

NASA/TM—2006–214379



# **FY 2004 Scientific and Technical Reports, Articles, Papers, and Presentations**

*Compiled by*

*B.A. Fowler*

*Marshall Space Flight Center, Marshall Space Flight Center, Alabama*

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**May 2006**

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National Aeronautics and  
Space Administration

Marshall Space Flight Center • MSFC, Alabama 35812

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## **FOREWORD**

In accordance with the NASA Space Act of 1958, the George C. Marshall Space Flight Center (MSFC) has provided for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.

Since July 1, 1960, when MSFC 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.”



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

FY 2004 SCIENTIFIC AND TECHNICAL REPORTS,  
ARTICLES, PAPERS, AND PRESENTATIONS

**TABLE OF CONTENTS**

NASA TECHNICAL MEMORANDA .....	1
NASA TECHNICAL PUBLICATIONS .....	5
NASA CONFERENCE PUBLICATIONS .....	8
NASA CONTRACTOR REPORTS .....	9
MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION .....	11
INDEX .....	55





## NASA TECHNICAL MEMORANDA

TM—2003–212926 October 2003  
Spray Bar Zero-Gravity Vent System for On-Orbit Liquid Hydrogen Storage. L.J. Hastings,\* R.H. Flachbart, J.J. Martin, A. Hedayat, M. Fazah, T. Lak,\*\* H. Nguyen,\*\* and J.W. Bailey\*\*\*. Vehicle and Systems Development Department, Space Transportation Directorate, \*Alpha Technology, Inc., \*\*The Boeing Company, and \*\*\*Sverdrup Technology, Inc.

During zero-gravity orbital cryogenic propulsion operations, a thermodynamic vent system (TVS) concept is expected to maintain tank pressure control without propellant resettling. In this case, a longitudinal spray bar mixer system, coupled with a Joule-Thompson (J-T) valve and heat exchanger, was evaluated in a series of TVS tests using the 18-m<sup>3</sup> multipurpose hydrogen test bed. Tests performed at fill levels of 90, 50, and 25 percent, coupled with heat tank leaks of about 20 and 50 W, successfully demonstrated tank pressure control within a 7-kPa band. Based on limited testing, the presence of helium constrained the energy exchange between the gaseous and liquid hydrogen (LH<sub>2</sub>) during the mixing cycles. A transient analytical model, formulated to characterize TVS performance, was used to correlate the test data. During self-pressurization cycles following tank lockup, the model predicted faster pressure rise rates than were measured; however, once the system entered the cyclic self-pressurization/mixing/venting operational mode, the modeled and measured data were quite similar. During a special test at the 25-percent fill level, the J-T valve was allowed to remain open and successfully reduced the bulk LH<sub>2</sub> saturation pressure from 133 to 70 kPa in 188 min.

TM—2003–212930 November 2003  
Overview of Nonnuclear Testing of the Safe, Affordable 30-kW Fission Engine, Including End-to-End Demonstrator Testing. M.K. Van Dyke, J.J. Martin, and M.G. Houts. Propulsion Research Center, Space Transportation Directorate.

Successful development of space fission systems will require an extensive program of affordable and realistic testing. In addition to tests related to design/development of the fission system, realistic testing of the actual flight unit must also be performed. At the power levels under consideration (3–300 kW electric power), almost all technical issues are thermal or stress related and will not be strongly affected by the radiation environment. These issues can be resolved more thoroughly, less expensively, and in a more timely fashion with nonnuclear testing, provided it is prototypic of the system in question. This approach was used for the safe, affordable fission engine test article development program and accomplished via cooperative efforts with Department of Energy labs, industry, universities, and other NASA Centers. This Technical Memorandum covers the analysis, testing, and data reduction of a 30-kW simulated reactor as well as an end-to-end

demonstrator, including a power conversion system and an electric propulsion engine, the first of its kind in the United States.

TM—2003–212932 December 2003  
Biological and Physical Space Research Laboratory Science Review 2002. P.A. Curreri, M.B. Robinson, and K.L. Murphy, Editors. Biological and Physical Space Research Laboratory, Science Directorate.

Documentation of the internal science research at the Biological and Physical Space Research Laboratory as presented in a review to Dr. Ann Whitaker, MSFC Science Director, in July 2002. These presentations have been revised and updated as appropriate for this report. The report documents flight and ground experiments in microgravity materials science and biotechnology science and space radiation. All of the work described includes significant scientific contributions by internal scientists (usually as principal or co-investigator on the research grant). Much of the research is in collaboration with external scientists. All the funding was provided as the result of competitive proposals evaluated by internal or external peer review processes. The external flight and ground research that our laboratory supports for the NASA program will be reviewed in a separate report.

TM—2003–212933 December 2003  
FY 2002 Scientific and Technical Reports, Articles, Papers, and Presentations. B.A. Fowler, Compiler. Office of Chief Information Officer, Center Operations Directorate.

This Technical Memorandum (TM) presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY 2002. It also includes papers of MSFC contractors.

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

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

TM—2003–212934 December 2003  
Thermal and Chemical Characterization of Composite Materials (MSFC Center Director's Discretionary Fund Final Report, Project No. ED36–18). D.C. Stanley and T.L. Huff. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The purpose of this research effort was to (1) provide a concise and well-defined property profile of current and developing composite materials using thermal and chemical characterization techniques and (2) optimize analytical testing requirements of materials. This effort applied a diverse array of methodologies to ascertain composite material properties.

Often, a single method or technique will provide useful, but nonetheless incomplete, information on material composition and/or behavior. To more completely understand and predict material properties, a broad-based analytical approach is required. By developing a database of information comprised of both thermal and chemical properties, material behavior under varying conditions may be better understood. This is even more important in the aerospace community, where new composite materials and those in the development stage have little reference data. For example, Fourier transform infrared (FTIR) spectroscopy spectral databases available for identification of vapor phase spectra, such as those generated during experiments, generally refer to well-defined chemical compounds. Because this method renders a unique thermal decomposition spectral pattern, even larger, more diverse databases, such as those found in solid and liquid phase FTIR spectroscopy libraries, cannot be used. By combining this and other available methodologies, a database specifically for new materials and materials being developed at Marshall Space Flight Center can be generated. In addition, characterizing materials using this approach will be extremely useful in the verification of materials and identification of anomalies in NASA-wide investigations.

TM—2004—213170 May 2004  
 Design Development Analyses in Support of a Heat Pipe-Brayton Cycle Heat Exchanger. B.E. Steeve and R.J. Kapernick\*. Structures, Mechanics, and Thermal Department, Engineering Directorate, and Los Alamos National Laboratory.

A heat pipe-cooled reactor coupled to a Brayton cycle is currently under consideration for nuclear electric propulsion or as a planetary surface power source. In this system, power is transferred from the heat pipes to the Brayton gas via a heat exchanger attached to the heat pipes. This Technical Memorandum (TM) discusses the fluid, thermal, and structural analyses that were performed in support of the design of the heat exchanger to be tested in the Safe, Affordable Fission Engine experimental program at Marshall Space Flight Center. A companion paper, "Mechanical Design and Fabrication of a SAFE-100 Heat Exchanger for use in NASA's Advanced Propulsion Thermal-Hydraulic Simulator," presents the fabrication issues and prototyping studies that, together with these analyses, led to the development of this heat exchanger. An important consideration throughout the design development of the heat exchanger was its capability to be used for higher power and temperature applications. This TM also discusses this aspect of the design and presents designs for specific applications under consideration.

TM—2004—213172 May 2004  
 Evaluation of Training Samples Manually Welded With the Universal Handtool in a Space Simulation Chamber.

C.K. Russell, T.W. Malone, and S.N. Cato. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The international space welding experiment was designed to evaluate the universal handtool (UHT) functions as a welding, brazing, coating, and cutting tool for in-space operations. The UHT is an electron beam welding system developed by the Paton Welding Institute (PWI), Kiev, Ukraine, and operated at 8 kV with up to 1 kW of power. In preparation for conducting the space welding experiment, cosmonauts were trained to properly operate the UHT and correctly process samples.

This Technical Memorandum presents the results of the destructive and nondestructive evaluation of the training samples made in Russia in 1998. It was concluded that acceptable welds can be made with the UHT despite the constraints imposed by a space suit. The lap joint fillet weld configuration was more suitable than the butt joint configuration for operators with limited welding experience. The tube braze joint configuration designed by the PWI was easily brazed in a repeatable manner.

TM—2004—213174 May 2004  
 STARSAT: A Project To Evaluate Ground Tracking of Small Objects in Space (MSFC Center Director's Discretionary Fund Final Report, Project No. 00-11). J.W. Campbell, M.R. Carruth, and T.M. Freestone. Materials, Processes, and Manufacturing Department, Engineering Directorate.

A laser space calibration experiment is considered using the 12-J, 15-Hz high-performance CO<sub>2</sub> ladar surveillance sensor (HI-CLASS) system on the 3.67-m aperture advanced electro-optics system (AEOS). The objectives are to provide accurate range and signature measurements of orbiting calibration spheres, demonstrate high-resolution tracking capability of small objects, and precision drag determination for low-Earth orbit (LEO). Ancillary benefits include calibrating radar and optical sites, completing satellite conjunction analyses, supporting orbital perturbation analyses, and comparing radar and optical signatures. A global positioning system (GPS), laser beacon instrumented microsatellite about 25 cm in diameter will be deployed from a Space Shuttle Hitchhiker canister or other suitable launch means. Orbiting in LEO, the microsatellite will pass over AEOS on the average of two times per 24-hr period. An onboard orbit propagator will activate the GPS unit and a visible laser beacon at the appropriate times. The HI-CLASS AEOS will detect the microsatellite as it rises above the horizon, using Space Command-generated acquisition vectors. GPS data will be transmitted to the ground providing independent on-orbit, submeter accuracy location information for the microsatellite.

## NASA TECHNICAL MEMORANDA

TM—2004—213175 May 2004

Analytical Modeling and Test Correlation of Variable Density Multilayer Insulation for Cryogenic Storage. L.J. Hastings,\* A Hedayat, and T.M. Brown. Vehicle and Systems Development Department, Space Transportation Directorate and \*Alpha Technology, Inc.

A unique foam/multilayer insulation (MLI) combination concept for orbital cryogenic storage was experimentally evaluated using a large-scale hydrogen tank. The foam substrate insulates for ground-hold periods and enables a gaseous nitrogen purge as opposed to helium. The MLI, designed for an on-orbit storage period for 45 days, includes several unique features including a variable layer density and larger but fewer perforations for venting during ascent to orbit. Test results with liquid hydrogen indicated that the MLI weight or tank heat leak is reduced by about half in comparison with standard MLI. The focus of this effort is on analytical modeling of the variable density MLI (VD-MLI) on-orbit performance. The foam/VD-MLI model is considered to have five segments. The first segment represents the optional foam layer. The second, third, and fourth segments represent three different MLI layer densities. The last segment is an environmental boundary or shroud that surrounds the last MLI layer. Two approaches are considered: a variable density MLI modeled layer by layer and a semiempirical model or “modified Lockheed equation.” Results from the two models were very comparable and were within 5–8 percent of the measured data at the 300 K boundary condition.

TM—2004—213282 June 2004

Solid Rocket Booster Hydraulic Pump Port Cap Joint Load Testing. W.R. Gamwell and N.C. Murphy. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The solid rocket booster uses hydraulic pumps fabricated from cast C355 aluminum alloy, with 17–4 PH stainless steel pump port caps. Corrosion-resistant steel, MS51830 CA204L self-locking screw thread inserts are installed into C355 pump housings, with A286 stainless steel fasteners installed into the insert to secure the pump port cap to the housing. In the past, pump port cap fasteners were installed to a torque of 33 Nm (300 in-lb). However, the structural analyses used a significantly higher nut factor than indicated during tests conducted by Boeing Space Systems. When the torque values were reassessed using Boeing’s nut factor, the fastener preload had a factor of safety of <1, with potential for overloading the joint. This paper describes how behavior was determined for a preloaded joint with a steel bolt threaded into steel inserts in aluminum parts. Finite element models were compared with test results. For all initial bolt preloads, bolt loads increased as external applied loads increased. For higher initial bolt preloads, less load was

transferred into the bolt, due to external applied loading. Lower torque limits were established for pump port cap fasteners and additional limits were placed on insert axial deformation under operating conditions after seating the insert with an initial preload.

TM—2004—213283 June 2004

NASA Marshall Space Flight Center Barrel-Shaped Asymmetrical Capacitor. J.W. Campbell, M.R. Carruth, D.L. Edwards, A. Finchum, G. Maxwell, S. Nabors, L. Smalley,\* D. Huston,\*\* D. Ila,\*\* R. Zimmerman,\*\* C. Muntele,\*\* and I. Muntele.\*\* Advanced Projects Office, Flight Projects Directorate, \*The University of Alabama in Huntsville, and \*\*Alabama A&M University.

The NASA Barrel-Shaped Asymmetrical Capacitor (NACAP) has been extensively tested at NASA Marshall Space Flight Center and the National Space Science and Technology Center. Trichel pulse emission was first discovered here. The NACAP is a magnetohydrodynamic device for electric propulsion. In air it requires no onboard propellant nor any moving parts. No performance was observed in hard vacuum. The next step shall be optimizing the technology for future applications.

TM—2004—213286 June 2004

The Geostationary Operational Environmental Satellite (GOES) Product Generation System. S.L. Haines, R.J. Suggs, and G.J. Jedlovec. Earth Science Department, Science Directorate.

The Geostationary Operational Environmental Satellite (GOES) Product Generation System (GPGS) is introduced and described. GPGS is a set of computer programs developed and maintained at the Global Hydrology and Climate Center and is designed to generate meteorological data products using visible and infrared measurements from the GOES-East Imager and Sounder instruments. The products that are produced by GPGS are skin temperature, total precipitable water, cloud top pressure, cloud albedo, surface albedo, and surface insolation. A robust cloud mask is also generated. The retrieval methodology for each product is described to include algorithm descriptions and required inputs and outputs for the programs. Validation is supplied where applicable.

TM—2004—213393 September 2004

X-Ray Calibration Facility/Advanced Video Guidance Sensor Test. N.A.S. Johnston, R.T. Howard, and D.W. Watson. Avionics Department, Engineering Directorate.

The advanced video guidance sensor was tested in the X-Ray Calibration facility at Marshall Space Flight Center to establish performance during vacuum. Two sensors were tested

## NASA TECHNICAL MEMORANDA

and a timeline for each are presented. The sensor and test facility are discussed briefly. A new test stand was also developed. A table establishing sensor bias and spot size growth for several ranges is detailed along with testing anomalies.

TM—2004—213394  
September 2004  
Science Directorate Publications and Presentations,  
January 1–December 31, 2003. Compiled by F.G. Summers.  
Business Management Office, Science Directorate.

This Technical Memorandum (TM) lists the significant publications and presentations of the Science Directorate during the period January 1–December 31, 2003. Entries in the main

part of the TM are categorized according to NASA Reports (arranged by report number), Open Literature and Presentations (arranged alphabetically by title). 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 TM should be directed to Dr. A.F. Whitaker (SD01; 544–2481) or to one of the authors.

TP—2003–212691 November 2003  
 Conceptual Design of In-Space Vehicles for Human Exploration of the Outer Planets. R.B. Adama, R.A. Alexander, J.M. Chapman, S.S. Fincher, R.C. Hopkins, A.D. Philips, T.T. Polsgrove, R.J. Litchford, B.W. Patton, G. Statham,\* P.S. White,\* and Y.C.F. Thio\*\*. Program Planning and Development Office, Space Transportation Directorate, \*ERC, Inc., and U.S. Department of Energy.

During fiscal year 2002, a team of engineers from TD30/Advanced Concepts and TD40/Propulsion Research Center embarked on a study of potential crewed missions to the outer solar system. This study was conducted under the auspices of the Revolutionary Aerospace Systems Concepts activity administered by Langley Research Center (LaRC). The Marshall Space Flight Center (MSFC) team interacted heavily with teams from other Centers, including Glenn Research Center, LaRC, Jet Propulsion Laboratory, and Johnson Space Center. The MSFC team generated five concept missions for this project. The concept missions use a variety of technologies, including magnetized target fusion (MTF), magnetoplasmadynamic thrusters, solid core reactors, and molten salt reactors in various combinations. This Technical Publication (TP) reviews these five concepts and the methods used to generate them. The analytical methods used are described for all significant disciplines and subsystems. The propulsion and power technologies selected for each vehicle are reviewed in detail. The MSFC team also expended considerable effort refining the MTF concept for use with this mission. The results from this effort are also contained within this TP. Finally, the lessons learned from this activity are summarized in the conclusions section.

TP—2003–212927 November 2003  
 Gauging the Nearness and Size of Cycle Maximum. Robert M. Wilson and David H. Hathaway. Space Science Department, Science Directorate.

A simple method for monitoring the nearness and size of conventional cycle maximum for an ongoing sunspot cycle is examined. The method uses the observed maximum daily value and the maximum monthly mean value of international sunspot number and the maximum value of the 2-mo moving average of monthly mean sunspot number to effect the estimation. For cycle 23, a maximum daily value of 246, a maximum monthly mean of 170.1, and a maximum 2-mo moving average of 148.9 were each observed in July 2000. Taken together, these values strongly suggest that conventional maximum amplitude for cycle 23 would be  $\approx 124.5$ , occurring near July 2002  $\pm 5$  mo, very close to the now well-established conventional maximum amplitude and occurrence date for cycle 23—120.8 in April 2000.

TP—2003–212929 November 2003  
 Nucleation Behavior of Oxygen-Acetylene Torch-Produced Diamond Films. F.E. Roberts. Materials, Processes, and Manufacturing Department, Engineering Directorate.

A mechanism is presented for the nucleation of diamond in the combustion flame environment. A series of six experiments and two associated simulations provide results from which the mechanism was derived. A substantial portion of the prior literature was reviewed and the data and conclusions from the previous experimenters were found to support the proposed mechanism. The nucleation mechanism builds on the work of previous researchers but presents an approach to nucleation in a detail and direction not fully presented heretofore. This work identifies the gas phase as the controlling environment for the initial formulation steps leading to nucleation. The development mechanism explains some of the difficulty which has been found in producing single crystal epitaxial films.

An experiment which modified the initial gas phase precursor using methane and carbon monoxide is presented. Addition of methane into the precursor gases was found to be responsible for pillaring of the films. Atomic force microscopy surface roughness data provided a reasonable look at suppression of nucleation by carbon monoxide. Surface finish data was taken on crystals which were open to the nucleation environment and generally parallel to the substrate surface. These surfaces were measured as an independent measure of the instantaneous nucleation environment. A gas flow and substrate experiment changed the conditions on the surface of the sample by increasing the gas flow rate while remaining on a consistent point of the atomic constituent diagram, and by changing the carbide potential of the substrate. Two tip modification experiments looked at the behavior of gas phase nucleation by modifying the shape and behavior of the flame plasma in which the diamond nucleation is suspected to occur. Diamond nucleation and growth was additionally examined using a high-velocity oxygen fuel gun and  $C_3H_6$  as the fuel gas phase precursor with addition of carbon monoxide gas or addition of liquid toluene.

TP—2004–213089 July 2004  
 Survey of Technologies Relevant to Defense From Near-Earth Objects. R.B. Adams, R.A. Alexander, J. Bonemetti, J.M. Chapman, S.S. Fincher, R.C. Hopkins, M. Kalkstein, T.T. Polsgrove, G. Statham,\* and P.S. White\*. Advanced Concepts Department, Space Transportation Directorate, and \*ERC, Inc.

Several recent near-miss encounters with asteroids and comets have focused attention on the threat of a catastrophic impact with the Earth. This Technical Publication reviews the historical impact record and current understanding of the number and location of near-Earth objects (NEOs) to address their impact probability. Various ongoing projects intended to survey and catalog the NEO population are also reviewed. Details are

given of a Marshall Space Flight Center-led study intended to develop and assess various candidate systems for protection of the Earth against NEOs. Details of analytical tools, trajectory tools, and a tool that was created to model both the undeflected inbound path of an NEO as well as the modified, postdeflection path are given. A representative selection of these possible options was modeled and evaluated. It is hoped that this study will raise the level of attention about this very real threat and also demonstrate that successful defense is both possible and practicable, provided appropriate steps are taken.

TP—2004–213143

April 2004

Plasma Sail Concept Fundamentals. G.V. Khazanov, P. Delamere,\* K. Kabin,\*\* and T.J. Linde\*\*\*. Space Science Department, Science Directorate, \*University of Colorado, \*\*University of Alberta, and \*\*\*The University of Chicago.

The mini-magnetospheric plasma propulsion (M2P2) device, originally proposed by Winglee et al., predicts that a 15-km standoff distance (or 20-km cross-sectional dimension) of the magnetic bubble will provide for sufficient momentum transfer from the solar wind to accelerate a spacecraft to unprecedented speeds of 50–80 km/s after an acceleration period of  $\approx 3$  mo. Such velocities will enable travel out of the solar system in a period of  $\approx 7$  yr—almost an order of magnitude improvement over present chemical-based propulsion systems. However, for the parameters of the simulation of Winglee et al., a fluid model for the interaction of M2P2 with the solar wind is not valid. It is assumed in the magnetohydrodynamic (MHD) fluid model, normally applied to planetary magnetospheres, that the characteristic scale size is much greater than the Larmor radius and ion skin depth of the solar wind. In the case of M2P2, the size of the magnetic bubble is actually less than or comparable to the scale of these characteristic parameters. Therefore, a kinetic approach, which addresses the small-scale physical mechanisms, must be used. A two-component approach to determining a preliminary estimate of the momentum transfer to the plasma sail has been adopted. The first component is a self-consistent MHD simulation of the small-scale expansion phase of the magnetic bubble. The fluid treatment is valid to roughly 5 km from the source and the steady-state MHD solution at the 5 km boundary was then used as initial conditions for the hybrid simulation. The hybrid simulations showed that the forces delivered to the innermost regions of the plasma sail are considerably ( $\approx 10$  times) smaller than the MHD counterpart, are dominated by the magnetic field pressure gradient, and are directed primarily in the transverse direction.

TP—2004–213173

May 2004

Performance Theory of Diagonal Conducting Wall Magnetohydrodynamic Accelerators. R.J. Litchford. Advanced Space Transportation Program, Space Transportation Directorate.

The theoretical performance of diagonal conducting wall crossed-field accelerators is examined on the basis of an infinite segmentation assumption using a cross-plane averaged generalized Ohm's law for a partially ionized gas, including ion slip. The desired accelerator performance relationships are derived from the cross-plane averaged Ohm's law by imposing appropriate configuration and loading constraints. A current-dependent effective voltage drop model is also incorporated to account for cold-wall boundary layer effects, including gasdynamic variations, discharge constriction, and electrode falls. Definition of dimensionless electric fields and current densities leads to the construction of graphical performance diagrams, which further illuminate the rudimentary behavior of crossed-field accelerator operation.

TP—2004–213281

June 2004

Application of the Maximum Amplitude-Early Rise Correlation to Cycle 23. Robert M. Wilson and David H. Hathaway. Space Science Department, Science Directorate.

On the basis of the maximum amplitude-early rise correlation, cycle 23 could have been predicted to be about the size of the mean cycle as early as 12 mo following cycle minimum. Indeed, estimates for the size of cycle 23 throughout its rise consistently suggested a maximum amplitude that would not differ appreciably from the mean cycle, contrary to predictions based on precursor information. Because cycle 23's average slope during the rising portion of the solar cycle measured 2.4, computed as the difference between the conventional maximum (120.8) and minimum (8) amplitudes divided by the ascent duration in months (47), statistically speaking, it should be a cycle of shorter period. Hence, conventional sunspot minimum for cycle 24 should occur before December 2006, probably near July 2006 ( $\pm 4$  mo). However, if cycle 23 proves to be a statistical outlier, then conventional sunspot minimum for cycle 24 would be delayed until after July 2007, probably near December 2007 ( $\pm 4$  mo). In anticipation of cycle 24, a chart and table are provided for easy monitoring of the nearness and size of its maximum amplitude once onset has occurred (with respect to the mean cycle and using the updated maximum amplitude-early rise relationship).

TP—2004–213284

June 2004

Toxic Gas Exposure Risks Associated With Potential Shuttle Catastrophic Failures. B. Jeffrey Anderson and Rebecca C. McCaleb. Engineering Systems Department, Engineering Directorate.

From early in the Shuttle program, the National Aeronautics and Space Administration has modeled hydrogen chloride (HCl) release by burning solid propellant in the solid rocket boosters. In 1998, the United States Air Force 45th Space Wing

instituted more stringent launch commit criteria (LCC) for the Titan and Delta vehicles and proposed that the same LCC be applied to the Shuttle to enhance safety of onsite visitors and offsite public. Two types of health and safety standards were applicable: (1) Expected casualties and risk and (2) air quality emergency response.

This study addresses the issues using the U.S. Environmental Protection Agency-recommended model, CALPUFF. Results were compared to those produced by the USAF model, REEDM, developed for projecting air quality from nominal launches. Model performance was also evaluated against results of a Kennedy Space Center-sponsored study at the Los Alamos National Laboratory (LANL) using a computer-intensive, wild-fire model.

CALPUFF and the LANL model are capable of multipuff modeling of multiple sources. REEDM is a single-source, single-puff model. This study revealed significant deficiencies in REEDM when applied to the catastrophic failure problem. CALPUFF results indicate that, if a Shuttle abort were to occur over land, serious levels of HCl exposure could occur out to distances of at least 10 km, sufficient range to include major onsite visitor viewing areas. A preliminary survey of mitigation alternatives indicates cost-effective measures could be implemented that are sufficiently protective. Recent safety initiatives in response to the *Columbia* Accident Investigation Board report are not reflected here.

TP—2004–213338

August 2004

Displacement Damage Effects in Solar Cells—Mining Damage From the Microelectronics and Photonics Test Bed Space Experiment. R.J. Walters, T.L. Mortin,\* and S.R. Messenger\*\*. NASA's Space Environments and Effects (SEE) Program, \*Ohio Aerospace Institute, and \*\*SFA, Inc.

The objective is to develop an improved space solar cell radiation response analysis capability and to produce

a computer modeling tool which implements the analysis. This was accomplished through analysis of solar cell flight data taken on the Microelectronics and Photonics Test Bed experiment. This effort specifically addresses issues related to rapid technological change in the area of solar cells for space applications in order to enhance system performance, decrease risk, and reduce cost for future missions.

TP—2004–213339

August 2004

Solar Variability and the Near-Earth Environment—Mining Enhanced Low Dose Rate Sensitivity Data From the Microelectronics and Photonics Test Bed Space Experiment. T. Turlinger, W. Schmeichel, J. Krieg, J. Titus, A. Campbell,\* M. Reeves,\* and P. Marshall\*\*. NASA's Space Environments and Effects (SEE) Program, NAVSEA Crane, and the \*Naval Research Laboratory.

This effort is a detailed analysis of existing microelectronics and photonics test bed satellite data from one experiment, the bipolar test board, looking to improve our understanding of the enhanced low dose rate sensitivity (ELDRS) phenomenon. Over the past several years, extensive total dose irradiations of bipolar devices have demonstrated that many of these devices exhibited ELDRS. In sensitive bipolar transistors, ELDRS produced enhanced degradation of base current, resulting in enhanced gain degradation at dose rates  $<0.1 \text{ rd(Si)/s}$  compared to similar transistors irradiated at dose rates  $>1 \text{ rd(Si)/s}$ . This Technical Publication provides updated information about the test devices, the in-flight experiment, and both flight-and ground-based observations. Flight data are presented for the past 5 yr of the mission. These data are compared to ground-based data taken on devices from the same date code lots. Information about temperature fluctuations, power shut-downs, and other variables encountered during the space flight are documented.

## NASA CONFERENCE PUBLICATIONS

CP—2003–212931 November 2003  
5th Conference on Aerospace Materials, Processes, and Environmental Technology. M.B. Cook and D. Cross Stanley, Editors. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The next millennium challenges us to produce innovative materials, processes, manufacturing, and environmental technologies that meet low-cost aerospace transportation needs while maintaining U.S. leadership. The pursuit of advanced aerospace materials, manufacturing processes, and environmental technologies supports the development of safer, operational, next-generation, reusable, and expendable aeronautical and space vehicle systems. The Aerospace Materials, Processes, and Environmental Technology Conference provided a forum for manufacturing, environmental, materials, and processes engineers, scientists, and managers to describe, review, and critically assess advances in these key technology areas.

CP—2004–213090 March 2004  
NASA Workshop on Technology for Human and Robotic Exploration and Development of Space. J.C. Mankins,\* N. Marzwell,\*\* C.A. Mullins,† C.B. Christensen,† J.T. Howell, and D.A. O’Neil. Advanced Projects Office, Flight Projects Directorate, \*NASA Headquarters, \*\*Jet Propulsion Laboratory, and †The Tauri Group.

Continued constrained budgets and growing interests in the industrialization and development of space requires NASA to seize every opportunity for assuring the maximum return on space infrastructure investments. This workshop provided an excellent forum for reviewing, evaluating, and updating pertinent strategic planning, identifying advanced concepts and high-risk/high-leverage research and technology requirements, developing strategies and roadmaps, and establishing approaches, methodologies, modeling, and tools for facilitating the commercial development of space and supporting diverse exploration and scientific missions. Also, the workshop addressed important topic areas including revolutionary space systems requiring investments in innovative advanced technologies; achieving transformational space operations through the insertion of new technologies; revolutionary science in space through advanced systems and new technologies enabling experiments to go anytime to any location; and, innovative and ambitious concepts and approaches essential for promoting advancements in space transportation. Details concerning the workshop process, structure, and results are contained in the ensuing report.

CP—2004–213091 March 2004  
8th Spacecraft Charging Technology Conference. J.L. Minor, Compiler. NASA’s Space Environments and Effects (SEE) Program.

The 8th Spacecraft Charging Technology Conference was held in Huntsville, Alabama, October 20–24, 2003. Hosted by NASA’s Space Environments and Effects (SEE) Program and co-sponsored by the Air Force Research Laboratory (AFRL) and the European Space Agency (ESA), the 2003 conference saw attendance from eleven countries with over 65 oral papers and 18 poster papers in the areas of Plasma Propulsion and Tethers, Ground Testing Techniques, Interactions of Spacecraft and Systems With the Natural and Induced Plasma Environment, Materials Characterizations, Models and Computer Simulation, Environment Specifications, Current Collection and Plasma Probes in Space Plasmas, and On-Orbit Investigations. A round-table discussion of international standards regarding electrostatic discharge (ESD) testing was also held with the promise of continued discussions in the off years and an official continuation at the next conference.

CP—2004–213229 June 2004  
Transformational Systems Concepts and Technologies for Our Future in Space. J.T. Howell, P. George,\* J.C. Mankins,\*\* and C.B. Christensen†. Advanced Projects Office, Flight Projects Directorate, \*Glenn Research Center, \*\*NASA Headquarters, and †The Tauri Group.

NASA is constantly searching for new ideas and approaches yielding opportunities for assuring maximum returns on space infrastructure investments. Perhaps the idea of transformational innovation in developing space systems is long overdue. However, the concept of utilizing modular space system designs combined with stepping-stone development processes has merit and promises to return several times the original investment since each new space system or component is not treated as a unique and/or discrete design and development challenge. New space systems can be planned and designed so that each builds on the technology of previous systems and provides capabilities to support future advanced systems. Subsystems can be designed to use common modular components and achieve economies of scale, production, and operation. Standards, interoperability, and “plug and play” capabilities, when implemented vigorously and consistently, will result in systems that can be upgraded effectively with new technologies. This workshop explored many building-block approaches via way of example across a broad spectrum of technology discipline areas for potentially transforming space systems and inspiring future innovation. Details describing the workshop structure, process, and results are contained in this Conference Publication.



CR—2003—212745 October 2003  
 Characterization of Magnetospheric Spacecraft Charging Environments Using the LANL Magnetospheric Plasma Analyzer Data Set. V.A. Davis, M.J. Mandell, and M.F. Thomsen. NASA's Space Environments and Effects (SEE) Program, Science Applications International Corporation.

An improved specification of the plasma environment has been developed for use in modeling spacecraft charging. It was developed by statistically analyzing a large part of the LANL Magnetospheric Plasma Analyzer (MPA) data set for ion and electron spectral signature correlation with spacecraft charging, including anisotropies. The objective is to identify a relatively simple characterization of the full particle distribution that yield an accurate prediction of the observed charging under a wide variety of conditions.

CR—2004—213227 June 2004  
 Analysis of CRRES PHA Data for Low-Energy-Deposition Events. P.J. McNulty. NASA's Space Environments and Effects (SEE) Program, Clemson University.

This effort analyzed the low-energy deposition Pulse Height Analyzer (PHA) data from the Combined Release and Radiation Effects Satellite (CRRES). The high-energy deposition data had been previously analyzed and shown to be in agreement with spallation reactions predicted by the Clemson University Proton Interactions in Devices (CUPID) simulation model and existing environmental and orbit positioning models (AP-8 with USAF B-L coordinates). The scope of this project was to develop and improve the CUPID model by increasing its range to lower incident particle energies, and to expand the modeling to include contributions from elastic interactions. Before making changes, it was necessary to identify experimental data suitable for benchmarking the codes; then, the models to the CRRES PHA data could be applied. It was also planned to test the model against available low-energy proton or neutron SEU data obtained with mono-energetic beams.

CR—2004—213228 June 2004  
 Mining CRRES IDM Pulse Data and CRRES Environmental Data to Improve Spacecraft Charging/Discharging Models and Guidelines. A.R. Frederickson and D.H. Brautigam\*. NASA's Space Environments and Effects (SEE) Program, \*Caltech Jet Propulsion Laboratory.

One can truly predict the charging and pulsing in space over a year's time using only the physics that worked for periods of an hour and less in prior publications. All portions of the task were achieved, including the optional portion of determining a value for conductivity that best fit the data.

Fortran statements were developed that are required for the NUMIT runs to work with this kind of data from space. In addition to developing the Fortran for NUMIT, simple correlations between the IDM pulsing history and the space radiation were observed because we now have a better characterization of the space radiation.

The study showed that: (1) the new methods for measurement of charge storage and conduction in insulators provide the correct values to use for prediction of charging and pulsing in space; (2) the methods in NUMIT that worked well for time durations less than hours now work well for durations of months; (3) an average spectrum such as AE8 is probably not a good guide for predicting pulsing in space—one must take time dependence into account in order to understand insulator pulsing; and (4) the old method for predicting pulse rates in space that was based on the CRRES data could be improved to include dependencies on material parameters.

CR—2004—213285 May 2004  
 The 2003 NASA Faculty Fellowship Program Research Reports. S.K. Nash-Stevenson, G. Karr,\* and L.M. Freeman\*\*\* (Program Directors) and J. Bland (Compiler and Editor). Education Programs Department, Customer and Employee Relations Directorate, \*The University of Alabama in Huntsville, and \*\*The University of Alabama.

For the 39th consecutive year, the NASA Faculty Fellowship Program (NFFP) was conducted at Marshall Space Flight Center. The program was sponsored by NASA Headquarters, Washington, DC, and operated under contract by The University of Alabama in Huntsville. In addition, promotion and applications are managed by the American Society for Engineering Education (ASEE) and assessment is completed by Universities Space Research Association (USRA). The nominal starting and finishing dates for the 10-week program were May 27 through August 1, 2003. The primary objectives of the NASA Faculty Fellowship Program are to: (1) Increase the quality and quantity of research collaborations between NASA and the academic community that contribute to NASA's research objectives; (2) provide research opportunities for college and university faculty that serve to enrich their knowledge base; (3) involve students in cutting-edge science and engineering challenges related to NASA's strategic enterprises, while providing exposure to the methods and practices of real-world research; (4) enhance faculty pedagogy and facilitate interdisciplinary networking; (5) encourage collaborative research and technology transfer with other Government agencies and the private sector; and (6) establish an effective education and outreach activity to foster greater awareness of this program.



MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

ABBAS, M.M.	SD50	ADAMS, J.H.	SD50
CRAVEN, P.D.	SD50	The EUSO Mission—Abstract Only. For presentation at The	
SPANN, J.F.	SD50	Second International Conference on Particle and Fundamen-	
TANKOSIC, D.	UAH	tal Physics in Space, Washington, DC, December 10–12,	
LECLAIR, A.	UAH	2003, and for publication in Nuclear Physics B, 2004.	
GALLAGHER, D.L.	SD50	ADAMS, J.H.	SD50
Laboratory Experiments on Rotation of Micron Size Cosmic		Plans for Extreme Energy Cosmic Ray Observations From	
Dust Grains With Radiation—Abstract Only. For presenta-		Space—Abstract Only. For presentation at the Seminar at	
tion at and publication in Proceedings of the 35th COSPAR		Princeton University Physics Department, Princeton, NJ,	
Scientific Assembly, Paris, France, July 18–25, 2004.		March 11, 2004.	
ABBAS, M.M.	SD50	ADAMS, J.H.	SD46
CRAVEN, P.D.	SD50	Radiation Hazards and Countermeasures for Human	
SPANN, J.F.	SD50	Space Flight—Abstract Only. For presentation at the 2004	
TANKOSIC, D.	UAH	NASA/JPL Workshop on Physics for Planetary Exploration,	
LECLAIR, A.	UAH	Solvang, CA, April 19–22, 2004.	
GALLAGHER, D.L.	SD50	ADAMS, M.	SD50
WEST, E.A.	SD50	FALCONER, D.A.	SD50
WEINGARTNER, J.C.	Mason University	LEE, J.K.	SD50
WITHEROW, W.K.	SD50	JONES, C.	SD50
Laboratory Experiments on Rotation and Alignment of the		Testing Fractal Methods on Observed and Simulated	
Analogs of Interstellar Dust Grains by Radiation—Abstract		Solar Magnetograms—Abstract Only. For presentation	
Only. For publication in The Astrophysical Journal, 2004.		at the American Astronomical Society, Atlanta, GA, Janu-	
ABBAS, M.M.	SD50	ary 4–8, 2004.	
CRAVEN, P.D.	SD50	ADRIAN, M.L.	UAH
SPANN, J.F.	SD50	GALLAGHER, D.L.	SD50
TANKOSIC, D.	UAH	CRAVEN, P.D.	SD50
LECLAIR, A.	UAH	IMAGE-POLAR Concurrent Plasmopause Observa-	
WEST, E.A.	SD50	tions—Abstract Only. For presentation at and publication	
Experiments on Dust Grain Charging—Abstract Only.		in Proceedings of the Fall AGU Meeting, San Francisco,	
For presentation at and publication in Proceedings of the		CA, December 13–17, 2004.	
American Geophysical Union 2004 Fall Annual Meeting,			
San Francisco, CA, December 13–17, 2004.			
ABBAS, M.M.	SD50	AHN, H.S.	University of Maryland
LECLAIR, A.	UAH	SEO, E.S.	University of Maryland
OWEN, T.	University of Hawaii	ADAMS, J.H.	SD50
CONRATH, B.J.	Cornell University	BASHINDZHAGYAN, G.L.	Moscow State University
FLASAR, F.M.	Goddard Space Flight Center	BATKOV, K.E.	Moscow State University
KUNDE, V.G.	University of Maryland	CHANG, J.	Max Planck Institute
NIXON, C.A.	University of Maryland	CHRISTL, M.J.	SD50
ACHTERBERG, R.K.	Science. Systems & Applications	FAZELY, A.R.	Southern University
BJORAKER, G.	Goddard Space Flight Center	GANEL, O.	University of Maryland
ET AL.		ET AL.	
Nitrogen Isotopic Ratio in Jupiter’s Atmosphere From		The Energy Spectra of Proton and Helium Measured From	
Observations by Composite Infrared Spectrometer (CIRS)		the ATIC Experiment—Abstract Only. For presentation	
on the Cassini Spacecraft—Abstract Only. For publication		at the 35th COSPAR Scientific Assembly, Paris, France,	
in The Astrophysical Journal, 2004.		July 18–25, 2004.	
ADAMS, C.W.	ED42	ALBYN, K.	ED31
HAMILTON, G.S.	ED42	EDWARDS, D.L.	ED31
Holistic Design for Total Product Well Being—Abstract		ALRED, J.	Boeing Space Station
Only. For presentation at the Human Factors & Ergonomics		Changes in the Optical Properties of Simulated Shuttle	
Society, New Orleans, LA, September 20–24, 2004.		Waste Water Deposits-Urine Darkening—Abstract Only.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- For publication in the Journal of Spacecraft and Rockets, 2004.
- ALHORN, D.C. ED17  
Autonomous Assembly of Modular Structures in Space and On Extraterrestrial Locations—Abstract Only. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 13–17, 2005.
- ALLEN, P.A. ED22  
AGGARWAL, P.K. ED22  
SWANSON, G.R. ED22  
Development of a Fatigue Crack Growth Coupon for Highly Plastic Stress Conditions—Final Paper. For presentation at and publication in Proceedings of the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–22, 2004.
- ALLEN, P.A. ED22  
WILSON, C.D. Tennessee Technological University  
Development of a Pressure-Dependent Constitutive Model With Combined Multilinear Kinematic and Isotropic Hardening—Final Paper. For presentation at the 2004 International ABAQUS Users Conference, Boston, MA, May 25–27, 2004.
- ALTINO, K.M. UAH  
KNUPP, K.R. UAH  
GOODMAN, S.J. SD60  
Correlation of Lightning Flash Rates With a Microburst Event—Abstract Only. For presentation at the American Meteorological Society (AMS) 22nd Conference on Severe Local Storms, Hyannis, MA, October 5–8, 2004.
- ANILKUMAR, A.V. Vanderbilt University  
GRUGEL, R.N. SD46  
BHOWMICK, J. Vanderbilt University  
WANG, T. Vanderbilt University  
Experiments on Suppression of Thermocapillary Oscillations in Sodium Nitrate Floating Half-Zones by High-Frequency End-Wall Vibrations—Abstract Only. For publication in the Journal of Crystal Growth, 2004.
- ARAKERE, N.K. University of Florida  
KNUDSEN, E.C. University of Florida  
SWANSON, G.R. ED22  
DUKE, G.C. Sverdrup Technology  
HAM-BATTISTA, G. ERC, Inc.  
Subsurface Stress Fields in FCC Single Crystal Anisotropic Contacts—Final Paper. For presentation at the ASME Turbo Expo, Vienna, Austria, June 14–17, 2004, and publication in the ASME Journal of Engineering for Gas Turbines and Power, 2004.
- ASTAFIEVA, M.M. Paleontological Institute  
ROZANOV, A.Y. Paleontological Institute  
HOOVER, R.B. SD50  
Framboidal Structures in Earth Rocks and in Astro-materials—Abstract Only. For presentation at the SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.
- ASTAFIEVA, M.M. Paleontological Institute  
ROZANOV, A.Y. Paleontological Institute  
HOOVER, R.B. SD50  
VICKERS-RICH, P. Monash University/Clayton  
WILDE, A. Monash University/Clayton  
Microbial Remains in Middle Proterozoic Rocks of Northern Australia—Abstract Only. For presentation at and publication in Proceedings of the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.
- AVANOV, L.A. SD50  
SMIRNOV, V.N. SD50  
CHANDLER, M.O. SD50  
Observations of Plasma Transient on the Lobe Field Line During the Substorm Interball Tail Observations on October 3, 1995—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.
- BALLARD, R. TD51  
Operational Issues in the Development of a Cost-Effective Reusable LOX/LH<sub>2</sub> Engine—Final Paper. For presentation at the 5th International Symposium on Liquid Space Propulsion, Chattanooga, TN, October 27–30, 2003.
- BAN, H. UAB  
LI, C. UAB  
LIN, B. UAB  
EMOTO, K. UAB  
SCRIPA, R.N. UAB  
SU, C.-H. SD46  
LEHOCZKY, S.L. SD46  
Thermal Diffusivity for III–VI Semiconductor Melts at Different Temperatures—Abstract Only. For presentation at the 14th International Conference on Crystal Growth, Grenoble, France, August 10–13, 2004.
- BAN, H. UAB  
LIN, B. UAB  
LI, C. UAB  
SCRIPA, R.N. UAB  
SU, C.-H. SD46  
LEHOCZKY, S.L. SD46  
Torque Transient of Magnetically Drive Flow for Viscosity Measurement—Abstract Only. For presentation at and publication in Proceedings of the 2004 Heat Transfer/

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

Fluids Engineering Summer Conference, Charlotte, NC, July 11–15, 2004.		NG, J.D.	SD46
		GARRIOTT, O.K.	SD46
BECKER, W.	Max Planck Institute	Cloning and Characterization of an $\alpha$ -amylase Gene From the Hyperthermophilic Archaeon <i>Thermococcus Thiore-</i> <i>ducens</i> —Abstract Only. For publication in the <i>Journal of</i> <i>Biological Chemistry</i> , 2004, and in <i>Process Biochemistry</i> , 2004.	
WEISSKOPF, M.C.	SD50		
ARZOUMANIAN, Z.	USRA		
LORIMER, D.	University of Manchester		
CAMILO, F.	Columbia University		
ELSNER, R.F.	SD50	BERNHARDSDOTTER, E.C.M.J.	SD46
KANBACH, G.	Max Planck Institute	PUSEY, M.L.	SD46
REIMER, O.	Ruhr-Universitat	NG, J.D.	UAH
SWARTZ, D.A.	USRA	GARRIOTT, O.K.	SD46
ET AL.		Enzymatic Properties of an Alkaline and Chelator Resis- tant $\alpha$ -Amylase From the Alkaliphilic <i>Bacillus Sp.</i> Isolate L1711—Abstract Only. For publication in the <i>Journal of</i> <i>Fermentation Engineering</i> , 2004, and in <i>Process Biochem-</i> <i>istry</i> , 2004.	
A Multi-Wavelength Search for a Counterpart of the Unidentified Gamma-Ray Source 3EG J2020+4017 (2CG078+2)—Abstract Only. For publication in <i>The</i> <i>Astrophysical Journal</i> , 2004.			
BECKER, W.	Max Planck Institute	BERNHARDSDOTTER, E.C.M.J.	UAH
WEISSKOPF, M.C.	SD50	PUSEY, M.L.	SD46
TENNANT, A.F.	SD50	NG, J.D.	UAH
JESSNER, A.	Max Planck Institute	GARRIOTT, O.K.	UAH
ZHANG, S.N.	SD50/UAH	Alpha-Amylase From the Hyperthermophilic Archaeon <i>Thermococcus Thireducens</i> —Abstract Only. For presenta- tion at the American Society for Gravitational and Space Biology, Huntsville, AL, November 12–16, 2003.	
Revealing the X-Ray Emission Processes of Old Rotation-Powered Pulsars: XMM-Newton Observations of PSR B0950+08, PSR B0823+26 and PSR J2043+2740— Abstract Only. For publication in <i>The Astrophysical Jour-</i> <i>nal</i> , 2004.			
BENEFIELD, M.P.J.	TD05	BHARDWAJ, A.	Vikram Sarabhari Space Center
BELCHER, J.A.	TD05	BRANDUARDI-RAYMONT, G.	U. College London
Modeling of Spacecraft Advanced Chemical Propulsion Systems—Final Paper. For presentation at the 2004 Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.		ELSNER, R.F.	SD50
		GLADSTONE, G.R.	Southwest Research Institute
		RAMSAY, G.	Mullard Space Science Laboratory
		RODRIGUEZ, P.R.	XMM-Newton SOC
		SORIA, R.	University College London
		WAITE, JR., J.H.	University of Michigan
		CRAVENS, T.E.	University of Kansas
BENFORD, A.	University of Texas Pan Am	Solar Control on Jupiter's Equatorial X-Ray Emissions: 26–29 November 2003 XMM-Newton Observation— Abstract Only. For publication in <i>Geophysical Research</i> <i>Letters</i> , 2004.	
TINKER, M.L.	ED21		
Comparison of Structural Optimization Techniques for a Nuclear Electric Space Vehicle—Final Paper. For presenta- tion at the Space Technology and Applications International Forum, Albuquerque, NM, February 8–12, 2004.			
BENFORD, A.	University of Texas Pan Am	BHARDWAJ, A.	SD50
TINKER, M.L.	ED20	ELSNER, R.F.	SD50
Truss Optimization for a Manned Nuclear Electric Space Vehicle Using Genetic Algorithms—Final Paper. For presenta- tion at the 10th AIAA/SSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY, August 30–Septem- ber 1, 2004.		GLADSTONE, G.R.	Southwest Research Institute
		WAITE, JR., J.H.	University of Michigan
		CRAVENS, T.E.	University of Kansas
		OSTGAARD, N.	University of Bergen
		CHANG, S.-W.	UAH/SD50
		METZGER, A.E.	Jet Propulsion Laboratory
		MAJEED, T.	University of Michigan
		First Terrestrial Soft X-Ray Aurora Observations by Chan- dra—Abstract Only. For presentation at and publication in <i>Proceedings of the Huntsville Modeling Workshop</i> , Hunts- ville, AL, October 18–22, 2004.	
BERNHARDSDOTTER, E.C.M.J.	SD46		
PUSEY, M.L.	SD46		

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

BLACKWELL, W.C.	Jacobs Sverdrup	the American Meteorological Society (AMS) 85th Annual Meeting, San Diego, CA, January 9–13, 2005.	
MINOW, J.I.	Jacobs Sverdrup		
O'DELL, S.L.	ED44		
CAMERON, R.A.	Harvard-Smithsonian	BOCCIPPIO, D.J.	SD60
VIRANI, S.N.	Harvard-Smithsonian	PETERSON, W.A.	UAH
The Chandra X-Ray Observatory Radiation Environment Model—Update—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.		CECIL, D.J.	UAH
		The Tropical Convective Spectrum: 1. Archetypal Vertical Structures—Abstract Only. For publication in the Journal of Climate, 2004.	
BLAKESLEE, R.J.	SD60	BOEDER, P.	Boeing
BAILEY, J.C.	SD60	MIKATARIAN, R.	Boeing
BUECHLER, D.E.	SD60	KOONTZ, S.	Johnson Space Center
GOODMAN, S.J.	SD60	ALBYN, K.	ED31
MCCAUL, JR., E.W.	SD60	FINCKENOR, M.	ED31
HALL, J.	SD60	Simulated Space Environment Effects on the Blocking Force of Silicone Adhesive—Abstract Only. For presentation at the 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10–13, 2005.	
The North Alabama Lightning Mapping Array (LMA): A Network Overview—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society (AMS) 85th Annual Meeting, San Diego, CA, January 9–13, 2005.		BONAMENTE, M.	UAH/SD50
		JOY, M.K.	SD50
BLEVINS, J.A.	TD40	CARLSTROM, J.E.	Enrico Fermi Institute
GOSTOWSKI, R.	TD40	LAROQUE, S.	University of Chicago
CHIANESE, S.	Penn State University	Determination of Cluster Distances From Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements: I—Analysis Methods and Initial Results—Abstract Only. For publication in The Astrophysical Journal, 2004.	
An Experimental Investigation of Hypergolic Ignition Delay of Hydrogen Peroxide With Fuel Mixtures—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.		BONAMENTE, M.	SD50
		LIEU, R.	SD50
BLUME, J.L.	ED43	KAASTRA, J.	SD50
Applying a Crew Accommodations Resource Model to Future Space Vehicle Research—Presentation. For presentation at the Huntsville Simulation Conference 2003, Huntsville, AL, October 29–31, 2003.		The Soft Excess Emission in the Hercules Supercluster Observed With the ROSAT Position Sensitive Proportional Counter—Abstract Only. For publication in The Astrophysical Journal, 2004.	
BOCCIPPIO, D.J.	SD60	BRADFORD, R.N.	FD40
Multivariate Statistical Inference of Lightning Occurrence, and Using Lightning Observations—Abstract Only. For presentation at the International Lightning Detection Conference, Helsinki, Finland, June 7–9, 2004.		New Directions in Space Operations Services in Support of Interplanetary Exploration—Abstract Only. For presentation at the IEEE Aerospace Conference, Big Sky, MT, March 5–12, 2005.	
BOCCIPPIO, D.J.	SD60	BRADFORD, R.N.	FD40
An Orbital “Virtual Radar” From TRMM Passive Microwave and Lightning Observations—Abstract Only. For presentation at and publication in Proceedings of the American Geophysical Union Fall Meeting 2004, San Francisco, CA, December 13–17, 2004.		LISOTTA, A.J.	Ames Research Center
		Spaceflight Operations Services Grid Project—Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.	
BOCCIPPIO, D.J.	SD60	BRADFORD, R.N.	FD40
CECIL, D.J.	SD60	MEHROTRA, A.	Ames Research Center
PETERSEN, W.A.	SD60	LISOTTA, A.J.	Ames Research Center
Lightning Contribution to Improvement of Passive Microwave Vertical Structure and Rainfall Estimation—Abstract Only. For presentation at and publication in Proceedings of		Spaceflight Operations Services Grid Prototype—Final Paper. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.	

## MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION

(Publicly available. Dates are conference dates.)

BRADFORD, R.N.	FD40	HOWARD, R.T.	ED19
THIGPEN, W.W.	Ames Research Center	CORDER, E.L.	ED12
Spaceflight Operations Services Grid (SOSG)—Abstract Only. For presentation at the 2004 Ground Systems Architecture Workshop, Manhattan Beach, CA, March 30–April 1, 2004.		Machine Vision Applied to Navigation of Confined Spaces—Final Paper. For presentation at the SPIE Defense and Security Symposium, Orlando, FL, April 12–16, 2004.	
BRADFORD, R.N.	FD40	BROWN, A.M.	ED21
THIGPEN, W.W.	Ames Research Center	MCGHEE, D.S.	ED21
LISOTTA, A.J.	Ames Research Center	Statistical Comparison and Improvement of Methods for Combining Random and Harmonic Loads—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Palm Springs, CA, April 19–22, 2004.	
REDMAN, S.	UAH	BRUBAKER, N.	SD60
Spaceflight Operations Services Grid (SOSG) Prototype Implementation and Feasibility Study—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.		JEDLOVEC, G.J.	SD60
BRAGG-SITTON, S.M.	TD40	A Cloud Mask for AIRS—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.	
FORSBACKA, M.	NASA Headquarters	BUECHLER, D.E.	UAH
Application of a Virtual Reactivity Feedback Control Loop in Non-Nuclear Testing of a Fast Spectrum Reactor—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants (ICAPP 2004), Pittsburgh, PA, June 13–17, 2004.		CHRISTIAN, H.J.	SD60
BRAGG-SITTON, S.M.	University of Michigan	GOODMAN, S.J.	SD60
KAPERINICK, R.J.	Los Alamos National Laboratory	The GOES-R Lightning Mapper Sensor—Abstract Only. For presentation at and publication in Proceedings of the National Weather Association Annual Meeting, Portland, OR, October 16–21, 2004.	
GODFROY, T.J.	TD40	BUECHLER, D.E.	UAH
Single Channel Testing for Characterization of the Direct Gas Cooled Reactor and the Safe-100 Heat Exchanger—Final Paper. For presentation at the 2004 Space Technology and Applications International Forum, Albuquerque, NM, February 8–12, 2004.		GOODMAN, S.J.	SD60
BRAGG-SITTON, S.M.	TD40	LA CASSE, K.	SD60
REID, R.S.	TD40	BLAKESLEE, R.J.	SD60
Transient Approximation of SAFE-100 Heat Pipe Operation—Final Paper. For presentation at the 2005 Space Technology and Applications International Forum, Albuquerque, NM, February 13–17, 2005.		DARDEN, C.	SD60
BRANDUARDI-RAYMONT, G.	Mullard Space Sci. Lab	Assessments of Total Lightning Data Utility in Weather Forecasting—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society Conference on Meteorological Applications of Lightning Data, San Diego, CA, January 9–13, 2005.	
ELSNER, R.F.	SD50	BUECHLER, D.E.	UAH
GLADSTONE, G.R.	Southwest Research Institute	MCCAUL, JR., E.W.	USRA
RAMSAY, G.	Mullard Space Science Laboratory	GOODMAN, S.J.	SD60
RODRIGUEZ, P.R.	XMM-Newton SOC	BLAKESLEE, R.J.	SD60
SORIA, R.	Mullard Space Science Laboratory	BAILEY, J.C.	Raytheon ITSS
WAITE, JR., J.H.	University of Michigan	GATLIN, P.N.	UAH
First Observation of Jupiter by XMM-Newton—Abstract Only. For publication in The Astronomy Journal, 2004, and in The Astrophysics Journal, 2004.		The Severe Weather Outbreak of 10 November 2002: Lightning and Radar Analysis of Storms in the Deep South—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society 22nd Conference on Severe Local Storms, Hyannis, MA, October 5–8, 2004.	
BRISCOE, J.M.	ED12	BURNS, H.	ED31
BRODERICK, D.J.	Auburn University	ALBYN, K.	ED31

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

EDWARDS, D.L.	ED31	Asymmetrical Capacitors for Propulsion—Presentation.	
BOOTHE, R.	ED31	For presentation at the IEEE Upper Monongalia Subsection	
FINCHUM, C.	ED31	of Pittsburg Section of IEEE, Morgan Town, WV, Febru-	
FINCKENOR, M.	ED31	ary 23, 2004.	
Capabilities of the Materials Contamination Team at Mar-			
shall Space Flight Center—Abstract Only. For presentation			
at the Contamination of Optical Equipment Workshop,			
Noordwijk, The Netherlands, December 11–12, 2003.			
BURNS, L.	Raytheon	CANNING, F.X.	ISR
DECKER, R.	ED44	WINET, E.	ISR
A Climatological Study of Cloud-to-Ground Lightning Strikes		ICE, B.	ISR
in the Vicinity of the Kennedy Space Center—Abstract/Final		MELCHER, C.	ISR
Paper. For presentation at the 11th AMS Conference on Avia-		PESAVENTO, P.	ISR
tion, Range and Aerospace Meteorology, Hyannis, MA, Octo-		HOLMES, A.	ISR
ber 4-8, 2004.		BUTLER, C.	ISR
		COLE, J.	TD40
		CAMPBELL, J.	TD40
		The ISR Asymmetrical Capacitor Thruster; Experimental	
		Results and Improved Designs—Presentation. For presenta-	
		tion at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion	
		Conference and Exhibit, Fort Lauderdale, FL, July 11–14,	
		2004.	
BURNS, L.	Raytheon	CANNING, F.X.	ISR
KELLER, V.W.	ED44	WINET, E.	ISR
Proposed Plan for Adopting Updated Range Reference		COLE, J.	TD40
Atmospheres—Presentation. For presentation at the 2004		CAMPBELL, J.	TD40
Department of Defense Climatology Workshop, Asheville,		The ISR Asymmetrical Capacitor Thruster: Experimental	
NC, April 28–30, 2004.		Results and Improved Designs—Abstract/Final Paper. For	
		presentation at the 40th AIAA/ASME/SAE/ASEE Joint	
		Propulsion Conference and Exhibit, Fort Lauderdale, FL,	
		July 11–14, 2004.	
CAMPBELL, J.W.	FD02	CARDELINO, H.	Spellman College
PHIPPS, C.	Photonics Associates	CARDELINO, C.A.	Georgia Institute of Technology
SMALLEY, L.	UAH	MOORE, C.E.	SD46
REILLY, J.	Northeast Science & Technology	DIETZ, N.	Georgia State University
BOCCIO, D.	SUNY	MCCALL, S.D.	Spellman College
The Impact Imperative: A Space Infrastructure Enabling		BACHMANN, K.	North Carolina State University
a Multi-Tiered Earth Defense—Final Paper. For presenta-		Advanced Computational Modeling of Vapor Deposition in	
tion at the 2004 Planetary Defense Conference: Protecting		a High-Pressure Reactor—Abstract Only. For publication	
Earth From Asteroids, Garden Grove, CA, February 23–26,		in Proceedings of the 2004 Conference on Advances in In-	
2004.		ternet Technologies and Applications, West Lafayette, IN,	
		July 8–11, 2004.	
CANFIELD, S.	Tennessee Technological University	CARPENTER, P.K.	SD46
BEARD III, J.W.	Tennessee Technological University	ARMSTRONG, J.	SD46
PEDDIESON, J.	Tennessee Technological University	Accuracy Evaluation of Electron-Probe Microanalysis as	
EWING, A.	Ewing Research	Applied to Semiconductors and Silicates—Abstract Only.	
GARBE, G.	TD05	For presentation at the 2004 Australian Conference on	
Similarity Rules for Scaling Solar Sail Systems—Final		Microscopy and Microanalysis 19, Geelong, Australia, Febru-	
Paper. For presentation at the Solar Sail Technology		ary 1–6, 2004.	
and Applications Conference, Greenbelt, MD, Septem-			
ber 28–30, 2004.			
CANNING, F.X.	ISR	CARPENTER, P.K.	SD46
WINET, E.	ISR	ARMSTRONG, J.	NIST
ICE, B.	ISR	Improvements in Electron-Probe Microanalysis: Appli-	
MELCHER, C.	ISR	cations to Terrestrial, Extraterrestrial, and Space-Grown	
PESAVENTO, P.	ISR		
HOLMES, A.	ISR		
BUTLER, C.	ISR		
COLE, J.	TD40		
CAMPBELL, J.	TD40		



MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- Materials—Abstract Only. For presentation at the Microscopy and Microanalysis 2004 Conference, Savannah, GA, August 1–5, 2004.
- CARRASQUILLO, R.L. FD21  
BAGDIGIAN, B. FD21  
PERRY, J.L. FD21  
LEWIS, J. FD21  
Evolution of the Baseline *ISS* ECLSS Technologies—The Next Logical Steps—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.
- CARRASQUILLO, R.L. FD21  
CLOUD, D. Hamilton Sundstrand  
BEDARD, J. Hamilton Sundstrand  
Status of the Node 3 Regenerative ECLSS Water Recovery and Oxygen Generation Systems—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.
- CARRIER, M. Florida State University  
ZOU, X. Florida State University  
LAPENTA, W.M. SD60  
JEDLOVEC, G.J. SD60  
Assessing the Usefulness of AIRS Radiance Observations in a 4D-Var Assimilation Scheme Using the Penn State/NCAR Mesoscale Model Version 5 (MM5) and a Stand Alone Radiative Transfer Algorithm (SARTA)—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.
- CARRINGTON, C.K. FD02  
DAY, G. Boeing Phantom Works  
A High-Energy Technology Demonstration Platform: The First Step in a Stepping Stones Approach to Energy-Rich Space Infrastructures—Abstract/Final Paper. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.
- CARRINGTON, C.K. FD02  
HOWELL, J.T. FD02  
DAY, G. Boeing Phantom Works  
A 100 kW-Class Technology Demonstrator for Space Solar Power—Abstract Only. For presentation at the Fourth International Conference on Solar Power From Space, Granada, Spain, June 30–July 2, 2004.
- CARTER, L. FD21  
TATARA, J.D. FD21  
MASON, R. FD21
- O’CONNOR, E. FD21  
BEDARD, J. FD21  
Performance Assessment of the *ISS* Water Processor Assembly Reactor—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.
- CASIANO, M.J. TD63  
ZOLADZ, T.F. TD63  
Acoustic Modeling and Analysis for the Space Shuttle Main Propulsion System Liner Crack Investigation—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.
- CATALINA, A.V. BAE/SD46  
STEFANESCU, D.M. University of Alabama  
SEN, S. SD46  
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition—Abstract Only. For presentation at the TMS Annual Meeting, Charlotte, NC, March 14–18, 2004.
- CECIL, D.J. UAH  
LAFONTAINE, F.J. Raytheon ITSS  
HOOD, R.E. SD60  
BLAKESLEE, R.J. SD60  
MACH, D.M. UAH  
HEYSFIELD, G. Goddard Space Flight Center  
Classification of Tropical Oceanic Precipitation Using High Altitude Aircraft Microwave and Electric Field Measurements—Abstract Only. For presentation at and publication in Proceedings of Eos 2004 Joint Assembly: AGU, Canadian Geophysical Union, and Society of Exploration Geophysicists, Montreal, CA, May 17–24, 2004; and for publication in Proceedings of the 26th AMS Conference on Hurricanes & Tropical Meteorology, Miami, FL, May 3–7, 2004.
- CHANG, H. UAH  
SMITH, D.D. SD46  
Gain-Assisted Superluminal Propagation in Coupled Optical Resonators—Abstract Only. For presentation at the Optical Society of American Frontiers in Optical Conference (OSA), Rochester, NY, October 10–14, 2004.
- CHANG, J. Purple Mountain Observatory  
SCHMIDT, W.K.H. Max Planck Institute  
ADAMS, J.H. SD50  
AHN, H.S. University of Maryland  
BASHINDZHAGYAN, G.L. Moscow State University  
BATKOV, K.E. Moscow State University  
CHRISTL, M.J. SD50

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

FAZELY, A.R.	Southern University	VEKILOV, P.G.	SD46
GANEL, O.	University of Maryland	DE YOREO, J.J.	SD46
ET AL.		Step and Kink Dynamics in Organic and Protein Crystal- lization—Abstract Only. For publication in the Materials Research Bulletin, 2004.	
The Electron Spectrum Above 20 GeV Measured by ATIC—Abstract Only. For presentation at and publication in Proceedings of the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.			
CHANG, S.-W.	SD50	CHOU, S.-H.	SD60
GALLAGHER, D.L.	SD50	LAPENTA, W.M.	SD60
SPANN, J.F.	SD50	JEDLOVEC, G.J.	SD60
MENDE, S.	SD50	MCCARTY, W.	UAH
GREENWALD, R.	SD50	MECIKALSKI, J.R.	UAH
NEWELL, P.T.	SD50	Regional Assimilation of NASA Atmospheric Infrared Sounder (AIRS) Data—Abstract Only. For presentation at and publication in Proceedings of the 13th Conference on Sat- ellite Meteorology and Oceanography, Norfolk, VA, Septem- ber 20–23, 2004.	
Cusp and LLBL as Sources of the Isolated Dayside Auroral Feature During Northward IMF—Abstract Only. For publi- cation in the Journal of Geophysical Research, 2004.			
CHAVERS, G.	TD40	CHOUDHARY, D.P.	SD50
CHANG-DIAZ, F.	Johnson Space Center	Large Solar Observatory—Abstract Only. For publication in Current Science, 2003.	
Development and Demonstration of a Device to Determine Thrust by Measuring the Force on a Target Plate in the Exhaust of a Plasma Thruster—Abstract Only. For presen- tation at the 40th Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.			
CHAVERS, G.	TD40	CHOUDHARY, D.P.	SD50
CHANG-DIAZ, F.	Johnson Space Center	BALASUBRAMANIAM, K.S.	National Solar Observatory
BREIZMAN, B.	University of Texas	SUEMATSU, Y.	National Astronomical Observatory
BENGTSON, R.	University of Texas	Asymmetric Stokes-V Profiles at the Penumbra Boundary of a Sunspot—Abstract Only. For presentation at and publi- cation in Proceedings of the Fifth Solar-B Science Meeting, Tokyo, Japan, November 12–14, 2003.	
Momentum Flux Measurements Using an Impact Thrust Stand—Abstract Only. For presentation at the American Physical Society 46th Annual Meeting of the Division of Plasma Physics, Savannah, GA, November 15–19, 2004.			
CHEN, F.	SD60	CHOUDHARY, D.P.	SD50
KISSEL, D.E.	SD60	MOORE, R.L.	SD50
WEST, L.T.	SD60	FALCONER, D.A.	SD50
RICKMAN, D.	SD60	POJOGA, S.	Prairie View A&M University
LUVALL, J.C.	SD60	HUANG, T.S.	Prairie View A&M University
ADKINS, W.	SD60	KRUCKER, S.	University of California
Mapping Surface Soil Organic Carbon for Crop Fields With Remote Sensing—Abstract Only. For publication in the Journal of Soil and Water Conservation, 2004.		UDDIN, W.	Aryabhata Research Institute
CHERNOV, A.A.	SD46	Triggering of the Two X-class Flares of 28 and 29 October 2003—Abstract Only. For presentation at the 204th Meet- ing of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.	
RASHKOVICH, L.N.	SD46		
VEKILOV, P.G.	SD46	CHOUDHARY, D.P.	SD50
Steps in Solution Growth: Dynamics of Kinks, Bunching and Turbulence—Abstract Only. For publication in the Journal of Crystal Growth, 2004.		STERLING, A.C.	SD50
CHERNOV, A.A.	SD46	MOORE, R.L.	SD50
RASHKOVICH, L.N.	SD46	YURCHYSHYN, V.	Big Bear Solar Observatory
		Evidence of “Tether-Cutting” Reconnection in the Onset of Quadrupolar Solar Magnetic Eruption—Abstract Only. For presentation at the 204th Meeting of the American Astro- nomical Society, Denver, CO, May 30–June 3, 2004.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

CHRISTIAN, H.J.	SD60	Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.
Total Lightning Activity as Observed From Space—Abstract Only. For presentation at the Darwin Lightning Observatory Workshop, Osaka, Japan, March 7–10, 2004, and at the Meeting With the National Space Projects Office on Lightning Mapper, Taipei, Taiwan, March 4–5, 2004.		
CHRISTIAN, H.J.	SD60	
Global Lightning Activity—Abstract Only. For presentation at the University of Mexico, Mexico City, Mexico, March 14–20, 2004, and at the India-United States Conference on Space Science, Applications, and Commerce, Bangalore, India, June 21–25, 2004.		
CHRISTL, M.J.	SD50	
Performance of the Zero Degree Detector—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.		
CISSOM, R.D.	FD32	
WATSON, K.	ARES Corporation	
Real-Time Payload Operations on the <i>International Space Station</i> —Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.		
CISZAK, E.M.	SD46	
DOMINIAK, P.M.	SD46	
The Thiamine Pyrophosphate-Motif—Abstract Only. For presentation at the Keystone Symposium, Snowbird, Utah, April 13–15, 2004.		
CLAYTON, L.	ED25	
Thermostructural Analysis of Carbon Cloth Phenolics “Ply Lifting” and Correlation to LHMEI Test Results—Abstract Only. For presentation at the JANNAF 14th Nondestructive Evaluation 23rd Rocket Nozzle Technology and 36th Structures & Mechanical Behavior Subcommittee Meeting, New Orleans, LA, March 30–April 1, 2004.		
CLINTON, JR., R.G.	SD40	
Strategic Research Directions in Microgravity Materials Science—Presentation. For presentation at the Transformational Space Launch and Operations Technologies Conference, Washington, DC, May 24–26, 2004.		
CLINTON, JR., R.G.	SD40	
SEMMES, E.B.	SD41	
COOK, M.B.	SD30	
WARGO, M.J.	NASA Headquarters	
MARZWELL, N.I.	Jet Propulsion Laboratory	
Strategic Research Directions in Microgravity Materials Science—Abstract Only. For presentation at the 42nd AIAA		
CLINTON, JR., R.G.	SD40	
SEMMES, E.B.	SD40	
SCHLAGHECK, R.A.	SD40	
BASSLER, J.A.	SD40	
COOK, M.B.	SD40	
WARGO, M. J.	NASA Headquarters	
SANDERS, G.B.	Johnson Space Center	
MARZWELL, N.I.	Jet Propulsion Laboratory	
Low Gravity Materials Science Research for Space Exploration—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–9, 2004.		
COFFEY, V.N.	SD50	
CHANDLER, M.O.	SD50	
SINGH, N.	UAH	
MILLER, J.	UAH	
MOORE, T.E.	Goddard Space Flight Center	
Observed Relationship Between Ion Energization and the Broadband ELF Spectrum—Abstract Only. For presentation at and publication in Proceedings of the American Geophysical Union 2004 Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.		
COOK, S.A.	NP01	
MORRIS, C.E.K.	NP01	
TYSON, R.W.	NP01	
Technology Innovations From NASA’s Next Generation Launch Technology Program—Final Paper. For presentation at the 5th International Astronautical Congress, Vancouver, CA, October 4–8, 2004.		
COOKE, W.J.	Morgan Research Corporation	
MOSER, D.	Morgan Research Corporation	
SUGGS, R.M.	ED44	
Meteor Outbursts and Storms From the Spacecraft Hazard Perspective—Abstract Only. For presentation at the Meteoroids 2004, London, Ontario, August 16–20, 2004.		
CORDER, E.L.	ED12	
BRISCOE, J.M.	ED12	
Imaging System for Measuring Macromolecule Crystal Growth Rates in Microgravity—Abstract Only. For presentation at the Microscopy and Microanalysis 2004, Savannah, GA, August 1–5, 2004.		
CRAVEN, P.D.	SD50	
MOORE, T.E.	SD50	
GALLAGHER, D.L.	SD50	
Thermal N <sup>+</sup> in the Inner Magnetosphere—Abstract Only. For presentation at the American Geophysical Union 2004		

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.
- CRUZ, A. SD46  
 BORS, K. SD46  
 JANSEN, H. SD46  
 RICHMOND, R.C. SD46  
 Radiation Dose Effects on Cell Cycle, Apoptosis, and Marker Expression of Ataxia Telangiectasia-Heterozygous Human Breast Epithelial Cells—Abstract Only. For presentation at the 5th Annual Biological Sciences Retreat, Guntersville, AL, October 11, 2003.
- CRUZEN, C. FD32  
 DYER, S. FD33  
 Expanding Remote Science Operations Capabilities Onboard the *International Space Station*—Abstract/Final Paper. For presentation at the 2005 IEEE Aerospace Conference, Big Sky, MT, March 5–12, 2005.
- CUNTZ, M. University at Texas/Arlington  
 SUESS, S.T. SD50  
 Shock Formation and Energy Dissipation of Slow Magnetosonic Waves in Coronal Plumes—Abstract Only. For publication in Proceedings of the 12th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, Boulder, CO, July 30–August 3, 2001.
- CUNTZ, M. SD50  
 SUESS, S.T. SD50  
 Properties of Longitudinal Flux Tube Waves III. Wave Propagation in Solar and Stellar Wind Flows—Abstract Only. For publication in *Astronomy & Astrophysics*, 2004.
- CURRERI, P.A. SD46  
 SIBILLE, L. BAE Systems  
 Microgravity Materials Research—Abstract Only. For presentation at the Space Technology and Applications International Forum (STAIF), Albuquerque, NM, February 8–11, 2004.
- DARROUZET, F. Belgian Institute  
 LEMAIRE, J.F. Belgian Institute  
 DECREAU, E. Universite d' Orleans  
 DE KEYSER, J. Belgian Institute  
 MASSON, A. Research and Scientific  
 GALLAGHER, D.L. SD50  
 SANTOLIK, O. MMF, Prague  
 TROTIGNON, J.G. Universite d' Orleans  
 RAUCH, J.L. Universite d' Orleans  
 ET AL.  
 Density Irregularities Inside the Plasmasphere: Cluster Observations—Abstract Only. For publication in *Annales Geophysicae*, 2003.
- DAVIS, R.N. University of Alabama  
 POLITES, M.E. University of Maryland  
 TREVINO, L.C. ED10  
 Autonomous Component Health Management With Failed Component Detection, Identification, and Avoidance—Abstract Only. For publication in the *Journal of Aerospace Engineering and Proceedings of the Institution of Mechanical Engineers, Part G*, 2004.
- DAVIS, S.E. ED36  
 ENGEL, C.D. ED36  
 RICHARDSON, E.R. ED36  
 Upward Flammability Testing—A Probabilistic Measurement—Abstract Only. For presentation at the Tenth International Symposium on Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres, Brisbane, Queensland, Australia, November 10–14, 2003.
- DECKER, R.K. ED44  
 LEACH, R. ED44  
 Tropospheric Wind Monitoring During Day-of-Launch Operations for National Aeronautics and Space Administration's Space Shuttle Program—Final Paper. For presentation at the 11th AMS Conference on Aviation, Range, and Aerospace Meteorology, Hyannis, MA, October 4–8, 2004.
- DECKER, R.K. ED44  
 LEACH, R. Morgan Research Corporation/ED44  
 Assessment of Atmospheric Winds Aloft During NASA Space Shuttle Program Day-of-Launch Operations—Abstract Only. For presentation at the 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10–13, 2005.
- DETKOVA, E.N. Institute of Microbiology  
 PIKUTA, E.V. SD50  
 HOOVER, R.B. SD50  
 Halotolerant and Resistant to High pH Hydrogenase From Haloalkaliphilic Sulfate-Reducing Bacterium *Desulfonatronum Thiodismutans*—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.
- DOBSON, C. TD40  
 HRBUD, I. Purdue University  
 Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, With Review of the 1-D Kinetic Model—Final Paper. For publication in the *Journal of Applied Physics*, 2004.
- DOMINIAC, P.M. SD46  
 CISZAK, E.M. SD46

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The Thiamin Pyrophosphate-Motif—Abstract Only. For publication in *Nature Structural Biology*, 2003, and in the *Journal of Molecular Biology*, 2003.

DOMINIAK, P.M. SD46  
CISZAK, E.M. SD46  
The Conservation of Structure and Mechanism of Catalytic Action in a Family of Thiamin Pyrophosphate (TPP)-Dependent Enzymes—Abstract Only. For publication in *Proteins: Structure, Function, and Bioinformatics*, 2004.

DORNEY, D.J. TD64  
MARCUS, B. Boeing/Rocketdyne  
Numerical Simulations of Vortex Shedding in Hydraulic Turbines—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

DUMBACHER, D.L. XP01  
X-37 Flight Demonstrator Project: Capabilities for Future Space Transportation System Development—Final Paper and Presentation. For presentation at the International Astronautical Federation, Vancouver, British Columbia, Canada, October 7, 2004.

EDWARDS, D.L. ED31  
HOLLERMAN, W. University of Louisiana  
HUBBS, W.S. ED31  
GRAY, P.A. CRC/ED31  
WERTZ, G.E. ED31  
HOPPE, D.T. ED31  
NEHLS, M.K. ED31  
SEMMELE, C.L. Qualis Corporation/ED31  
Electron Radiation Effects on Candidate Solar Sail Material—Final Paper. For publication in *High Performance Polymers*, 2003.

EDWARDS, D.L. ED31  
HOVATER, M. ED31  
HUBBS, W.S. ED31  
WERTZ, G.E. ED31  
HOLLERMAN, W. University of Louisiana  
GRAY, P.A. Qualis Corporation  
Characterization of Candidate Solar Sail Material Exposed to Space Environmental Effects—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

EDWARDS, D.L. ED31  
NEHLS, M.K. ED31  
SEMMELE, C.L. Qualis Corporation/ED31  
HOVATER, M. ED31  
GRAY, P.A. ICRC/ED31

HUBBS, W.S. ED31  
WERTZ, G.E. ED31  
Space Environmental Effects on Candidate Solar Sail Materials—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.

EDWARDS, D.L. ED31  
SEMMELE, C.L. Qualis Corporation  
HOVATER, M. ED31  
NEHLS, M.K. ED31  
GRAY, P.A. ICRC/ED31  
HUBBS, W.S. ED31  
WERTZ, G.E. ED31  
Status of Solar Sail Material Characterization at NASA's Marshall Space Flight Center—Abstract Only. For presentation at The Seventh International Space Conference Protection of Materials and Structures From the Space Environment, Toronto, Ontario, Canada, May 10–13, 2004.

EDWARDS, D.L. ED31  
SEMMELE, C.L. Qualis Corporation  
HOVATER, M. ED31  
NEHLS, M.K. ED31  
GRAY, P.A. ICRC/ED31  
HUBBS, W.S. ED31  
WERTZ, G.E. ED31  
Solar Sail Material Performance Property Response to Space Environmental Effects—Abstract Only. For presentation at the Seventh International Space Conference Protection of Materials and Structures From the Space Environment, Toronto, Ontario, Canada, May 10–13, 2004, and the International Symposium on Optical Science and Technology, Denver, CO, August 2–6, 2004.

ELANDER, V. UNLV  
KOSHAK, W. SD60  
PHANORD, D. UNLV  
A Preliminary ZEUS Lightning Location Error Analysis Using a Modified Retrieval Theory—Abstract Only. For presentation at and publication in *Proceedings of the 2004 Fall Meeting of the American Geophysical Union*, San Francisco, CA, December 13–17, 2004.

ELSNER, R.F. SD50  
BHARDWAJ, A. NRC  
WAITE, JR., J.H. University of Michigan  
LUGAZ, N. University of Michigan  
MAJEED, T.E. University of Michigan  
CRAVENS, T. University of Kansas  
GLADSTONE, G.R. Southwest Research Institute  
FORD, P. MIT  
GRODENT, D. Universite de Liege  
ET AL.

## MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION

(Publicly available. Dates are conference dates.)

Simultaneous Chandra X-Ray, HST UV, and Ulysses Radio Observations of Jupiter's Aurora—Abstract Only. For presentation at the 2004 Meeting of the High Energy Astrophysics Division of the American Astronomical Society, New Orleans, LA, September 8–11, 2004.

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions—Final Paper. For presentation at the Society of Photo-Optical Instrumentation Engineers, San Diego, CA, March 14–16, 2004.

ELSNER, R.F.	SD50	ENGELHAUPT, D.	UAH
RAMSEY, B.D.	SD50	RAMSEY, B.D.	SD50
WAITE, JR., J.H.	University of Michigan	Electrodeposition of High Quality Nickel Phosphorous Alloys for Pollution Reduction and Energy Conservation—Abstract Only. For presentation at and publication in Proceedings of the American Electroplaters & Surface Finishers Society Week 2004, Lake Buena Vista, FL, January 26–30, 2004, and for presentation at the American Electroplaters and Surface Finishers Society's Aerospace/Airline Plating & Metal Finishing Forum, Tulsa, OK, March 29–April 1, 2004.	
REHAK, P.	BNL		
JOHNSON, R.E.	University of Virginia		
COOPER, J.F.	Raytheon		
SWARTZ, D.A.	USRA		
X-MIME: An Imaging X-Ray Spectrometer for Detailed Study of Jupiter's Icy Moons and the Planet's X-Ray Aurora—Abstract Only. For presentation at the 36th Annual DPS Meeting, Louisville, KY, November 8–12, 2004.			
ELSNER, R.F.	SD50	ESTES, H.	ED17
RAMSEY, B.D.	SD50	A NASA SHARP Mentoring Experience Utilizing GP-B—Presentation. For presentation at the American Association of Physics Teachers 128th National Meeting, Miami Beach, FL, January 24–28, 2004.	
WAITE, JR., J.H.	University of Michigan		
REHAK, P.	Brookhaven National Laboratory		
JOHNSON, R.E.	University of Virginia		
COOPER, J.F.	Raytheon		
SWARTZ, D.A.	USRA/SD50	EVANS, S.W.	ED44
X-Ray Probes of Magnetospheric Interactions With Jupiter's Auroral Zones, the Galilean Satellites, and the Io Plasma Torus—Abstract Only. For publication in Icarus, 2004.		Tethers as Debris: Simulating Impacts of Kevlar Tethers on Shuttle Tiles—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–24, 2004.	
EMERSON, C.W.	Western Michigan University		
LAM, S.-N.	Louisiana State University		
QUATTROCHI, D.A.	SD60	EVANS, S.W.	ED44
A Comparison of Local Variance Fractal Dimension, and Moran's I as Aids to Multispectral Image Classification—Abstract Only. For publication in the International Journal of Remote Sensing, 2004.		STALLWORTH, R.	ED23
		STELLINGWERF, R.F.	Stellingwerf Consulting
		Comparison of SPHC Hydrocode Results With Penetration Equations and Results of Other Codes—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–24, 2004.	
EMRICH, W.J.	TD40		
HAWK, C.W.	UAH		
Magnetohydrodynamic Instabilities in a Simple Gasdynamic Mirror Propulsion System—Final Paper. For publication in the Journal of Propulsion and Power, 2004.		FALCONER, D.A.	SD50
		MOORE, R.L.	SD50
		GARY, G.A.	SD50
		Prediction of Active-Region CME Productivity From Magnetograms—Abstract Only. For publication in The Astrophysical Journal, 2004.	
ENG, R.	SD72		
STAHL, P.	SD72		
HOGUE, W.	SD72		
HADAWAY, J.	UAH		
Poco Graphite Inc. SuperSiC 0.25m Mirror Cryogenic Test Result—Abstract Only. For presentation at the Mirror Technology Days, Huntsville, AL, August 17–19, 2004.		FALCONER, D.A.	UAH/SD50
		MOORE, R.L.	SD50
		GARY, G.A.	SD50
		BALASUBRAMANIAN, S.	UAH/SD50
		Forecasting Coronal Mass Ejections From Magnetograms—Abstract Only. For presentation at the Living With a Star Workshop, Boulder, CO, March 23–26, 2004;	
ENGBERG, R.C.	ED27		
OOI, T.K.	UAH		

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- for presentation at and publication in Proceedings of the American Astronomical Society, Solar Physics Division, Denver, CO, May 31–June 3, 2004; and for presentation at the Solar, Heliospheric and Interplanetary Environment 2004 Workshop, Big Sky, MT, June 27–July 2, 2004.
- FARR, R.A. TD72  
ELAM, S.K. TD61  
HICKS, E.D. Jacobs Sverdrup  
SANDERS, T.M. TD72  
LONDON III, J.R. TD70  
MAYNE, A.W. TRW (Retired)  
CHRISTENSEN, D.L. Lockheed Martin  
The 2003 Goddard Rocket Replica Project: A Reconstruction of the World's First Functional Liquid Rocket System—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.
- FERGUSON, C.K. SD22  
ABUSHAGUR, M. SD22  
ENGLISH, J.M. SD22  
NORDIN, G.P. SD22  
Design and Analysis of a MEMS Micro-Translation Stage With Indefinite Travel—Abstract Only. For presentation at the Nanospace 2003, Galveston, TX, February 2004.
- FISHMAN, G.J. SD50  
The Mystery of Gamma-Ray Bursts—Abstract Only. For presentation at the Rice University Space Exploration Series, Houston, TX, March 22, 2004.
- FLANDRO, G.A. University of Tennessee  
MAJDALANI, J. University of Tennessee  
SIMS, J.D. TD07  
Nonlinear Longitudinal Mode Instability in Liquid Propellant Rocket Engine Preburners—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.
- FLASAR, F.M. Goddard Space Flight Center  
KUNDE, V.G. University of Maryland  
ABBAS, M.M. SD50  
ACHTERBERG, R.K. Science Systems & Applications  
ADE, P. University of Cardiff  
BARUCCI, A. Observatoire de Paris  
BEZARD, B. Observatoire de Paris  
BJORAKER, G.L. Goddard Space Flight Center  
BRASUNAS, J.C. Goddard Space Flight Center  
ET AL.  
Exploring the Saturn System in the Thermal Infrared: The Composite Infrared Spectrometer—Abstract Only. For publication in Space Science Reviews, 2004.
- FLASAR, F.M. Goddard Space Flight Center  
KUNDE, V.G. University of Maryland  
ACHTERBERG, R.K. Science Systems & Applications  
CONRATH, B.J. Cornell University  
SIMON-MILLER, A.A. Goddard Space Flight Center  
NIXON, C.A. University of Maryland  
GIERASCH, P.J. Cornell University  
ROMANI, P.N. Goddard Space Flight Center  
ABBAS, M.M. SD50  
ET AL.  
Prospecting Jupiter in the Thermal Infrared: Temperatures and Dynamics—Abstract Only. For publication in Nature, 2004.
- FORBES, J.C. TD62  
XENOFOS, G.D. TD62  
FARROW, J.L. Qualis Corporation/TD62  
TYLER, T. TD63  
WILLIAMS, R. TD64  
SARGENT, S. Boeing/Rocketdyne  
MOHAROS, J. Boeing/Rocketdyne  
Mechanical Design of a Performance Test Rig for the Turbine Air-Flow Task (TAFT)—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.
- FORSYTHE, E.L. BAE Systems  
GORTI, S. SD46  
PUSEY, M.L. SD46  
The Crystallization of Canavalin as a Function of pH and NaCl Concentration—Abstract Only. For publication in the Acta Crystallographica D Journal, 2004.
- FOX, N.J. SD50  
GOLDBERG, R. SD50  
BARNES, R.J. SD50  
SIGWARTH, J.B. SD50  
BEISSER, K.B. SD50  
MOORE, T.E. SD50  
HOFFMAN, R.A. SD50  
RUSSELL, C.T. SD50  
SPANN, J.F. SD50  
ET AL.  
Packaging a Successful NASA Mission to Reach a Large Audience Within a Small Budget—Earth's Dynamic Space: Solar-Terrestrial Physics & NASA's Polar Mission—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.
- FULLER, K.A. UAH  
SMITH, D.D. SD46  
Characteristic Matrices for Spherical Shell Photonic Systems—Final Paper. For publication in Optic Letters, 2004.

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

FUSS, T.	University of Missouri-Rolla	WILLIAMS, R.	TD64
RAY, C.S.	SD46	Overview of MSFC's Applied Fluid Dynamics Analysis Group Activities—Presentation. For presentation at the MSFC Spring Fluid Workshop, MSFC, AL, April 13, 2004.	
LESHER, C.E.	University of California-Davis		
DAY, D.E.	University of Missouri-Rolla		
Crystallization of an $\text{Li}_2\text{O}_2\text{SiO}_2$ Glass Under High Hydrostatic Pressures—Abstract Only. For presentation at the 106th Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 18–21, 2004.		GARY, G.A.	SD50
		MOORE, R.L.	SD50
GALLAGHER, D.L.	SD50	Eruption of a Multiple-Turn Helical Magnetic Flux Tube in a Large Flare: Evidence for External and Internal Reconnection that Fits the Breakout Model of Solar Magnetic Eruptions—Abstract Only. For publication in <i>The Astrophysical Journal</i> , 2003.	
When Earth Songs Filled the Void of Space—Abstract Only. For presentation at the Birmingham Astronomical Society, Birmingham, AL, January 20, 2004.		GATLIN, P.N.	SD60
GALLAGHER, D.L.	SD50	GOODMAN, S.J.	SD60
Space Weather—Abstract Only. For presentation at the MSFC Educator Resource Center: Teacher Workshop, Huntsville, AL, January 27, 2004.		Signatures in Lightning Activity During Tennessee Valley Severe Storms of 5–6 May 2003—Final Paper. For presentation at and publication in <i>Proceedings of the American Meteorological Society 2nd Conference on Severe Local Storms</i> , Hyannis, MA, October 5–8, 2004.	
GALLAGHER, D.L.	SD50	GERMANY, G.	UAH
Seeing the Invisible With the IMAGE Mission—Abstract Only. For presentation at the Royal Observatory of Belgium, Brussels, Belgium, May 5, 2004.		SPANN, J.F.	SD50
GALLAGHER, D.L.	SD50	DEVERAPALLI, C.	UAH
ADRIAN, M.L.	SD50	HUNG, C.-C.	Southern Polytechnic State University
LIEMOHN, M.W.	SD50	The Utility of Auroral Image-Based Activity Metrics—Abstract Only. For presentation at and publication in <i>Proceedings of the Fall AGU Meeting</i> , San Francisco, CA, December 12–17, 2004.	
The Origin and Evolution of Deep Plasmaspheric Notches—Abstract Only. For presentation at the Inner Magnetosphere Interactions Workshop, Yosemite, CA, February 2–7, 2004, and presentation at and publication in <i>Proceedings of the Fall AGU 2004 Meeting</i> , San Francisco, CA, December 13–17, 2004.		GEVEDEN, R.D.	DD01
GALLAGHER, D.L.	SD50	An Overview of the Gravity Probe B Mission—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.	
KHAZANOV, G.V.	SD50	GILLIES, D.C.	SD40
Unresolved Issues With Inner Magnetosphere-Ionosphere Coupling—Abstract Only. For presentation at the Outer Radiation Belt Injection, Transport, Acceleration, and Loss Satellite (ORBITALS) Workshop, Banff, Alberta, Canada, September 23–24, 2004.		Microanalytical Efforts in Support of NASA's Materials Science Programs—Abstract Only. For presentation at the <i>Microscopy and Microanalysis 2004 Conference</i> , Savannah, GA, August 1–5, 2004.	
GARBE, G.	TD05	GILLIES, D.C.	SD40
MONTGOMERY IV, E.E.	TD05	ENGEL, H.P.	SD40
HEATON, A.F.	TD05	CARPENTER, P.K.	SD40
VAN SANT, J.T.	GSFC	Computed Tomography and its Application for the 3D Characterization of Coarse Gained Meteorites—Abstract Only. For presentation at the <i>Microscopy and Microanalysis 2004 Conference</i> , Savannah, GA, August 1–5, 2004.	
CAMPBELL, B.A.	GSFC	GOGUS, E.	SD50
NASA's Integrated Development of Solar Sail Propulsion Project—Final Paper. For presentation at the AIAA/AAS Space Flight Dynamics Meeting, Maui, HI, February 10, 2004.		FINGER, M.H.	SD50
GARCIA, R.	TD64	KOUVELIOTOU, C.	SD50
GRIFFIN, L.	TD64	WOODS, P.M.	SD50



MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

PATEL, S.K.	SD50	tion at and publication in Proceedings of the 18th International Lightning Detection Conference, Helsinki, Finland, June 7–9, 2004.
RUPEN, M.	SD50	
SWANK, J.H.	SD50	
MARKWARDT, C.B.	SD50	
VANDERKLIS, M.	SD50	GOODMAN, S.J. SD60
Long-Term Spectral and Timing Behavior of Black Hole Candidate XTE J1908+094—Abstract Only. For publication in <i>The Astrophysical Journal</i> , 2003.		BLAKESLEE, R.J. SD60
		CHRISTIAN, H. SD60
		KOSHAK, W. SD60
		BAILEY, J.C. Global Hydrology & Climate Center
GOLDMAN, A.	SD46	HALL, J. Global Hydrology & Climate Center
KELTON, K.F.	SD46	MCCAUL, E. Global Hydrology & Climate Center
ROGERS, J.R.	SD46	BUECHLER, D.E. Global Hydrology & Climate Center
Science Using an Electrostatic Levitation Furnace in the MUCAT Sector at the APS—Abstract Only. For presentation at the High-Energy Workshop, Argonne, IL, August 9–10, 2004.		DARDEN, C. NSSTC
		ET AL.
		The North Alabama Lightning Mapping Array: Recent Severe Storm Observations and Future Prospects—Abstract Only. For publication in <i>Atmospheric Research</i> , 2004.
GONZALEZ, J.E.	Santa Clara University	
LUVALL, J.	SD60	GOODMAN, S.J. SD60
RICKMAN, D.	SD60	LAPENTA, W.M. SD60
COMARAZAMY, D.E.	SD60	JEDLOVEC, G.J. SD60
PICON, A.	SD60	Improving the Transition of Earth Satellite Observations From Research to Operations—Abstract Only. For presentation at and publication in Proceedings of the AIAA Space 2004 Conference, San Diego, CA, September 30, 2004.
Analysis of Upper Air, Ground and Remote Sensing Data for the ATLAS Field Campaign in San Juan, Puerto Rico—Abstract Only. For presentation at and publication in Proceedings of the 85th AMS Annual Meeting, San Diego, CA, January 9–13, 2005, and publication in <i>Remote Sensing of Environment</i> , 2004.		
GOODMAN, D.D.	TD62	GORTI, S. SD46
Solid Edge's Role and Modeling Techniques for Space Shuttle Flowliner Crack Investigation and Related Components—Presentation. For presentation at the Solid Edge Summit 2004, Orlando, FL, May 31–June 4, 2004.		FORSYTHE, E.L. BAE Systems
		PUSEY, M.L. SD46
		Kinetic Roughening Transition and Energetics of Tetragonal Lysozyme Crystal Growth—Abstract Only. For presentation at the 10th International Conference on the Crystallization of Biological Macromolecules (ICCBM10), Beijing, China, June 5–8, 2004.
GOODMAN, H.M.	SD60	GORTI, S. SD46
REGNER, K.	UAH	FORSYTHE, E.L. BAE Systems/SD46
CONOVER, H.	UAH	PUSEY, M.L. SD46
ASHCROFT, P.	Remote Sensing Systems	Growth Modes and Energetics of 101 Face Lysozyme Crystal Growth—Abstract Only. For publication in <i>Crystal Growth and Design</i> , 2004.
WENTZ, F.	Remote Sensing Systems	
CONWAY, D.	UAH	
LOBL, E.	UAH	
BEAUMONT, B.	UAH	GORTI, S. SD46
HAWKINS, L.	UAH	KONNERT, J. Naval Research Laboratory
JONES, S.	UAH	FORSYTHE, E.L. BAE Systems/SD46
Science Data Processing for the Advanced Microwave Scanning Radiometer—Earth Observing System—Abstract Only. For presentation at the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.		PUSEY, M.L. SD46
		Effects of Kinetic Roughening and Liquid-Liquid Phase Transition on Lysozyme Crystal Growth Velocities—Abstract Only. For publication in <i>Crystal Growth and Design</i> , 2004.
GOODMAN, S.J.	SD60	GOSTOWSKI, R. TD40
The LATEST Project: Operational Assessment of Total Lightning Data in the U.S.—Abstract Only. For presenta-		Isothermal Calorimetric Observations of the Effect of Welding on Compatibility of Stainless Steels With High-Test

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- Hydrogen Peroxide Propellant—Final Paper. For presentation at the JANNAF 39th Combustion Meeting, Colorado Springs, CO, December 1–5, 2003.
- GOSTOWSKI, R. TD40  
Isothermal Microcalorimetric Evaluation of Compatibility of Proposed Injector Materials With High-Test Hydrogen Peroxide Propellant—Final Paper. For publication in the *Journal of Propulsion and Power*, 2003.
- GREGG, M.W. ED22  
NASA Fracture Panel 2004: Post-Proof NDE—Presentation. For presentation at the Southwest Research Institute, San Antonio, TX, June 1–4, 2004.
- GREGG, M.W. ED22  
NASA Fracture Panel 2004: Fasteners—Presentation. For presentation at the Southwest Research Institute, San Antonio, TX, June 1–4, 2004.
- GREGORY, D.A. UAH  
HERREN, K.A. SD70  
Specific Impulse Definition for Ablative Laser Propulsion—Abstract Only. For presentation at the Third International Symposium on Beamed Energy Propulsion, Troy, NY, October 11–13, 2004.
- GREINER, J.C. Max Planck Institute  
KLOSE, S. Thuringer Landesstern.  
REINSCH, K. Universitats-Sternwarte  
SCHMID, H.M. Institut fur Astronomie  
SARI, R. California Institute of Technology  
HARTMANN, D.H. Clemson University  
KOUVELIOTOU, C. SD50  
RAU, A. Max Planck Institute  
PALAZZI, E. Istituto di Astrofisica  
ET AL.  
Polarization Evolution of the Afterglow of GRB 030329—Abstract Only. For publication in *Nature*, 2003.
- GRUGEL, R.N. SD46  
Pore Formation and Mobility Investigation (PFMI): Concept, Hardware Development, and Initial Analysis of Experiments Conducted Aboard the *International Space Station*—Abstract Only. For presentation at the University of Texas, Austin, TX, October 7, 2003.
- GRUGEL, R.N. SD46  
Pore Formation and Mobility Investigation (PFMI): Concept, Hardware Development, and Initial Analysis of Experiments—Abstract Only. For presentation at an Invited Talk to the European Space Agency, Paris, France, April 4–11, 2004.
- GRUGEL, R.N. SD46  
Materials Processing in Space: Model Experiments Aboard the *International Space Station*—Abstract Only. For presentation at an Invited Talk, Vanderbilt University, Nashville, TN, April 19, 2004.
- GRUGEL, R.N. SD46  
ANILKUMAR, A.V. SD46  
LEE, C.P. SD46  
Direct Observation of Pore Formation and Bubble Mobility During Controlled Melting and Resolidification in Microgravity—Abstract Only. For presentation at and publication in *Proceedings of the Minerals Metals & Materials Society (TMS) Annual Meeting*, Charlotte, NC, March 14–18, 2004.
- GRUGEL, R.N. SD46  
LUZ, P. SD46  
SMITH, A. SD46  
SPIVEY, R. SD46  
SEN, S. SD46  
ANIKUMAR, A.V. SD46  
The Pore Formation and Mobility Investigation: The Apparatus, Operations, Science Obtained, and Potential for Continued Usage—Abstract Only. For presentation at the Institute of Electrical and Electronics Engineers—Lasers and Electro-Optics Society Meeting, San Diego, CA, June 28–30, 2004.
- GUBAREV, M. SD50  
O'DELL, S.L. SD50  
KESTER, T. SD50  
LEHNER, D. SD50  
JONES, W. SD50  
SMITHERS, M. SD50  
Incoming Metrology of Segmented X-Ray Mandrels at MSFC—Abstract Only. For presentation at SPIE *Astronomical Telescopes & Instrumentation*, Glasgow, Scotland, June 21–25, 2004.
- GUBAREV, M. SD50  
RAMSEY, B.D. SD50  
APPLE, J. SD50  
Performance of Gas Scintillation Proportional Counter Array for High-Energy X-Ray Observatory—Abstract Only. For presentation at SPIE *Astronomical Telescopes & Instrumentation*, Glasgow, Scotland, June 21–25, 2004.
- GUILLORY, A.R. SD60  
NASA Earth Science Research and Applications Using UAV's—Abstract Only. For presentation at the Technical Analysis and Applications Center 2003 UAV Conference, Albuquerque, NM, October 28–30, 2003.

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

HADAWAY, J.	UAH	HATHAWAY, D.H.	SD50
STAHL, P.	SD72	Recent Progress in Understanding the Sun's Magnetic	
ENG, R.	SD72	Dynamo—Abstract Only. For presentation at Vanderbilt	
HOGUE, W.	SD72	University—Public Lecture, Nashville, TN, April 8,	
Cryogenic Test Results of Hextek Mirror—Abstract Only.		2004.	
For presentation at the Mirror Technology Days 2004,			
Huntsville, AL, August 17–19, 2004.			
HAINES, S.L.	SD60	HATHAWAY, D.H.	SD50
JEDLOVEC, G.J.	SD60	Modern Solar Mysteries—Abstract Only. For presentation	
LAFONTAINE, F.J.	SD60	at Vanderbilt University—Public Lecture, Nashville, TN,	
Spatially Varying Spectrally Thresholds for MODIS Cloud		April 8, 2004.	
Detection—Abstract Only. For presentation at the 13th			
Conference on Satellite Meteorology and Oceanography,			
Norfolk, VA, September 20–24, 2004.			
HALE, J.	TD32	HATHAWAY, D.H.	SD50
Simulation Based Acquisition for NASA's Office of		What the Long-Term Sunspot Record Tells Us About Space	
Exploration Systems—Abstract Only. For presentation		Climate—Abstract Only. For presentation at the First	
at the Huntsville Simulation Conference, Huntsville, AL,		International Symposium on Space Weather, Oulu, Finland,	
October 19–21, 2004.		June 20–23, 2004.	
HAMILTON, G.S.	ED42	HATHAWAY, D.H.	SD50
DUMAS II, J.D.	University of Tennessee	Flows in the Solar Convection Zone—Abstract Only. For	
BROOKMAN, S.	University of Maryland	presentation at the 35th COSPAR Scientific Assembly, Paris,	
TILGHMAN, N.	QTEC	France, July 18–25, 2004.	
Evaluating the Usability of Pinchigator, A System for Navi-			
gating Virtual Worlds Using Pinch Gloves—Abstract Only.			
For presentation at the Huntsville Simulation Conference,			
Huntsville, AL, October 29–31, 2003.			
HANSON, J.M.	TD54	HATHAWAY, D.H.	SD50
HALL, C.E.	TD54	CHOUDHARY, D.P.	SD50
MULQUEEN, J.A.	TD54	Supergranule Diffusion and Active Region Decay—Abstract	
JONES, R.E.	TD54	Only. For publication in the Bulletin of the 204th Meeting of	
Advanced Guidance and Control for Hypersonics and Space		the American Astronomical Society, Denver, CO, May 30–	
Access—Final Paper. For presentation at the JANNAF		June 3, 2004.	
Interagency Propulsion Committee Joint Meeting, Colorado			
Springs, CO, December 1–5, 2003.			
HANSON, J.M.	TD54	HATHAWAY, D.H.	SD50
JONES, R.E.	Sverdrup Technology	MEYER, P.J.	SD50
Test Results for Entry Guidance Methods for Reusable		TEMPLETON, G.	SD50
Launch Vehicles—Final Paper. For presentation at the 42nd		The VISAR Process—Final Paper. For publication in Com-	
AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV,		munication of the ACM, 2003.	
January 5–8, 2004.			
HANSON, J.M.	TD54	HATHAWAY, D.H.	SD50
JONES, R.E.	TD54	NANDY, D.	Montana State University
Test Results for Entry Guidance Methods for Space		WILSON, R.M.	SD50
Vehicles—Final Paper. For publication in the AIAA Journal		REICHMANN, E.J.	SD50
of Guidance, Control, and Dynamics, 2004.		Erratum: "Evidence that a Deep Meridional Flow Sets the	
		Sunspot Cycle Period—Abstract Only. For publication in	
		The Astrophysical Journal, 2003.	
		HATHAWAY, D.H.	SD50
		WILSON, R.M.	SD50

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

What the Sunspot Record Tells Us About Space Climate—Abstract Only. For publication in the Solar Physics Journal, 2004.		HERREN, K.A.	SD71
		LIN, J.	UAH
		COHEN, T.	UAH
		PAKHOMOV, A.V.	UAH
HEATON, A.F.	TD54	THOMPSON, M.S.	Information Systems, Inc.
Solar Sail GN&C Model Comparisons—Final Paper. For presentation at the AIAA GN&C Conference, Providence, RI, August 16–19, 2004.		Status of the Ablative Laser Propulsion Studies—Abstract Only. For presentation at the 15th Advanced Space Propulsion Workshop, Pasadena, CA, June 15–17, 2004.	
HEFNER, K.	FD03	HOLLADAY, J.B.	FD24
DAVIDSON, G.	Northrop Grumman	DAY, G.	Boeing
Performance as Promised: How the Chandra X-Ray Observatory Accomplished One of NASA's Most Challenging Missions for Billions of Dollars Less Than Originally Planned—Final Paper. For presentation at the AIAA Space 2004 Conference, San Diego, CA, September 28–30, 2004.		GILL, L.	Carleton Technologies
		Guidelines for Developing Spacecraft Structural Requirements; A Thermal and Environmental Perspective—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.	
HENDERSON, S.J.	U.S. Military Academy	HOLLADAY, J.B.	FD24
HAMILTON, G.S.	ED42	REAGAN, S.E.	FD24
Human Motion Tracking at Marshall Space Flight Center's Collaborative Engineering Center ANVIL—Abstract Only. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 19–21, 2004.		DAY, G.	Boeing
		Solid-State Distributed Temperature Control for <i>International Space Station</i> —Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.	
HENLEY, M.W.	Boeing/Phantom Works	HOLLERMAN, W.	University of Louisiana
HOWELL, J.T.	FD02	ALBARDO, T.	University of Louisiana
Space Solar Power Technology for Lunar Polar Applications—Presentation. For presentation at the International Workshop on the Laser Energy Transmission for Space Exploration and Ground Applications, Nara, Japan, June 6–7, 2004.		LENTZ, M.	University of Louisiana
		EDWARDS, D.L.	ED31
		HUBBS, W.S.	ED31
		SEMMELE, C.L.	Qualis Corporation
		Ionizing Radiation Exposure Measurements for Candidate Solar Sails—Final Paper. For presentation at the Joint Propulsion Conference, Huntsville, AL, July 21–23, 2003.	
HEREFORD, J.	Murray State University	HOLT, J.M.	ED25
GWALTNEY, D.	ED17	CLANTON, S.E.	Jacobs Sverdrup
Design Space Issues for Intrinsic Evolvable Hardware—Abstract Only. For presentation at the 2004 NASA/DoD Conference on Evolvable Hardware, Seattle, WA, June 24–26, 2004.		Case Study of Risk Mitigation Based on Hardware/Software Integration (HSI) Testing for the <i>International Space Station (ISS)</i> Node 2 Module—Abstract Only. For presentation at the French Aviation & Space Association Complex and Safe Systems Engineering Conference, Paris, France, June 21–22, 2004.	
HEREFORD, J.	Murray State University	HONG, Y.-S.	SD46/BAE Systems
GWALTNEY, D.	ED17	ADAMEK, D.H.	SD46/AZ Technology
Scalability, Timing, and System Design Issues for Intrinsic Evolvable Hardware—Final Paper. For publication in Genetic Programming and Evolvable Machines, 2004.		BRIDGE, K.	SD46/UAH
		MALONE, C.C.	SD46/BAE Systems
HERREN, K.A.	SD70	YOUNG, R.B.	BAE Systems/UAH
COHEN, T.	UAH	MILLER, T.	SD46
LIN, J.	UAH	KARR, L.	SD46
PAKHOMOV, A.V.	UAH		
Two-Pulsed Technique for Ablative Laser Propulsion: Force Measurement in Vacuum—Abstract Only. For presentation at the Third International Symposium on Beamed Energy Propulsion, Troy, NY, October 11–13, 2004.			

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- Purification and Crystallization of Murine Myostatin a Negative Regulator of Muscle Mass—Abstract Only. For presentation at the American Society for Biochemistry & Molecular Biology, Boston, MA, June 12–16, 2004.
- HOOD, R.E. SD60  
BLAKESLEE, R.J. SD60  
CECIL, D.J. UAH  
LAFONTAINE, F.J. Raytheon ITSS  
HEYSFIELD, G. Goddard Space Flight Center  
MARKS, F. NOAA Hurricane Research Division  
Tropical Cyclone Precipitation Types and Electrical Field Information Observed by High Altitude Aircraft Instrumentation—Abstract Only. For presentation at the 26th AMS Conference on Hurricanes & Tropical Meteorology, Miami, FL, May 3–7, 2004.
- HOOD, R.E. SD60  
KAKAR, R. NASA Headquarters  
Early Results of the NASA Convection and Moisture Experiment (CAMEX)—Abstract Only. For presentation at the 58th Interdepartmental Hurricane Conference, Charleston, SC, February 29–March 5, 2004.
- HOOVER, R.B. SD50  
PIKUTA, E.V. SD50  
A Case for Microorganisms on Comets, Europa and the Polar Ice Caps of Mars—Abstract Only. For presentation at and publication in Proceedings of the SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.
- HOOVER, R.B. SD50  
PIKUTA, E.V. SD50  
WICKRAMASINGHE, N.C. Cardiff Center  
WALLIS, M.K. Cardiff Center  
Astrobiology of Comets—Abstract Only. For presentation at and publication in Proceedings of the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.
- HOOVER, R.B. SD50  
ROZANOV, A.Y. Paleontological Institute  
New Evidence for the Presence of Indigenous Microfossils in Carbonaceous Chondrites—Abstract Only. For presentation at and publication in Proceedings of the International Society for Optical Science and Technology 49th Annual Meeting, Vol. 5555, Denver, CO, August 2–6, 2004.
- HOOVER, R.B. SD50  
ROZANOV, A.Y. Paleontological Institute  
JERMAN, G. ED21  
COSTEN, J. ED21
- Microfossils in C1 and CO Carbonaceous Meteorites—Abstract Only. For presentation at and publication in Proceedings of SPIE—The International Society for Optical Science and Technology 48th Annual Meeting, Vol. 5163, San Diego, CA, August 3–8, 2003.
- HOUSTON, J. Jacobs Sverdrup  
GATTIS, C.B. ED21  
Passive Isolators for Use on the *International Space Station*—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.
- HOWARD, R.T. ED19  
JOHNSTON, A.S. ED19  
BRYAN, T.C. ED19  
BOOK, M.L. ED19  
Advanced Video Guidance Sensor (AVGS) Development Testing—Final Paper. For presentation at the SPIE Defense and Security Symposium, Orlando, FL, April 12–16, 2004.
- HOWELL, J.T. FD02  
MANKINS, J.C. NASA Headquarters  
Transformational System Concepts and Technologies for Our Future in Space—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.
- HOWELL, J.T. FD02  
O'NEILL, M. Entech, Inc.  
FORK, R. UAH  
Advanced Receiver/Converter Experiments for Laser Wireless Power Transmission—Abstract Only. For presentation at the Fourth International Conference on Solar Power From Space, Granada, Spain, June 30–July 2, 2004.
- HOWSMAN, T.G. Dynamic Concepts  
O'NEIL, D.A. FD02  
CRAFT, M.A. Dynamic Concepts  
A Stigmergic Cooperative Multi-Robot Control Architecture—Final Paper. For presentation at the Ninth International Conference on the Simulation and Synthesis of Living Systems, Boston, MA, September 12–15, 2004.
- HU, Z.W. SD46  
HOLMES, A. SD46  
THOMAS, B.R. SD46  
CHERNOV, A.A. SD46  
CHU, Y.S. Argonne National Laboratory  
LAI, B. Argonne National Laboratory  
X-Ray Microscopic Characterization of Protein Crystals—Abstract Only. For presentation at the 10th International

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.
- HULCHER, A.B. ED34  
Film Processing Module for Automated Fiber Placement—Presentation. For presentation at the SAMPE Conference, NASA Technical Briefings Session, Long Beach, CA, May 19, 2004.
- HULCHER, A.B. ED34  
Automated Composites Processing Technology: Film Module—Abstract Only. For publication in the AIAA Aerospace America Magazine, 2004.
- HUTCHENS, C. FD21  
GRAVES, R. Allied  
Results of the Vapor Compression Distillation Flight Experiment (VCD-FE)—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.
- HYERS, R.W. University of Massachusetts  
BRADSHAW, R.C. University of Massachusetts  
ROGERS, J.R. SD46  
RATHZ, T.J. UAH  
LEE, G.W. Washington University  
GANGOPADHYAY, A.K. Washington University  
KELTON, K.F. Washington University  
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys—Abstract Only. For presentation at the Minerals, Metals, & Materials Society (TMS) Annual Meeting, Charlotte, NC, March 14–18, 2004.
- HYERS, R.W. University of Massachusetts  
BRADSHAW, R.C. University of Massachusetts  
ROGERS, J.R. SD46  
RATHZ, T.J. UAH  
LEE, G.W. Washington University  
KELTON, K.F. Washington University  
GANGOPADHYAY, A.K. Washington University  
Surface Tension and Viscosity of Quasicrystal-Forming Ti-Zr-Ni Alloys—Abstract Only. For publication in the International Journal of Thermophysics, 2003.
- HYERS, R.W. SD46  
MATSON, D.M. SD46  
KELTON, K.F. SD46  
ROGERS, J.R. SD46  
Control of Convection in Containerless Processing—Abstract Only. For presentation at The Minerals, Metals, & Materials Society (TMS) Annual Meeting, Charlotte, NC, March 14–18, 2004.
- IRWIN, D.E. SD60  
Land Use and Change—Abstract Only. For presentation at the Mesoamerican Environmental Information System—NASA Monitoring and Visualization System (SIAM-SERVIR) Workshop, Panama City, Panama, July 10–17, 2004, and August 16–20, 2004.
- IRWIN, D.E. SD60  
SEVER, T.L. SD60  
GRAVES, S. UAH  
HARDIN, D. UAH  
SIAM-SERVIR: An Environmental Monitoring and Decision Support System for Mesoamerica—Abstract Only. For presentation at and publication in Proceedings of the Monitoring Science and Technology Symposium, Denver, CO, September 20–24, 2004.
- JAAP, J. FD42  
DAVIS, E. FD42  
An Enabling Technology for New Planning and Scheduling Paradigms—Final Paper and Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.
- JAAP, J. FD42  
DAVIS, E. FD42  
RICHARDSON, L. FD42  
Maximally Expressive Modeling—Final Paper. For presentation at the Fourth International Workshop on Planning and Scheduling for Space, Darmstadt, Germany, June 23–25, 2004.
- JAAP, J. FD42  
MAXWELL, T. FD42  
Enabling New Operations Concepts for Lunar and Mars Exploration—Abstract Only. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 13–17, 2004.
- JACOBSON, D. XP01  
X-37 Flight Demonstrator—A Building Block in NASA's Future Access to Space—Presentation. For presentation at the Space Technology and Information International Technology Forum, Albuquerque, NM, February 11, 2004.
- JACOBSON, D. XP01  
X-37 Flight Demonstrator—Orbital Vehicle Technology Development Approach—Presentation. For presentation at the Space Technology and Information International Technology Forum, Albuquerque, NM, February 11, 2004.
- JEDLOVEC, G.J. SD60  
Use of MODIS/AIRS Direct Broadcast Data for Short Term Weather Forecasting—Abstract Only. For presentation at the

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

EOS Direct Broadcast Users Conference in Hohala Coast, HI, November 17–20, 2003.		HAINES, S.L.	SD60
JEDLOVEC, G.J.	SD60	Application of Satellite-Derived Land Surface Temperature to Minimum Temperature Forecasting—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.	
HAINES, S.	UAH		
SUGGS, R.J.	SD60		
BRADSHAW, T.	NWS Forecast Office	JUDGE, R.A.	SD40
BURKS, J.	NWS Forecast Office	SNELL, E.H.	BAE Systems/SD40
MODIS Data in AWIPS: A Precursor of NPOESS and GOES-R Capabilities—Abstract Only. For presentation at the National Weather Association Annual Meeting, Portland, OR, October 16–21, 2004.		KEPHART, R.	SD40
JOHNSON, D.L.	ED44	VAN DER WOERD, M.J.	BAE Systems/SD40
VAUGHAN, W.W.	UAH	Decades of Data: Extracting Trends From Microgravity Crystallization History—Abstract Only. For presentation at the Symposium on Neutron Protein Crystallography, Tokyo, Japan, February 14–20, 2004.	
Terrestrial Environment (Climatic) Criteria Handbook for Use in Aerospace Vehicle Development—Final Paper. For presentation at the 11th AMS Conference on Aviation, Range, and Aerospace Meteorology, Hyannis, MA, October 4–8, 2004.		JUSTUS, C.G.	Computer Sciences Corporation
JOHNSON, D.L.	ED44	DUVALL, A.L.	Computer Sciences Corporation
VAUGHAN, W.W.	UAH	KELLER, V.W.	ED44
Terrestrial Environment (Climatic) Criteria Handbook for Use in Aerospace Vehicle Development—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.		Connecting Atmospheric Science and Atmospheric Models for Aerocaptured Missions to Titan and The Outer Planets—Abstract Only. For presentation at the International Conference, European Geosciences Union 1st General Assembly, Nice, France, April 25–30, 2004.	
JOHNSON, D.L.	ED44	JUSTUS, C.G.	Morgan Research Corporation/ED44
VAUGHAN, W.W.	UAH	DUVALL, A.L.	Morgan Research Corporation/ED44
KELLER, V.W.	ED44	KELLER, V.W.	ED44
Status on Updated NASA Standard—“Terrestrial Environment (Climatic) Criteria Handbook for Use in Aerospace Vehicle Development”—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.		Atmospheric Models for Aerocapture—Abstract/Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Fort Lauderdale, FL, July 12–16, 2004.	
JOHNSON, L.	TD05	JUSTUS, C.G.	Morgan Research Corporation/ED44
ALEXANDER, L.A.	TD05	DUVALL, A.L.	Morgan Research Corporation/ED44
BAGGETT, R.M.	TD05	KELLER, V.W.	ED44
BONOMETTI, J.A.	TD05	Validation of Mars-Gram and Planned New Features—Final Paper. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.	
HERRMANN, M.	TD05	JUSTUS, C.G.	Morgan Research Corporation/ED44
JAMES, B.F.	TD05	DUVALL, A.L.	Morgan Research Corporation/ED44
MONTGOMERY, S.E.	TD05	KELLER, V.W.	ED44
NASA’s In-Space Propulsion Technology Program: Overview and Status—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion & Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004, and for presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.		Validation of Mars-Gram and Planned New Features—Final Paper. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.	
JOHNSON, L.	TD05	JUSTUS, C.G.	Morgan Research Corporation/ED44
BISHOP-BEHTEL, K.	TD05	DUVALL, A.L.	Morgan Research Corporation/ED44
In-Space Propulsion for Science & Exploration—Presentation. For presentation at the National Space & Missile Materials Symposium, Seattle, WA, June 21–25, 2004.		KELLER, V.W.	ED44
JONES, P.R.	SD60	Earth Gram-99 and Trace Constituents—Final Paper. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.	
JEDLOVEC, G.J.	SD60	JUSTUS, C.G.	Computer Sciences Corporation
SUGGS, R.J.	SD60	DUVALL, A.L.	Computer Sciences Corporation
		KELLER, V.W.	ED44
		Atmospheric Models for Aerocapture Systems Studies—Abstract Only. For presentation at the AIAA Atmospheric Flight Mechanics Symposium, Providence, RI, August 16–19, 2004.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

JUSTUS, C.G.	Morgan Research Corp./ED44	Geophysics Spring Meeting, Montreal, Quebec, Canada, May 17–21, 2004.	
DUVALL, A.L.	Morgan Research Corp./ED44		
KELLER, V.W.	ED44		
Atmospheric Models for Aeroentry and Aeroassist— Abstract/Final Paper. For presentation at the 2nd Interna- tional Planetary Probe Workshop, Ames Research Center, CA, August 23–27, 2004.		KHAZANOV, G.V.	SD50
		Ring Current Electrodynamic Coupling—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.	
KAKAR, R.	NASA Headquarters	KHAZANOV, G.V.	SD50
GOODMAN, H.M.	SD60	GALLAGHER, D.L.	SD50
HOOD, R.E.	SD60	SPANN, J.F.	SD50
GUILLOREY, A.R.	SD60	SINGH, N.	UAH
Overview of the Convection and Moisture Experiment (CAMEX)—Abstract Only. For publication in the Journal of Atmospheric Science, 2004.		Cross-Scale Coupling in the Inner Magnetosphere— Abstract Only. For presentation at the Huntsville 2004 Workshop, Huntsville, AL, October 18–22, 2004.	
KAUFFMAN, B.	ED03	KHAZANOV, G.V.	SD50
HARDAGE, D.	ED03	LIEMOHN, M.W.	University of Michigan
MINOR, J.	ED03	FOK, M.-C.	Goddard Space Flight Center
Space Environments and Effects (SEE) Program: Spacecraft Charging Technology Development Activities—Final Paper and Presentation. For presentation at the 8th Spacecraft Charging Technology Development Conference, Huntsville, AL, October 20–24, 2003.		NEWMAN, T.S.	UAH
		RIDLEY, A.J.	University of Michigan
		Stormtime Particle Energization With High Temporal Reso- lution AMIE Potentials—Abstract Only. For publication in the Journal of Geophysical Research, 2004.	
KEYS, A.S.	SD50	KHAZANOV, G.V.	SD50
CROW, R.W.	Sensing Strategies, Inc.	SINGH, N.	UAH
ASHLEY, P.R.	U.S. Army Aviation	GAMAYUNOV, K.V.	University of Alaska Fairbanks
NELSON, JR., T.R.	Air Force Laboratory, SNDD	KRIVORUTSKY, E.N.	SD50
PARKER, J.H.	Air Force Laboratory, SNJT	The Role of the Heavy Ions in the Wave Magnetospheric Phenomena—Abstract Only. For presentation at and publi- cation in Proceedings of the American Geophysical Union Fall 2004 Annual Meeting, San Francisco, CA, Decem- ber 13–17, 2004.	
BEECHER, E.A.	Air Force Laboratory, SNJT		
Fabrication and Testing of Binary-Phase Fourier Grati- ngs for Nonuniform Array Generation—Final Paper. For presentation at the Optical Society of America’s Diffrac- tive Optics and Micro-Optics Conference, Rochester, NY, October 9–13, 2004.		KIESSLING, E.	ED01
		Organizational Considerations in Managing System Safety: A NASA Case Study—Abstract Only. For presentation at the American Society for Engineering Management, Alex- andria, VA, October 20–23, 2004.	
KHAZANOV, G.V.	SD50		
The Nonlinear Coupling of Alfvén and Lower Hybrid Waves in Space Plasma—Abstract Only. For presentation at the 2004 National Radio Science Meeting, Boulder, CO, January 4–8, 2004.		KIESSLING, E.	ED01
		TIPPETT, D.D.	UAH
		SHIVERS, H.	ED01
KHAZANOV, G.V.	SD50	Improving Performance of the System Function at Mar- shall Space Flight Center—Final Paper. For presentation at the American Society for Engineering Management 25th National Conference, Alexandria, VA, October 20–23, 2004.	
Large- and Small-Scale Ring Current Electrodynamic Coupling—Abstract Only. For presentation at the 30th Anniversary Yosemite Workshop on Inner Magnetosphere Interaction, Yosemite, CA, February 3–6, 2004.			
KHAZANOV, G.V.	SD50	KLEIMAN, J.I.	Integrity Testing Laboratory
The Nonlinear Coupling of Electromagnetic Ion Cyclotron and Lower Hybrid Waves in the Ring Current Region— Abstract Only. For presentation at the 2004 American		GUDIMENKO, Y.	Integrity Testing Laboratory
		ISKANDEROVA, Z.A.	Integrity Testing Lab.
		GRIGOREVSKI, A.	Public Joint Stock Co.



MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

EDWARDS, D.L.	ED31	KNOX, J.C.	FD21
FINCKENOR, M.	ED31	MULLOTH, L.M.	SAIC
Simulated Space Environment Exposure of Surface-Modified Thermal Control Coatings—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–9, 2004.		AFFLECK, D.L.	SAIC
		Integrated Testing of a 4-Bed Molecular Sieve and a Temperature-Swing Absorption Compressor for Closed-Loop Air Revitalization—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.	
KLOSE, S.	Thuringer Landessternwarte		
GREINER, J.	Max Planck Institute		
RAU, A.	Max Planck Institute	KOBELL, W.	SD70
HENDEN, A.A.	USNO/USRA	A Novel and New Ultra-Lightweight Reinforcement for Producing Low Mass Optical Systems—Abstract Only. For presentation at the Mirror Technology Days, Huntsville AL, August 17–19, 2004.	
HARTMANN, D.H.	Clemson University		
ZEH, A.	Thuringer Landessternwarte		
MASETTI, N.	Istituto di Astrofisica		
GUENTHER, E.	Thuringer Landessternwarte		
KOUVELIOTOU, C.	SD50	KOELFGEN, S.J.	UAH
ET AL.		ESKRIDGE, R.	TD40
The Achromatic Light Curve of the Optical Afterglow of GRB 030226 at a Redshift of $Z \sim 2$ —Abstract Only. For publication in The Astrophysical Journal, 2004.		FIMOGNARI, P.	UAH
		HAWK, C.W.	UAH
		LEE, M.	TD40
		MARTIN, A.	TD40
		Magnetic and Langmuir Probe Measurements on the Plasmod Thruster Experiment (PTX)—Abstract/Final Paper. For presentation at the 40th AIAA Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.	
KLOSE, S.	Thuringer Landesternwarte		
GREINER, J.C.	Max Planck Institute		
RAU, A.	Max Planck Institute		
HENDEN, A.A.	U.S. Naval Observatory		
HARTMANN, D.H.	Clemson University		
ZEH, A.	Thuringer Landessternwarte	KOŁODZIEJCZAK, J.J.	SD31
RIES, C.	Wendelstein-Observatorium	Lessons for STEP From GP-B—Abstract Only. For presentation at Testing the Equivalence Principle on Ground and in Space, Pescara, Italy, September 20–24, 2004.	
MASETTI, N.	Istituto di Astrofisica		
KOUVELIOTOU, C.	SD50		
ET AL.			
Probing a GRB Progenitor at a Redshift of $z=2$ : A Comprehensive Observing Campaign of the Afterglow of GRB 030226—Abstract Only. For publication in The Astronomical Journal, 2004.			
		KOROTCHKINA, L.G.	State University of NY/Buffalo
		CISZAK, E.M.	SD46
		PATEL, M.S.	State University of NY/Buffalo
		Function of Several Critical Amino Acids in Human Pyruvate Dehydrogenase Revealed By Its Structure—Abstract Only. For publication in the Archives of Biochemistry and Biophysics, 2004.	
KLOSE, S.	Thuringer Landesstern.		
HENDEN, A.A.	U.S. Naval Observatory		
GEPPERT, U.	Astrophysical Institute		
HARTMANN, D.H.	Dept./Physics & Astronomy	KOSHAK, W.	SD60
KOUVELIOTOU, C.	SD50	Dimensional Reduction: A Method for Retrieving Lightning Charge—Abstract Only. For presentation at and publication in Proceedings of the 2004 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 13–17, 2004.	
LUGINBUHL, C.B.	U.S. Naval Observatory		
STECKLUM, B.	Thuringer Landesstern.		
VRBA, F.J.	U.S. Naval Observatory		
A Deep Near-Infrared Survey of the N49 Region Around the Soft Gamma-Ray Repeater 0526-66—Abstract Only. For publication in The Astrophysical Journal Letters, 2004.			
		KOUVELIOTOU, C.	SD50
		Observations of Magnetars—Abstract Only. For presentation at The Electromagnetic Spectrum of Neutron Stars Conference, Marmaris, Turkey, June 13–18, 2004.	
KNOX, J.C.	FD21		
Experimental and Analytical Investigation of Pressure Differentials for Clean and Loaded Wire Meshes Used in Zeolite Retention—Final Paper. For presentation at the 34th International Conference on Environments Systems, Colorado Springs, CO, July 19–22, 2004.			
		KOUVELIOTOU, C.	SD50
		Observations of X-Ray Afterglows—Abstract Only. For presentation at the Workshop on Gamma-Ray Bursts and Supernovae Connection, Seattle, WA, July 5–7, 2004.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

KOUVELIOTOU, C. GRACE Collaboration in the Swift Era—Abstract Only. For presentation at and publication in Proceedings of the Meeting of the Energy Astrophysics Division (HEAD) of the American Astronomical Society, New Orleans, LA, September 8–11, 2004.	SD50	LEE, G.W. GANGOPADHYAY, A.K. KELTON, K.F. HYERS, R.W. RATHZ, T.J. ROGERS, J.R.	Washington University Washington University Washington University University of Massachusetts UAH SD46
KOUVELIOTOU, C. WOOSLEY, S.E. PATEL, S.K. LEVAN, A. BLANDFORD, R.	SD50 University of California SD50 University of Leicester Kavli Inst. for Particle Astrophysics and Cosmology	LEE, J.A.	ED33 Commercialization of NASA's High Strength Cast Aluminum Alloy for High Temperature Applications—Abstract and Presentation. For presentation at the 28th Annual Conference on Composites, Materials & Structures, Cocoa Beach, FL, January 26–30, 2004.
RAMIREZ-RUIZ, E. WIJERS, R.A.M.J. WEISSKOPF, M.C. TENNANT, A.F. ET AL.	Institute for Advanced Study University of Amsterdam SD50 SD50	LEE, J.A.	ED33 High Strength and Compatible Aluminum Alloy for Hydrogen-Peroxide Fuel Tanks—Abstract Only. For presentation at the 52nd JANNAP Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.
KULPA, V.	QS10	LEE, J.K. NEWMAN, T.S. GARY, G.A.	UAH UAH SD50
LAPENTA, W.M. BRADSHAW, T. BURKS, J. DARDEN, C. DEMBEK, S.	SD60 NWS Forecast Office NWS Forecast Office NWS Forecast Office USRA	LEIMKUEHLER, T.O. LUKENS, C. REEVES, D.R. HOLT, J.M.	Honeywell, Inc. Honeywell, Inc. The Boeing Company ED25
LEAHY, F.B.	ED44	HOLT, J.M.	ED25
LEE, G.W. GANGOPADHYAY, A.K. KELTON, K.F. HYERS, R.W. RATHZ, T.J. ROGERS, J.R.	Washington University Washington University Washington University University of Massachusetts UAH SD50	LEIMKUEHLER, T.O. LUKENS, C. REEVES, D.R. HOLT, J.M.	Honeywell, Inc. Honeywell, Inc. The Boeing Company ED25
A Liquid-Liquid Transition in an Undercooled Ti-Zr-Ni Liquid—Abstract Only. For publication in Nature, 2003.		LI, C. BAN, H.	UAB UAB

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

LIN, B.	UAB	LI, C.	UAB
SCRIPA, R.N.	UAB	SU, C.-H.	SD46
SU, C.-H.	SD46	LEHOCZKY, S.L.	SD46
LEHOCZKY, S.L.	SD46	SCRIPA, R.N.	UAB
Temperature Dependence of Density, Viscosity, and Electrical Conductivity for Hg-Based II–VI Semiconductor Melts—Abstract Only. For publication in the Journal of Crystal Growth, 2004.		BAN, H.	UAB
		LIN, B.	UAB
		Thermophysical Properties of Selected II–VI Semiconducting Melts—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–10, 2004.	
LI, C.	UAB/SD46	LIEMOHN, M.W.	University of Michigan
LEHOCZKY, S.L.	SD46	KHAZANOV, G.V.	SD50
SU, C.-H.	SD46	Magnetosphere-Ionosphere Coupling and Associated Ring Current Energization Processes—Abstract Only. For publication in the American Geophysical Union Monograph on Astrophysical Particle Acceleration in Geospace and Beyond, 2004.	
SCRIPA, R.N.	UAB		
Electrical Conductivity of HgTe at High Temperatures—Abstract Only. For presentation at the 2004 Materials Research Society (MRS) Fall Meeting, Boston, MA, November 29–December 3, 2004.			
LI, C.	UAB	LIEMOHN, M.W.	SD50
BAN, H.	SD46	RIDLEY, A.J.	SD50
LIN, B.	SD46	KOZYRA, J.U.	SD50
SCRIPA, R.N.	SD46	GALLAGHER, D.L.	SD50
SU, C.-H.	SD46	BRANDT, P.C.	SD50
LEHOCZKY, S.L.	SD46	HENDERSON, M.G.	SD50
ZHU, S.	SD46	DENTON, M.H.	SD50
Transient Torque Method: A Fast and Non-Intrusive Technique to Simultaneously Determine Viscosity and Electrical Conductivity of Semiconducting and Metallic Melts—Abstract Only. For publication in Review of Scientific Instruments, 2003.		JAHN, J.M.	SD50
		ROELOF, E.C.	SD50
		ET AL.	
		Conductance Effects on Inner Magnetospheric Plasma Morphology: Model Comparisons With IMAGE EUV, MENA and HENA Data—Abstract Only. For presentation at the Spring AGU 2004 Meeting, Montreal, Quebec, Canada, and publication in Proceedings of the 2004 Joint Assembly, AGU, CGU, & Society of Exploration Geophysicists, 2004.	
LI, C.	UAB	LITCHFORD, R.J.	TD40
SCRIPA, R.N.	UAB	Propulsion and Power Technologies for The NASA Exploration Vision: A Research Perspective—Presentation. For presentation at the Symposium on MHD Electrical Power Generation and Related Technology, Tsukuba Science City, Japan, September 10, 2004.	
BAN, H.	UAB		
LIN, B.	UAB		
SU, C.-H.	SD46		
LEHOCZKY, S.L.	SD46		
Density, Electrical Conductivity, and Viscosity of Hg <sub>0.8</sub> Cd <sub>0.2</sub> Te Melt—Abstract Only. For presentation at the 14th International Conference on Crystal Growth, Grenoble, France, August 10–13, 2004, and publication in the Journal of Crystal Growth.			
LI, C.	SD46	LOVELACE, J.	SD46
SCRIPA, R.N.	SD46	SOARES, A.S.	SD46
BAN, H.	SD46	BELLAMY, H.	SD46
LIN, B.	SD46	SWEET, R.M.	SD46
SU, C.-H.	SD46	SNELL, E.H.	SD46
LEHOCZKY, S.L.	SD46	BORGSTAHL, G.	SD46
Thermophysical Properties and Structural Transition of Hg <sub>0.8</sub> Cd <sub>0.2</sub> Te Melt—Abstract Only. For publication in the Journal of Non-Crystalline Solids, 2004.		First Results of Digital Topography Applied to Macromolecular Crystals—Abstract Only. For publication in the Journal of Applied Crystallography, 2004.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

MACH, D.M.	UAH	MANGUS, D.	TD54
BLAKESLEE, R.J.	SD60	HEATON, A.F.	TD54
BAILEY, J.C.	Raytheon ITSS	Solar Sail Control Actuator Concepts—Final Paper. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.	
FARRELL, W.M.	Goddard Space Flight Center		
GOLDBERG, R.A.	Goddard Space Flight Center		
DESCH, M.D.	Goddard Space Flight Center		
HOUSER, J.G.	Goddard Space Flight Center	MARKUSIC, T.E.	TD40
Lightning Optical Pulse Statistics From Storm Overflights During the Altus Cumulus Electrification Study—Abstract Only. For publication in the Special Issue of Atmospheric Research, 2004.		Liquid-Metal-Fed Pulsed Electromagnetic Thrusters for In-Space Propulsion—Final Paper. For presentation at the JANNAF Conference, Las Vegas, NV, May 10–13, 2004.	
MACLEOD, T.C.	SD22	MARKUSIC, T.E.	TD40
HO, F.D.	UAH	Liquid Metal Propellant Feed System for Plasma Propulsion—Abstract Only. For presentation at the 40th AIAA Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.	
Ferroelectric Field Effect Transistor Model Using Partitioned Ferroelectric Layer and Partial Polarization—Abstract Only. For presentation at The 16th International Symposium on Integrated Ferroelectrics, Gyeongju, Korea, April 8, 2004, and for publication in the Integrated Ferroelectric Journal, 2004.		MARKUSIC, T.E.	TD40
MADDOX, W.	UAH/CSPAR	JONES, J.E.	TD40
SPANN, J.F.	SD50	COX, M.D.	TD40
GERMANY, G.	UAH/CSPAR	Thrust Stand for Electric Propulsion Performance Evaluation—Abstract/Final Paper. For presentation at the Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.	
Correlation of Far Ultraviolet Lunar Albedo With Solar Activity—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.		MARTIN, A.	TD40
MAJUMDAR, A.	ED25	ESKRIDGE, R.	TD40
Numerical Modeling of Conjugate Heat Transfer in Fluid Network—Abstract Only. For presentation at the 2004 15th Annual Thermal & Fluids Analysis Conference, Philadelphia, PA, August 30–September 3, 2004.		FIMOGNARI, P.	UAH
		KOELFGEN, S.J.	UAH
		LEE, M.	TD40
		Progress on the Plasmoid Thruster Experiment (PTX)—Abstract Only. For presentation at the 40th AIAA Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.	
MAKAL, A.	SD46	MARTIN, A.	TD40
HONG, Y.-S.	SD46	ESKRIDGE, R.	TD40
POTTER, R.	SD46	FIMOGNARI, P.	UAH
VETTAIKKORUMAKANKAUV, A.K.	SUNY	KOELFGEN, S.J.	UAH
KOROTCHKINA, L.G.	SUNY	LEE, M.	TD40
PATEL, M.S.	SUNY	The Plasmoid Thruster Experiment (PTX)—Abstract Only. For presentation at the American Physical Society 46th Annual Meeting of the Division of Plasma Physics, Savannah, GA, November 15–19, 2004.	
CISZAK, E.M.	SD46	MARTIN, J.J.	TD40
Intricate Crystal Structure of Dihydrolipoamide Dehydrogenase (E3) With its Binding Protein: Multiple Copies, Dynamic and Static Disorders—Abstract Only. For presentation at the American Crystallographic Association, Chicago, IL, July 17–22, 2004.		REID, R.S.	TD40
MALONE, R.W.	QD01	Sodium Based Heat Pipe Modules for Space Reactor Concepts: Stainless Steel SAFE-100 Core—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants, Pittsburg, PA, June 13–17, 2004.	
MOSES, K.	Futron Corporation		
Development of Risk Assessment Matrix for NASA Engineering and Safety Center—Final Paper. For presentation at the Risk Analysis: The Profession and the Future, Wyndham Palm Springs, CA, December 5–8, 2004.			

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

MARTIN, J.J.	TD40	MCNEAL, JR., C.I.	TD07
SALVAIL, P.	Morgan Research Corporation	Bantam: A Cautionary Tale—Presentation. For presentation at the Space 2004 Conference and Exposition, San Diego, CA, September 28–30, 2004.	
Sodium Heat Pipe Module Processing for the SAFE-100 Reactor Concept—Final Paper. For presentation at the STAIF 2004 Conference, Albuquerque, NM, February 8–12, 2004.			
MARTIN, M.A.	TD53	MCNEAL, JR., C.I.	TD07
NGUYEN, H.H.	TD53	A Decade of X-Vehicles: Lessons Learned—Presentation. For presentation at Space 2004 Conference and Exposition, San Diego, CA, September 28–30, 2004.	
GREENE, W.D.	TD53		
SEYMOUR, D.C.	TD53/ERC, Inc.	MEEGAN, C.A.	SD50
Transient Mathematical Modeling for Liquid Rocket Engine Systems: Methods, Capabilities, and Experience—Final Paper. For presentation at the 5th International Symposium on Liquid Space Propulsion, Chattanooga, TN, October 27–30, 2003.		The GLAST Burst Monitor—Abstract Only. For presentation at the American Physical Society, Denver, CO, May 1–4, 2004.	
MAY, G.	Institute for Technology Development	MEINHOLD, A.	MP71
MITCHELL, B.	SD10	Shuttle Environmental Assurance (SEA) Initiative—Presentation. For presentation at the U.S. Army Materials Command Environmental Office, Madison, AL, June 2–3, 2004.	
Imaging Beyond What Man Can See—Abstract Only. For presentation at the Monitoring Science and Technology Symposium, Denver, CO, October 21–24, 2004.			
MAZURUK, K.	UAH	MINAMITANI, E.F.	BAE Systems
VOLZ, M.P.	SD46	PUSEY, M.L.	SD46
Lorentz Body Force Induced by Traveling Magnetic Fields—Abstract Only. For publication in the Journal Magnetohydrodynamics, 2003.		Flourescent Approaches to High Throughput Crystallography—Abstract Only. For presentation at the 10th International Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.	
MCCAUL, JR., E.W.	SD60	MINAMITANI, E.F.	BAE Systems
COHEN, C.	USRA/SD60	PUSEY, M.L.	SD46
KIRKPATRICK, C.	UAH	Solution-Phase Processes of Macromolecular Crystallization—Abstract Only. For presentation at the 10th International Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.	
The Sensitivity of Simulated Storm Structure and Intensity to the Temperature at the Lifted Condensation Level—Abstract Only. For publication in the Monthly Weather Review, 2004.			
MCCOLLUM, M.	ED44	MINOW, J.I.	ED44
Space Environmental Effects and Spacecraft EMC—Presentation. For presentation at the 2004 IEEE EMS Symposium, Santa Clara, CA, August 9–13, 2004.		ALSTATT, R.L.	Jacobs Sverdrup/ED44
		NEERGAARD, L.F.	Jacobs Sverdrup/ED44
MCNAMARA, H.	ED44	Interplanetary Radiation and Internal Charging Environment Models for Solar Sails—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.	
JONES, J.	University of Western Ontario	MITCHELL, D.W.	XP01
KAUFFMAN, B.	ED44	X-37 Flight Demonstrator—X-40A Flight Test Approach—Presentation. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 11, 2004.	
SUGGS, R.M.	ED44		
COOKE, W.J.	Morgan Research Corporation/ED44	MONACO, L.	SD46
SMITH, S.	Morgan Research Corporation/ED44	Lab on a Chip Application Development for Exploration—Abstract Only. For presentation at the Mars Astrobiology Science and Technology Workshop, Washington, DC, September 8–10, 2004.	
Meteoroid Engineering Model (MEM): A Meteoroid Model for the Inner Solar System—Abstract Only. For presentation at the Meteoroids Conference 2004, London, Ontario, Canada, August 16–20, 2004.			

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

MONTGOMERY IV, E.E.	TD05	Meeting and Exhibit, Reno, NV, January 5–8, 2004, and for publication in the Journal of Propulsion and Power, 2004.	
JOHNSON, L.	TD05		
The Development of Solar Sail Propulsion for NASA Science Missions to the Inner Solar System—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 5th AIAA Gossamer Spacecraft Forums, Palm Springs, CA, April 19–24, 2004.		NALL, M.E.	SD10
		Meeting NASA's Mission Through Commercial Partnerships—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 4–8, 2004.	
MONTGOMERY IV, E.E.	TD05	NALL, M.E.	SD10
JOHNSON, L.	TD05	CASAS, J.	SD10
Development of Solar Sail Propulsion for Inner Solar System NASA Science Missions—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.		Accelerating Exploration Through the Sharing of Best Practices in Research Partnerships—Abstract Only. For presentation at the 24th International Symposium on Space Technology and Science, Miyazaki, Japan, May 30–June 6, 2004.	
MOORE, R.L.	SD50	NALL, M.E.	SD10
FALCONER, D.A.	UAH	CASAS, J.	SD10
PORTER, J.G.	SD50	Space Exploration Technologies Developed Through Existing and New Research Partnerships Initiatives—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.	
HATHAWAY, D.H.	SD50		
YAMAUCHI, Y.	SD50		
Coronal Heating, Spicules, and Solar-B—Abstract Only. For presentation at and publication in Proceedings of the Fifth Solar-B Science Meeting, Tokyo, Japan, November 14, 2003.		NEERGAARD, L.F.	Jacobs Sverdrup/ED44
		DAVIS, V.A.	SAIC
MOORE, R.L.	SD50	GARDNER, B.	SAIC
FALCONER, D.A.	SD50	MANDELL, M.	SAIC
STERLING, A.C.	SD50	MINOW, J.I.	ED44
Main-Sequence CME's as Magnetic Explosions: Compatibility With Observed Kinematics—Abstract Only. For presentation at the 2004 Shine Workshop, Big Sky, MT, June 26–July 2, 2004.		Analysis of Surface Charging for a Candidate Solar Sail Mission Using Nascap-2k—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.	
MOORE, R.L.	SD50	NESTEROV, V.V.	New Mexico Highlands University
STERLING, A.C.	SD50	ANTIPIN, M.Y.	New Mexico Highlands University
Compact Flares and CMEs—Abstract Only. For presentation at the RHESSI/SOHO/TRACE Workshop: Coordinated Observations of Flares and CME's, Sonoma, CA, December 8–11, 2004.		NESTEROV, V.N.	New Mexico Highlands University
		MOORE, C.E.	SD46
		CARDELINO, B.H.	Spellman College
		TIMOFEEVA, T.V.	New Mexico Highlands University
MOORE, R.L.	SD50	Thermally Stable Heterocyclic Imines as New Potential Nonlinear Optical Materials—Abstract Only. For publication in the Journal of Physical Chemistry B, 2004.	
YAMAUCHO, Y.	NJIT		
Solar Magnetic Explosions, Spicules, and the Heliosphere—Abstract Only. For presentation at and publication in Proceedings of the 2004 Conference of the American Astronomical Society/Solar Physics Division, Denver, CO, May 30–June 3, 2004.		NETTLES, A.T.	ED34
		Allowables for Structural Composites—Abstract Only. For presentation at the International Conference on Composite Engineering, Hilton Head, SC, August 8–14, 2004.	
MORRIS, C.I.	TD40	NEVALAINEN, J.	SD50
Numerical Modeling of Pulse Detonation Rocket Engine Gasdynamics and Performance—Final Paper and Presentation. For presentation at the 42nd AIAA Aerospace Sciences		OOSTERBROEK, T.	SD50
		BONAMENTE, M.	SD50
		COLAFRANCESCO, S.	SD50

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

Non-Thermal Hard X-Ray Emission in Galaxy Clusters Observed With the BeppoSAX PDS—Abstract Only. For publication in <i>The Astrophysical Journal</i> , 2003.	NICHOLS, K.F.	FD41
	SCHNEIDER, L.	COLSA Corporation
	BEST, S.	FD41
	Making Wireless Networks Secure for NASA Mission Critical Applications Using Virtual Private Network (VPN) Technology—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, CA, October 4–8, 2004.	
NEWCHURCH, M.J.	UAH	
FULLER, K.A.	UAH	
BOWDLE, D.A.	UAH	
JOHNSON, S.	SD60	
KNUPP, K.R.	UAH	
GILLANI, N.	UAH	NISHIKAWA, K.I.
BIAZAR, A.	UAH	HARDEE, P.
MCNIDER, R.T.	UAH	RICHARDSON, G.
BURRIS, J.	Goddard Space Flight Center	PREECE, R.
ET AL.		SOL, H.
Vertical Profiling of Air Pollution at RAPCD—Abstract Only. For presentation at the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.		FISHMAN, G.J.
		Particle Acceleration and Magnetic Field Generation in Electron-Positron Relativistic Shocks—Abstract Only. For publication in <i>The Astrophysical Journal</i> , 2004.
NEWMAN, T.S.	UAH	NISHIKAWA, K.I.
SANTHANAM, N.	UAH	HEDEDAL, C.
ZHANG, H.	UAH	HARDEE, P.
GALLAGHER, D.L.	SD50	RICHARDSON, G.
Limited Angle Reconstruction Method for Reconstructing Terrestrial Plasmaspheric Densities From EUV Images—Abstract Only. For presentation at The Applied Information Systems Research Program, Pittsburg, PA, October 28–29, 2003.		PREECE, R.
		SOL, H.
		FISHMAN, G.J.
		Particle Acceleration, Magnetic Field Generation, and Emission in Relativistic Shocks—Abstract Only. For presentation at the Swift Workshop, New Orleans, LA, September 8, 2004; for presentation at and publication in Proceedings of the 8th Meeting of the American Astronomical Society High Energy Astrophysics Division, New Orleans, LA, September 8–11, 2004; and for presentation at the Workshop on Relativistic Plasmas in Magnetic Field, Stanford, CA, August 16–18, 2004.
NEWTON, R.L.	ED10	
DAVIDSON, J.L.	Vanderbilt University	
ICE, G.E.	Oak Ridge National Laboratory	
LIU, W.	Oak Ridge National Laboratory	
Synchrotron X-Ray Microdiffraction Analysis of Proton Irradiated Polycrystalline Diamond Films—Final Paper. For publication in <i>Diamond and Related Materials</i> , 2004.		
NGUYEN, H.H.	TD53	NISHIKAWA, K.I.
MARTIN, M.A.	TD53	RICHARDSON, G.
An Interpolation Method for Obtaining Thermodynamic Properties Near Saturated Liquid and Saturated Vapor Lines—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–14, 2004.		KOIDE, S.
		SHIBATA, K.
		KUDOH, T.
		HARDEE, P.
		FISHMAN, G.J.
		A General Relativistic Magnetohydrodynamics Simulation of Jet Formation With a State Transition—Abstract Only. For publication in <i>The Astrophysical Journal</i> , 2004.
NICHOLS, K.F.	FD41	
SCHNEIDER, L.	COLSA Corporation	
BEST, S.	FD41	NISHIKAWA, K.I.
Making Wireless Networks Secure for NASA Mission Critical Applications Using Virtual Private Network (VPN) Technology—Final Paper and Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.		YAN, X.Y.
		CAI, D.S.
		LEMBEGE, B.
		Magnetospheric Magnetic Reconnection With Southward IMP by a 3D EMPM Simulation—Abstract Only. For presentation at the Explosive Phenomena in Magnetized

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

Plasma—New Development of Reconnection Research, Kyoto, Japan, March 17–19, 2004.		SWIDERSKA-SRODA, A.	SD46
		FIETKIEWICZ, K.	SD46
		KALISZ, G.	SD46
NIX, M.	TD53	GRZANKA, E.	SD46
STATON, E.J.	Jacobs Sverdrup	STEL'MAKH, S.	SD46
Turnaround Time Modeling for Conceptual Rocket Engines— Final Paper. For presentation at the 52nd JANNAF Meeting/ 1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.		PALOSZ, B.	BAE Systems
		Combining Hard With Soft Materials in Nonoscale Under High-Pressure, High-Temperature Conditions—Abstract Only. For presentation at and publication in Proceedings of the NATO Advanced Research Workshop—Innovative Superhard Materials and Sustainable Coatings, Kiev, Ukraine, May 12–15, 2004.	
NIXON, C.A.	University of Maryland		
ACHTERBERG, R.K.	Science Systems & Apps.		
CONRATH, B.J.	Cornell University		
IRWIN, P.G.J.	University of Oxford	PALOSZ, B.	SD46
FOUCHET, T.	University of Oxford/Meudon	STEL'MAKH, S.	SD46
PARRISH, P.D.	University of Oxford	GRZANKA, E.	SD46
ABBAS, M.M.	SD50	GIERLOTKA, S.	SD46
LECLAIR, A.	SD50	PALOSZ, B.	BAE Systems
ROMANI, P.N.	Goddard Space Flight Center	High Pressure X-Ray Diffraction Studies of Nanocrystal- line Materials—Abstract Only. For presentation at the 22nd European Crystallographic Meeting, Budapest, Hungary, August 26–31, 2004.	
	Meridional Variations of C <sub>2</sub> H <sub>2</sub> and C <sub>2</sub> H <sub>6</sub> in Jupiter's Atmosphere From Cassini CIRS Infrared Spectra—Abstract Only. For publication in Icarus, 2004.		
NUNES, JR., A.C.	ED33	PALOSZ, B.	SD46
Plasma Arc Welding: How it Works: A Brief Account of the Physical Principles of PAW—Abstract Only. For publication in The Fabricator, 2004.		VOLZ, M.P.	SD46
		COBB, S.D.	SD46
		MOTAKEF, S.	Cape Simulations, Inc.
		SZOFRAN, F.R.	SD46
OELGOETZ, P.	Boeing	Detached Growth of Germanium by Directional Solidifica- tion—Abstract Only. For presentation at the 14th Interna- tional Conference on Crystal Growth in Conjunction With the 12th International Conference on Vapor Growth and Epitaxy, Grenoble, France, August 9–13, 2004.	
JOHNSON, R.	Boeing		
TODD, D.	Boeing		
RUSSELL, S.	ED32	PANDEY, A.B.	Pratt & Whitney
WALKER, W.	ED32	SHAH, S.R.	ED33
Blind Leak Detection for Closed Systems—Abstract Only. For presentation at the Boeing Technical Excellence Confer- ence, St. Louis, MO, February 24, 2004.		SHADOAN, M.	TD07
		High Strength Discontinuously Reinforced Aluminum for Rocket Applications—Final Paper. For presentation at the TMS Materials Science and Technology Conference, Chi- cago, IL, November 9–12, 2003.	
O'NEIL, D.A.	FD02		
MANKINS, J.C.	NASA Headquarters		
Advanced Technology Lifecycle Analysis Stem (ATLAS)— Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.			
OVERBEY, B.G.	Raytheon	PANNELL, B.	ED42
ROBERTS, B.C.	ED44	Using a Genetic Algorithm to Design a Nuclear Electric Spacecraft—Presentation. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 30–31, 2003.	
Extreme Meteorological Parameters During Space Shuttle Pad Exposure Periods—Final Paper. For presentation at the 11th American Meteorological Society Aviation, Range, & Aerospace Meteorological Conference, Hyannis, MA, October 4–8, 2004.			
		PANOV, A.D.	Moscow State University
		ADAMS, J.H.	SD50
		AHN, H.S.	University of Maryland
		BASHINDZHAGYAN, G.L.	Moscow State University
		BATKOV, K.E.	Moscow State University
PALOSZ, B.	SD46	CHANG, J.	Max Planck Institute
GIERLOTKA, S.	SD46		



MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

CHRISTL, M.J.	SD50	Potential Application of Anaerobic Extremophiles for Hydrogen Production—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.
FAZELY, A.R.	Southern University	
GANEL, O.	University of Maryland	
ET AL.		
The Energy Spectra of Heavy Nuclei Measured by the ATIC Experiment—Abstract Only. For presentation at and publication in Proceedings of the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.		
PARKINSON, D.A.	TD51	
BROWN, K.K.	TD51	
Test Planning Approach and Lessons—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.		
PATRICK, M.C.	ED12	
COOPER, A.E.	ED12	
POWERS, W.T.	ED12	
Support of Integrated Health Management (IHM) Through Automated Analyses of Flow-Field-Derived Spectrographic Data—Final Paper. For presentation at the JANNAF Interagency Propulsion Committee, Colorado Springs, CO, December 1–5, 2003.		
PECK, J.	ED21	
TORRES, I.	ED21	
A DMAP Program for the Selection of Accelerometer Locations in MSC/Nastran—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, May 19–22, 2004.		
PERRIN, D.J.	SD50	
SIDMAN, E.D.	SD50	
MEEGAN, C.A.	SD50	
BRIGGS, M.S.	SD50	
CONNAUGHTON, V.	SD50	
GLAST Burst Monitor Trigger Classification Algorithm—Abstract Only. For presentation at and publication in Proceedings of the High Energy Astrophysics Division of the American Society, New Orleans, LA, September 8–11, 2004.		
PIKUTA, E.V.	SD50	
HOOVER, R.B.	SD50	
Astrobiological Significance of Chemolithoautotrophic Acidophiles—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.		
PIKUTA, E.V.	SD50	
HOOVER, R.B.	SD50	
Growth of the Facultative Anaerobes From Antarctica, Alaska, and Patagonia at Low Temperatures—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.		
PIKUTA, E.V.	SD50	
HOOVER, R.B.	SD50	
Oxygen Effect on the Low Temperature Tolerance of Facultative Anaerobes From Antarctica, Alaska, and Patagonia—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.		
PIKUTA, E.V.	SD50	
MARSIC, D.	UAH	
BEJ, A.	UAB	
TANG, J.	American Type Culture Collection	
KRADER, P.	American Type Culture Collection	
HOOVER, R.B.	SD50	
Carnobacterium Pleistocaenium sp. nov. a Novel Psychrotolerant, Facultative Anaerobe Isolated From Permafrost of the Fox Tunnel in Alaska—Abstract Only. For publication in the International Journal of Systematic and Evolutionary Microbiology, 2004.		
PIVOVAROFF, M.J.	SD50	
BARBER, W.C.	SD50	
CRAIG, W.W.	SD50	
HASAGAWA, B.H.	SD50	
RAMSEY, B.D.	SD50	
TAYLOR, C.	SD50	
Gamma-Ray Focusing Optics for Small Animal Imaging—Abstract Only. For presentation at the IEEE Rome 2004 Medical Imaging Conference, Rome, Italy, October 16–22, 2004.		
POLETTO, G.	INAF	
SUESS, S.T.	SD50	
JD 7: The Sun and the Heliosphere as an Integrated System—Abstract Only. For publication in the Highlights of Astronomy, 2003.		
PIKUTA, E.V.	SD50	
HOOVER, R.B.	SD50	
POLETTO, G.	SD50	
SUESS, S.T.	SD50	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
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Ground-Based Telescope Parametric Cost Model—Abstract Only. For presentation at and publication in Proceedings of the Astronomical Telescopes and Instrumentation 2004 Scottish Exhibition and Convention Center, Glasgow, Scotland, June 21–25, 2004.
- STAHL, H.P. SD70  
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REESE, G. SAIC  
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- STAHL, H.P. SD70  
SMITH, W.S. SD70  
Mirror Requirements for SAFIR—Abstract Only. For presentation at From Spitzer to Herschel and Beyond: The Future of Far-IR Space Astrophysics, Pasadena, CA, June 7–10, 2004.
- STANOJEV, B.J. TD40  
HOUTS, M. Los Alamos National Laboratory  
Deflection Measurements of a Thermally Simulated Nuclear Core Using a High-Resolution CCD-Camera—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants (ICAPP 2004), Pittsburgh, PA, June 13–17, 2004.
- STEEVE, B.E. ED22  
KAPERNICK, R.J. Los Alamos National Laboratory  
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- STELLINGWERF, R.F. Stellingwerf Consulting  
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EVANS, S.W. ED31  
STALLWORTH, R. ED31  
HOVATER, M. ED31  
Foam-On-Tile Impact Modeling for the STS-107 Investigation—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.
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HOVATER, M. ED31  
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MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

- STERLING, A.C. SD50  
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- STERLING, A.C. SD50  
Solar Spicules: Prospects for Breakthroughs in Understanding With Solar-B—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.
- STERLING, A.C. SD50  
X-Ray and EUV Observations of CME Eruption Onset—Abstract Only. For presentation at the International Astronomical Meeting Symposium 226, Coronal and Stellar Mass Ejections, Beijing, China, September 13–17, 2004.
- STERLING, A.C. SD50  
MOORE, R.L. SD50  
External and Internal Reconnection in Two Filament-Carrying Magnetic-Cavity Solar Eruptions—Abstract Only. For publication in *The Astrophysical Journal*, 2004, and presentation at the 204th Meeting of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.
- STORRIE-LOMBARDI, M.C. Kinohi Institute  
HOOVER, R.B. SD50  
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- SU, C.-H. SD46  
LEHOCZKY, S.L. SD46  
LI, C. UAB  
KNUTESON, D. BAE Systems  
RAGHOTHAMACHAR, B. SUNY  
DUDLEY, M. SUNY  
SZOKE, J. Admatis Ltd.  
BARCZY, P. University of Miskolc  
Crystal Growth of CdTe by Gradient Freeze in Universal Multizone Crystallizer (UMC)—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–10, 2004.
- SUESS, S.T. SD50  
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- SUESS, S.T. SD50  
NERNEY, S. Ohio University  
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- SUGGS, R.J. SD60  
JEDLOVEC, G.J. SD60  
HAINES, S.L. UAH  
Near Real-Time Derived Products From MODIS—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.
- SUGGS, R.M. ED44  
How to Do Science in an Engineering Organization—Abstract Only. For presentation at the New Mexico State University, Las Cruces, NM, October 3, 2003.
- SWARTZ, D.A. SD50  
DRAKE, J.J. SD50  
ELSNER, R.F. SD50  
GHOSH, K.K. SD50  
GRADY, C.A. SD50  
WASSELL, E. SD50  
The Herbig Ae Star HD 163296 in X-Rays—Abstract Only. For publication in *The Astrophysical Journal*, 2004.
- SWARTZ, D.A. SD50  
GHOSH, K.K. SD50  
TENNANT, A.F. SD50  
WU, K. SD50  
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MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

SWIFT, W.R.	ED44	SSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY, August 30–September 1, 2004.
SUGGS, R.M.	ED44	
COOKE, W.J.	Morgan Research Corporation/ED44	
	Meteor Video Meteor Photometry—Abstract Only. For presentation at the Meteoroids 2004 Conference, London, Ontario, Canada, August 16–20, 2004.	
SWINGLE, M.R.	University of South Alabama	
CISZAK, E.M.	UAH/SD46	
HONKANEN, E.	University of South Alabama	
	Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase Type 5 (PP5)—Abstract Only. For publication in <i>Science</i> , 2004, and in the <i>Journal of Biological Chemistry</i> , 2004.	
TATARA, J.D.	Qualis Corporation	
PERRY, J.L.	FD21	
	Spacecraft Cabin Atmospheric Major Constituent Monitoring Using Off-the-Shelf Techniques—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.	
TAYLOR, J.	Austin Peay State University	
RAKOCZY, J.	SD71	
STEINCAMP, J.	SD71	
	Genetic Algorithm Phase Retrieval for the Systematic Image-Based Optical Alignment Testbed—Abstract Only. For publication in the <i>Astronomical Society of the Pacific</i> , 2004.	
TAYLOR, T.L.	XP01	
	X-37 Flight Demonstrator—Approach & Landing Test Vehicle Flight Test Approach—Presentation. For presentation at the Space Technology and Information International Technology Forum (STAIF), Albuquerque, NM, February 11, 2004.	
THORNTON, G.	SD70	
	The Use of Solid Edge as an Engineering Tool to Support NASA Projects—Abstract Only. For presentation at the Solid Edge User Summit, Orlando, FL, June 2–4, 2004.	
TINKER, M.L.	ED20	
STEINCAMP, J.W.	ED20	
STEWART, E.T.	ED20	
PATTON, B.W.	ED20	
PANNELL, W.P.	ED20	
NEWBY, R.L.	ED20	
COFFMAN, M.E.	ED20	
KOS, L.D.	ED20	
	Nuclear Electric Vehicle Optimization Toolset (NEVOT)—Final Paper. For presentation at the AIAA/	
		TINKER, M.L. ED20
		STEINCAMP, J.W. ED20
		STEWART, E.T. ED20
		PATTON, B.W. ED20
		PANNELL, W.P. ED20
		NEWBY, R.L. ED20
		COFFMAN, M.E. ED20
		QUALLS, A.L. Oak Ridge National Laboratory
		BANCROFT, S. Arnold Engineering
		MOLVIK, G. Arnold Engineering
		Nuclear Electric Vehicle Optimization Toolset (NEVOT): Integrated System Design Using Genetic Algorithms—Final Paper. For presentation at the Space Technology and Applications International Forum (STAIF 2004), Albuquerque, NM, February 8–12, 2004.
		TUCKER, D.S. SD71
		ETHRIDGE, E.C. SD71
		SMITH, G.A. UAH
		Low Gravity Rapid Thermal Analysis of Glass—Abstract Only. For presentation at the XX International Congress on Glass, Kyoto International Conference Hall, Kyoto, Japan, September 26–October 1, 2004.
		TUCKER, D.S. SD71
		SMITH, G.A. UAH
		The Effects of Gravity on the Crystallization Behavior of Heavy Metal Fluoride Glasses—Abstract Only. For publication in the <i>Progress in Materials Science</i> (Book Chapter), 2004.
		TUCKER, K. TD64
		WEST, J. TD64
		WILLIAMS, R. TD64
		LIN, J. TD64
		ROCKER, M. TD64
		CANABAL, F. TD64
		ROBLES, B. TD64
		GARCIA, R. TD64
		CHENOWETH, J. CRAFT Tech
		Using CFD as a Rocket Injector Design Tool: Recent Progress at Marshall Space Flight Center—Final Paper. For presentation at the 5th International Symposium on Liquid Space Propulsion Long Life Combustion Devices Technology, Chattanooga, TN, October 27–30, 2003.
		TURNER, M.B. University of Alabama/SD46
		HOLBREY, J.D. University of Alabama
		SPEAR, S.K. University of Alabama
		PUSEY, M.L. SD46
		ROGERS, R.D. University of Alabama/SD46

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
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- Effect of Oxygen-Containing Functional Groups on Protein Stability in Ionic Liquid Solutions—Abstract Only. For publication in the American Chemical Society Symposium Series Book, 2004.
- TURNER, S. XP01  
X-37 Project Lessons Learned: Maximizing Knowledge to Improve Space Transportation System Development—Presentation. For presentation at the NASA Academy of Program and Project Leadership, Baltimore, MD, August 9–11, 2004.
- TURPIN, J.B. TD53  
Variable Step Integration Coupled With the Method of Characteristics Solution for Water-Hammer Analysis, A Case Study—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.
- VALENTINE, P.G. ED34  
MEYER, D. ED34  
SNOW, H. ED34  
Hot Structure Control Surface Progress for X-37 Technology Development Program—Abstract Only. For publication in Aerospace America, 2004.
- VAN DER WOERD, M.J. SD46  
DNA in a Tunnel: A Comfy Spot for Recognition—or The Structure of BsoBI complexed With DNA—What Can We Learn About Function Via Structure Determination and How Can This Be Applied to Bone or Muscle Biology?—Abstract Only. For presentation at an Invited Talk at Johnson Space Center, Houston, TX, March 26, 2004.
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MARTIN, J.J. TD40  
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- VAN PELT, M. ESA-ESTEC  
HUNT, C.D. TD31  
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- VAUGHAN, W.W. UAH  
ANDERSON, B.J. ED44  
Aerospace Meteorology Lessons Learned Relative to Aerospace Vehicle Design and Operations—Final Paper. For presentation at the 11th AMS Conference on Aviation, Range, and Aerospace Meteorology, Hyannis, MA, October 4–8, 2004.
- VAUGHN, J.A. ED31  
CURTIS, L. ED31  
GILCHRIST, B.E. University of Michigan  
BILEN, S. Pennsylvania State University  
LORENZINI, E. Smithsonian Astrophysics  
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- VAUGHN, J.A. ED31  
SCHNEIDER, T.A. ED31  
POLK, J. Jet Propulsion Laboratory  
GOEBEL, D. Jet Propulsion Laboratory  
OHLINGER, W. Consultant  
HILL, D.N. Georgia Institute of Technology  
NEXIS Reservoir Cathode 2000 Hour Life Test—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.
- VINE, F.J. Accurate Automation  
MANKOWSKI, J.J. Accurate Automation  
SAEKS, R.E. Accurate Automation  
CHOW, A.S. TD40  
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube—Final Paper. For presentation at the JANNAF Conference, Colorado Springs, CO, December 1–5, 2003.
- VOLZ, M.P. SD46  
Semiconductor Crystal Growth in Static and Rotating Magnetic Fields—Abstract Only. For publication in Proceedings of the International Workshop on Materials Analysis & Processing in Magnetic Fields, Tallahassee, FL, March 7–10, 2004, and for presentation at The International Workshop on Materials Analysis and Processing in Magnetic Fields, Tallahassee, FL, March 17–19, 2004.
- VOLZ, M.P. SD46  
WALKER, J.S. University of Illinois  
SCHWEIZER, M. USRA/SD46/Schott Glas  
COBB, S.D. SD46

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

SZOFRAN, F.R.	SD46	WEAVER, A.R.	SD60
Bridgman Growth of Germanium Crystals in a Rotating Magnetic Field—Abstract Only. For presentation at the International Conference on Crystal Growth 14, Grenoble, France, August 9–13, 2004.		KISSEL, D.E.	SD60
		CHEN, F.	SD60
		WEST, L.T.	SD60
		ADKINS, W.	SD60
		RICKMAN, D.	SD60
WACHTER, S.	SD50	LUVALL, J.C.	SD60
KOUVELIOTOU, C.	SD50	Mapping Soil Ph Buffering Capacity of Selected Fields in the Coastal Plain—Abstract Only. For publication in the Soil Science Society of American Journal, 2003.	
PATEL, S.K.	SD50		
TENNANT, A.F.	SD50	WEEKS, D.J.	TD04
WOODS, P.M.	SD50	WALKER, S.H.	DARPA
EICHLER, D.	SD50	SACKHEIM, R.L.	TD04
LYUBARSKY, Y.	SD50	Small Satellites and the DARPA/Air Force Falcon Program—Final Paper. For presentation at the International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.	
BOUCHET, P.	SD50		
The Precise Location of the Soft Gamma Repeater SGR 1627-41 With Chandra—Abstract Only. For publication in The Astrophysical Journal, 2003.		WEISSKOPF, M.C.	SD50
		Chandra Observations of Microquasars—Abstract Only. For presentation at the Fifth Microquasar Workshop, Beijing, China, June 7–13, 2004.	
WANG, T.-S.	TD64		
Transient Two-Dimensional Analysis of Side Load in Liquid Rocket Engine Nozzles—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004, and publication in the AIAA Journal of Propulsion and Power, 2004.		WEISSKOPF, M.C.	SD50
		The Chandra X-Ray Observatory: An Overview—Abstract Only. For presentation at the Topics in X-Ray Astronomy, Tubingen, Germany, February 23–25, 2004, and at The Electromagnetic Spectrum of Neutron Stars, Marmaris, Turkey, June 13–18, 2004.	
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		Chandra Overview—Abstract Only. For presentation at the Astronomical Telescopes and Instrumentation 2004, Glasgow, Scotland, June 21–25, 2004.	
WATSON, M.D.	ED12		
ASHLEY, P.R.	U.S. Army AMRDEC		
ABUSHAGUR, M.	Rochester Institute of Tech.	WEISSKOPF, M.C.	SD50
Modeling of Optical Waveguide Poling and Thermally Stimulated Discharge (TSD) Charge and Current Densities for Guest/Host Electro Optic Polymers—Final Paper. For publication in the IEEE Journal of Quantum Electronics, 2004.		Five Years of Operation of the Chandra X-Ray Observatory—Abstract Only. For publication in the Proceedings of the Astronomical Telescopes & Instrumentation 2004, Glasgow, Scotland, June 21–25, 2004.	
WATSON, M.D.	ED12	WEISSKOPF, M.C.	SD50
MINOW, J.	ED12	ALDCROFT, T.L.	SAO
ALTSTATT, R.	Jacobs Sverdrup	BAUTZ, M.	MIT
WERTZ, G.E.	ED12	CAMERON, R.A.	SAO
SEMMELE, C.L.	Qualis Corporation	DEWEY, D.	MIT
EDWARDS, D.L.	ED12	DRAKE, J.J.	SAO
ASHLEY, P.R.	U.S. Army Aviation	GRANT, C.E.	MIT
Space Application Requirements for Organic Avionics—Final Paper. For presentation at SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.		MARSHALL, H.L.	MIT
		MURRAY, S.S.	SAO
		An Overview of the Performance of the Chandra X-Ray Observatory—Abstract Only. For publication in the Journal of Experimental Astrophysics, 2004.	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

WEISSKOPF, M.C.	SD50	DAVIS, J.M.	SD50
ALDCROFT, T.L.	SD50	GARY, G.A.	SD50
CAMERON, R.A.	SD50	NOBLE, M.	SD50
GANDHI, P.	SD50	The Marshall Space Flight Center Solar Ultraviolet Magnetograph—Abstract Only. For presentation at and publication in Proceedings of SPIE Astronomical Telescopes & Instrumentation, Glasgow, Scotland, June 21–25, 2004.	
FOELLM, C.	SD50		
ELSNER, R.F.	SD50		
PATEL, S.K.	SD50		
O'DELL, S.L.	SD50		
The First Chandra Field: The Identification of Leon X-1—Abstract Only. For presentation at the 2004 Meeting of the High Energy Astrophysics Division of the American Astronomical Society, New Orleans, LA, September 8–11, 2004.		WESTRA, D.G.	ED25
		HEINRICH, J.C.	University of Arizona
		POIRIER, D.R.	University of Arizona
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WEISSKOPF, M.C.	SD50		
ALDCROFT, T.L.	Smithsonian Astrophysics		
CAMERON, R.A.	Smithsonian Astrophysics	WHORTON, M.S.	TD54
GANDHI, P.	European Southern Observatory	Closed Loop System Identification With Genetic Algorithms—Final Paper. For presentation at the AIAA GN&C Conference, Providence, RI, August 15–19, 2004.	
FOELLM, C.	European Southern Observatory		
ELSNER, R.F.	Smithsonian Astrophysics		
PATEL, S.K.	USRA		
O'DELL, S.L.	SD50	WHORTON, M.S.	TD54
Leon X-1, the First Chandra Source—Final Paper. For publication in The Astrophysical Journal, 2004.		Robust Control for the g-Limit Microgravity Vibration Isolation System—Final Paper. For publication in the Journal of Spacecraft and Rockets, 2004.	
WEISSKOPF, M.C.	SD50		
ELSNER, R.F.	SD50	WILSON, C.A.	SD50
RAMSEY, B.D.	SD50	The BATSE Earth Occultation Catalog—Abstract Only. For presentation at Beyond Einstein: From the Big Bang to Black Holes, San Mateo, CA, May 12–15, 2004.	
O'DELL, S.L.	SD50		
X-Ray Scattering Polarimeters: An Overview—Abstract Only. For presentation at the X-Ray Polarimetry Workshop, Stanford, CA, February 9–11, 2004.		WILSON, C.A.	SD50
		COE, M.J.	Southampton
WEISSKOPF, M.C.	SD50	FINGER, M.H.	SD50
WU, K.	University College London	WEISSKOPF, M.C.	SD50
TENNANT, A.F.	SD50	GREINER, J.C.	MPE
SWARTZ, D.A.	USRA/SD50	REIG, P.	University of Crete
GHOSH, K.K.	USRA/SD50	GRO J2058+42 Observations With Chandra and Detection of a Likely Optical Counterpart—Abstract Only. For presentation at and publication in Proceedings of the Meeting of the High Energy Astrophysics Division of the American Astronomical Society 2004, New Orleans, LA, September 8–11, 2004.	
On the Nature of the Bright Short-Period X-Ray Source in the Circinus Galaxy Field—Abstract Only. For publication in The Astrophysical Journal, 2003.			
WELLS, B.E.	UAH		
WEIR, J.	ED10	WILSON, C.A.	SD50
TREVINO, L.C.	ED10	WILSON, A.	SD50
PATRICK, C.	ED10	PENDLETON, N.	SD50
STEINCAMP, J.	ED10	FISHMAN, G.J.	SD50
Applying a Genetic Algorithm to Reconfigurable Hardware—Abstract Only. For presentation at the 36th Annual Southeastern Symposium on System Theory, Georgia Tech, Atlanta, GA, March 14–16, 2004.		Background Studies for EXIST—Abstract Only. For presentation at Beyond Einstein: From the Big Bang to Black Holes, San Mateo, CA, May 12–15, 2004.	
WEST, E.A.	SD50	WINGARD, C.D.	ED34
PORTER, J.G.	SD50	Characterization of Space Shuttle External Tank Thermal Protection System (TPS) Materials in Support of the	

MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION  
(Publicly available. Dates are conference dates.)

<i>Columbia</i> Accident Investigation—Abstract Only. For presentation at the North American Thermal Analysis Society Conference, Williamsburg, VA, October 4–6, 2004.		STEINBERG, J.T.	SD50
WOODCOCK, G.	Gray Research	SAKURAI, T.	SD50
BYERS, D.	SAIC	Differential Velocity Between Solar Wind Protons and Alpha Particles in Pressure Balance Structures—Abstract Only. For publication in the <i>Journal of Geophysical Research</i> , 2003, and for presentation at the Ulysses Science Working Team Meeting, Noordwijk, The Netherlands, April 22–23, 2004.	
ALEXANDER, L.A.	TD05	ZATESPIN, V.I.	Moscow State University
KREBSBACH, A.	TD05	ADAMS, J.H.	SD50
Advanced Chemical Propulsion Study—Final Paper. For presentation at the 2004 Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.		AHN, H.S.	University of Maryland
WRIGHT, K.H.	UAH	BASHINDZHAGYAN, G.L.	Moscow State U.
GARBE, G.	TD05	BATKOV, K.E.	Moscow State University
Plasma Measurement Strategies for Solar Sailcraft—Abstract Only. For presentation at and publication in Proceedings of the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.		CHANG, J.	Max Planck Institute
XIONG-SKIBA, P.	Austin Peay State University	CHRISTL, M.J.	SD50
HULGUIN, R.	Austin Peay State University	FAZELY, A.R.	Southern University
ENGELHAUPT, D.	UAH	GANEL, O.	University of Maryland
RAMSEY, B.D.	SD50	ET AL.	
Electrocomposite of Alumina in Nickel Matrix—Abstract Only. For presentation at the 205th Meeting of the Electrochemical Society, San Antonio, TX, May 9–13, 2004.		The Silicon Matrix as a Charge Detector in the ATIC Experiment—Abstract Only. For publication in <i>Nuclear Instruments and Methods</i> , 2004.	
YAMAUCHI, Y.	SD50/NRC	ZENG, W.	UAH
MOORE, R.L.	SD50	HORWITZ, J.L.	UAH
SUESS, S.T.	SD50	CRAVEN, P.D.	SD50
WANG, H.	NJIT/BBSO	RICH, F.J.	Air Force Research Laboratory
SAKURAI, T.	National Astronomical Observatory	MOORE, T.E.	Goddard Space Flight Center
Macrospicules, Coronal Heating, and Solar-B—Abstract Only. For publication in Proceedings of the Fifth Solar-B Science Meeting, Tokyo, Japan, November 14, 2003.		The O+ Density Trough at 5000 km Altitude in the Polar Cap—Abstract Only. For publication in the <i>Journal of Geophysical Research</i> , 2003.	
YAMAUCHI, Y.	SD50	ZIMMERMAN, F.R.	ED33
SUESS, S.T.	SD50	Vacuum Plasma Spray Forming of Tungsten Lorentz Force Accelerator Components—Abstract Only. For presentation at the National Space and Missile Materials Symposium, Seattle, WA, June 20–25, 2004.	

## INDEX

### TECHNICAL MEMEORADUM

BAILEY, J.W. ....	1	NABORS, S. ....	3
BROWN, T.M. ....	3	NGUYEN, H. ....	1
CAMPBELL, J.W. ....	2, 3	ROBINSON, M.B. ....	1
CARRUTH, M.R. ....	2, 3	RUSSELL, C.K. ....	2
CATO, S.N. ....	2	SMALLEY, L. ....	3
CURRERI, P.A. ....	1	STANLEY, D.C. ....	1
EDWARDS, D.L. ....	3	STEEVE, B.E. ....	2
FAZAH, M. ....	1	SUGGS, R.J. ....	3
FINCHUM, A. ....	3	SUMMERS, F.G. ....	4
FLACHBART, R.H. ....	1	VAN DYKE, M.K. ....	1
FOWLER, B.A. ....	1	WATSON, D.W. ....	3
FREESTONE, T.M. ....	2	ZIMMERMAN, R. ....	3
GAMWELL, W.R. ....	3		
HAINES, S.L. ....	3	<b>TECHNICAL PUBLICATION</b>	
HASTINGS, L.J. ....	1, 3	ADAMA, R.B. ....	5
HEDAYAT, A. ....	1, 3	ADAMS, R.B. ....	5
HOUTS, M.G. ....	1	ALEXANDER, R.A. ....	5
HOWARD, R.T. ....	3	ANDERSON, B.J. ....	6
HUFF, T.L. ....	1	BONEMETTI, J. ....	5
HUSTON, D. ....	3	CAMPBELL, A. ....	7
ILA, D. ....	3	CHAPMAN, J.M. ....	5
JEDLOVEC, G.J. ....	3	DELAMERE, P. ....	6
JOHNSTON, N.A.S. ....	3	FINCHER, S.S. ....	5
KAPERINICK, R.J. ....	2	HATHAWAY, D.H. ....	5, 6
LAK, T. ....	1	HOPKINS, R.C. ....	5
MALONE, T.W. ....	2	KABIN, K. ....	6
MARTIN, J.J. ....	1	KALKSTEIN, M. ....	5
MAXWELL, G. ....	3	KHAZANOV, G.V. ....	6
MUNTELE, C. ....	3	KRIEG, J. ....	7
MUNTELE, I. ....	3	LINDE, T.J. ....	6
MURPHY, K.L. ....	1	LITCHFORD, R.J. ....	5, 6
MURPHY, N.C. ....	3	MARSHALL, P. ....	7

MCCALED, R.C. ....	6	FREEMAN, L.M. ....	9
MESSENGER, S.R. ....	7	KARR, G. ....	9
MORTIN, T.L. ....	7	MANDELL, M.J. ....	9
PATTON, B.W. ....	5	MCNULTY, P.J. ....	9
PHILIPS, A.D. ....	5	NASH-STEVENSON, S.K. ....	9
POLSGROVE, T.T. ....	5	THOMSEN, M.F. ....	9
REEVES, M. ....	7		
ROBERTS, F.E. ....	5		
SCHMEICHEL, W. ....	7		
STATHAM, G. ....	5		
THIO, Y.C.F. ....	5		
TITUS, J. ....	7		
TURLINGER, T. ....	7		
WALTERS, R.J. ....	7		
WHITE, P.S. ....	5		
WILSON, R.M. ....	5, 6		

**MSFC ABSTRACTS, ARTICLES, PAPERS,  
AND PRESENTATIONS CLEARED  
FOR DISSEMINATION**

ABBAS, M.M. ....	11, 23, 40
ABUSHAGUR, M. ....	23, 52
ACHTERBERG, R.K. ....	11, 23, 40
ADAMEK, D.H. ....	28, 46
ADAMS, C.W. ....	11
ADAMS, J.H. ....	11, 17, 40, 47, 54
ADAMS, M. ....	11
ADE, P. ....	23
ADKINS, W. ....	18, 52
ADRIAN, M.L. ....	11, 24
AFFLECK, D.L. ....	33
AGGARWAL, P.K. ....	12
AHN, H.S. ....	11, 17, 40, 47, 54
ALBARDO, T. ....	28
ALBYN, K. ....	11, 14, 15
ALDCROFT, T.L. ....	52, 53
ALEXANDER, L.A. ....	31, 54
ALHORN, D.C. ....	12
ALLEN, P.A. ....	12
ALRED, J. ....	11
ALSTATT, R.L. ....	37
ALTINO, K.M. ....	12
ALTSTATT, R. ....	52
ANDERSON, B.J. ....	51
ANILKUMAR, A.V. ....	12, 26
ANTIPIN, M.Y. ....	38

**CONFERENCE PUBLICATIONS**

CHRISTENSEN, C.B. ....	8
COOK, M.B. ....	8
CROSS STANLEY, D. ....	8
GEORGE, P. ....	8
HOWELL, J.T. ....	8
MANKINS, J.C. ....	8
MARZWELL, N. ....	8
MINOR, J.L. ....	8
MULLINS, C.A. ....	8
O'NEIL, D.A. ....	8

**CONTRACTOR REPORTS**

BLAND, J. ....	9
BRAUTIGAM, D.H. ....	9
DAVIS, V.A. ....	9
FREDERICKSON, A.R. ....	9



APPLE, J. ....	26	BENGTSON, R. ....	18
ARAKERE, N.K. ....	12	BERNHARDSDOTTER, E.C.M.J. ....	13
ARMSTRONG, J. ....	16	BESHEARS, R. ....	45
ARZOUMANIAN, Z. ....	13	BEST, S. ....	39
ASHCROFT, P. ....	25	BEZARD, B. ....	23
ASHLEY, P.R. ....	32, 52	BHARDWAJ, A. ....	13, 21
ASTAFIEVA, M.M. ....	12	BHOWMICK, J. ....	12
AVANOV, L.A. ....	12	BIAZAR, A. ....	39
BACHMANN, K. ....	16	BILEN, S. ....	51
BAGDIGIAN, B. ....	17	BISHOP-BEHEL, K. ....	31
BAGGETT, R.M. ....	31	BJORAKER, G. ....	11
BAILEY, J.C. ....	14, 15, 25, 36	BJORAKER, G.L. ....	23
BALASUBRAMANIAN, S. ....	18, 22	BLACKWELL, W.C. ....	14
BALLARD, R. ....	12	BLAKESLEE, R.J. ....	14, 15, 17, 25, 29, 36
BAN, H. ....	12, 34, 35	BLANDFORD, R. ....	34
BANCROFT, S. ....	50	BLEVINS, J.A. ....	14
BARBER, W.C. ....	41	BLUME, J.L. ....	14
BARCZY, P. ....	49	BOCCIO, D. ....	16
BARNES, R.J. ....	23	BOCCIPPIO, D.J. ....	14
BARUCCI, A. ....	23	BOEDER, P. ....	14
BASHINDZHAGYAN, G.L. ....	11, 17, 40, 47, 54	BONAMENTE, M. ....	14, 38
BASSLER, J.A. ....	19	BONOMETTI, J.A. ....	31
BATKOV, K.E. ....	11, 17, 40, 47, 54	BOOK, M.L. ....	29
BAUTZ, M. ....	52	BOOTHE, R. ....	16
BEARD III, J.W. ....	16	BORGSTAHL, G. ....	35
BEAUMONT, B. ....	25	BORS, K. ....	20, 43
BECKER, W. ....	13	BOUCHET, P. ....	52
BEDARD, J. ....	17	BOWDLE, D.A. ....	39
BEECHER, E.A. ....	32	BRADFORD, R.N. ....	14, 15
BEISSER, K.B. ....	23	BRADSHAW, R.C. ....	30
BEJ, A. ....	41	BRADSHAW, T. ....	31, 34
BELCHER, J.A. ....	13	BRAGG-SITTON, S.M. ....	15
BELLAMY, H. ....	35	BRANDT, P.C. ....	35
BEMPORAD, A. ....	42, 49	BRANDUARDI-RAYMONT, G. ....	13, 15
BENEFIELD, M.P.J. ....	13	BRASUNAS, J.C. ....	23
BENFORD, A. ....	13	BREIZMAN, B. ....	18
BENFORD, D.J. ....	48	BRIDGE, K. ....	28

BRIGGS, M.S. ....	41	CASIANO, M.J. ....	17
BRISCOE, J.M. ....	15, 19	CATALINA, A.V. ....	17
BRODERICK, D.J. ....	15	CECIL, D.J. ....	14, 17, 29
BROOKMAN, S. ....	27	CHANDLER, M.O. ....	12, 19
BROW, R.K. ....	43	CHANG, H. ....	17, 47
BROWN, A.M. ....	15	CHANG, J. ....	11, 17, 40, 47, 54
BROWN, K.K. ....	41	CHANG, S.-W. ....	13, 18
BRUBAKER, N. ....	15	CHANG-DIAZ, F. ....	18
BRYAN, T.C. ....	29	CHAVERS, G. ....	18
BUECHLER, D.E. ....	14, 15, 25	CHEN, F. ....	18, 52
BURKS, J. ....	31, 34	CHENOWETH, J. ....	50
BURNS, H. ....	15	CHERNOV, A.A. ....	18, 29
BURNS, L. ....	16	CHIANESE, S. ....	14
BURRIS, J. ....	39	CHOU, S.-H. ....	18
BUTLER, C. ....	16	CHOUDHARY, D.P. ....	18, 27
BYBERG, A. ....	48	CHOW, A.S. ....	51
BYERS, D. ....	54	CHRISTENSEN, D.L. ....	23
CAI, D.S. ....	39	CHRISTIAN, H. ....	25
CAMERON, R.A. ....	14, 52, 53	CHRISTIAN, H.J. ....	15, 19
CAMILO, F. ....	13	CHRISTL, M.J. ....	11, 17, 19, 41, 47, 54
CAMPBELL, B.A. ....	24	CHU, Y.S. ....	29
CAMPBELL, J. ....	16	CISSOM, R.D. ....	19
CAMPBELL, J.W. ....	16	CISZAK, E.M. ....	19, 20, 21, 33, 36, 42, 50
CANABAL, F. ....	50	CLANTON, S.E. ....	28
CANFIELD, S. ....	16	CLARK, D.W. ....	44
CANNING, F.X. ....	16	CLAYTON, L. ....	19
CARDELINO, B.H. ....	38	CLINTON, JR., R.G. ....	19
CARDELINO, C.A. ....	16	CLOUD, D. ....	17
CARDELINO, H. ....	16	COBB, S.D. ....	40, 51
CARLSTROM, J.E. ....	14	COE, M.J. ....	53
CARPENTER, P.K. ....	16, 24	COFFEY, V.N. ....	19
CARRASQUILLO, R.L. ....	17	COFFMAN, M.E. ....	50
CARRIER, M. ....	17	COHEN, C. ....	37
CARRINGTON, C.K. ....	17	COHEN, T. ....	28
CARTER, L. ....	17	COLAFRANCESCO, S. ....	38
CARTER, R. ....	45	COLE, J. ....	16
CASAS, J. ....	38	COMARAZAMY, D.E. ....	25

CONNAUGHTON, V. ....	41	DECKER, R. ....	16
CONOVER, H. ....	25	DECKER, R.K. ....	20
CONRATH, B.J. ....	11, 23, 40	DECREAU, E. ....	20
CONWAY, D. ....	25	DEMBEK, S. ....	34
COOK, B. ....	45	DENTON, M.H. ....	35
COOK, M.B. ....	19	DESCH, M.D. ....	36
COOK, S.A. ....	19	DETKOVA, E.N. ....	20
COOKE, W.J. ....	19, 37, 50	DEVERAPALLI, C. ....	24
COOPER, A.E. ....	41	DEWEY, D. ....	52
COOPER, J.F. ....	22	DE YOREO, J.J. ....	18
CORDER, E.L. ....	15, 19	DE KEYSER, J. ....	20
COSTEN, J. ....	29, 46	DIETZ, N. ....	16
COX, M.D. ....	36	DOBSON, C. ....	20
CRAFT, M.A. ....	29	DOMINIAK, P.M. ....	19, 20, 21
CRAIG, W.W. ....	41	DORNEY, D.J. ....	21
CRAVEN, P.D. ....	11, 19, 47, 54	DRAKE, J.J. ....	49, 52
CRAVENS, T. ....	21	DUDLEY, M. ....	49
CRAVENS, T.E. ....	13	DUKE, G.C. ....	12
CROW, R.W. ....	32	DUMAS II, J.D. ....	27
CRUZ, A. ....	20, 43	DUMBACHER, D.L. ....	21
CRUZEN, C. ....	20	DUVALL, A.L. ....	31, 32
CUNTZ, M. ....	20	DYER, S. ....	20
CURRERI, P.A. ....	20	EDWARDS, D.L. ....	11, 16, 21, 28, 33, 52
CURTIS, L. ....	51	EICHLER, D. ....	52
CURTIS, S.S. ....	44	ELAM, S.K. ....	23
DARDEN, C. ....	15, 25, 34	ELANDER, V. ....	21
DARROUZET, F. ....	20	ELLIOTT, H.A. ....	42
DAVIDSON, G. ....	28	ELLIS, D.L. ....	45
DAVIDSON, J.L. ....	39	ELSNER, R.F. ....	13, 15, 21, 22, 43, 49, 53
DAVIS, E. ....	30	EMERSON, C.W. ....	22
DAVIS, J.M. ....	53	EMOTO, K. ....	12
DAVIS, R.N. ....	20	EMRICH, W.J. ....	22
DAVIS, S.E. ....	20	ENG, R. ....	22, 27
DAVIS, V.A. ....	38	ENGBERG, R.C. ....	22
DAY, D.E. ....	24, 43	ENGEL, C.D. ....	20
DAY, G. ....	17, 28	ENGEL, H.P. ....	24
DEACON, A.M. ....	47	ENGELHAUPT, D. ....	22, 43, 54

ENGLISH, J.M. ....	23	GANGOPADHYAY, A.K. ....	30, 34
ESKRIDGE, R. ....	33, 36	GARBE, G. ....	16, 24, 54
ESTES, H. ....	22	GARCIA, R. ....	24, 50
ETHRIDGE, E.C. ....	50	GARDNER, B. ....	38
EVANS, S.W. ....	22, 48	GARRIOTT, O.K. ....	13
EWING, A. ....	16	GARY, G.A. ....	22, 24, 34, 53
FALCONER, D.A. ....	11, 18, 22, 38	GATLIN, P.N. ....	15, 24
FARR, R.A. ....	23	GATTIS, C.B. ....	29
FARRELL, W.M. ....	36	GAVIRA, J.A. ....	42
FARROW, J.L. ....	23	GAVIRA-GALLARDO, J.A. ....	46
FAZELY, A.R. ....	11, 18, 41, 47, 54	GEPPERT, U. ....	33
FEINBERG, L.D. ....	48	GERMANY, G. ....	24, 36, 48
FERGUSON, C.K. ....	23	GEVEDEN, R.D. ....	24, 45
FERGUSON, D. ....	46	GHOSH, K.K. ....	49, 53
FIETKIEWICZ, K. ....	40	GIERASCH, P.J. ....	23
FIMOGNARI, P. ....	33, 36	GIERLOTKA, S. ....	40
FINCHUM, C. ....	16	GILCHRIST, B.E. ....	51
FINCKENOR, M. ....	14, 16, 33	GILL, L. ....	28
FINGER, M.H. ....	24, 53	GILLANI, N. ....	39
FISHMAN, G.J. ....	23, 39, 53	GILLIES, D.C. ....	24
FLANDRO, G.A. ....	23	GLADSTONE, G.R. ....	13, 15, 21
FLASAR, F.M. ....	11, 23	GODFROY, T.J. ....	15
FOELLM, C. ....	53	GOEBEL, D. ....	51
FOK, M.-C. ....	32	GOGUS, E. ....	24
FORBES, J.C. ....	23	GOLDBERG, R. ....	23
FORD, P. ....	21	GOLDBERG, R.A. ....	36
FORK, R. ....	29	GOLDMAN, A. ....	25
FORSBACKA, M. ....	15	GONZALEZ, J.E. ....	25
FORSYTHE, E.L. ....	23, 25	GOODMAN, D.D. ....	25
FOUCHET, T. ....	40	GOODMAN, H.M. ....	25, 32
FOX, N.J. ....	23	GOODMAN, S.J. ....	12, 14, 15, 24, 25
FULLER, K.A. ....	23, 39, 47	GORTI, S. ....	23, 25
FUSS, T. ....	24	GOSTOWSKI, R. ....	14, 25, 26
GALLAGHER, D.L. ....	11, 18, 19, 20, 24, 32, 35, 39, 47	GOUDY, R. ....	45
GAMAYUNOV, K.V. ....	32	GOWDA, S. ....	44
GANDHI, P. ....	53	GRADY, C.A. ....	49
GANEL, O. ....	11, 18, 41, 47, 54	GRANOT, J. ....	43

GRANT, C.E. ....	52	HAWKINS, L. ....	25
GRAVES, R. ....	30	HEATON, A.F. ....	24, 28, 36
GRAVES, S. ....	30	HEDEDAL, C. ....	39
GRAY, P.A. ....	21	HEFNER, K. ....	28
GREENE, W.D. ....	37	HEINRICH, J.C. ....	53
GREENWALD, R. ....	18	HENDEN, A.A. ....	33
GREGG, M.W. ....	26	HENDERSON, M.G. ....	35
GREGORY, D.A. ....	26	HENDERSON, S.J. ....	28
GREINER, J.C. ....	26, 33, 53	HENLEY, M.W. ....	28
GRIFFIN, L. ....	24	HEREFORD, J. ....	28
GRIGOREVSKI, A. ....	32	HERREN, K.A. ....	26, 28
GRODENT, D. ....	21	HERRMANN, M. ....	31
GRUGEL, R.N. ....	12, 26	HEYSFIELD, G. ....	17, 29
GRZANKA, E. ....	40	HICKS, E.D. ....	23
GUBAREV, M. ....	26, 43	HILL, D.N. ....	51
GUDIMENKO, Y. ....	32	HO, F.D. ....	36
GUENTHER, E. ....	33	HOFFMAN, R.A. ....	23
GUILLORY, A.R. ....	26, 32	HOGUE, W. ....	22, 27
GWALTNEY, D. ....	28	HOLBREY, J.D. ....	50
HADAWAY, J. ....	22, 27	HOLLADAY, J.B. ....	28, 44
HAINES, S. ....	31	HOLLERMAN, W. ....	21, 28
HAINES, S.L. ....	27, 31, 49	HOLMES, A. ....	16, 29
HALE, J. ....	27	HOLT, J.M. ....	28, 34
HALE, J.P. ....	44	HONG, Y.-S. ....	28, 36, 42
HALL, C.E. ....	27	HONKANEN, E. ....	50
HALL, J. ....	14, 25	HOOD, R.E. ....	17, 29, 32
HAM-BATTISTA, G. ....	12	HOOVER, R.B. ....	12, 20, 29, 41, 45, 49
HAMILTON, G.S. ....	11, 27, 28	HOPPE, D.T. ....	21
HANSON, B. ....	42	HORWITZ, J.L. ....	54
HANSON, J.M. ....	27	HOURLIER-BAHLOUL, D. ....	46
HARDAGE, D. ....	32	HOUSER, J.G. ....	36
HARDEE, P. ....	39	HOUSTON, J. ....	29
HARDIN, D. ....	30	HOUTS, M. ....	48
HARTMANN, D.H. ....	26, 33	HOVATER, M. ....	21, 48
HASAGAWA, B.H. ....	41	HOWARD, R.T. ....	15, 29, 44
HATHAWAY, D.H. ....	27, 38	HOWELL, J.T. ....	17, 28, 29
HAWK, C.W. ....	22, 33	HOWSMAN, T.G. ....	29

HRBUD, I. ....	20	JONGEWARD, G.A. ....	46
HU, Z.W. ....	29	JOY, M.K. ....	14
HUANG, T.S. ....	18	JUDGE, R.A. ....	31
HUBBS, W.S. ....	21, 28	JUSTUS, C.G. ....	31, 32
HULCHER, A.B. ....	30	KAASTRA, J. ....	14
HULGUIN, R. ....	54	KAKAR, R. ....	29, 32
HUNG, C.-C. ....	24	KALISZ, G. ....	40
HUNT, C.D. ....	51	KANBACH, G. ....	13
HUTCHENS, C. ....	30	KAPER, L. ....	45
HYERS, R.W. ....	30, 34, 43	KAPERNICK, R.J. ....	15, 48
ICE, B. ....	16	KARR, L. ....	28
ICE, G.E. ....	39	KAUFFMAN, B. ....	32, 37
IRWIN, D.E. ....	30, 46	KELLER, V.W. ....	16, 31, 32
IRWIN, P.G.J. ....	40	KELTON, K.F. ....	25, 30, 34, 43
ISKANDEROVA, Z.A. ....	32	KEPHART, R. ....	31
JAAP, J. ....	30	KERSLAKE, T.W. ....	46
JACOBSON, D. ....	30	KESTER, T. ....	26
JAHN, J.M. ....	35	KEYS, A.S. ....	32
JAMES, B.F. ....	31	KHAZANOV, G.V. ....	24, 32, 35, 47, 48
JANSEN, H. ....	20	KIESSLING, E. ....	32
JEDLOVEC, G.J. ....	15, 17, 18, 25, 27, 30, 31, 49	KIM, C.W. ....	43
JERMAN, G. ....	29, 46	KING, D.A. ....	45
JESSNER, A. ....	13	KIRKPATRICK, C. ....	37
JOHNSON, D.L. ....	31	KISSEL, D.E. ....	18, 43, 52
JOHNSON, L. ....	31, 38	KLEIMAN, J.I. ....	32
JOHNSON, R. ....	40	KLOSE, S. ....	26, 33
JOHNSON, R.E. ....	22	KNOX, J.C. ....	33
JOHNSON, S. ....	39	KNUDSEN, E.C. ....	12
JOHNSTON, A.S. ....	29	KNUPP, K.R. ....	12, 39, 44
JONES, C. ....	11	KNUTESON, D. ....	49
JONES, J. ....	37	KO, Y. ....	42
JONES, J. ....	47	KOBELL, W. ....	33
JONES, J.E. ....	36	KOELFGEN, S.J. ....	33, 36
JONES, P.R. ....	31	KOIDE, S. ....	39
JONES, R.E. ....	27	KOLODZIEJCZAK, J.J. ....	33, 43
JONES, S. ....	25	KONNERT, J. ....	25
JONES, W. ....	26	KOONTZ, S. ....	14

KOROTCHKINA, L.G. ....	33, 36	LI, C. ....	12, 34, 35, 49
KOS, L.D. ....	50	LIEMOHN, M.W. ....	24, 32, 35
KOSHAK, W. ....	21, 25, 33	LIEU, R. ....	14
KOUVELIOTOU, C. ....	24, 26, 33, 34, 43, 45, 52	LIN, B. ....	12, 35
KOZYRA, J.U. ....	35	LIN, D. ....	42
KRADER, P. ....	41	LIN, J. ....	28, 50
KREBSBACH, A. ....	54	LISOTTA, A.J. ....	14, 15
KRIVORUTSKY, E.N. ....	32	LITCHFORD, R.J. ....	35
KRUCKER, S. ....	18	LIU, W. ....	39
KUDOH, T. ....	39	LIU, Z.-J. ....	42
KULPA, V. ....	34	LO, Y. ....	45
KUNDE, V.G. ....	11, 23	LOBL, E. ....	25
LA CASSE, K. ....	15	LONDON III, J.R. ....	23, 45
LAFONTAINE, F.J. ....	17, 27, 29	LORENZINI, E. ....	51
LAI, B. ....	29	LORIMER, D. ....	13
LAM, S.-N. ....	22	LOVELACE, J. ....	35
LAPENTA, W.M. ....	17, 18, 25, 34	LU, H.-L. ....	44
LAROQUE, S. ....	14	LUGAZ, N. ....	21
LEACH, R. ....	20	LUGINBUHL, C.B. ....	33
LEAHY, F.B. ....	34	LUKENS, C. ....	34
LECLAIR, A. ....	11, 40	LUO, Q. ....	44
LEE, C.P. ....	26	LUVALL, J.C. ....	18, 25, 42, 43, 52
LEE, G.W. ....	30, 34	LUZ, P. ....	26
LEE, J.A. ....	34	LYUBARSKY, Y. ....	52
LEE, J.K. ....	11, 34	MACH, D.M. ....	17, 36
LEE, M. ....	33, 36	MACLEOD, T.C. ....	36
LEHNER, D. ....	26	MADDOX, W. ....	36, 48
LEHOCZKY, S.L. ....	12, 35, 49	MAJDALANI, J. ....	23
LEIMKUEHLER, T.O. ....	34	MAJEED, T. ....	13
LEISAWITZ, D.T. ....	48	MAJEED, T.E. ....	21
LEMAIRE, J.F. ....	20	MAJUMDAR, A. ....	36
LEMBEGE, B. ....	39	MAKAL, A. ....	36
LENTZ, M. ....	28	MALONE, C.C. ....	28
LESHER, C.E. ....	24	MALONE, R.W. ....	36
LESLIE, F.W. ....	42	MANDELL, M. ....	38
LEVAN, A. ....	34	MANGUS, D. ....	36
LEWIS, J. ....	17	MANKINS, J.C. ....	29, 40

MANKOWSKI, J.J. ....	51	MELCHER, C. ....	16
MARCU, B. ....	21	MENDE, S. ....	18
MARKS, F. ....	29	MENDE, S.B. ....	48
MARKUSIC, T.E. ....	36	METZGER, A.E. ....	13
MARKWARDT, C.B. ....	25	MEYER, D. ....	51
MARSHALL, H.L. ....	52	MEYER, P.J. ....	27
MARSHALL, S. ....	44	MIKATARIAN, R. ....	14
MARSIC, D. ....	41	MIKELLIDES, I.G. ....	46
MARTIN, A. ....	33, 36	MILLER, J. ....	19
MARTIN, J.J. ....	36, 37, 51	MILLER, M.D. ....	47
MARTIN, M.A. ....	37, 39	MILLER, T. ....	28
MARZWELL, N.I. ....	19	MINAMITANI, E.F. ....	37
MASETTI, N. ....	33	MINOR, J. ....	32
MASK, P. ....	43	MINOW, J.I. ....	14, 37, 38, 52
MASON, R. ....	17	MITCHELL, B. ....	37
MASSON, A. ....	20	MITCHELL, D.W. ....	37
MATSON, D.M. ....	30	MOHAROS, J. ....	23
MAXWELL, T. ....	30	MOLVIK, G. ....	50
MAY, G. ....	37	MONACO, L. ....	37
MAYNE, A.W. ....	23	MONTGOMERY, S.E. ....	31
MAZURUK, K. ....	37	MONTGOMERY IV, E.E. ....	24, 38
MAZZALI, P.A. ....	43	MOORE, C.E. ....	16, 38
MCCALL, S.D. ....	16	MOORE, R.L. ....	18, 22, 24, 38, 49, 54
MCCARTY, W. ....	18	MOORE, T.E. ....	19, 23, 54
MCCAUL, E. ....	25	MORRIS, C.E.K. ....	19
MCCAUL, JR., E.W. ....	14, 15, 37	MORRIS, C.I. ....	38
MCCLYMER, J.P. ....	46	MOSER, D. ....	19
MCCOLLUM, M. ....	37	MOSES, K. ....	36
MCDANIELS, D.M. ....	45	MOTAKEF, S. ....	40, 42
MCGHEE, D.S. ....	15	MULLOTH, L.M. ....	33
MCNAMARA, H. ....	37	MULQUEEN, J.A. ....	27
MCNEAL, JR., C.I. ....	37	MURPHY, L. ....	44
MCNIDER, R.T. ....	39	MURRAY, S.S. ....	52
MECIKALSKI, J.R. ....	18	NALL, M.E. ....	38
MEEGAN, C.A. ....	37, 41	NANDY, D. ....	27
MEHROTRA, A. ....	14	NEERGAARD, L.F. ....	37, 38
MEINHOLD, A. ....	37	NEHLS, M.K. ....	21



NELSON, JR., T.R. ....	32	PANNELL, B. ....	40
NERNEY, S. ....	49	PANNELL, W.P. ....	50
NESTEROV, V.N. ....	38	PANOV, A.D. ....	40
NESTEROV, V.V. ....	38	PARKER, J.H. ....	32
NETTLES, A.T. ....	38	PARKINSON, D.A. ....	41
NEVALAINEN, J. ....	38	PARRISH, P.D. ....	40
NEWBY, R.L. ....	50	PATEL, M.S. ....	33, 36
NEWCHURCH, M.J. ....	39	PATEL, S.K. ....	25, 34, 43, 52, 53
NEWELL, P.T. ....	18	PATRICK, C. ....	53
NEWMAN, T.S. ....	32, 34, 39	PATRICK, M.C. ....	41
NEWTON, R.L. ....	39	PATTON, B.W. ....	50
NG, J.D. ....	13, 42	PEARSON, J.B. ....	47
NGUYEN, H.H. ....	37, 39	PECK, J. ....	41
NICHOLS, K.F. ....	39	PEDDIESON, J. ....	16
NISHIKAWA, K.I. ....	39	PENDLETON, N. ....	53
NIX, M. ....	40	PERRIN, D.J. ....	41
NIXON, C.A. ....	11, 23, 40	PERRY, J.L. ....	17, 45, 50
NOBLE, M. ....	53	PESAVENTO, P. ....	16
NORDIN, G.P. ....	23	PETERSEN, W.A. ....	14
NORDLEY, G.D. ....	44	PETERSON, T. ....	46
NUNES, JR., A.C. ....	40, 45, 46	PETERSON, W.A. ....	14
O'CONNOR, E. ....	17	PHANORD, D. ....	21
O'DELL, S.L. ....	14, 26, 43, 53	PHIPPS, C. ....	16
O'NEIL, D.A. ....	29, 40	PICON, A. ....	25
O'NEILL, M. ....	29	PIKUTA, E.V. ....	20, 29, 41
OELGOETZ, P. ....	40	PIVOVAROFF, M.J. ....	41
OGLESBY, R. ....	44	POIRIER, D.R. ....	53
OHLINGER, W. ....	51	POJOGA, S. ....	18
OOI, T.K. ....	22	POLETTO, G. ....	41, 42, 49
OOSTERBROEK, T. ....	38	POLITES, M.E. ....	20
OSTGAARD, N. ....	13	POLK, J. ....	51
OVERBEY, B.G. ....	40	POPP, C.G. ....	42
OWEN, T. ....	11	PORTER, J.G. ....	38, 53
PAKHOMOV, A.V. ....	28	POTTER, R. ....	36, 42
PALAZZI, E. ....	26	POWERS, W.T. ....	41
PALOSZ, B. ....	40	PRAISSMAN, J. ....	42
PANDEY, A.B. ....	40	PREECE, R. ....	39

PRESSON, K. ....	42	RICHMOND, R.C. ....	20, 43
PRICE, M.W. ....	42	RICKMAN, D. ....	18, 25, 43, 52
PUSEY, M.L. ....	13, 23, 25, 37, 42, 50	RIDLEY, A.J. ....	32, 35
QUALLS, A.L. ....	50	RIES, C. ....	33
QUATTROCHI, D.A. ....	22, 42	RITCHIE, S.M.C. ....	44
QUINN, J.E. ....	42	ROADS, J. ....	44
RAGHOTHAMACHAR, B. ....	49	ROBERTS, B.C. ....	40, 44
RAKOCZY, J. ....	50	ROBERTSON, B. ....	44
RAMACHANDRAN, N. ....	42	ROBERTSON, F.R. ....	44
RAMIREZ-RUIZ, E. ....	34, 43	ROBERTSON, T. ....	44
RAMSAY, G. ....	13, 15	ROBINSON, J.H. ....	48
RAMSEY, B.D. ....	22, 26, 41, 43, 53, 54	ROBINSON, P.J. ....	42
RANASINGHE, K.S. ....	43	ROBINSON, R.K. ....	44
RASHKOVICH, L.N. ....	18	ROBLES, B. ....	50
RATHZ, T.J. ....	30, 34, 43	ROCKER, M. ....	50
RAU, A. ....	26, 33	RODGERS, S. ....	44
RAUCH, J.L. ....	20	RODRIGUEZ, P.R. ....	13, 15, 44
RAY, C.S. ....	24, 42, 43	ROE, F.D. ....	44
REAGAN, S.E. ....	28	ROELOF, E.C. ....	35
REDMAN, S. ....	15	ROGERS, E. ....	44
REESE, G. ....	48	ROGERS, J.H. ....	44
REEVES, D.R. ....	34	ROGERS, J.R. ....	25, 30, 34, 42, 43, 45
REGNER, K. ....	25	ROGERS, R.D. ....	50
REHAK, P. ....	22	ROL, E. ....	45
REICHMANN, E.J. ....	27	ROMANI, P.N. ....	23, 40
REID, R.S. ....	15, 36, 43	ROWELL, G.H. ....	48
REIG, P. ....	53	ROYCHOUDHURY, S. ....	45
REILLY, J. ....	16	ROZANOV, A.Y. ....	12, 29, 45
REIMER, O. ....	13	RUF, J.H. ....	45
REINSCH, K. ....	26	RUPEN, M. ....	25
REIS, S.T. ....	43	RUSSELL, C.K. ....	45
RICH, F.J. ....	54	RUSSELL, C.T. ....	23
RICHARDON, G. ....	39	RUSSELL, J.K. ....	48
RICHARDSON, E.R. ....	20	RUSSELL, S. ....	40
RICHARDSON, G. ....	39	SACKHEIM, R.L. ....	45, 52
RICHARDSON, L. ....	30	SAEKS, R.E. ....	51
RICHARDSON, S. ....	48	SAFIE, F.M. ....	44

SAHA, S. ....	47	SIDMAN, E.D. ....	41
SAKURAI, T. ....	54	SIGWARTH, J.B. ....	23
SALAS, A.O. ....	44	SIMON-MILLER, A.A. ....	23
SALVAIL, P. ....	37	SIMS, J.D. ....	23
SANDERS, G.B. ....	19	SIMS, W.H. ....	46, 47
SANDERS, T.M. ....	23	SINGH, N. ....	19, 32, 47
SANTHANAM, N. ....	39	SINGHAL, S.N. ....	47
SANTOLIK, O. ....	20	SKELLEY, S.E. ....	47
SARGENT, S. ....	23	SMALLEY, L. ....	16
SARI, R. ....	26	SMIRNOV, V.N. ....	12
SATURNO, W. ....	46	SMITH, A. ....	26
SCHAFFER, C. ....	45	SMITH, D.D. ....	17, 23, 47
SCHLAGHECK, R.A. ....	19, 45	SMITH, G.A. ....	50
SCHMID, H.M. ....	26	SMITH, S. ....	37
SCHMIDT, W.K.H. ....	17	SMITH, W.S. ....	48
SCHNEIDER, J.A. ....	45, 46	SMITHERMAN, JR., D.V. ....	47
SCHNEIDER, L. ....	39	SMITHERS, M. ....	26
SCHNEIDER, T.A. ....	46, 51	SNELL, E.H. ....	31, 35, 46, 47
SCHRAMM, F. ....	46	SNOW, H. ....	51
SCHWADRON, N. ....	42	SNYDER, D. ....	46
SCHWEIZER, M. ....	51	SOARES, A.S. ....	35
SCRIPA, R.N. ....	12, 35, 42	SOKOLSKAYA, N.V. ....	47
SEGRE, P.N. ....	46	SOL, H. ....	39
SEMMELE, C.L. ....	21, 28, 52	SORENSEN, K. ....	47
SEMMES, E.B. ....	19	SORIA, R. ....	13, 15
SEN, S. ....	17, 26	SPANN, J.F. ....	11, 18, 23, 24, 32, 36, 48
SEO, E.S. ....	11	SPEAR, S.K. ....	50
SEVER, T.L. ....	30, 46	SPEEGLE, C.O. ....	43
SEXTON, J. ....	46	SPIVEY, R. ....	26
SEYMOUR, D.C. ....	37	STAGG, E. ....	45
SHADOAN, M. ....	40	STAHL, H.P. ....	48
SHAH, S.R. ....	40, 46	STAHL, P. ....	22, 27
SHAW, J. ....	43	STALLWORTH, R. ....	22, 48
SHEETS, P. ....	46	STANOJEV, B.J. ....	48
SHIBATA, K. ....	39	STATON, E.J. ....	40
SHIVERS, H. ....	32	STECKLUM, B. ....	33
SIBILLE, L. ....	20, 46	STEELE, G. ....	46

STEEVE, B.E. ....	48	THIGPEN, W.W. ....	15
STEFANESCU, D.M. ....	17	THOMAS, B.R. ....	29
STEINBERG, J.T. ....	54	THOMPSON, M.S. ....	28
STEINCAMP, J. ....	50, 53	THORNTON, G. ....	50
STEINCAMP, J.W. ....	50	TILGHMAN, N. ....	27
STEL'MAKH, S. ....	40	TIMOFEEVA, T.V. ....	38
STELLINGWERF, R.F. ....	22, 48	TINKER, M.L. ....	13, 50
STERLING, A.C. ....	18, 38, 49	TIPPETT, D.D. ....	32
STEWART, E.T. ....	50	TODD, D. ....	40
STORRIE-LOMBARDI, M.C. ....	49	TORRES, I. ....	41
STOTT, J.E. ....	45	TREVINO, L.C. ....	20, 53
STROM, R. ....	45	TRICHILO, M. ....	42
SU, C.-H. ....	12, 35, 49	TROTIGNON, J.G. ....	20
SUEMATSU, Y. ....	18	TUCKER, D.S. ....	50
SUESS, S.T. ....	20, 41, 42, 49, 54	TUCKER, K. ....	50
SUGGS, R.J. ....	31, 49	TURNER, M.B. ....	50
SUGGS, R.M. ....	19, 37, 49, 50	TURNER, S. ....	51
SULLIVAN, D. ....	43	TURPIN, J.B. ....	51
SWANK, J.H. ....	25	TYLER, T. ....	23
SWANSON, G.R. ....	12	TYSON, R.W. ....	19
SWARTZ, D.A. ....	13, 22, 49, 53	UDDIN, W. ....	18
SWEET, R.M. ....	35	VALENTINE, P.G. ....	51
SWIDERSKA-SRODA, A. ....	40	VAN DEN HEUVEL, E.P.J. ....	45
SWIFT, W.R. ....	50	VAN DER HORST, A.J. ....	45
SWINGLE, M.R. ....	50	VAN DER KLIS, M. ....	25
SZOFRAN, F.R. ....	40, 42, 52	VAN DER WOERD, M.J. ....	31, 47, 51
SZOKE, J. ....	49	VAN DYKE, M.K. ....	51
TANG, J. ....	41	VAN PELT, M. ....	51
TANKOSIC, D. ....	11	VAN SANT, J.T. ....	24
TATARA, J.D. ....	17, 50	VAUGHAN, W.W. ....	31, 51
TAYLOR, C. ....	41	VAUGHN, J.A. ....	51
TAYLOR, J. ....	50	VEITH, E.M. ....	42
TAYLOR, T.L. ....	50	VEKILOV, P.G. ....	18
TEMPEL, W. ....	42	VETTAIKKORUMAKANKAUV, A.K. ....	36
TEMPLETON, G. ....	27	VICKERS-RICH, P. ....	12
TENNANT, A.F. ....	13, 34, 49, 52, 53	VINE, F.J. ....	51
TEXTER, S. ....	48	VIRANI, S.N. ....	14

VOLZ, M.P. ....	37, 40, 51	WILDE, A. ....	12
VRBA, F.J. ....	33	WILKERSON, D. ....	44
WACHTER, S. ....	52	WILLIAMS, R. ....	23, 24, 50
WAITE, JR., J.H. ....	13, 15, 21, 22	WILSON, A. ....	53
WALKER, J.S. ....	51	WILSON, C.A. ....	53
WALKER, S.H. ....	52	WILSON, C.D. ....	12
WALKER, W. ....	40	WILSON, R.M. ....	27
WALLIS, M.K. ....	29	WINET, E. ....	16
WALSH, D. ....	45	WINGARD, C.D. ....	53
WANG, B.-C. ....	42	WITHEROW, W.K. ....	11
WANG, H. ....	54	WOODCOCK, G. ....	54
WANG, T. ....	12	WOODS, P.M. ....	24, 52
WANG, T.-S. ....	52	WOOSLEY, S.E. ....	34, 43
WARGO, M.J. ....	19	WRIGHT, K.H. ....	54
WASSELL, E. ....	49	WU, K. ....	49, 53
WATSON, K. ....	19	XENOFOS, G.D. ....	23
WATSON, M.D. ....	52	XIONG-SKIBA, P. ....	54
WEAVER, A.R. ....	52	YAMAUCHI, Y. ....	38, 54
WEEKS, D.J. ....	45, 52	YAMAUCHO, Y. ....	38
WEI, P.F. ....	43	YAN, X.Y. ....	39
WEINGARTNER, J.C. ....	11	YOUNG, R.B. ....	28
WEIR, J. ....	53	YURCHYSHYN, V. ....	18
WEISSKOPF, M.C. ....	13, 34, 43, 52, 53	ZATESPIN, V.I. ....	54
WELLS, B.E. ....	53	ZEH, A. ....	33
WENTZ, F. ....	25	ZENG, W. ....	54
WERTZ, G.E. ....	21, 52	ZHANG, H. ....	39
WEST, E.A. ....	11, 53	ZHANG, S.N. ....	13
WEST, J. ....	50	ZHU, S. ....	35
WEST, L.T. ....	18, 52	ZIMMERMAN, F.R. ....	54
WESTRA, D.G. ....	53	ZOLADZ, T.F. ....	17
WHORTON, M.S. ....	53	ZOOK, K. ....	44
WICKRAMASINGHE, N.C. ....	29	ZOU, X. ....	17
WIJERS, R.A.M.J. ....	34, 45	ZURBUCHEN, T. ....	42

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