998.

LIEMOHN, M.W. ES83
KHAZANOV, G.V. UAH
Banded Electron Structure Formation in the Inner Magnetosphere. For publication in American Geophysical Journal.

LIEMOHN, M.W. University of Michigan
CRAVEN, P.D. ES83
KHAZANOV, G.V. University of Alaska
Kinetic Modeling of Plasmaspheric Refilling. For presentation at American Geophysical Union 1998 Fall Meeting, San Francisco, CA, December 7, 1998.

LIEMOHN, M.W.
KOZYRA, J.U.
KHAZANOV, G.V.
CRAVEN, P.D. ES83
Modeling Electric Field Influences on Plasmaspheric

Refilling. For presentation at 6th Huntsville Modeling Workshop, Guntersville, AL, October 26, 1998.

LIETZKE, S.E.
BARNES, C.L. ES76
KUNDROT, C.E. ES76
Structure of Pseudoknot PK26 Shows 3D Domain Swapping in an RNA. For publication in Nature, 1998.

LIEWER, P.C. JPL
DAVIS, J.M. ES82
DE JONG, E.M. JPL
GARY, G.A. ES82
KLIMCHUK, J.A. Naval Research Lab
REINERT, R.P. Ball Aerospace
Report on New Mission Concept Study: Stereo X-Ray Corona Imager Mission. For presentation at SPIE Conference, San Diego, CA, July 27–August 1, 1998.

LIM, K. Texas A&M University
ADIMURTHY, G. University of Toledo
NADARAJAH, A. University of Toledo
FORSYTHE, E.L. USRA
PUSEY, M.L. ES76
Locations of Halide Ions in Tetragonal Lysozyme Crystals. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

LIM, K. ES76
NADARAJAH, A. ES76
FORSYTHE, E.L. ES76
PUSEY, M.L. ES76
Location of Bromide Ions in Tetragonal Lysozyme Crystals. For publication in Acta Crystallographica D, 1998.

LOLLAR, L.F. PD11
MAUS, L.C. PD11
Electrical Power Systems for NASA's Space Transportation Program. For presentation at 33rd Intersociety Engineering Conference on Energy Conversion, Colorado Springs, CO, August 2–6, 1998.

LONDON, J.R., III RA30
LYLES, G.M. RA30
X–34 Program Status. For presentation at International Astronautical Congress, Melbourne, Australia, October 1, 1998.

LUVALL, J.C. HR20
QUATTROCHI, D.A. HR20
Thermal Characteristics of Urban Landscapes. For presentation at 23rd Conference on Agricultural and Forest Meteorology, Albuquerque, New Mexico, November 2–6, 1998.

LYLES, G.M. RA10
GRINER, C. DD01
A Status of the Advanced Space Transportation Program from Planning to Action. For presentation at 49th International Astronautical Congress, Melbourne, Australia, September 28–October 2, 1998.

LYLES, G.M. RA10
BACHTEL, F. RA01
A Technology Plan for Enabling Commercial Space Business. For presentation at International Astronautical Congress, Turin, Italy, October 6–10, 1997.

MACLEOD, T.C. EP93
HO, F.D. UAH
Modeling of Metal-Ferroelectric-Semiconductor Field Effect Transistors. For presentation at 10th International Symposium on Integrated Ferroelectrics, Monterey, CA, March 1, 1998.

MARTIN, C.E. ION Corp.
SUMMERS, S.M. ION Corp.
ROMAN, M.C. ED62
Development of a System to Assess Biofilm Formation in the *International Space Station*. For presentation at 28th International Conference on Environmental Systems (ICES), Danvers, MA, July 13–16, 1998.

MCCALEB, R. AE01
HOLLAND, D.L. AE01
X–33 Environmental Impact Statement: A Fast Track Approach. For publication in Proceedings of 3rd Conference on Aerospace Environmental Technology, MSFC, AL, October 1998.

MCCOLLOUGH, M.L. USRA
ROBINSON, C.R. USRA
ZHANG, S.N. USRA
HARMON, B.A. ES84
HJELLMING, R.M. NRAO
WALTMAN, E.B. NRL
FOSTER, R.S. NRL
GHIGO, F.D. NRAO
JOHNSTON, K.J. USNO

Discovery of Correlated Behavior Between the Hard X-Ray and the Radio Bands in Cygnus X–3. For publication in University of Chicago Press, Chicago, IL, 1998.

MCCOLLOUGH, M.L. USRA
ROBINSON, C.R. USRA
ZHANG, S.N. USRA
HARMON, B.A. ES84
PACIESAS, W.S. UAH
DIETERS, S.W. UAH
HJELLMING, R.M. National Radio Astronomy
RUPEN, M. National Radio Astronomy
MIODUSZEWSKI, A.J. JIVE/National Radio
ET AL.

RXTE Observations of Cygnus X–3. For publication in New Astronomy, Amsterdam, The Netherlands, 1998.

MCDONALD, J.P. Sverdrup
HEDAYAT, A. Sverdrup
BROWN, T.M. Sverdrup
KNIGHT, K.C. Sverdrup
CHAMPION, R.H., JR.

Subsystem Analysis/Optimization for the X–34 Main Propulsion System. For presentation at 7th AIAA, NASA, ISSMO Symposium on Multidisciplinary Analysis and Optimization, St. Louis, MO, September 2–4, 1998.

MCDUFFIE, J.H. UAH
SHTESSEL, Y.B. UAH
HALL, C. ED13
GALLAHER, M.N. ED13

Sliding Mode Control of the X–33 Vehicle in Reentry Mode. For presentation at AIAA GN&C Conference, Boston, MA, August 1998.

MCKAY, D.S. JSC
ROZANOV, A.Y.
HOOVER, R.B. ES82
WESTALL, F. JSC

Phosphate Biomineralization of Cambrian Microorganisms. For publication in Proceedings for SPIE'S International Symposium on Optical Science, Engineering & Instrumentation, Bellingham, WA, June 9, 1998.

MCMILLAN, V.C. CO30

The Successful Transfer of Space Derived Convergent Spray Technology: An Application for Industrial Roof Coatings and Interstate Bridge Repair. For presentation at 3rd Conference on Aerospace Environmental Technology, Huntsville, AL, June 1–3, 1998.

MCNAMARA, B.J. New Mexico State
HARRISON, T.E. New Mexico State
MASON, P.A. New Mexico State
TEMPLETON, M. New Mexico State
HEIKKILA, C.W. New Mexico State
BUCKLEY, T. New Mexico State
GALVAN, E. New Mexico State
SILVA, A. New Mexico State
HARMON, B.A. ES66

A Multi-Year Light Curve of Scorpius X–1 Based on CGRO BATSE Spectroscopy Detector Observations. For publication in The Astrophysical Journal, Chicago, IL, 1998.

MEEGAN, C.A. ES84

The BATSE Catalog of Gamma-Ray Bursts. For presentation at High Energy Astrophysics Division (HEAD) 1997 Meeting, Estes Park, CO, November 3–7, 1997.

MEEGAN, C.A. ES84

Gamma-Ray Bursts—Where Are We Now? For presentation at Non-Sleeping Universe: From Galaxies to the Horizon Conference, Porto, Portugal, November 27–29, 1997.

MENDE, S.B. ES83
FREY, H. ES83
VO, H. ES83
GELLER, S.P. ES83
DOOLITTLE, J.H. ES83
SPANN, J.F., JR. ES83

Conjugate Observations of Optical Aurora with POLAR Satellite and Ground Based Imagers in Antarctica. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

MEYER, P.J. HR20
GUILLORY, A.R. HR20
ATKINSON, R.J. HR20
JEDLOVEC, G.J. HR20

Interactive Sectoring and Animation of Global Change Data. For presentation at 15th International Conference on Interactive Information and Processing Systems, Dallas, Texas, January 10–15, 1999.

MILLER, T.L. HR20
LESLIE, F.W. ES71
Microgravity Experiments and Numerical Modeling of Rotating Buoyant Convection in a Spherical Shell with Latitudinal Thermal Gradients. For publication in Microgravity Science & Technology International Journal for Microgravity Research and Applications, 1998.

MILLER, T.L. HR20
KAVAYA, M.J. HR20
EMMITT, G.D. Simpson Weather
Prospects of Measuring Atmospheric Winds with a 2-Micron Coherent Doppler Lidar from the *International Space Station*. For presentation at Conference on *International Space Station* Utilization, Albuquerque, NM, January 31–February 4, 1999.

MINAMITANI, T. USRA
APPLE, J.A. ES84
AUSTIN, R.A. USRA
DIETZ, K.L. ES84
KOLODZIEJCZAK, J.J. USRA
RAMSEY, B.D. ES84
WEISSKOPF, M.C. ES84
Hard X-Ray Observation of Cygnus X–1 by the Marshall Imaging X-Ray Experiment (MIXE2). For presentation at 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 12–19, 1998.

MINOR, J. EL23
BREWER, D.S. NASA Headquarters
Recent Results of NASA's Space Environments and Effects Program. For presentation at 49th International Astronautical Congress, Melbourne, Australia, September 28–October 2, 1998.

MITROFANOV, I.G. ES84
POZANENKO, A.S. ES84
BRIGGS, M.S. ES84
PACIESAS, W.S. ES84
PREECE, R.D. ES84
PENDLETON, G.N. ES84
MEEGAN, C.A. ES84
Generic Signature of the Time Profiles of Cosmic Gamma-Ray Bursts. For publication in The Astrophysical Journal, Chicago, IL, 1998.

MITROFANOV, I.G.
ANFIMOV, D.S.
LITVAK, M.L.
BRIGGS, M.S. ES84
PACIESAS, W.S.
PENDLETON, G.N.
PREECE, R.D.
Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. For publication in Astrophysical Journal, Chicago, IL, 1998.

MITROFANOV, I.G.
ANFIMOV, D.S.
LITVAK, M.L.
BRIGGS, M.S. ES84
PACIESAS, W.S.
PENDLETON, G.N.
PREECE, R.D.
MEEGAN, C.A. ES84
Average Cosmological Invariant Parameters of Cosmic Gama-Ray Bursts. For publication in The Astrophysical Journal, Chicago, IL, 1998.

MONTGOMERY, E.E. PS02
ZELDERS, G.W., JR. Sirius Group
The Case for Aggressive Segmentation of the Primary Mirror of the Next Generation Space Telescope and Future ORIGINS Missions. For presentation at SPIE's Symposium on Astronomical Telescopes and Instrumentation, Kona, HI, March 23–29, 1998.

MOORE, C.E. ES75
CARDELINO, B.H. Spelman College
FRAZIER, D.O. ES75
NILES, J. Clark Atlanta University
WANG, X.-Q. Clark Atlanta University
Molecular Static Third-Order Polarizabilities of Carbon-Cage Fullerenes and Their Correlation with Three Geometric Parameters: Group Order, Aromaticity, and Size. For presentation at 6th Conference on Current Trends in Computational Chemistry, Jackson, MS, November 7–8, 1997.

MOORE, C.E. ES01
CARDELINO, B.H. ES01
FRAZIER, D.O. ES01
NILES, J. ES01
WANG, X.-Q. ES01
Molecular Statis Third-Order Polarizabilities of Carbon-Cage Fullerenes and Their Correlation with Three Geometric Properties: Symmetry, Aromaticity, and Size. For publication in Journal of Molecular Structure: THEOCHEM, 1998.

MOORE, L.E. EH13
GIBSON, H. EH13
THOM, R.L. EH13
Liquid Hydrogen Testing of Silicon Nitride Bearings for Use in High Speed Turbomachinery. For presentation at Aerospace Mechanisms Symposium, Kennedy Space Center, FL, May 1998.

MOORE, R.L. ES82
FALCONER, D.A. ES82
PORTER, J.G. ES82
Evidence that the X-Ray Plasma in Microflares is in a Sequence of Subresolution Magnetic Tubes. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

MOORE, R.L. ES82
Solar Prominence Eruption. For publication in Encyclopedia of Astronomy and Astrophysics, Institute of Physics, UK, 1998.

MOORE, R.L. ES82
FALCONER, D.A. ES82
PORTER, J.G. ES82
SUESS, S.T. ES82
Coronal Heating by Magnetic Explosions. For presentation at SOHO 7 Workshop, Northeast Harbor, ME, September 28–October 2, 1998.

MYERS, W.N. EP82
NASA Technology Benefits Orthotics. For publication in BioMechanics Magazine, San Francisco, CA, June 1998.

NELSON, R.W. ES84
BILDSTEN, L. ES84
CHAKRABARTY, D. ES84
FINGER, M.H. ES84
KOH, D.T. ES84
PRINCE, T.A. ES84
RUBIN, B.C. ES84
SCOTT, D.M. ES84
VAUGHAN, B.A. ES84
WILSON, R.B. ES84
On the Dramatic Spin-Up/Spin-Down Torque Reversals in Accreting Pulsars. For publication in The Astrophysical Journal, Chicago, IL, 1998.

NGUYEN, H. ED63
Thermal Analysis and Testing of Fastrac Gas Generator Design. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Cleveland, OH, July 13–15, 1998.

NICOLAS, D.P. EB13
DEVANEY, J. Hi-Rel Laboratories
GORES, M. Hi-Rel Laboratories
DICKEN, H. DM Data, Inc.
Analysis of a Memory Device Failure. For presentation at 17th Annual Meeting of Alabama Imaging and Microscopy Society, Orange Beach, AL, February 19–20, 1998.

NOEVER, D. ES76
KOCZOR, R. ES76
Radio-Frequency Illuminated Superconductive Disks: Reverse Josephson Effects and Implications for Precise Measuring of Proposed Gravity Effects. For presentation at Ninth Advanced Space Propulsion Research Workshop and Conference, Pasadena, CA, March 11–13, 1998.

NOEVER, D. ES76
KOCZOR, R. ES76
ROBERTSON, R. ES76
Superconductor-Mediated Modification of Gravity? AC Motor Experiments With Bulk YBCO Disks in Rotating Magnetic Fields. For publication in Proceedings of the 1998 AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cleveland, OH, July 13–15, 1998.

NOEVER, D.A. ES76
SMITH, D.D. ES76
SIBILLE, L. USRA
BROWN, S.C. Southern Research
CRONISE, R.J. ES76
LEHOCZKY, S.L. ES76
High Performance Materials Applications to Moon/Mars Missions and Bases. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

NOEVER, D.A. ES76
SIBILLE, L. USRA
SMITH, D.D. ES76
CRONISE, R.J. ES76
Prototype Aerogel Insulation for Melamine-Foam Substitute: Critical Space Station Express Rack Technology. For publication in Proceedings of Space Congress 98, Cocoa Beach, FL, April 30, 1998.

NOEVER, D.A. ES76
SMITH, D.D. ES76
SIBILLE, L. USRA
BROWN, S.C. Southern Research
CRONISE, R.J. ES76
LEHOCZKY, S.L. ES76

High Performance Materials Applications to Moon/Mars Missions and Bases. For publication in Proceedings of 6th International Conference and Exposition on Engineering, Construction and Operations in Space, Albuquerque, NM, April 26–30, 1998.

NOEVER, D.A. ES76

Computational Microbial Morphometry and NASA Astrobiology Initiatives. For presentation at International Conference on Pattern Formation and Developing Biology, Dundee, Scotland, September 20, 1998.

NOVAK, H.L. USBI
HALL, P.B. EH14

Development and Implementation of Environmentally Compatible Solid Folm Lubricants. For presentation at Aerospace Environmental Technology Conference, Huntsville, AL, June 1–3, 1998.

NUNES, A.C., JR. EH23
ZAIDI, A.A. Wichita State University
RAVI, T.S. Wichita State University
TALIA, J.E. Wichita State University

Microparticulate Emissions in 2195 Aluminum-Lithium Alloy Weldments. For publication in Journal of High Temperature Metals and Processes, 1997/1998.

OBER, D.M. ES83
THOMSEN, M.F. Los Alamos National Lab
GALLAGHER, D.L. ES83
MCCOMAS, D.J. Los Alamos National Lab

Survey of Warm Pancake-Shaped Ion Distributions at Geosynchronous Orbit. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26–29, 1998.

OBER, D.M. UAH
HORWITZ, J.L. UAH
GALLAGHER, D.L. ES83

Convection of Plasmaspheric Plasma into the Outer Magnetosphere and Boundary Layer Region: Initial Results. For publication in ISTP Monograph AGU, August 1998.

OBRIDKO, V.
FORMICHEV, V.
KHARSHILADZE, A.F.
ZHITNIK, I.
SLEMZIN, V.
HATHAWAY, D.H. ES82
WU, S.T.

Analysis and Modeling of Coronal Holes Observed by CORONAS-1 I. Morphology and Magnetic Field Configuration. For publication in Solar Physics, 1998.

PACIESAS, W.S. ES84
FISHMAN, G.J. ES84

XTE J0421+560. For publication in IAU Circular 6856, Cambridge, MA, 1998.

PACIESAS, W.S. UAH
MEEGAN, C.A. ES84
PENDLETON, G.N. UAH
BRIGGS, M.S. UAH
KOUVELIOTOU, C. USRA
KOSHUT, T.M. USRA
LESTRADE, J.P. Mississippi State
MCCOLLOUGH, M.L. USRA
BRAINERD, J.J. UAH
ET AL.

The Fourth BATSE Gamma-Ray Burst Catalog. For publication in Astrophysical Journal Supplement, Chicago, IL, September 1998.

PALEY, M.S. USRA
FRAZIER, D.O. ES76
SMITH, D.D. ES76
WITHEROW, W.K. ES76
ABDELDAYEM, H.A. USRA
WOLFE, D.B. Rice University

Photonic and Opto-Electronic Applications of Polydiacetylene Films Photodeposited From Solution and Polydiacetylene Copolymer Networks. For presentation at and publication in Proceedings of the SPIE Conference, Orlando, FL, April 16, 1998.

PALOSZ, W. ES75

Diffusive Gas Losses From Silica Glass Ampoules at Elevated Temperatures. For publication in Journal of Crystal Growth, 1998.

PARHI, S. ES82
SUESS, S.T. ES82
SULKANEN, M. ES82

Can Kelvin-Helmholtz Instabilities of Jet-Like Structures and Plumes Cause Solar Wind Fluctuations at

1 AU? For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

PARHI, S. ES82
SUESS, S.T. ES82
SULKANEN, M. ES82
The Generation of Smooth High Speed Solar Wind from Plume-Interplume Mixing. For presentation at Solar Wind 9 Conference, Nantucket, MA, October 5–9, 1998.

PARHI, S. ES82
SUESS, S.T. ES82
SULKANEN, M.E. ES82
Can Kelvin-Helmholtz Instabilities of Jet-Like Structures and Plumes Cause Solar Wind Fluctuations at 1 AU? For publication in Journal of Geophysical Research, September 1998.

PARK, H.S. ES81
WILLIAMS, G.G. ES81
ABLES, E. ES81
BAND, D.L. ES81
BARTHELMY, S.D. ES81
BIONTA, R.M. ES81
BUTTERWORTH, P.S. ES81
CLINE, T.L. ES81
FERGUSON, D.H. ES81
ET AL.
New Constraints on Simultaneous Optical Emission From Gamma-Ray Bursts Measured by the Livermore Optical Transient Imaging System Experiment. For publication in The Astrophysical Journal, 1998.

PARK, H.S. ES81
ABLES, E. ES81
BAND, D.L. ES81
BARTHELMY, S.D. ES81
BIONTA, R.M. ES81
BUTTERWORTH, P.S. ES81
CLINE, T.L. ES81
FERGUSON, D.H. ES81
FISHMAN, G.J. ES81
ET AL.
Real-Time Optical Flux Limits from Gamma-Ray Bursts Measured by the Gamma-Ray Optical Counterpart Search Experiment. For publication in The Astrophysical Journal, 1998.

PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
CHEN, L. ES83
ELSEN, R.K. ES83
MCCARTHY, M. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
Does the Ultraviolet Imager on Polar Detect Cometesimals? For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
CHEN, L. ES83
CHUA, D. ES83
ELSEN, R.K. ES83
FILLINGIM, M.O. ES83
MCCARTHY, M. ES83
WILBER, M. ES83
SPANN, J.F., JR. ES83
ET AL.
Understanding Substorms from the Auroral Ionosphere to the Distant Plasma Sheet. For presentation at 32nd COSPAR—Advances in Auroral Plasma Physics, Nagoya, Japan, July 12–19, 1998.

PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
CHEN, L. ES83
ELSEN, R. ES83
MCCARTHY, M. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
Does the UVI on Polar Detect Cosmic Snowballs? For publication in Geophysical Research Letters, 1998.

PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
CHEN, L. ES83
CHUA, D. ES83
ELSEN, R. ES83
FILLINGIM, M.O. ES83
MCCARTHY, M. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
Observations of Substorms From the Auroral Ionosphere to the Distant Plasma Sheet. For presentation at Fourth International Conference on Substorms, Lake Hamana, Japan, March 9–13, 1998.

PARNELL, T.A. ES84
WATTS, J.W., JR. ES84
ARMSTRONG, T.W. SAIC
Radiation Effects and Protection for Moon and Mars Missions. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

PARSONS, A.M. GSFC
GEHRELS, N. GSFC
PACIESAS, W.S. UAH
HARMON, B.A. ES84
FISHMAN, G.J. ES84
WILSON, C.A. ES84
ZHANG, S.N. USRA
Multi-Year BATSE Earth Occultation Monitoring of NGC 4151. For publication in American Astronomical Society, University of Chicago Press, Chicago, IL, 1998.

PATNAUDE, D. Smithsonian
PEASE, D. Smithsonian
DONNELLY, H. Smithsonian
JUDA, M. Smithsonian
JONES, C. Smithsonian
MURRAY, S. Smithsonian
ZOMBECK, M. Smithsonian
SWARTZ, D. USRA
ELSNER, R.F. ES84
ET AL.
Effective Area of the AXAF High-Resolution Camera (HRC). For presentation at 1998 SPIE Conference, San Diego, CA, July 19–25, 1998.

PEARSON, J.B. EP63
WATSON, M.D. EP63
Analytical Study of the Relationship Between an Absorber Cavity and Solar Fresnel Concentrator. For presentation at ASME Solar Space Applications Conference, Albuquerque, NM, June 13–19, 1998.

PEARSON, S.D. EL23
HARDAGE, D.M. EL23
NASA's Space Environments and Effects (SEE) Program: The Pursuit of Tomorrow's Space Technology. For presentation at SPIE—The International Society for Optical Engineering, San Diego, CA, July 19–24, 1998.

PENDLETON, G.N. ES81
PACIESAS, W.S. ES81
BRIGGS, M.S. ES81
PREECE, R.D. ES81
MALLOZZI, R.S. ES81
MEEGAN, C.A. ES81
HORACK, J.M. ES81
FISHMAN, G.J. ES81
BANK, D.L. ES81
ET AL.
The Identification of Two Different Spectral Types of Pulses in Gamma-Ray Bursts. For publication in The Astrophysical Journal, 1998.

PENDLETON, G.N. UAH
BRIGGS, M.S. UAH
KIPPEN, R.M. UAH
PACIESAS, W.S. UAH
STOLLBERG, M. UAH
WOODS, P. UAH
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
MCCOLLOUGH, M.L. USRA
CONNAUGHTON, V. NRC/MSFC
The Structure and Evolution of LOCBURST: The BATSE Burst Location Algorithm. For publication in The Astrophysical Journal, Chicago, IL, 1998.

PERRY, J.L. ED62
CURTIS, R.E. Boeing
ALEXANDRE, K.L. Boeing
RUGGIERO, L.L. Boeing
SHTESSEL, N. Boeing
Performance Testing of a Trace Contaminant Control Subassembly for the *International Space Station*. For presentation at 28th International Conference on Environmental Systems, Danvers, MA, July 13–16, 1998.

PESKOV, V. ES84
RAMSEY, B.D. ES84
FONTE, P. LIP/Coimbra University
Breakdown Features of Various Microstrip-Type Gas Counter Designs and Their Improvements. For publication in Proceedings of IEEE Transactions on Nuclear Science.

PETRUZZO, J.J., III ES84
ELSNER, R.F. ES84
JOY, M.K. ES84
O'DELL, S.L. ES84
WEISSKOPF, M.C. ES84
Grazing Incidence Nickel Replicated Optics for Hard X-Ray Telescopes. For presentation at Structure and

Evolution of the Universe Technology Working Group Meeting, Greenbelt, MD, April 1, 1997.

PHANORD, D.D. University of Wisconsin
KOSHAK, W.J. HR20
SOLAKIEWICZ, R.J. Chicago State University
BLAKESLEE, R.J. HR20
Calculation of the Bulk Electromagnetic Properties of Thunderclouds Using a Two-Space Scattering Formalism. For publication in Applied Physics, 1998.

POLITES, M.E. EB01
ET AL.
1998 Guidance, Navigation, and Control Highlights. For publication in Aerospace America, December 1998.

POLITES, M.E. EB01
ET AL.
1998 Digital Avionics Highlights. For publication in Aerospace America, December 1998.

POLITES, M.E. EB01
ET AL.
Recent Events in Guidance, Navigation, and Control. For publication in Proceedings of 1998 AIAA GH&C Conference, Boston, MA, August 1998.

POLITES, M.E. EB01
Automated Rendezvous and Capture in Space: A Technology Assessment. For publication in AIAA Journal of Spacecraft and Rockets, 1998.

PORTER, J.G. ES82
The Magnetic Roots of Enhanced Coronal Heating. For presentation at Solar Jets and Polar Plumes Meeting, Pointe a Pitre, Guadeloupe, France, February 23–27, 1998.

PORTER, J.G. ES82
FALCONER, D.A. ES82
MOORE, R.L. ES82
HARVEY, K.L. SPRC
RABIN, D.M. NSO
SHIMIZU, T. University of Tokyo
Magnetic Roots and the Driving of Extended Coronal Heating. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

POWELL, R.W. LaRC
LOCKWOOD, M.K. LaRC

COOK, S.A. RA10
The Road from the NASA Access to Space Study to a Reusable Launch Vehicle. For presentation at 49th International Astronautical Congress, Melbourne, Australia, September 28–October 2, 1998.

PREECE, R.D. ES84
BRIGGS, M.S. ES84
MALLOZZI, R.S. ES84
PENDLETON, G.N. ES84
PACIESAS, W.S. ES84
BAND, D.L. ES84
The Synchrotron Shock Model Confronts a "Line of Death" in the BATSE Gamma-Ray Burst Data. For publication in The Astrophysical Journal, Berkeley, CA, 1998.

PRICE, M.W. UAB
SCRIPA, R.N. UAB
SZOFRAN, F.R. ES75
LEHOCZKY, S.L. ES75
SU, C.-H. ES75
Differential Thermal Analysis of Hg(1-x)MnxTe Alloys in the X=0 to 0.3 Range. For publication in Journal of Crystal Growth, 1998.

PRICE, M.W. UAB
SCRIPA, R.N. UAB
LEHOCZKY, S.L. ES75
SZOFRAN, F.R. ES75
SU, C.-H. ES75
Directional Solidification and Characterization of Hg0.89Mn0.11Te. For publication in Journal of Crystal Growth, 1998.

PRICE, M.W. UAB
SCRIPA, R.N. UAB
LEHOCZKY, S.L. ES75
SZOFRAN, F.R. ES75
SU, C.-H. ES75
Directional Solidification and Characterization of Hg0.89Mn0-11Te. For presentation at 12th International Conference on Crystal Growth, Jerusalem, Israel, July 26–31, 1998.

PRICE, M.W. UAB
SCRIPA, R.N. UAB
SZOFRAN, F.R. ES75
LEHOCZKY, S.L. ES75
SU, C.-H. ES75
Differential Thermal Analysis of Hg(1-x)MnxTe Alloys in the X=0 to 0.3 Range. For presentation at

12th International Conference on Crystal Growth, Jerusalem, Israel, July 26–31, 1998.

PUSEY, M.L. ES76
SMITH, L. UAH
Fluorescence Studies of Lysozyme Nucleation. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

PUSEY, M.L. ES76
An Overview of NASA Biotechnology. For presentation at Science and Technical Advisory Council Meeting, Huntsville, AL, November 10, 1997.

QUATTROCHI, D.A. HR20
Scale in Remote Sensing and GIS: An Advancement in Methods Towards a "Science of Scale." For presentation at 1998 American Association for the Advancement of Science Meeting and Science Innovation Exposition, Philadelphia, PA, February 12–17, 1998.

QUATTROCHI, D.A. HR20
LAM, N.S. Louisiana State
QIU, H.-L. California State
Fractal Characterization of Multitemporal Scaled Remote Sensing Data. For publication in Scale Issues in GIS, 1998.

QUATTROCHI, D.A. HR20
LUVALL, J.C. HR20
ESTES, M.G. HR20
LO, C.P. University of Georgia
KIDDER, S.Q. Colorado State
HAFNER, J. Colorado State
TAHA, H. Lawrence Berkeley
BORNSTEIN, R.D. San Jose State
GILLIES, R.R. Utah State University
GALLO, K.P. NOAA/NESDIS
Project Atlanta (Atlanta Land Use Analysis: Temperature and Air Quality)—A Study of How the Urban Landscape Affects Meteorology and Air Quality Through Time. For presentation at Second Urban Environment Symposium, Albuquerque, NM, November 2–6, 1998.

RAMSEY, B.D. ES84
PESKOV, V. ES84
FONTE, P. Coimbra University

PODOLIAK, E.
Instrumentation for X-Ray Astronomy From High-Altitude Balloons: Recent Developments and Future Plans. For publication in Proceedings of New Detectors Workshop, Erice, Italy, November 1–7, 1997.

REDMON, J.W. EB52
ENGELHAUPT, D. UAH
Electroformed Nickel Mirrors for the Next Generation Space Telescope. For presentation at and publication in Proceedings of the 43rd Annual SPIE Meeting, San Diego, CA, July 19–24, 1998.

RICHMOND, R.C. ES76
Pharmacy in Space. For presentation at 145th Annual Meeting of the American Pharmaceutical Association, Miami, FL, March 23, 1998.

RICKS, K.G. EB44
WELLS, B.E. UAH
An Analysis of an Improved Bus-Based Multiprocessor Architecture. For presentation at and publication in Proceedings of the1998 International Conference on Parallel Distributed Processing Techniques and Applications, Las Vegas, NV, July 13–16, 1998.

ROBERTS, B.C. EL23
KNUPP, K.R. UAH
BUECHLER, D.L. UAH
A Low Precipitation Supercell Over the Southeast U.S.: A Case Study. For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

ROBERTSON, F.R. HR01
FITZJARRALD, D. HR01
MCCAUL, E.W. USRA
Consistency Between Divergent Circulations from Reanalysis Data Sets and Satellite-Derived Precipitation, Radiation, and Surface Fluxes. For presentation at Reanalysis Meeting, Washington, DC, October 27–31, 1997.

ROBINSON, M.B. ES75
LI, D. NRC/MSFC
RATHZ, T.J. UAH
WILLIAMS, G. UAH
Undercooling, Liquid Separation and Solidification of Cu-Co Alloys. For publication in Journal of Materials Science, 1998.

ROBINSON, M.B. ES75
RATHZ, T.J. UAH
LI, D. NRC
WORKMAN, G.L. UAH

A Study of Undercooling Behavior of Immiscible Metal Alloys in the Absence of Crucible-Induced Nucleation. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 14, 1998.

ROGERS, J.R. ES71
ROBINSON, M.B. ES71
SAVAGE, L. ES93
SOELLNER, W. Raytheon
HUIE, D. Mevatec

An Overview of the Electrostatic Levitation Facility at NASA's Marshall Space Flight Center. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 15, 1998.

ROGERS, P.R. ED24
BYNUM, J.E. ED24
SHAH, S.R. Lockheed Martin

Wide Panel Testing Technique for Evaluating Repair Weld Strengths. For presentation at 1998 ASME/JSME Joint PVP Conference, San Diego, CA, July 26–30, 1998.

ROTHERMEL, J. HR01
OLIVIER, L.D. NOAA
BANTA, R.M. NOAA
HARDESTY, R.M. NOAA
HOWELL, J.N. NOAA
CUTTEN, D.R. UAH
JOHNSON, S.C. HR01
MENZIES, R.T. JPL
TRATT, D.M. JPL

Remote Sensing of Multi-Level Wind Fields With High-Energy Airborne Scanning Coherent Doppler Lidar. For publication in Optics Express, Washington, D.C.

ROVIRA, M.
SCHMIEDER, B. Observatoire de Paris
DEMOULIN, P. Observatoire de Paris
SIMNETT, G.M. University of Birmingham
HAGYARD, M.J. ES01
REICHMANN, E. ES01
TANDBERG-HANSSEN, E.J. ES01

Bright Points and Subflares in UV Lines and in X-Rays. For publication in Astrophysical Journal, 1998.

RUBIN, B.C. ES84
FINGER, M.H. ES84
SCOTT, D.M. ES84
WILSON, R.B. ES84

Observation of a Long-Term Spin-up Trend in 4U 1538-52. For publication in The Astrophysical Journal, Chicago, IL, 1998.

RUSSELL, C.K. EH23
DING, R.J. EH23

Friction Stir Welding of Large Scale Cryogenic Tanks for Aerospace Applications. For presentation at Aeromat 1998, Tysons Corner, Virginia, June 15–18, 1998.

RYAN, R.M. EP72
ROTHSCHILD, W.J. Boeing
CHRISTENSEN, D.L. Lockheed Martin

Booster Main Engine Selection Criteria for the Liquid Fly-Back Booster. For presentation at 1998 JANNAF Propulsion Meeting, Cleveland, OH, July 15–17, 1998.

SAFIE, F.M. CR10

An Overview of Quantitative Risk Assessment of Space Shuttle Propulsion Elements. For presentation at PSAM 4 Conference, New York City, New York, September 13–18, 1998.

SAHOO, N.K. EB52
SHAPIRO, A.P. EB52

Magnesium-Aluminum-Zirconium Oxide Amorphous Ternary Composite: A Dense and Stable Optical Coating. For publication in Applied Optics, Washington, DC, 1998.

SAHU, K.C. ES81
LIVIO, M. ES81
PETRO, L. ES81
MACCHETTO, F.D. ES81
VAN PARADIJS, J. ES81
KOUVELIOTOU, C. ES81
FISHMAN, G.J. ES81
MEEGAN, C.A. ES81
GROOT, P.J. ES81
GALAMA, T.J. ES81

The Optical Counterpart to Gamma-Ray Burst GRB 970228 Observed Using the Hubble Space Telescope. For publication in Nature, 1998.

SCHALLHORN, P. Sverdrup
MAJUMDAR, A. Sverdrup

VAN HOOSER, K. EP74
MARSH, M. EP74
Flow Simulation in Secondary Flow Passages of a Rocket Engine Turbopump. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cleveland, OH, July 13–15, 1998.

SCHMIDT, G.R. EP61
Propulsion Research and Technology at NASA MSFC. For presentation at 34th AIAA Joint Propulsion Conference, Cleveland, OH, July 12–15, 1998.

SCHONBERG, W.P. UAH
WILLIAMSEN, J. ED52
Modelling Damage and Predicting Survivability for Spacecraft Impacted by Orbital Debris. For presentation at ASME Piping and Pressure Vessels Symposium, San Diego, CA, July 1998.

SEN, S. USRA
DHINDAW, B.K. IIT Kharagpur, India
PETERS, P. ES75
CURRERI, P.A. ES75
KAUKLER, W.F. UAH
Measurement of Interfacial Undercooling in a Dilute Pb-Sn Alloy Near the Regime of Morphological Instability. For publication in Metallurgical Transactions, 1998.

SEN, S. ES75
KAUKLER, W.F. ES75
CURRERI, P.A. ES75
A Real-Time Investigation of Morphological Evolution During Solidification of Different Alloy Systems. For presentation at Asian Foundry Congress, Calcutta, India, January 22, 1999.

SEVER, T.L. HR20
Remote Sensing Methods. For publication in Advances in Science and Technology for Historic Preservation, 1998.

SHACKELFORD, B. EP72
A History of Solid Propulsion at the Marshall Space Flight Center. For presentation at 34th Joint Propulsion Conference, Cleveland, OH, July 13–15, 1998.

SHARP, D. HR20
WILLIAMS, E. HR20
BOLDI, B. HR20
GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
MATLIN, A. HR20
WEBER, M. HR20
Observations of Total Lightning Associated with Severe Convection During the Wet Season in Central Florida. For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

SHAW, E.J. PP03
HAMAKER, J.W. PP03
PRINCE, F.A. PP03
GREENBERG, J. Princeton Synergetics
Macroeconomic Benefits of Low-Cost Reusable Launch Vehicles. For presentation at 49th International Astronautical Federation Conference, Melbourne, Australia, September 18–October 2, 1998.

SHAW, E.J. PP03
HAMAKER, J.W. PP03
PRINCE, F.A. PP03
Benefits of Government Incentives for Reusable Launch Vehicle Development. For presentation at 49th International Astronautical Federation Conference, Melbourne, Australia, September 18–October 2, 1998.

SHAW, E.J. PP03
Technology Development Benefits and the Economics Breakdown Structure. For presentation at 49th International Astronautical Conference, Melbourne, Australia, September 18–October 2, 1998.

SHERIF, S.A. University of Florida
LEAR, W.E. University of Florida
STEADHAM, J.M. University of Florida
HUNT, P.L. ED62
HOLLADAY, J.B. ED62
Analysis and Modeling of a Two-Phase Jet Pump of a Thermal Management System for Aerospace Applications. For presentation at 36th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 12–15, 1998.

SHTESSEL, Y. UAH
JACKSON, M. ED13
HALL, C. ED13
KRUPP, D. ED13
HENDRIX, N.D. ED13
X–33 Vehicle Control in Launch Mode via Sliding Mode Control. For publication in Journal of Guidance, Control and Dynamics, Reston, VA, 1998.

SHTESSEL, Y. UAH
JACKSON, M. ED13
HALL, C. ED13
KRUPP, D. ED13
HENDRIX, N.D. ED13
Sliding Mode Control of the X–33 Vehicle in Launch Mode. For presentation at American Control Conference, Philadelphia, PA, June 24–26, 1998.

SITAR, R.J. ES83
CLAUER, C.R. ES83
BAKER, J.B. ES83
RIDLEY, A.J. ES83
CUMNOCK, J.A. ES83
GERMANY, G.A. ES83
SPANN, J.F., JR. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
Multi-Instrument Analysis of a Traveling Convection Vortex Event on July 24th 1996 Coordinated With the Polar UVI. For publication in Journal of Geophysical Research, 1998.

SLEDD, A.M. JA63
MUELLER, C.W. JA63
EXPRESS Rack. For presentation at AIAA Aerospace Sciences Meeting, Reno, NV, January 11–14, 1999.

SMELTZER, S.S., III ED52
FINCKENOR, J.L. ED62
A Single-Lap Joint Adhesive Bonding Optimization Method Using Gradient and Genetic Algorithms. For presentation at OPTI 99, Computer Aided Optimum Design of Structures, Orlando, FL, March 16–18, 1999.

SMITH, C.C. EH32
IIA, D. Alabama A&M
SARKISOV, S. Alabama A&M
WILLIAMS, E.K. Alabama A&M
POKER, D.B. Oak Ridge Lab.
HENSLEY, D.K. Oak Ridge Lab.
The Optical Properties of ION Implanted Silica. For presentation at MRS Technical Symposia/Tutorial, Boston, MA, December 1–5, 1997.

SMITH, D.D. ES76
SIBILLE, L. USRA
CRONISE, R.J. ES76
NOEVER, D.A. ES76
Surface Plasmon Resonance Evaluation of Colloidal Metal Aerogel Filters. For publication in Journal of Noncrystalline Solids.

SMITH, D.D. ES76
SIBILLE, L. USRA
CRONISE, R.J. ES76
NOEVER, D.A. ES76
Noble Metal Immersion Spectroscopy of Silica Alcogels and Aerogels. For publication in Journal of Porous Materials, 1998.

SMITH, D.D. ES76
BENDER, M.W. ES76
BOYD, R.W. University of Rochester
Effect of Percolation on the Cubic Susceptibility of Metal Nanoparticle Composites. For presentation at Nonlinear Optics '98, Kauai, Hawaii, August 10–14, 1998.

SMITH, L. UAH
PUSEY, M.L. ES76
Preparation and Characterization of Fluorescent Derivatives of Lysozyme. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

SNELL, E.H. ES76
BOGGON, T.J. University of Manchester
FEWSTER, P.F. Philips Research Lab.
SIDDONS, D.P. Brookhaven National Lab.
STOJANOF, V. ESRF, France
PUSEY, M.L. ES76
Reciprocal Space Mapping of Macromolecular Crystals in the Laboratory. For presentation at 7th International Conference on the Crystallization of Biological Macromolecules, Granada, Spain, May 3, 1998.

SOFFITTA, P. Istituto di Astrofisica
TOMSICK, J.A. Columbia University
HARMON, B.A. ES84
COSTA, E. Istituto di Astrofisica
FORD, E.C. Columbia University
TAVANI, M. Columbia University
ZHANG, S.N. USRA
KAARET, P. Columbia University
Identification of the Periodic Hard X-Ray Transient GRO J1849–03 with the X-Ray Pulsar GS 1843–02 = X1845–024—A New Be/X-Ray Binanry. For publication in The Astrophysical Journal, Chicago, IL, 1998.

SPANN, J.F., JR. ES83
GERMANY, G.A. UAH
PARKS, G.K. University of WA, Seattle
BRITTNACHER, M.J. University of WA, Seattle
WINGLEE, R.W. University of WA, Seattle

On the Total Energy Deposition Between Periodically Occurring Activations of the Aurora. For presentation at American Geophysical Union 1998 Fall Meeting, San Francisco, CA, December 6, 1998.

SPANN, J.F., JR. ES83
BRITTNACHER, M.J. ES83
FILLINGIM, M.O. ES83
GERMANY, G.A. ES83
PARKS, G.K. ES83

Global Auroral Energy Deposition During Substorm Onset Compared with Local Time and Solar Wind IMF Conditions. For presentation at 1998 Cambridge Symposium Workshop on the Physics of Space Plasmas, Lisbon, Portugal, June 20–July 5, 1998.

SPANN, J.F., JR. ES83
VENTURINI, C.C. UAH
COMFORT, R.H. UAH

Charging of Single Micron Sized Dust Grains by Secondary Electron Emission: A Laboratory Study. For presentation at Seventh Workshop on the Physics of Dusty Plasmas, Boulder, CO, April 5–10, 1998.

SPANN, J.F., JR. ES83
GERMANY, G.A. ES83
PARKS, G.K. ES83
ELSEN, R.K. ES83
BRITTNACHER, M.J. ES83

Initial Response of the Aurora to the January 10, 1997 Magnetic Cloud. For publication in Geophysical Research Letters.

SPANN, J.F., JR. ES83
GERMANY, G.A. ES83
BRITTNACHER, M.J. ES83
PARKS, G.K. ES83
ELSEN, R.K. ES83

Spatial and Temporal Energy Characterization of Precipitating Electrons for the January 10, 1997 Magnetic Cloud Event. For presentation at 1997 Spring AGU Meeting, Baltimore, MD, May 1997.

SPANN, J.F., JR. ES83
GERMANY, G.A. ES83
PARKS, G.K. ES83
BRITTNACHER, M.J. ES83

Comparison of Energy Deposition in the Auroral Oval and Cap Regions for Cases Where Transpolar Structures Exist. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26–29, 1998.

SPANN, J.F., JR. ES83
ABBAS, M.M. ES83

Experimental Determination of Infrared Extinction Coefficients of Interplanetary Dust Particles. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26–29, 1998.

SPRINGER, A.M. EH32
COOPER, K.G. EH32

Aerodynamic Properties Analysis of Rapid Prototyped Models Versus Conventional Machined Models. For presentation at Time Compression Technologies '98, Nottingham, United Kingdom, October 11–14, 1998.

SPRINGER, A.M. ED34

Comparison of the Aerodynamic Characteristics of Similar Models in Two Size Wind Tunnels at Transonic Speeds. For presentation at 7th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Albuquerque, NM, June 15–18, 1998.

STARK, B.A. National Research
HAGYARD, M.J. ES82

Quantifying the Complexity of Flaring Active Regions. For presentation at SPD, Bozeman, MO, June 1997.

STARK, B.A. National Research
ADAMS, M.L. ES82
HATHAWAY, D.H. ES82
HAGYARD, M.J. ES82

Evaluation of Two Fractal Methods for Magnetogram Image Analysis. For publication in Solar Physics 174.

STEFANESCU, D.M. University of Alabama
GRUGEL, R.N. USRA
CURRERI, P.A. ES75

In Situ Resource Utilization for Processing of Metal Alloys on Lunar and Mars Bases. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

STEFANESCU, D.M. University of Alabama
JURETZKO, F.R. University of Alabama
DHINDAW, B.K. University of Alabama
CATALINA, A.V. University of Alabama

SEN, S. USRA
CURRERI, P.A. ES75
Particle Engulfment and Pushing by Solidifying Interfaces Part II: Microgravity Experiments and Theoretical Analysis. For publication in Metallurgical Transactions, 1998.

STEVENSON, B.A. ES83
HORWITZ, J.L. ES83
SU, Y.J. ES83
ELLIOTT, H.A. ES83
COMFORT, R.H. ES83
MOORE, T.E. ES83
GILES, B.L. ES83
CRAVEN, P.D. ES83
CHANDLER, M.O. ES83
POLLOCK, C.J. ES83
POLAR/TIDE Survey of Thermal O+ Characteristics Near 5000 km Altitude Over the Polar Cap. For presentation at American Geophysical Union Meeting, San Francisco, CA, December 5, 1998.

STEVENSON, B.A. ES83
HORWITZ, J.L. ES83
SU, Y.-J. ES83
ELLIOTT, H.A. ES83
COMFORT, R.H. ES83
CRAVEN, P.D. ES83
CHANDLER, M.O. ES83
MOORE, T.E. ES83
GILES, B.A. ES83
POLLOCK, C.J. ES83
POLAR/TIDE Perigee Observations of Thermal O+ Characteristics in the Polar Cap Region. For presentation at 6th Huntsville Modeling Workshop, Guntersville, AL, October 26, 1998.

STONE, N.H. ES83
The Tethered Satellite System: Scientific and Technological Results. For presentation at The International Astronautical Federation Conference, Turin, Italy, October 1997.

STONE, N.H. ES83
RAITT, W.J. Utah State University
The TSS–1R Electrodynamic Tether Experiment: Scientific and Technological Results. For presentation at COSPAR, Japan, July 18, 1998.

STONE, N.H. ES83
RAITT, W.J. Utah State University
The TSS–1R Electrodynamic Tether Experiment: Scientific and Technological Results. For publication in Advances in Space Research, August/September 1998.

STROLLBERG, M.
FINGER, M.H. ES84
WILSON, R.B. ES84
SCOTT, D.M.
CRARY, D.J.
PACIESAS, W.S.
BATSE Observation and Orbit Determination of the Be/X-Ray Transient EXO 2030+375. For publication in Astrophysical Journal, Chicago, IL, 1998.

SU, C.-H. ES75
PALOSZ, W. USRA
FETH, S. Hughes STX Corp.
LEHOCZKY, S.L. ES75
Heat Treatments of ZnSe Starting Materials for Physical Vapor Transport. For publication in Journal of Crystal Growth, Amsterdam, Netherlands.

SU, C.-H. ES75
Bulk Growth of Wide Band Gap II-VI Compound Semiconductors by Physical Vapor Transport. For presentation at U.S.–Russian Space STAC Symposium, Huntsville, AL, November 10–13, 1997.

SU, C.-H. ES75
FETH, S. Hughes STX Corp.
LEHOCZKY, S.L. ES75
Simultaneous In Situ Optical Monitoring Techniques During Crystal Growth of ZnSe by Physical Vapor Transport. For presentation at 10th International Conference on Vapor Growth and Epitaxy (ICVGE10), Jerusalem, Israel, July 26–31, 1998.

SU, C.-H. ES75
BREBRICK, R.F. Marquette University
BURGER, A. Fisk University
DUDLEY, M. State University of NY
MATYI, R.J. University of Wisconsin
RAMACHANDRAN, N. USRA
SHA, Y.-G. USRA
VOLZ, M.P. ES75
SHIH, H.-D. Central Research Labs
Crystal Growth of ZnSe and Related Ternary Compound Semiconductors by Vapor Transport. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 14–16, 1998.

SU, Y.-J. UAH
HORWITZ, J.L. UAH
MOORE, T.E. ES83
GILES, B.L. ES83
CHANDLER, M.O. ES83
CRAVEN, P.D. ES83
CHANG, S.-W. UAH
SCUDDER, J. UAH
Polar Wind Measurements with TIDE/PSI and HYDRA on the Polar Spacecraft. For presentation at 1998 Western Pacific AGU Meeting, Taipei, Taiwan, July 17, 1998.

SUESS, S.T. ES82
POLETTO, G. ES82
WANG, A.H. ES82
WU, S.T. ES82
CUSERI, I. ES82
The Geometric Spreading of Coronal Plumes and Coronal Holes. For publication in Solar Physics.

SUESS, S.T. ES82
The Sun and the Solar Wind Close to the Sun. For presentation at 32nd COSPAR Scientific Assembly, Nagoya, Japan, July 12–19, 1998.

SUESS, S.T. ES82
PARHI, S. ES82
MOORE, R.L. ES82
The Paradox of Filamented Coronal Hole Flow but Uniform High Speed Wind. For presentation at 1998 Spring AGU Meeting, Boston, MA, May 26, 1998.

SUESS, S.T. ES82
Models of Plumes: Their Flow, Their Geometric Spreading, and Their Mixing with Interplume Flow. For publication in "Solar Plumes and Coronal Jets"—European Space Agency SP–421, The Netherlands, June 1, 1998.

SUESS, S.T. ES82
WANG, A.-H. UAH
WU, S.T. UAH
POLETTO, G. Osservatorio Astrofisico
MCCOMAS, D.J. Los Alamos National Lab.
A Two-Fluid, MHD Coronal Model. For publication in Journal of Geophysical Research—Space Physics, Washington, DC.

SUESS, S.T. ES82
The Sun and the Solar Wind Close to the Sun. For publication in Advances in Space Research, Elsevier Science Ltd., Holland, 1998.

SUESS, S.T. ES82
GARY, G.A. ES82
NERNEY, S. ES82
Beta in Streamers. For presentation at Solar Wind 9 Conference, Nantucket Island, MA, October 1, 1998.

SUESS, S.T. ES82
POLETTO, G. ES82
SIMNETT, G.M. ES82
CORTI, G. ES82
NEUGEBAUER, M. ES82
GOLDSTEIN, B.E. ES82
Ulysses-UVCS Coordinated Observations. For presentation at SOHO 7, Northeast Harbor, ME, September 23, 1998.

SUESS, S.T. ES82
WANG, A.H. ES82
WU, S.T. ES82
NERNEY, S. ES82
Streamer Evaporation. For presentation at SOHO 7 Workshop, Northeast Harbor, ME, September 23, 1998.

SUGGS, R.J. HR20
JEDLOVEC, G.J. HR20
LAPENTA, W.M. HR20
Satellite Derived Land Surface Temperature for Model Assimilation. For presentation at 79th American Meteorological Society Annual Meeting, Dallas, TX, January 10–15, 1999.

SULKANEN, M.E. ES84
JOY, M.K. ES84
PATEL, S.K. UAH
Galaxy Cluster Shapes and Systematic Errors in the Hubble Constant as Determined by the Sunyaev-Zelldovich Effect. For presentation at 191st American Astronomical Society Meeting, Washington, DC, January 6–10, 1998.

SULKANEN, M.E. University of Michigan
JOY, M.K. ES84
PATEL, S.K. UAH
Galaxy Cluster Shapes and Systematic Errors in H-O as Determined by the Sunyaev-Zelldovich Effect. For publication in The Astrophysical Journal, Chicago, IL, 1998.

SUUNKARA, H.B. ES76
PENN, B.G. ES76
FRAZIER, D.O. ES76

RAMACHANDRAN, N. ES76
Lattice Dynamics of Colloidal Crystals During Photopolymerization of Acrylic Monomer Matrix. For publication in Journal of Materials Science, London, UK, 1997/1998.

SWARTZ, D.A. ES84
ELSNER, R.F. ES84
KOLODZIEJCZAK, J.J. ES84
O'DELL, S.L. ES84
TENNANT, A.F. ES84
SULKANEN, M.E. ES84
WEISSKOPF, M.C. ES84
EDGAR, R.J. ES84
On the Use of Monochromators for the Calibration of AXAF. For publication in Proceedings of SPIE Conference, San Diego, CA, July 1998.

SWIFT, W.R. ES83
GERMANY, G.A. ES83
RICHARDS, P.G. ES83
PARKS, G.K. ES83
BRITTNACHER, M.J. ES83
SPANN, J.F., JR. ES83
Compensation for Spherical Geometric and Absorption Effects on Lower Thermospheric Emission Intensities Derived from High Earth Orbit Images. For presentation at 1997 Fall AGU Meeting, San Francisco, CA, December 8–12, 1997.

SZOFRAN, F.R. ES75
VOLZ, M.P. ES75
COBB, S.D. ES75
MOTAKEF, S. CAPE Simulations, Inc.
Bridgman Growth of Germanium. For presentation at U.S.-Russian Space STAC Symposium, Huntsville, AL, November 10–13, 1997.

SZOFRAN, F.R. ES75
BENZ, K.W. Universitat, Freiburg
CROLL, A. Universitat, Freiburg
DOLD, P. Universitat, Freiburg
COBB, S.D. ES75
VOLZ, M.P. ES75
MOTAKEF, S. CAPE Simulations, Inc.
WALKER, J.S. University of Illinois
Reduction of Defects in Germanium-Silicon. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 15, 1998.

SZOFRAN, F.R. ES75
BENZ, K.W. Universitat, Freiburg
CROLL, A. Universitat, Freiburg
DOLD, P. Universitat, Freiburg
COBB, S.D. ES75
VOLZ, M.P. ES75
MOTAKEF, S. CAPE Simulations, Inc.
Magnetic Damping of Solid Solution Semiconductor Alloys. For presentation at Microgravity Materials Science Conference, Huntsville, AL, July 15, 1998.

TATARA, J.D. ION Corp.
PERRY, J.L. ED62
FRANKS, G.D. ED62
Overview of the *International Space Station* System Level Trace Contaminant Injection Test. For presentation at 28th International Conference on Environmental Systems (ICES), Danvers, MA, July 13–16, 1998.

TENNANT, A.F. ES84
WU, K. University of Sydney
O'DELL, S.L. ES84
WEISSKOPF, M.C. ES01
Simulating AXAF Grating Spectra of Accreting White Dwarfs. For publication in Publications of Astronomical Society of Australia, Sydney, Australia, 1998.

TINKER, M.L. ED23
Accelerometer Placement for the *International Space Station* Node Modal Test. For presentation at AIAA 39th Structures, Structural Dynamics, and Materials Conference, Long Beach, CA, April 20–23, 1998.

TINKER, M.L. ED23
Passively Adaptive Inflatable Structure for the Shooting Star Experiment. For presentation at AIAA 39th Structures, Structural Dynamics, and Materials Conference, Long Beach, CA, April 20–23, 1998.

TINKER, M.L. ED23
Free-Suspension Residual Flexibility Testing of Space Station Pathfinder: Comparison to Fixed-Base Results. For presentation at AIAA 39th Structures, Structural Dynamics, and Materials Conference, Long Beach, CA, April 20–23, 1998.

TIPPETT, D.D. UAH
CHILDRESS, R.G. ED53
SWEITZER, M.G. ENI Technologies, Inc.
Downsizing: Is There a "Right" Way? For presenta-

tion at 19th American Society of Engineering Management, Virginia Beach, VA, October 1–3, 1998.

TUCKER, D.S. ES75
ETHRIDGE, E.C. ES75
Processing Glass Fiber from Moon/Mars Resources. For publication in Proceedings of American Society of Civil Engineers Conference, Albuquerque, NM, April 26–30, 1998.

TUCKER, D.S. ES75
WORKMAN, G.L. UAH
SMITH, G.A. UAH
Commercial Production of Heavy Metal Fluoride Glass Fiber in Space. For presentation at and publication in Proceedings of Space Technology and Applications International Forum, Albuquerque, NM, January 25–29, 1998.

TUCKER, D.S. ES75
SCRIPA, R.N. UAB
WANG, B. UAB
RIGSBEE, J.M. UAB
Effects of Gravity on Crystallization of Fluorozircante Optical Fibers. For presentation at 18th International Congress on Glass, San Francisco, CA, July 5–10, 1998.

TUCKER, P.K. ED32
SHYY, W. University of Florida
SLOAN, J.G. University of Florida
An Integrated Design Optimization Methodology for Rocket Engine Injectors. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Cleveland, OH, July 13–15, 1998.

TURNER, J.E. EE61
HUETER, U. RA10
A Progress Report on the Advanced Reusable Technologies Project. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Cleveland, OH, July 13–15, 1998.

VAN DER HOOFT, F. University of Amsterdam
KOUVELIOTOU, C. USRA/ES84
VAN PARADIJS, J. UAH
PACIESAS, W.S. UAH
LEWIN, W.H.G. MIT
VAN DER KLIS, M. University of California, Berkeley
CRARY, D.J. ES84/NRC
FINGER, M.H. USRA/ES84
HARMON, B.A. ES84
ZHANG, S.N. USRA/ES84
Hard X-Ray Lags in GRO J1719-24. For publication in The Astrophysical Journal, San Diego, CA, 1998.

VAN DER HOOFT, F. University of Amsterdam
KOUVELIOTOU, C. USRA/ES84
VAN PARADIJS, J. UAH
PACIESAS, W.S. UAH
LEWIN, W.H.G. MIT
VAN DER KLIS, M. University of Amsterdam
CRARY, D.J. USRA
FINGER, M.H. USRA/ES84
HARMON, B.A. ES84
ZHANG, S.N. USRA/ES84
Hard X-Ray Variability of the Black-Hole Candidate GRO J0422+32 During its 1992 Outburst. For publication in Astrophysical Journal, San Diego, CA, 1998.

VAN DYKE, M. EP63
Identification of Influential Factors for Liquid Acquisition Device Designs. For presentation at 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Cleveland, OH, July 13–15, 1998.

VAN PARADIJS, J. ES81
VAN DEN HEUVEL, E.P.J. ES81
KOUVELIOTOU, C. ES81
FISHMAN, G.J. ES81
FINGER, M.H. ES81
LEWIN, W.H.G. ES81
Evidence for Neutron Star Formation from Accretion Induced Collapse of a White Dwarf. For publication in Astronomy and Astrophysics, 1998.

VAUGHAN, O.H., JR. HR20
A View of Lightning from the Space Shuttle—Red Sprites and Blue Jets. For presentation at Auburn University, Auburn, AL, November 20, 1997.

VAUGHAN, O.H., JR. HR20
BOECK, W.L. Niagara University
Space Shuttle Video Images: An Example of Warm Cloud Lightning. For publication in Journal of Atmospheric Research, American Meteorological Society, 1998.

VENTURINI, C.C. UAH
SPANN, J.F., JR. ES83
COMFORT, R.H. UAH
Preliminary Results From a Laboratory Study of Charging Mechanisms in a Dusty Plasma. For

publication in Proceedings of Seventh Workshop on the Physics of Dusty Plasmas Conference, June 5, 1998.

VENTURINI, C.C. UAH
SPANN, J.F., JR. ES83
COMFORT, R.H. UAH
Recent Results From a Laboratory Study of Charging Mechanisms in a Dusty Plasma. For presentation at American Geophysical Union 1998 Fall Meeting, San Francisco, CA, December 6, 1998.

VLASSE, M. ES76
Microgravity Materials and Biotechnology Experiments. For presentation at UCLA, Los Angeles, CA, March 19, 1998.

VOLZ, M.P. ES75
SZOFRAN, F.R. ES75
VUJISIC, L. Cape Simulations, Inc.
MOTAKEF, S. Cape Simulations, Inc.
Bridgman Growth of GeSi Alloys in a Static Magnetic Field. For presentation at 12th International Conference on Crystal Growth, Jerusalem, Israel, July 26–31, 1998.

WALKER, J.L. UAH
RUSSELL, S.S. EH13
WORKMAN, G.L. UAH
HILL, E.V.K. Embry-Riddle University
Neural Network/Acoustic Emission Burst Pressure Prediction for Impact Damaged Composite Pressure Vessels. For publication in Materials Evaluation.

WALKER, J.L. UAH
RUSSELL, S.S. EH13
WORKMAN, G.L. UAH
Thermographic Qualification of Graphite/Epoxy Instrumentation Racks. For presentation at SPIE Conference on Nondestructive Techniques for Aging Infrastructure and Manufacturing, San Antonio, TX, March 31, 1998.

WALLACE, S. EB33
BROWN, T. EB33
FREESTONE, K. EB33
A Table-Driven Control Method to Meet Continuous, Near-Real-Time Observation Requirements for the Solar X-Ray Imager. For presentation at Digital Avionics SC, Seattle, WA, October 31–November 6, 1998.

WANG, J.C. Alabama A&M University
LEHOCZKY, S.L. ES71
WATRING, D.A. ES71
Magnetic Field Effects on Convective Fluid Flow in a Vertical Bridgman System. For presentation at Alabama Materials Research Conference, Birmingham, AL, September 8, 1998.

WANG, T.-S. ED32
DC–X In-Ground Effect on Base-Heating Environment. For publication in Journal of Thermophysics and Heat Transfer, Reston, VA, 1998.

WANG, T.-S. ED32
Analysis of Aerospike Plume Induced Base-Heating Environment. For presentation at 7th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Albuquerque, NM, June 15–18, 1998.

WANG, T.-S. ED32
Analysis of Linear Aerospike Plume Induced X–33 Base-Heating Environment. For publication in Journal of Spacecraft and Rockets, 1998.

WATSON, M.D. EB52
JAYROE, R. EB52
Fresnel Lens Solar Concentrator Design Based on Geometric Optics and Blackbody Radiation Equations. For presentation at ASME/ASES/AIA International Solar Energy Conference, Albuquerque, NM, June 13–19, 1998.

WATSON, M.D. EB52
ABUSHAGUR, M.A.G. UAH
ASHLEY, P.R. U.S. Army Missile
COLE, H.J. EB53
High Efficiency Binary Blazed Grating Waveguide Couplers. For presentation at Optical Society of America, Summer Topical Meetings, Diffractive Optics and Micro Optics, Kailua-Kona, Hawaii, June 8–11, 1998.

WEISSKOPF, M.C. ES01
O'DELL, S.L. ES01
ELSNER, R.F. ES01
VAN SPEYBROECK, L.P. Smithsonian
Advanced X-Ray Astrophysics Facility (AXAF)—An Overview. For presentation at 1997 Meeting of the High Energy Astrophysics Division (HEAD), Denver, CO, November 4–11, 1997.

WEISSKOPF, M.C. ES84
ELSNER, R.F. ES84
JOY, M.K. ES84
O'DELL, S.L. ES84
Graded Multilayers Not Required for Hard X-Ray Imaging. For publication in Proceedings of Next Generation X-Ray Observatories, Leicester, United Kingdom, 1997/1998.

WEISSKOPF, M.C. ES84
ELSNER, R.F. ES84
JOY, M.K. ES84
O'DELL, S.L. ES84
Graded Multilayers Not Required for Hard X-Ray Imaging. For publication in Proceedings of Workshop on Future Missions in X-Ray Astronomy, Cambridge, MA, 1997/1998.

WEISSKOPF, M.C. ES84
O'DELL, S.L. ES84
VAN SPEYBROECK, L.P. ES84
The Calibration of AXAF: Overview. For presentation at Proceedings of SPIE Conference, San Diego, CA, July 1998.

WHITAKER, A.F. EH01
CURRERI, P.A. EH01
SHARPE, J.B. Lockheed Martin
COLBERG, W.R.
VICKERS, J.H.
Space Manufacturing: The Next Challenge. For publication in SAMPE Journal, 1998.

WHORTON, M.S. EB23
ALHORN, D.C. EB23
Microgravity Vibration Control and Civil Applications. For presentation at Space '98: Engineering, Construction and Operations in Space, Albuquerque, NM, April 26–30, 1998.

WHORTON, M.S. EB12
CALISE, A.J. Georgia Institute of Tech.
On-Orbit Model Refinement for Controller Redesign. For presentation at 1998 IEEE Aerospace Conference, Snowmass, CO, March 21–28, 1998.

WILKERSON, G.W. Micro Craft, Inc.
HUEGELE, V. EB52
The Optical Design of a System Using a Fresnel Lens That Gathers Light for a Solar Concentrator and That Feeds Into Solar Alignment Optics. For presentation at International Optical Design Conference, Optical Society of America, Kona, Hawaii, June 8–12, 1998.

WILLIAMS, E. HR20
BOLDI, B. HR20
MATLIN, A. HR20
WEBER, M. HR20
HODANISH, S. HR20
SHARP, D. HR20
GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
BUECHLER, D.L. HR20
Total Lightning as a Severe Weather Diagnostic in Strongly Baroclinic Systems in Central Florida. For presentation at 19th Conference on Severe Local Storms, Minneapolis, MN, September 14–18, 1998.

WILLIAMS, E. MIT
BOLDI, B. MIT
MATLIN, A. MIT
WEBER, M. MIT
HADANISH, S. National Weather Service
SHARP, D. National Weather Service
GOODMAN, S.J. HR20
RAGHAVAN, R. HR20
BUECHLER, D.L. HR20
The Behavior of Total Lightning Activity in Severe Florida Thunderstorms. For publication in Special Issue of Atmospheric Research in Honor of Bernard Vonnegut, 1998.

WILLIAMSEN, J. ED52
Space System Vulnerability to Orbital Debris Penetration. For presentation at AIAA Aircraft Survivability Conference, Monterey, CA, October 21–23, 1997.

WILLIAMSEN, J. ED52
BLACKLOCK, K. Sverdrup
EVANS, H. Sverdrup
GUAY, T.D. Sverdrup
Quantifying and Reducing *International Space Station* Vulnerability Following Orbital Debris Penetration. For publication in Journal of Spacecraft and Rockets, 1997/1998.

WILLIAMSEN, J. University of Denver
ROBINSON, J. ED52
Meteoroid Protection Requirements, Shielding, and Penetration Models for NASA Spacecraft, 1968–1998. For presentation at Leonid Meteoroid Storm

and Satellite Threat Conference, Manhattan Beach, CA, April 27–28, 1998.

WILSON, C.A. ES84
DIETERS, S.W. UAH
FINGER, M.H. USRA
SCOTT, D.M. USRA
VAN PARADIJS, J. UAH
RXTE Observations of the Anomalous Pulsar 4U 0142+61. For publication in The Astrophysical Journal, 1998.

WILSON, C.A. ES84
FINGER, M.H. USRA
SCOTT, D.M. USRA
Recent Outbursts From the Transient X-Ray Pulsar Cep X-4 (GS 2138+56). For publication in The Astrophysical Journal, Chicago, IL, 1998.

WILSON, C.A. ES84
HARMON, B.A. ES84
PACIESAS, W.S. UAH
MCCOLLOUGH, M.L.
XTE J1550-564. For publication in International Astronomical Union Circular No. 7010, Cambridge, MA, 1998.

WILSON, C.A. ES84
FINGER, M.H. ES84
WILSON, R.B. ES84
SCOTT, D.M. ES84
XTE J1946+274 = GRO J1944+26. For publication in International Astronomical Union Circular No. 7014, Cambridge, MA, 1998.

WILSON, R.B. ES84
SCOTT, D.M. USRA
FINGER, M.H. USRA
Long-Term Observations of Her X-1 with BATSE. For publication in AIP Conference Proceedings, New York, NY.

WILSON, R.B. ES84
FINGER, M.H. USRA
Pulse Shape and Spectral Variability of OAO 1657-415. For presentation at High Energy Astrophysics Division (HEAD) 1997 Meeting, Estes Park, CO, November 3–7, 1997.

WILSON, R.M. ES82
Volcanism, Cold Temperature, and Paucity of Sunspot Observations (1818–1858): A Connection? For publication in Journal of Geophysical Research, 1998.

WILSON, R.M. ES82
A Comparison of Wolf's Reconstructed Record of Annual Sunspot Number With Schwabe's Observed Record of "Clusters of Spots" for the Interval of 1826–1868. For publication in Solar Physics, The Netherlands, 1998.

WILSON, R.M. ES82
HATHAWAY, D.H. ES82
REICHMANN, E.J. ES82
Estimating the Size and Timing of Maximum Amplitude for Cycle 23 From Its Early Cycle Behavior. For publication in Journal of Geophysical Research (Space Physics), Berkeley, CA, February 1998.

WILSON, R.M. ES82
Trends in the Annual Frequency of Atlantic Basin Intense Hurricanes: Implications for the Near-Term. For publication in Monthly Weather Review, Boulder, CO, February 11, 1998.

WILSON, R.M. ES82
On the Annual Frequency of Intense Hurricanes in Relation to the Extremes of ENSO and the Interludes Between Them. For publication in Journal of Geophysical Research, Rhode Island, 1998.

WILSON, R.M. ES82
On the Long-Term Trend of Atlantic Basin Intense Hurricanes. For publication in Geophysical Research Letters, Washington, DC, July 1998.

WINGLEE, R. University of Wash., Seattle
ELSEN, R.K. University of Wash., Seattle
BRITTNACHER, M. University of Wash., Seattle
PARKS, G.K. University of Wash., Seattle
SPANN, J.F., JR. ES83
GERMANY, G.A. UAH
Global Simulation of the May 29, 1996 Magnetic Cloud Event. For presentation at 1997 Spring AGU Meeting, Baltimore, MD, May 27–30, 1997.

WITHEROW, W.K. ES76
Scientific Applications of Optical Instruments to Materials Research. For presentation at Science and Technical Advisory Council Meeting, Huntsville, AL, November 10, 1997.

WOODS, P. ES84
KOUVELIOTOU, C. USRA/ES84
VAN PARADIJS, J.
BRIGGS, M.S.
WILSON, C.A.
DEAL, K.J.
HARMON, B.A.
FISHMAN, G.J. ES84
LEWIN, W.H.G.
KOMMERS, J.M.

Properties of the Second Outburst of the Bursting Pulsar (GRO J1744-28) as Observed with BATSE. For publication in Astrophysical Journal, 1998.

WOODS, P.M. UAH
KOUVELIOTOU, C. USRA
FISHMAN, G.J. ES84

GRB 971227. For publication in International Astronomical Union Circular No. 6798, 1998.

WUEST, M. Southwest Research
HUDDLESTON, M. Southwest Research
BURCH, J.L. Southwest Research
DEMPSEY, D.L. Southwest Research
CRAVEN, P.D. ES83
CHANDLER, M.O. ES83
SPANN, J.F., JR. ES83
PETERSON, W.K. Lockheed-Martin
COLLIN, H.L. Lockheed-Martin
LENNARTSSON, W. Lockheed-Martin

Magnetospheric Response to the Arrival of the Shock Wave in Front of the Magnetic Cloud Event of January 10, 1997. For presentation at COSPAR 32nd Scientific Assembly, Nagoya, Japan, July 12–19, 1998

YOUNG, R.B. ES76
VAUGHN, J.R. ES76
BRIDGE, K.Y. ES76
SMITH, C.K., II Lilly Research Labs

Effect of Increased Cyclic AMP Concentration on Muscle Protein Synthesis and B-Adrenergic Receptor Expression in Chicken Skeletal Muscle Cells in Culture. For presentation at 1998 Congress on In Vitro Biology, Las Vegas, NV, May 30–June 4, 1998.

ZHANG, T.X. UAH
HWANG, K.S. CSC
WU, S.T. UAH
STONE, N.H. ES83
SORENSON, J. ES83
WRIGHT, K.H. ES83

Current Collection in Plasmas by a Static Bare Tether. For presentation at 1997 Fall American Geophysical Union Meeting, San Francisco, CA, December 1997.

ZWIENER, J.M. EH12
KAMENETZKY, R.R. EH12
VAUGHN, J.A. EH12
FINCKENOR, M.M. EH12

Contamination Observed on the Passive Optical Sample Assembly (POSA)—1 Experiment. For presentation at SPIE International Symposium, San Diego, CA, July 19–24, 1998.

ZWIENER, J.M. EH12
KAMENETZKY, R.R. EH12
VAUGHN, J.A. EH12
FINCKENOR, M.M. EH12

The Passive Optical Sample Assembly (POSA)—I Experiment: First Flight Results and Conclusions. For presentation at AIAA Aerospace Sciences Meeting, Reno, NV, January 11–14, 1999.

INDEX

TECHNICAL MEMORANDA

TECHNICAL PUBLICATIONS

CONFERENCE PUBLICATIONS

CONTRACTOR REPORTS

PAPERS CLEARED FOR PRESENTATION

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	March 1999	Technical Memorandum

4. TITLE AND SUBTITLE
FY 1998 Scientific and Technical Reports, Articles, Papers, and Presentations

5. FUNDING NUMBERS

6. AUTHORS
J.E. Turner Waits, Compiler

7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES)
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

8. PERFORMING ORGANIZATION REPORT NUMBER
M-916

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Aeronautics and Space Administration
Washington, DC 20546

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
NASA/TM—1999-209149

11. SUPPLEMENTARY NOTES
Prepared by Technical Information & Operations Services Office, Center Operations Directorate

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified-Unlimited
Availability: NASA CASI (301) 621-0390
Nonstandard Distribution

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY98. 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.

14. SUBJECT TERMS

15. NUMBER OF PAGES
76

16. PRICE CODE
A05

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited