FY 1996 Scientific and Technical Reports, Articles, Papers, and Presentations

Compiled by
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Marshall Space Flight Center • MSFC, Alabama
FOREWORD

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

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

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

FY 1996 SCIENTIFIC AND TECHNICAL REPORTS,
ARTICLES, PAPERS, AND PRESENTATIONS

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Second United States Microgravity Payload (USMP-2), flown in March 1994, carried four major microgravity experiments plus a sophisticated accelerometer system. The USMP program is designed to accommodate experiments requiring extensive resources short of a full Spacelab mission. The four USMP-2 experiments dealt with understanding fundamental aspects of materials behavior, three with the formation of crystals from melts, and one with the critical point of a noble gas. This successful, scientifically rich mission also demonstrated telesience operations.

This report documents the Marshall Space Flight Center (MSFC) 13-month smoothed solar flux ($F_{10.7}$) and geomagnetic index ($A_p$) intermediate (months) and long-range (years) statistical estimation technique, referred to as the MSFC Lagrangian Linear Regression Technique (MLLRT). Estimates of future solar activity are needed as updated input to upper atmosphere density models used for satellite and spacecraft orbital lifetime predictions. An assessment of the MLLRT computer program’s products is provided for 5-year periods from the date estimates were made. This was accomplished for a number of past solar cycles.

This document presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY95. It also includes papers of MSFC contractors.

A space flight qualified controller for experiments that is modular and based on an open architecture commercially available standard can reduce system development time by leveraging off commercial hardware and software. While the unique requirements of flight may mandate custom hardware designs, a modular design approach in which a core set of modules is designed and built would provide a basis for future experiment controllers. Any unique requirements could then be met by adding modules as necessary. A central processing unit module, a MIL-STD-1553 interface module, and a Spacelab interface module were developed. These modules are linked using the IEEE standard 1296 Multibus II™ bus architecture. This report describes the work done to develop this core set of processing and interface modules that meet the IEEE 1296 Multibus II™ standards.
Zerodur\textsuperscript{TM} is a low coefficient of thermal expansion glass-ceramic material. This property makes Zerodur\textsuperscript{TM} an excellent material for high precision optical substrates. Functioning as a high precision optical substrate, a material must be dimensionally stable in the system operating environment. Published data indicate that Zerodur\textsuperscript{TM} is dimensionally unstable when exposed to large doses of ionizing radiation. The dimensional instability is discussed as an increase in Zerodur\textsuperscript{TM} density. This increase in density is described as a compaction.

Experimental data showing proton-induced compation of Zerodur\textsuperscript{TM} is presented. The dependence of compation on proton dose was determined to be a power law relationship. Previous publications determined a powder law relationship between Zerodur\textsuperscript{TM} compaction and electron radiation. Correlation between the published data and the results of this investigation are currently being studied.

To obtain the proper measurement amplitude with a spectrum analyzer, the correct frequency-dependent transducer factor must be added to the voltage measured by the transducer. This report will examine how entering transducer factors into a spectrum analyzer can cause significant errors in field amplitude due to the misunderstanding of the analyzer's interpolation methods. It will also discuss how to reduce these errors to obtain a more accurate field amplitude reading.

The space station furnace facility (SSFF) provides the necessary core systems to operate various material processing furnaces. The thermal control system (TCS) is defined as one of the core systems, and its function is to collect excess heat from furnaces and to provide precise cold temperature control of components and of certain furnace zones. Physical interconnection of parallel thermal control subsystems through a common pump implies the description of the whole TCS by coupled nonlinear differential equations in flow and pressure. The report formulates the system equations and develops the sliding mode controllers that cause the interconnected subsystems to operate in the local sliding modes, resulting in control system invariance to interaction disturbances and plant uncertainties. The desired decoupled flow rate profile tracking is achieved by optimization of the local linear sliding mode equations. Extensive digital simulation results are presented to show the flow rate tracking robustness and invariance to plant nonlinearities, time-varying plant parameters, and variations of the system pressure supplied to the controlled subsystems. A comparison against the popular proportional-plus-derivative-plus-integral (PID) control algorithm is included to demonstrate improved performance over traditional control techniques.

This is a programmer's guide for the Mars Global Reference Atmospheric Model (Mars-GRAM 3.34): Programmer’s Guide. C.G. Justus,* B.F. James, and D.L. Johnson. Electromagnetics and Aerospace Environments Branch, System Analysis and Integration Laboratory. *Computer Sciences Corporation, Huntsville, AL. 19960036976N (96N-30652)
model for various parameters of the Mars atmosphere. Detailed descriptions are given of the main driver programs, subroutines, and associated computational methods. Lists and descriptions include input, output, and local variables in the programs. These descriptions give a summary of program steps and "map" of calling relationships among the subroutines. Definitions are provided for the variables passed between subroutines through "common" lists. Explanations are provided for all diagnostic and progress messages generated during execution of the program. A brief outline of future plans for Mars-GRAM is also presented.

TM–108510 June 1996

A unique growth cell was designed in which crossed electric and magnetic fields could be separately or simultaneously applied during semiconductor crystal growth. A thermocouple was inserted into an InSb melt inside the growth cell to examine the temperature response of the fluid to applied electromagnetic fields. A static magnetic field suppressed time-dependent convection when a destabilizing thermal field was applied. The simultaneous application of electric and magnetic fields resulted in forced convection in the melt. The InSb ingots grown in the cell were polycrystalline. An InGaSb crystal, 0.5 cm in diameter and 23-cm long, was grown without electromagnetic fields applied. The axial composition results indicated that complete mixing in the melt occurred for this large aspect ratio.

TM–108511 June 1996

The terrestrial environment is an important forcing function in the design and development of the launch vehicle. The scope of the terrestrial environment includes the following phenomena: Winds; atmospheric thermodynamic models and properties; thermal radiation; U.S. and world surface environment extremes; humidity; precipitation, fog, and icing; cloud characteristics and cloud cover models; atmospheric electricity; atmospheric constituents; vehicle engine exhaust and toxic chemical release; occurrences of tornadoes and hurricanes; geological hazards, and sea states. One must remember that the flight profile of any launch vehicle is in the terrestrial environment. Terrestrial environment definitions are usually limited to information below 90 km. Thus, a launch vehicle's operations will always be influenced to some degree by the terrestrial environment with which it interacts. As a result, the definition of the terrestrial environment and its interpretation is one of the key launch vehicle design and development inputs. This definition is a significant role, for example, in the areas of structures, control systems, trajectory shaping (performance), aerodynamic heating, and take off/landing capabilities. The launch vehicle’s capabilities which result from the design, in turn, determines the constraints and flight opportunities for tests and operations.

TM–108512 June 1996

More extensive testing was performed through a NASA research announcement (NRA) between Marshall Space Flight Center (MSFC) and Lockheed Martin Astronautics on the promising LO2 propellant conditioning concept of passive recirculation (no-bleed). Data from the project are being used to further anchor models in LO2 conditioning behavior and broaden the data base of no-bleed and low-bleed conditioning. Data base expansion includes results from testing the limits of no-bleed and low-bleed conditioning with various configuration changes to the test facility and designed test article. Configuration changes include low velocity effects in the recirculation loop above the test article, test article internal constriction impacts, test article out-of-plane effects, impact from an actual Titan LO2 pump attachment, feed duct slope effects, and up-leg booster effects. LN2 was used as the test fluid. The testing was conducted between July 1994 and January 1995 at the west test area of MSFC. Data have shown that in most cases passive recirculation was demonstrated when the aforementioned limits were applied.

TM–108513 July 1996
This report describes the newly revised model thermosphere for the Mars Global Reference Atmospheric Model (Mars-GRAM, Version 3.4). It also provides descriptions of other changes made to the program since publication of the programmer’s guide (Justus et al., 1996) for Mars-GRAM Version 3.34. The original Mars-GRAM model thermosphere was based on the global-mean model of Stewart (1987). The revised thermosphere is based largely on parameterizations derived from output data from the three-dimensional Mars Thermospheric Global Circulation Model (MTGCM) of Bougher et al. (1990). The new thermospheric model includes revised dependence on the 10.7-cm solar flux for the global means of exospheric temperature, temperature of the base of the thermosphere, and scale height for the thermospheric temperature variations, as well as revised dependence on orbital position for global mean height of the base of the thermosphere. Other features of the new thermospheric model are (1) realistic variations of temperature and density with latitude and time of day; (2) more realistic wind magnitudes, based on improved estimates of horizontal pressure gradients; and (3) allowance for user-input adjustments to the model values for mean exospheric temperature and for height and temperature at the base of the thermosphere. Other new features of Mars-GRAM 3.4 include (1) allowance for user-input values of climatic adjustment factors for temperature profiles from the surface to 75 km, and (2) a revised method for computing the sub-solar longitude position in the “ORBIT” subroutine.

The Computer-Aided System Engineering and Analysis (CASE/A) Version 5.0 User’s Manual provides the user with information needed to execute and learn the CASE/A 5.0 modeling package. CASE/A 5.0 is a trade study tool that provides modeling/simulation capabilities for analyzing environmental control and life support systems and active thermal control systems. CASE/A has been successfully used in studies such as the evaluation of carbon dioxide removal in the Space Station Freedom. CASE/A modeling provides a graphical and command-driven interface for the user. This interface allows the user to construct a model by placing equipment components in a graphical layout of the system hardware, then connect the components via flow streams and define their operating parameters. Once the equipment is placed, the simulation time and other control parameters can be set to run the simulation based on the model constructed. After completion of the simulation, graphical plots or text files can be obtained for evaluation of the simulation results over time. Additionally, users have the capability to control the simulation and extract information at various times in the simulation (e.g., control equipment operating parameters over the simulation time or extract plot data) by using “User Operations (OPS) Code.” This OPS code is written in FORTRAN with a canned set of utility subroutines for performing common tasks.

CASE/A version 5.0 software runs under the VAX VMS™ environment. It utilizes the Tektronics 4014™ graphics display system and the VT100™ text manipulation/display system.

Enhancement of High-Speed Infrared Array Electronics (Center Director’s Discretionary Fund Final Report, Project 93–03). W.T. Sutherland. Astrionics Laboratory.

A state-of-the-art infrared detector was to be used as the sensor in a new spectrometer-camera for astronomical observations. The sensitivity of the detector required the use of low-noise, high-speed electronics in the system design. The key component in the electronic system was the preamplifier that amplified the low voltage signal coming from the detector. The system was designed based on the selection of the amplifier and that was driven by the maximum noise level, which would yield the desired sensitivity for the telescope system.

A vacuum chamber designed for use in shearography nondestructive evaluation of aerospace components is presented. The inspection of an aerospace insulation is used as an example of vacuum excitation shearography for evaluation of debonds. Design drawings of subcomponents and the assembly are included in an appendix.
capabilities for analyzing environmental control and life support systems and active thermal control systems. CASE/A has been successfully used in studies such as the evaluation of carbon dioxide removal in the space station.

CASE/A modeling provides a graphical and command-driven interface for the user. This interface allows the user to construct a model by placing equipment components in a graphical layout of the system hardware, then connect the components via flow streams and define their operating parameters. Once the equipment is placed, the simulation time and other control parameters can be set to run the simulation based on the model constructed. After completion of the simulation, graphical plots or text files can be obtained for evaluation of the simulation results over time. Additionally, users have the capability to control the simulation and extract information at various times in the simulation (e.g., control equipment operating parameters over the simulation time or extract plot data) by using "User Operations (OPS) Code." This OPS code is written in FORTRAN with a canned set of utility subroutines for performing common tasks.

CASE/A version 5.0 software runs under the VAX VMS™ environment. It utilizes the Tektronics 4014™ graphics display system and the VT100™ text manipulation/display system.
Localized corrosion in welded samples of 2219–T87 Al alloy (2319 filler), 2090 Al-Li alloy (4043 and 2319 fillers), and 2195 Al-Li alloy (4043 and 2319 fillers) has been investigated using the relatively new scanning reference electrode technique. The weld beads are cathodic in all cases, leading to reduced anode/cathode ratios. A reduction in anode/cathode ratio leaders to an increase in the corrosion rates of the welded metals, in agreement with results obtained in previous electrochemical and stress corrosion studies involving the overall corrosion rates of welded samples. The cathodic weld beads are bordered on both sides by strong anodic regions, with high propensity for corrosion.

The dynamic environment must be known to evaluate high pressure oxidizer turbopump inducer fatigue life. This report sets the dynamic design loads for the alternate turbopump inducer as determined by water-flow rig testing. Also, guidelines are given for estimating the dynamic environment or other inducer and impeller applications.

Numerous thermal control and polymeric samples with potential International Space Station applications were evaluated for atomic oxygen and vacuum ultraviolet radiation effects in the Princeton Plasma Physics Laboratory 5-eV Neutral Atomic Oxygen Facility and in the MSFC Atomic Oxygen Drift Tube System. Included in this study were samples of various anodized aluminum samples, ceramic paints, polymeric materials, and beta cloth, a Teflon™-impregnated fiberglass cloth. Aluminum anodizations tested were black duranodic, chromic acid anodize, and sulfuric acid anodize. Paint samples consisted of an inorganic glossy black paint and Z–93 white paint made with the original PS7 binder and the new K2130 binder. Polymeric samples evaluated included bulk Halar™, bulk PEEK, and silverized FEP Teflon™. Aluminized and nonaluminized Chemfab 250™ beta cloth were also exposed. Samples were evaluated for changes in mass, thickness, solar absorptance, and infrared emittance. In addition to material effects, an investigation was made comparing diffuse reflectance/solar absorptance measurements made using a Beckman DK2 spectrophotometer and like measurements made using an AZ Technology-developed laboratory portable spectrophotometer.

Marshall Space Flight Center has a rich heritage of launch vehicles that have used aerodynamic surfaces for flight stability and for flight control. Recently, due to the aft center-of-gravity (cg) locations on launch vehicles currently being studied, the need has arisen for the vehicle control augmentation that can be provided by these flight controls. Aero-dynamic flight control can also reduce engine gimbalng requirements, provide actuator failure protection, enhance crew safety, and increase vehicle reliability and payload capability.

As a starting point for the novel design of aerodynamic flight control augmentors for a Saturn class, aft cg launch vehicle, this report undertakes a review of our national heritage of launch vehicles using aerodynamic surfaces, along with a survey of current use of aerodynamic surfaces on large launch vehicles of other nations. This report presents one facet of Center Director's Discretionary Fund Project 93–05 and has a previous and subsequent companion publication.

While the systems engineering process is a program formal management technique and contractually binding, the design process is the informal practice of achieving the design project requirements throughout all design phases of the systems engineering process. The design process and organization are systems- and component-dependent. Informal reviews include technical information meetings and concurrent engineering sessions, and formal technical discipline reviews are conducted...
through the systems engineering process. This paper discusses and references major philosophical principles in the design process, identifies its role in interacting systems and disciplines analyses and integrations, and illustrates the process application in experienced aerostructural designs.

TP–3648 August 1996
19960045438N (96N–32360)

The characteristics of the minima between sunspot cycles are found to provide important information for predicting the amplitude and timing of the following cycle. For example, the time of the occurrence of sunspot minimum sets the length of the previous cycle, which is correlated by the amplitude-period effect to the amplitude of the next cycle, with cycles of shorter (longer) than average length usually being followed by cycles of larger (smaller) than average size (true for 16 of 21 sunspot cycles). Likewise, the size of the minimum at cycle onset is correlated with the size of the cycle’s maximum amplitude, with cycles of larger (smaller) than average size minima usually being associated with larger (smaller) than average size maxima (true for 16 of 22 sunspot cycles). Also, it was found that the size of the previous cycle’s minimum and maximum relates to the size of the following cycle’s minimum and maximum with an even-odd cycle number dependency. The latter effect suggests that cycle 23 will have a minimum and maximum amplitude probably larger than average in size (in particular, minimum smoothed sunspot number Rm = 12.3±7.5 and maximum smoothed sunspot number Rm = 198.8±36.5, at the 95-percent level of confidence), further suggesting (by the Waldmeier effect) that it will have a faster than average rise to maximum (fast-rising cycles have ascent durations of about 41±7 months). Thus, if, as expected, onset for cycle 23 will be December 1996 ±3 months, based on smoothed sunspot number, then the length of cycle 22 will be about 123±3 months, inferring that it is a short-period cycle and that cycle 23 maximum amplitude probably will be larger than average in size (from the amplitude-period effect), having an Rm of about 133±39 (based on the usual ±30-percent spread that has been seen between observed and predicted values), with maximum amplitude occurrence likely sometime between July 1999 and October 2000.

TP–3652 September 1996
19960050464N (96N–34504)

The behavior of ascent duration, maximum amplitude, and period for cycles 1 to 21 suggests that they are not mutually independent. Analysis of the resultant three-dimensional contingency table for cycles divided according to rise time (ascent duration), size (maximum amplitude), and duration (period) yields a chi-square statistic (= 18.59) that is larger than the test statistic (= 9.49 for 4 degrees-of-freedom at the 5-percent level of significance), thereby, inferring that the null hypothesis (mutual independence) can be rejected. Analysis of individual 2 by 2 contingency tables (based on Fisher’s exact test) for these parameters shows that, while ascent duration is strongly related to maximum amplitude in the negative sense (inverse correlation)—the Waldmeier effect, it also is related (marginally) to period, but in the positive sense (direct correlation). No significant (or marginally significant) correlation is found between period and maximum amplitude. Using cycle 22 as a test case, we show that by the 12th month following conventional onset, cycle 22 appeared highly likely to be fast-rising, larger-than-average-size cycle. Because of the inferred correlation between ascent duration and period, it also seems likely that it will have a period shorter than average length.

TP–3653 September 1996

The positive aspect of problem occurrences is the opportunity for learning and a challenge for innovation. The learning aspect is not restricted to the solution period of the problem occurrence, but can become the beacon for problem prevention on future programs. Problems/failures serve as a point of departure for scaling to new designs. To ensure that problems/failures and their solutions guide the future programs, a concerted effort has been expended to study these problems, their solutions, their derived lessons learned, and projections for future programs. This includes identification of technology thrusts, process changes, codes development, etc. However, they must not become an excuse for adding layers upon layers of standards, criteria, and requirements, but must serve as guidelines that assist instead of stifling engineers. This report is an extension of prior efforts to accomplish this task. Although these efforts only scratch the surface, it is a beginning that others must complete.
CP–3332  March 1996
Thirteenth Workshop for Computational Fluid Dynamic Applications in Rocket Propulsion and Launch Vehicle Technology (Volume I). Compiled by R.W. Williams. Structures and Dynamics Laboratory.
19960029140N (96N–29670)

CP–3332  March 1996
Thirteenth Workshop for Computational Fluid Dynamic Applications in Rocket Propulsion and Launch Vehicle Technology (Volume II). Compiled by R.W. Williams. Structures and Dynamics Laboratory.
19960029254N (96N–29750)

CP–3325  February 1996
19960020567N (96N–24116)
Spacecraft System Failures and Anomalies Attributed to the Natural Space Environment.

19960050463N (96N–34503)
NASA CONTRACTOR REPORTS
(Abstracts for these reports may be obtained from STAR)

CR–4705 February 1996

CR–4706 February 1996

CR–4707 February 1996
Formation and Description of Debris Clouds Produced by Hypervelocity Impact. NAS8–38856. University of Dayton Research Institute. 19960015933N (96N–22124)

CR–4716 February 1996

CR–4720 February 1996
Catastrophic Failure Modes Assessment of the International Space Station Alpha. NAS8–37383. Meyer Analytics, Inc. 19960017822N (96N–23346)

CR–4740 May 1996

CR–4744 May 1996

CR–199201 September 1995
Special Environmental Control and Life Support Equipment Test Analyses and Hardware, Final Report. NAS8–38250. ION Electronics. 19960004068N (96N–14078)

CR–199817 September 1995

CR–199818 September 25, 1995

CR–199819 September 18, 1995

CR–199820 October 23, 1995

CR–199826 November 30, 1995

CR–199828 September 15, 1995

CR–199829 December 10, 1995

CR–199830 February 1996
CR-199831  July 14, 1995
Space Station Water Processor Process Pump,
Final Report. NAS8–38250–12, ION Electronics.
19960016957N (96N–22564)

CR-200698  March 1996
Paren I Final Report for VRA Modeling Con-
tract. NAS8–38250–18, ION Electronics.
19960017612N (96N–23169)

CR-199832  May 22, 1995
Preliminary Design Program Vapor Compress-
sion Distillation Flight Experiment Program,
NAS8–38250–11, ION Electronics.
19960016649N (96N–22274)

CR-200699  July 1995
SPE Oxygen Generator Assembly (OGA)
(Refurbishment of the Technology Demonstra-
tor LFSPE Oxygen Generation Subsystem), Final
19960017565N (96N–23144)

CR-199833  August 1995
NAS8–38250–28, United Technologies.
19960016584N (96N–22228)

CR-200700  May 22, 1995
Static Feed Electrolyzer Flight Experiment Pro-
gram Preliminary Design Program, Final Report.
NAS8–38250–29, Life Systems, Inc.
19960021248N (96N–23160)

CR-199834  September 1995
Molecular Sieve Bench Testing and Computer
 McDonnell Douglas Aerospace.
19960016571N (96N–22215)

CR-200701  December 15, 1995
Generic Health Management: A System
Engineering Process Handbook Overview and
Processes, Final Report. NAS8–40365. Alpha
Technology. 19960017620N (96N–23177)

CR-199835  July 23, 1995
PCR-Based Microbial Monitor for Analysis of
Recycled Water Aboard the ISSA: Issues and
Prospects, Final Report (October 1, 1994 to June
19960016594N (96N–22238)

CR-200702  December 15, 1995
SSFF Health Management Analysis Report Part
II (Proof of Concept), Final Report. NAS8–40365, Alpha Technology.
19960017621N (96N–23178)

CR-199836  February 1, 1996
Study of Activation of Metal Samples From
LDEF–1 and Spacelab–2, Final Report (March
Kentucky University.
19960017615N (96N–23172)

CR-200703  October 1995
Advanced Transportation System Studies Tech-
ical Area 3, Alternate Propulsion Subsystem
Concepts, Tripropellant Comparison Study, Final
19960017710N (96N–23241)

CR-199837  December 1995
Investigation of Advanced Processed Single-
Crystal Turbine Blade Alloys, Final Report
(December 16, 1991 to December 31, 1995).
NAS8–39050. United Technology Corporation,
Pratt & Whitney.
19960017548N (96N–23130)

CR-200704  September 1995
Rocket Engine Combustion Devices Design and
Demonstration Program, Final Report. NAS8–
39567, Rockwell.
19960020399N (96N–23977)

CR-199838  July 14, 1995
Space Station Water Processor Mostly Liquid
Separator (MLS), Final Report. NAS8–38250–
12, United Technologies.
19960017622N (96N–23179)

CR-200705  January 22, 1996
Video Emulated Tweening: Simulating Full
Motion Video From Intermittent Video, Final
Report. Omniview, Inc.
19960017541X (95X–36537)

CR-200708  March 22, 1996
Design of Low Stress Switching Electronics for
EMA Applications, Final Report. NAS8–39131,
D.O. No. 31. Auburn University.
19960017563N (96N–23143)
NASA CONTRACTOR REPORTS
(AbSTRACTS FOR THESE REPORTS MAY BE OBTAINED FROM STAR)

CR–200711
November 30, 1995

CR–200715
October 1995
Structural Damage Prediction and Analysis for Hypervelocity Impact, Final Report (Attachments 2, 3, 4, 5, 6, 8, and 9). NAS8–38856. Lockheed Martin. 19960022784N (96N–25677)

CR–200718
April 11, 1996
Final Report for Delivery Order 84. NAS8–38609, University of Alabama in Huntsville. 19960024140N (96N–71446)

CR–200719
April 12, 1996

CR–200720
May 8, 1995

CR–200721
June 21, 1995

CR–201124
July 1995

CR–201125
July 1995

CR–201126
July 1995

CR–201127
July 1995

CR–201128
July 1995

CR–201131
November 10, 1995
Materials Engineering Data Base, Final Report. NAS8–37780. BAMSI, Inc. 19960038269N (96N–30749)

CR–201132
December 31, 1995

CR–201133
December 1995

CR–201134
April 30, 1996

CR–201135
February 15, 1996
Parabolic Aircraft Solidification Experiments. NAS8–38609, D.O. No. 130. University of Alabama in Huntsville. 19960034386N (96N–30231)

CR–201136
May 1996

CR–201137
May 16, 1996
CR–201138 August 1996

CR–201139 April 24, 1996

CR–201141 July 1996

CR–201142 June 1996

CR–201143 May 16, 1995

CR–201144 June 3, 1996

CR–201145 August 13, 1996
MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

ABBAS, M. ES41
MICHELEN, H.A. Harvard University
GUNSON, M.R. JPL
ABRAMS, M.C. LaRC
NEWCHURCH, M.J. UAH
CHANG, A.Y. JPL
GOLDMAN, A. Denver University
IRION, F.W. California Institute of Technology
MANNEY, G.L. JPL
ET AL.

Hydrogen Budget of the Stratosphere From ATMOS/ATLAS Measurements of Water Vapor and Methane. For publication in EOS, American Geophysical Union Fall Meeting, San Francisco, CA, 1996.

ABBAS, M.M. ES41
GUNSON, M.R. JPL
NEWCHURCH, M.J. UAH
MICHELEN, H.A. Harvard University
SALAWITCH, R.J. JPL
ALLEN, M. California Institute of Technology
ABRAMS, M.C. LaRC
CHANG, A.Y. JPL
GOLDMAN, A. Denver University
ET AL.
The Hydrogen Budget of the Stratosphere Inferred From ATMOS Measurements of H₂O and CH₄. For publication in American Geophysical Union, Washington, DC, 1996.

ABBAS, M.M. ES41
MICHELEN, H.A. Harvard University
GUNSON, M.R. JPL
ABRAMS, M.C. LaRC
NEWCHURCH, M.J. UAH
SALAWITCH, R.J. JPL
CHANGE, A.Y. JPL
GOLDMAN, A. Denver University
IRION, F.W. California Institute of Technology
ET AL.


ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES76
PALEY, M.S. USRA
WITHEROW, W.K. ES76
SHIELDS, A. ES76
Two-Photon Absorption in Polydiacetylene Thin Films Using the Z-Scan Technique at Low He-Ne Laser Illumination. For publication in Applied Physics Letters, Argonne, IL.

ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES76
PALEY, M.S. USRA
WITHEROW, W.K. ES76

Intensity-Dependent Changes in the Third-Order Nonlinearity of Polydiacetylene Using Z-Scan Technique. For publication in Journal of Optical Society of America-B, Washington, DC.

ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES76
PALEY, M.S. USRA
WITHEROW, W.K. ES76
BANKS, C. ES76
SHIELDS, A. ES76
HICKS, R. ES76

Intrinsic Optical Bistability in Vapor Deposited Films of Metal-Free Phthalocyanine. For publication in Applied Physics Letters, Argonne, IL.

ABDELDAYEM, H.A. ES76 (USRA)
FRAZIER, D.O. ES76
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ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES01
PALEY, M.S. ES01
WITHEROW, W.K. ES01
BANKS, C. ES01
HICKS, R. ES01

Optical Computers and Space Technology. For presentation at The International Association of Science and Technology for Development (LASTED), Cairo, Egypt, December 4–7, 1995.

ASHLEY, P.R. USRA
HICKS, R. ES76
ASHLEY, P.R. U.S. Army Missile Command

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

ABDELDAYEM, H.A. USRA
FRAZIER, D.O. ES76
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ADAMS, M. NRC
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HATHAWAY, D.H. ES82
MUSIELAK, Z.E. ES82
Fractal Analysis of the Magnetic Complexity of a Flaring Active Region: The Hurst Method. For publication in Astrophysical Journal, Chicago, IL.

ADAMS, M. ES82
STARK, B.A. ES82
HATHAWAY, D.H. ES82
MUSIELAK, Z.E. UAH
Fractal Analysis of a Flaring Active Region. For presentation at SCOSTEP/STEP WG–1 Workshop on Measurements and Analyses of the 30 Solar Magnetic Fields, Huntsville, AL, April 9–11, 1996.

ADRIAN, M.L. UAH
MOORE, T.E. ES83
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Performance Modeling of Grazing Incidence Optics Due to Structural Deformations and Metrology Errors. For presentation at 1996 SPIE Symposium, Denver, CO, August 4–9, 1996.

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KOULILOTOU, C. USRA
FISHMAN, G.J. ES84
IAUC #6326 GRO J1744–28. For publication in IAU Circular, Cambridge, MA.

AUGUSTEIJN, T. ESO
VAN DE STEEN, G. ESO
FRAIL, D.A. National Radio Ast.
VAN PARADAJS, J. UAH
KOULILOTOU, C. USRA (ES84)
FISHMAN, G.J. ES84
ET AL.
IAUC #6309: Possible Optical Counterpart. For publication in IAUC #6309, Cambridge, MA.

AUSTIN, R.A. USRA
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BAGDIGIAN, R.M. ED62
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ROARK, W. Mevatec Corp.
MSG: Microgravity Science Glovebox. For presentation at SPIE Conference on Space Processing of Materials, Denver, CO, August 4–9, 1996.

BECK, J. G. UCLA
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Considerations for the Application of AI-Li Alloys to Large Aerospace Structures. For presentation at ASM/TMS Materials Week, Cleveland, OH, October 31, 1995.

BLAKESLEE, R.J. ES41
KOSK, W.J. ES41
BAILEY, J.C. ES41
Application of Linear Analytic Techniques to Lightning Location Retrieval During the Maritime Continent Thunderstorm Experiment
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<td>Real-Time Mission Simulation Test for AXAF-1. For presentation at IECEC, Washington, DC, August 11–16, 1996, and for publication in the proceedings of the conference.</td>
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<tr>
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<tr>
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<tr>
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Modeling of Convection and Segregation During HgCdTe Directional Solidification With Emphasis on Coupling With Crystal-Melt Interface Alternation. For presentation at 10th American Conference on Crystal Growth, Vail, CO, August 4–9, 1996.

BURNS, H.D. EH 12
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Multi-User Facility for Protein Crystal Growth in Microgravity: Results From PCAM and DCAM. For presentation at IUCR Meeting, Seattle, WA, August 14–16, 1996.

CHANDLER, M.O. ES83
CRAVEN, P.D. ES83
GILES, B.L. ES83
MOORE, T.E. ES83

CHANG, A.Y. JPL
SALAWITCH, R.J. JPL
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ABRAMS, M.C. LaRC
ZANDER, R. University of Liege
RINSLAND, C.P. LaRC
WEBSTER, C.R. JPL
ABBAS, M.M. ES41
ET AL.

A Comparison of Measurements From ATMOS and Instruments Aboard the ER-2 Aircraft: Halogenated Gases. For publication in American Geophysical Union, Washington, DC, 1996.

CHANG, F.-C. UAH
JEDLOVEC, G.J. ES41


CHANG, F.-C. UAH
JEDLOVEC, G.J. ES41


CHANG, F.-C. UAH
JEDLOVEC, G.J. ES41

Total Precipitable Water Distribution During Severe Winters Over the Southeastern United States. For presentation at The 21st Annual Climate Diagnostics and Prediction Workshop, Huntsville, AL, October 28–November 1, 1996.

CHEN, P.S. IIT Research Institute
KURUVILLA, A.K. IIT Research Institute
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STANTON, W.P. EH23

Improving Cryogenic Toughness of Alloy 2195 by Optimizing Aging. For publication in Journal of Materials Science and Engineering, Stony Brook, NY.

CHOU, L.C. ED32
GUO, K.L. Alabama A&M University
LIAW, G.S. Alabama A&M University

Transitional Flows Over a Vertical Plate by a Modified Direct Simulation Monte Carlo Method. For presentation at 20th International Symposium of Rarefied Gas Dynamics Conference, Beijing, China, August 19–24, 1996.

CHRISTIAN, J.H. ES41
BERGSTROM, J.W. ES41
STEWART, M.F. ES41

The Low Light Level Cloud Imager. For presentation at Fall AGU Meeting, San Francisco, CA, December 1996.

CHRISTIAN, H.J. ES41
DRISCOLL, K.T. ES41
GOODMAN, S.J. ES41
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Seasonal Variation and Distribution of Lightning Activity. For presentation at Fall AGU Meeting, San Francisco, CA, December 1996.

CHUNG, H. SUNY
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Correlation Between X-Ray Reflectivity Measurements and Surface Roughness of AXAF Coated Witness Samples. For presentation at SPIE 1996 International Symposium on Optical Science, Engineering and Instrumentation, Denver, CO, August 4–9, 1996.

NASA Ceramic Matrix Composite Programs for Liquid Rocket Engine Applications. For presentation at Seventh AeroMat Conference, Dayton, OH, June 3–6, 1996.


Space Station Furnace Facility. For presentation at SPIE's 1996 International Symposium, Denver, CO, August 4–9, 1996.


CRARY, D.J. ES84
KOUVELIOTOU, C. USRA
VAN PARADIS, J. UAH
VAN DER HOOFT, F. University of Amsterdam
SCOTT, D.M. USRA
ZHANG, S.N. USRA
RUBIN, B.C. USRA
FINGER, M.H. USRA
HARMON, B.A. ES84
ET AL.

1,100 Days of BATSE Observations of Cygnus X-1. For publication in Astronomy and Astrophysics, Germany.

CRAVEN, P.D. ES83
CHANDLER, M.O. ES83
MOORE, T.E. ES83
COMFORT, R.H. UAH

The Search for He⁺. For presentation at 1996 American Geophysical Union Meeting, San Francisco, CA, December 1996.

CRAVEN, P.D. ES83
COMFORT, R.H. UAH
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CRAVEN, P.D. ES83
GALLAGHER, D.L. ES83
COMFORT, R.H. UAH

The Relative Concentration of He⁺ in the Inner Magnetosphere as Observed by DE1/RIMS. For publication in Journal of Geophysical Research.

CRONISE, R.J. ES76
NOEVER, D.A. ES76
BRITTAIN, A. ES76

Self Organized Criticality in Closed Ecosystems: Carbon Dioxide Fluctuations in Biosphere 2. For publication in International Journal of Climatology, Birmingham, United Kingdom.

CURREN, P.A. ES75
Snyder, R.S. ES75
LEHOČZKY, S.L. ES75

Materials Science in Low Gravity. For presentation at SPACE 96, Fifth International Conference and Exposition on Engineering, Construction, and Operations in Space, Albuquerque, NM, June 1–6, 1996.

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An Overview of Future NASA Programs. For presentation at 33rd Space Congress, Cocoa Beach, FL, April 23–26, 1996.

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Atmospheric Conductivity Observations Over a Wide Latitudinal Range. For presentation at 10th International Conference on Atmospheric Electricity, Osaka, Japan, June 10–14, 1996.

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Results of the DC-XA Program. For presentation at 1996 AIAA Space Program and Technology Conference and Exhibit, Huntsville, AL, September 24–26, 1996.
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Radiation-Induced Degradation of White Thermal Control Paint. For presentation at 14th International Conference on the Application of Accelerator in Research and Industry, Denton, TX, November 6–9, 1996, and for publication in the conference proceedings.

EFFINGER, M. EH34
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Tensile and Interlaminar Shear Evaluation of DuPont/Lanxide CMC’s. For presentation at 20th Annual American Ceramic Society Meeting, Cocoa Beach, FL, January 1996.

ELLIOTT, H.A. UAH
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CRAVEN, P.D. ES83
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Preliminary Ion Velocities Obtained Using Thermal Ion Dynamics Experiment (TIDE). For presentation at The Huntsville Workshop, Guntersville, AL, September 1996.

EMRICH, W.J., JR. PS05


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ROY, R.J. Hamilton Std. Sp. Sys.
TATARA, J.D. ION Electronics, Inc.

Solid Polymer Electrolysis Oxygen Generator Testing at MSFC. For presentation at International Conference on Environmental Systems, Monterey, CA, July 8–11, 1996.

ETHRIDGE, E.C. ES75

The Viscosity of Palladium Alloys. For publication in Journal of Applied Physics, Argonne, IL.

ETTER, B.D. Texas A&M University
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Melting and Arc Efficiency of Plasma Arc Welds. For publication in American Welding Society Journal, Miami, FL.

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3-D Magnetic Fields and Coronal Heating in Active Regions. For presentation at 188th AAS SPD, Madison, WI, June 9–13, 1996.
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FISHMAN, G.J. ES81

FISHMAN, G.J. ES81
The Mystery of Gamma-Ray Bursts. For presentation at Colloquium at Washington University, St. Louis, MO, January 30–February 2, 1996.

FISHMAN, G.J. ES81

FISHMAN, G.J. ES81
The Mystery of Gamma-Ray Bursts. For presentation at Auburn University, Auburn, AL, May 10, 1996.
MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

GRINDLAY, J. Harvard Smithsonian
BLOSER, P. Harvard Smithsonian

FOSTER, R.S. Naval Research Laboratory
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GARY, G.A. ES82
Rendering Three-Dimensional Solar Coronal Structures. For presentation at SCOSTEP/STEP WG-1 Workshop on Measurements and Analyses of the 3-D Solar Magnetic Field, Huntsville, AL, April 9–11, 1996.

GARY, G.A. ES82
Rendering Three-Dimensional Solar Coronal Structures. For publication in Solar Physics, Tucson, AZ.

GILLIES, D.C. ES75
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Effect of Residual Accelerations During Microgravity Directional Solidification of Mercury Cadmium Telluride on the USMP-2 Mission. For presentation at 10th American Conference for Crystal Growth, Vail, CO, August 4–9, 1996.

GILLIES, D.C. ES75
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GOLDBERG, B. ED01
More Green for NASA. For publication in Aerospace America.

GOODWIN, C.J. Meyer Analytics
WILLIAMSEN, J. ED52
Catastrophic Failure of Stored Energy Modules Following Orbital Debris Penetration. For presentation at SPIE Consequences of Orbital Debris Conference, Denver, CO, August 4–9, 1996.

GREEN, J.L. GSFC
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Evolution of NASA’s Communications Networks: Cost-Effective Synergy Between Industry and Government. For presentation at 47th International Astronautical Congress, Beijing, China, October 7–11, 1996.

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HAGYARD, M.J. ES82
Recent Results on Preflare Energy Buildup. For publication in Proceedings of Workshop on
Solar Flares and Related Disturbances, Hitachi, Japan, January 1996.

HALE, J.P., II  

HALE, J.P., II  

HALE, J.P., II  

HALL, D.K.  
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HAMAKER, J.W.  
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FISHMAN, G.J.  
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GRS 1915+105. For publication in IAUC No. 6204, Cambridge, MA.

HARMON, B.A.  
PACIESAS, W.S.  
FISHMAN, G.J.  
INOUE, H.  
ET AL.  
GRS 1915+105 (Cir. No. 6266). For publication in IAUC No. 6266, Cambridge, MA.

HARMON, B.A.  
ZHANG, S.N.  
PACIESAS, W.S.  

HATHAWAY, D.  
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HILL, F.  
National Solar Observatory  
HOWARD, R.  
National Solar Observatory  
JONES, H.  
NASA/GSFC  
ET AL.  
GONG Observations of Surface Flows. For publication in Science, Washington, DC.

HATHAWAY, D.H.  
GILLMAN, P.A.  
NCAR/HAO  
HARVEY, J.  
NOAO/NSO  
HILL, F.  
NOAO/NSO  
HOWARD, R.F.  
NOAO/NSO  
LEIBACHER, J.  
NOAO/NSO  
PINTAR, J.  
NOAO/NSO  
JONES, H.P.  
NASA/GSFC
KASHER, J. University of Nebraska
SIMON, G.W. AFMC/PL/GPSS
GONG Observations of Solar Surface Flows. For presentation at 188th Meeting of the AAS, Madison, WI, June 9–13, 1996.

HEAMAN, J.P. ED34
A Nozzle Test Facility. For presentation at 85th Supersonic Tunnel Association Meeting, Atlanta, GA, April 14–17, 1996.

HERRMANN, M. PD21

HILL, F. National Solar Observatory
STARK, P.B. ES82
ANDERSON, E.R. National Solar Observatory
ANTIA, H.M. National Solar Observatory
BROWN, T.M. High Altitude Observatory
HATHAWAY, D.H. ES82
ET AL.
GONG Estimates of Solar Eigenspectral Parameters. For publication in Science, Washington, DC.

HIRAHARA, J. UAH
HORWITZ, J.L. UAH
GERMANY, G. UAH
MOORE, T.E. ES83
SPANN, J.M. ES83
CHANDLER, M.O. ES83
GILES, B.L. ES83
Properties of Upflowing Ionospheric Ion Conics and Magnetosheath Proton Precipitation at 5,000 km Altitude Over Cusp/Cleft Auroral Forms: Initial Observations From the TIDE and UVI Instruments on POLAR. For presentation at 1996 Huntsville Workshop, Guntersville, AL, September 1996.

HO, J.X. ES76
CHANG, B. ES76
KEELING, K. ES76
HOLOWACHUK, E.W. MIB Hospital
PETERS, T. MIB Hospital
CARTER, D.C. ES76

HOOD, R.E. ES41
SPENCER, R.W. ES41

HOOD, R.E. ES41
SPENCER, R.W. ES43
CHISHOLM, W. ES93
SPENCE, R. Mevatec
SIMMONS, D. Mevatec
CORREA, T. Mevatec
MARTINEZ, N. ES93
LOBL, E. UAH

HORACK, J.M. ES84
EMSLIE, A.G. UAH
KOSHUT, T.M. UAH
MALLOZZI, R.S. UAH
MEEGAN, C.A. ES84

HORACK, J.M. ES84
EMSLIE, A.G. UAH
KOSHUT, T.M. UAH
MALLOZZI, R.S. UAH
MEEGAN, C.A. ES84

HORACK, J.M. ES84
HAKKIJA, J. Mankato State University
The Internal Luminosity Distribution of Bright Gamma-Ray Bursts and Its Relation to Duration and Spectral Hardness. For publication in Astrophysical Journal, University of Chicago Press, Chicago, IL.
MSFC PAPERS CLEARED FOR PRESENTATION
(Available only from authors. Dates are presentation dates.)

HORACK, J.M. ES84
HAKKILA, J. Mankato State University
PREECE, R.D. UAH
KOSHUT, T.M. USRA
MALLOZZI, R.S. UAH


HORACK, J.M. ES84
MALLOZZI, R.S. UAH
KOSHUT, T.M. UAH


HORACK, J.M. ES84
MEEGAN, C.A. ES84
HAKKILA, J. Mankato State University
EMSLIE, A.G. UAH


HORACK, J.M. ES84
RIZVI, S. Buckhorn High School
FRIEND, L. Buckhorn High School


HOU, R. University of Texas
EVANS, D.M. University of Texas
MCCLURE, J.C. University of Texas
NUNES, A.C. EH23
GARCIA, G. EH23

The Role of Shield Gas on Heat Transfer Efficiency in Plasma Arc Welding. For publication in Welding Journal, American Welding Society, Miami, FL.

HUG, R.J. ES71 (UAH)
LONG, Y.T. ES71 (UAH)
ZU, G.J. UAH


HUG, R.J. ES41 (UAH)
LONG, Y.T. ES41 (UAH)


HUFFAKER, F. PS03
FLEMING, B. Lockheed Martin


HUH, O.K. Louisiana State University
MOELLER, C. University of Wisconsin
RICKMAN, D. ES41


HUH, O.K. Louisiana State University
MOELLER, C. University of Wisconsin
RICKMAN, D. ES41

HUNG, R.J.  ES71 (UAH)
      PAN, H.L.  ES71 (UAH)
Effect of Baffles on Orbital Accelerations—
Induced Bubble Oscillations in Microgravity.
For publication in International Journal of
Mechanical Science, 1996.

HUNG, R.J.  ES71 (UAH)
PAN, H.L.  ES71 (UAH)
Baffle Effect Modulated Interface Oscillations
Activated by Gravity Gradient. Dominated
Accelerations in Microgravity. For publication in
Microgravity Quarterly, 1996.

HUNG, R.J.  ES71 (UAH)
ZU, G.J.  UAH
LONG, Y.T.  UAH
Coupling of Gravity-Gradient-Dominated Accel-
eration-Induced Slosh Reaction Torques With
Spacecraft Orbital Dynamics. For publication in

HUTT, J.J.  EP12
CRAMER, J.M.  EP12
Advanced Rocket Injector Development at the
Marshall Space Flight Center. For presentation at
AIAA Space Programs and Technology Conference,
Huntsville, AL, September 24-26, 1996.

IRION, F.W. California Institute of Technology
MOYER, E.J. California Institute of Technology
GUNSON, M.R. JPL
RINSLAND, C.P. LaRC
MICHELSON, H.A. Harvard University
SALAWITCH, R.J. JPL
ABBAS, M.M. ES41
ABRAMS, M.C. LaRC
CHANG, A.Y. JPL
ET AL.
Stratospheric Observations of CH3D and HDO
From ATMOS Infrared Solar Spectra: Enrich-
ments of Deuterium in Methane and Implica-
tions for HD. For publication in American Geo-
physical Union, Washington, DC, 1996.

JACKSON, M.E.  ED12
SHTESSEL, Y.B. UAH
Sliding Mode Thermal Control System for Space
Station Furnace Facility. For publication in IEEE
Transactions on Control Systems Technology,

JARZEMBSKI, M.A.  ES41
SRIVASTAVA, V. ES41
CHAMBERS, D.M. Micro Craft, Inc.
Lidar Calibration Technique Using Lab-
Generated Aerosols. For publication in Applied

JEDLOVEC, G.J.  ES41
ATKINSON, R.J. Lockheed Martin
LERNER, J.A. UAH
Upper-Level Water Vapor Transport From
GOES Data. For presentation at Conference on
Hydrology, 77th AMS Annual Meeting, Long
Beach, CA, February 2-7, 1997.

JEDLOVEC, G.J.  ES41
ATKINSON, R.J. Lockheed Martin
KIDDER, S.Q. Colorado State University
A Water Vapor Transport Index for Climate Research. For publication in GEWEX News, Silver Spring, MD.

JENKINS, F.M. Auburn University
CRUIT, W. EP12
SMITH, A. EP12
Cold-Flow Study of Hybrid Rocket Motor Flow
Dynamics. For presentation at 32nd Annual
Joint Propulsion Conference, Orlando, FL, July
1996.

JOHNSON, D.L.  EL23
PEARSON, S.D.  JPL
YUNG, S.
Tornadic Weather Consideration for Various NASA Sites/Projects. For presentation at AIAA

JOHNSON, L.  PS02
ESTES, R. Smithsonian
LORENZINI, E. Smithsonian
CARROLL, J. Tether Appl. Comp.
GILCHRIST, B. University of Michigan
Electrodynamic Tethers for Spacecraft Propul-
sion and Reboost of the International Space Sta-
tion. For presentation at AIAA Space Programs
and Technology Conference, Huntsville, AL,
September 24-26, 1996.

JUSTUS, C.G. Computer Sciences Corp.
JAMES, B. EL23
JOHNSON, D.L. EL23

JUSTUS, C.G. Computer Sciences Corp.
JOHNSON, D.L. EL23

JUSTUS, C.G. Computer Sciences Corp.
JOHNSON, D.L. EL23

KANDELBOURG, C.C. Stanford University
WALKER, A.B.C., Jr. Stanford University
HOOVER, R.B. ES82
BARBEE, T.W., Jr. Lawrence Livermore National Laboratory
Observation and Modeling of Soft X-Ray Bright Points. For publication in Astrophysical Journal, Chicago, IL.

KAUKLER, W.F. UAH
CURRERI, P.A. ES75

KAYE, J.A. NASA Headquarters
 MILLER, T.L. ES41
The ATLAS Series of Shuttle Missions. For publication in Geophysical Research Letters, June 1996.

KELLER, V. PS02
CARRINGTON, C. PD12
RUPP, C. PS04
CARROLL, J. Tether Applications, Inc.
VAS, I. Boeing
JOHNSON, J. Boeing
Space Station Reboost Via Orbiter Towing and Tethered Momentum Exchange. For presentation at AIAA Space Programs and Technology Conference, Huntsville, AL, September 24–26, 1996.

KEYS, A. EO37

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

KHAZANOV, G.V. ES83
MOORE, T.E. ES83
HORWITZ, J.L. UAH
RICHARDS, P.G. UAH
KONIKOV, Y.V. Izmiran, Russia

KHAZANOV, G.V. ES83
MOORE, T.E. ES83
KRIVORUTSKY, E.N. UAH
HORWITZ, J.L. UAH
LIEMOHN, M.W. University of Michigan
Lower Hybrid Turbulence and Ponderomotive Force Effects in Space Plasmas Subjected for Large-Amplitude Low-Frequency Waves. For publication in Geophysical Letter.

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

KOMMERS, J.M. MIT
RUTLEDGE, R.E. MIT
FOX, D.W. MIT
LEWIN, W.H.G. MIT
MORGAN, E.H. MIT
KOVELATTOU, C. USRA (ES84)

KOSHAK, W.J. ES41
SOLAKIEWICZ, R.J. Chicago State University
KOSHUT, T.M. UAH
PACESAS, W.S. UAH
KOUVELIOTOU, C. USRA
VAN PARADIS, J. UAH
PENDLETON, G.N. UAH
FISHMAN, G.J. ES81
MEEGAN, C.A. ES84


KOUVELIOTOU, C. USRA
DEAL, K. UAH
WOODS, P. UAH
BRIGGS, M. UAH
HARMON, B.A. ES84
FISHMAN, G.J. ES81
VAN PARADIS, J. UAH
FINGER, M.H. USA
KOMMERS, J. MIT
LEWIN, H.G. MIT


KOUVELIOTOU, C. USRA
GREINER, J. UAH
VAN PARADIS, J. UAH
FISHMAN, G.J. ES81
ET AL.

IAUC #6369: GRO J1744–28. For publication in IAUC #6369, Cambridge, MA.

KOUVELIOTOU, C. USRA (ES84)
KOMMERS, J. MIT
LEWIN, W.H.G. MIT
VAN PARADIS, J. UAH
ET AL.


KOUVELIOTOU, C. USRA
VAN PARADIS, J. UAH
FISHMAN, G.J. ES81
BRIGGS, M.S. UAH
KOMMERS, J. MIT
HARMON, B.A. ES84
MEEGAN, C.A. ES84
LEWIN, W.H.G. MIT


KRAMER, E.A. University of Georgia
LUVALL, J.C. ES41

The Use of Thermal Remote Sensing for Measuring the Vegetation Dynamics of a Dry Tropical Forest in Costa Rica. For presentation at U.S. Landscape Ecology Symposium, Galveston, TX, March 26–30, 1996.

KRIVORUTSKY, E.N. UAH
HORWITZ, J.L. UAH
KHAZANOV, G.V. NRC/ES83
MOORE, T.E. ES83
LIMÖHN, M.W. ES83

Lower Hybrid Oscillations in the Multicomponent Space Plasmas Subjected to Low-Frequency Waves. For presentation at 1996 Spring American Geophysical Union Meeting, May 20–24, 1996.

LAL, R.B. Alabama A&M University
ZHANG, H.W. Alabama A&M University
WANG, W.S. Alabama A&M University
AGGARWAL, M.D. Alabama A&M University
LEE, H.W.H. LLNL

PENN, B.G. ES76

Crystal Growth and Optical Properties of 4-Aminobenzophenone (ABP) Crystals for NLO Applications. For presentation at the 10th American Conference on Crystal Growth, Vail, CO, August 4–9, 1996.

LANSING, M. UAH
WALKER, J. UAH
RUSSELL, S.S. EH13N

Composite Pressure Vessel Failure Prediction by Computer Vision and Neural Network Analysis. For presentation at 1996 Spring ASNT Conference, Norfolk, VA, March 18–22, 1996.

LARSON, D. EO47
HAGOPIAN, J. EO47


LASSITER, J.O. ED74

Microgravity Acceleration Measurements for Payload Isolation Development. For publication in Sound and Vibration, Bay Village, OH, 1996.

LASSITER, J.O. ED73


LEE, J.A. EH23


LU, H.-I. MILLER, T.L. University of Georgia Wave Dispersion in a Rotating, Differentially Heated Fluid Model. For publication in Dynamics of Atmospheres and Oceans.

LU, H.-I. MILLER, T.L. University of Georgia Characteristics of Annulus Baroclinic Flow Structure During Amplitude Vacillation. For publication in Dynamics of Atmospheres and Oceans.


LUTZ, B. Meyer Analytics Critical Fracture of Space Station Modules Following Orbital Debris Penetration. For presentation at AIAA Space Programs and Technologies...
Conference, Huntsville, AL, September 23–25, 1996.

LUVALL, J.C. ES41
QUATTROCHI, D.A. ES41
LO, C.-P. University of Georgia

LYLES, G.M. PF02

MACKERRAS, D. University of Queensland
DARVENIZA, M. University of Queensland
ORVILLE, R.E. Texas A&M University
WILLIAMS, E.R. MIT
GOODMAN, S.J. ES41

MAJUMDAR, A.K. Sverdrup
BAILEY, J.W. Sverdrup
HOLT, K.A. EP22
TURNER, S.G. EP22

MARTIN, C. EP12
VAN DYKE, M. EP42

MAXWELL, T. EO47
HAGOPIAN, J. EO47

MAZURUK, K. USRA
SU, C.-H. ES75
SHA, Y.-G. USRA
LEHOCKZY, S.J. ES75
Thermophysical and Thermodynamic Properties of Hg$_1$-Zn$_x$Te Pseudobinary Melts III: Viscosity. For publication in Journal of Applied Physics, Argonne, IL.

MCCAEB, R.C. AE01

MEEGAN, C.A. ES84
Observations of Gamma-Ray Bursts. For presentation at Joint APS/AAPT Meeting, Indianapolis, IN, May 2–5, 1996.

MEEGAN, C.A. ES84

MEEGAN, C.A. ES84
PENDLETON, G.N. UAH
BRIGGS, M.S. UAH
KOUVELIOTOU, C. USRA
ET AL.
The Third BATSE Gamma-Ray Burst Catalog. For publication in Astrophysical Journal, Chicago, IL.

MEHTA, G. Lockheed Martin
HASTINGS, J. EP23
PERRY, G. EP85

MEHTA, G. Lockheed Martin
INGRAM, C. Lockheed Martin
STONE, B. Rocketdyne
GROSSKOPF, W.J. EP42
LEE, C. EP42

MICHELEN, H.A. Harvard University
SALAWITCH, R.J. JPL
GUNSON, M.R. JPL
AELLIG, C. Naval Research Laboratory
KAEMPFER, N. Naval Research Laboratory
ABBAS, M.M. ES41
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BROWN, T.L. JPL
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XIQUES, K.E. Adaptive Research

MIN, J.B. ED27
XIQUES, K.E. Adaptive Research

MOHAMADINEJAD, H. McDonnell Douglas
KNOX, J.C. ED62
SMITH, J.E. UAH
FINN, J.E. Ames

MOORE, C.E. ES75
CARDELINO, B.H. Spelman College

MOORE, C.E. ES75
CARDELINO, B.H. Spelman College

MOORE, R.L. ES82
FALCONER, D.A. NRC
PORTER, J.G. ES82
GARY, G.A. ES82
SHIMIZU, T. University of Tokyo
Evidence that Strong Coronal Heating Results From Photospheric Magnetic Flux Cancellation. For presentation at 27th Meeting of the AAS SPD, Madison, WI, June 9–13, 1996.

MOORE, R.L. ES82
HUDSON, H.S. University of Hawaii
LEMEN, J.R. Lockheed
SHIBATA, K. National Solar Observatory
HIRAYAMA, T. National Solar Observatory
OGAWARA, Y. Institute of Space and Astronomical Science

MOORE, R.L. ES82
HUDSON, H.S. University of Hawaii
LEMEN, J.R. LPARL
SHIBATA, K. NAO, Japan
HIRAYAMA, T. NAO, Japan
OGAWARA, Y. ISAS, Japan
The 3-D Magnetic Eruption in the Birth of CME’s: Coronal Observations From the Yohkoh SXT. For presentation at Chapman Conference, Bozeman, MT, August 11–15, 1996.

MOORE, T.E. ES83
CHANDLER, M.O. ES83
CHAPPELL, C.R. ES83
CRAVEN, P.D. ES83
GILES, B.L. ES83
POLLOCK, C.J. Southwest Research
WAITE, J.H. Southwest Research
YOUNG, D.T. Southwest Research
BURCHI, J.L. Southwest Research
ET AL.

MOORE, T.E. ES83
CHANDLER, M.O. ES83
CHAPPELL, C.R. ES83
POLLOCK, C.J. ES83
WAITE, J.H. Southwest Research
YOUNG, D.T. Southwest Research
MCCOMAS, D.J. Los Alamos National Laboratory
NORDHOLT, J.E. Los Alamos National Laboratory
BERTHELIER, J.J. Centre d’Etudes Terrestre
Initial Results From the Thermal Ion Dynamics Experiment (TIDE) and the Plasma Source Investigation (PSI) on POLAR. For presentation at 1996 Spring American Geophysical Union Meeting, Baltimore, MD, May 20–24, 1996.

MOORE, T.E. ES83
CHAPPELL, C.R. ES83
CHANDLER, M.O. ES83
FIELDS, S.A. ES83
POLLOCK, C.J. ES83
REASONER, D.L. ES83
YOUNG, D.T. Southwest Research
BURCH, J.L. Southwest Research
EAKER, N. Southwest Research
ET AL.

MOORE, T.E. ES83
POLLOCK, C.J. ES83
ADRIAN, M.F. UAH

MOORE, T.E. ES83
POLLOCK, C.J. ES83
KINTNER, P.M. Cornell University
ARNOLDY, R.L. University of New Hampshire
LYNCH, K.A. University of New Hampshire
SCIFER—The Cleft Ion Plasma Environment at Low Solar Activity. For publication in Geophysical Research Letters.

MUSS, J. Aerojet
NGUYEN, T. Aerojet
RESKE, E. ED32
MCDANIELS, D. ED32
GOROKOV, V. Chemical Automatics

NADARAJAH, A. UAH
PUSEY, M.L. ES76
Growth Mechanism and Morphology of Tetragonal Lysozyme Crystals. For publication in Journal of Acta Crystallographica Section D.

NEERGAARD, L.F. UAH
MUSIELAK, Z.E. UAH
HATHAWAY, D.H. ES82
Klein-Gordon Equations for Acoustic Waves and Their Applications in Helioseismology. For publication in Solar Physics, Dordrecht/Boston/London.

NEWCHURCH, M.J. UAH
ALLEN, M. JPL
GUNSON, M.R. JPL
SALAWITCH, R.J. JPL
COLLINS, G.B. UAH
HUSTON, K.H. UAH
ABBAS, M.M. ES41
ABRAMS, M.C. LaRC
CHANG, A.Y. JPL

ET AL.
Stratospheric NO and NO2 Abundances From ATMOS Solar-Occultation Measurements. For publication in American Geophysical Union, Washington, DC, 1996.

NGUYEN, H.O. ED63

NICHOLAS, D.P. EB13
Video Printers Versus Instant Film: A Comparison. For presentation at Alabama Imaging and Microscopy Society Meeting, Orange Beach, AL, February 29–March 1, 1996.

NOEVER, D. ES76
BASKARAN, S. Hughes (ES76)

NOEVER, D. ES76
MATSOS, H. ES76
BRITTAINE, A. ES76
OBENHUBER, D. ES76
CRONISE, R. ES76
ARMSTRONG, S. ES76
Microbial Diffraction Gratings as Optical Detectors for Heavy Metal Pollutants. For publication in Reviews of Scientific Instruments, Argonne, IL.

NOEVER, D. ES76
SIBILLE, L. USRA
CRONISE, R. ES76
BASKARAN, S. Hughes (ES76)
HUNT, A. Lawrence Berkeley
Neural Net to Predict Silica Aerogel Transparency. For publication in Physical Review A, Ridge, NY.

NOEVER, D.A. ES76
Computerized Monitoring of Aqueous Heavy Metal and Organic Chemical Contamination Based on Protozoa Swimming Response. For presentation at The Second International Conference on Environment and Industrial Toxicology, Bangkok, Thailand, December 9–13, 1996.

NOEVER, D.A. ES76
BRITTAIN, A. NRC/ES76
MATSOS, H.C. ES76
BASKARAN, S. Hughes
OBENHUBER, D. MCI
The Effects of Variable Biome Distribution on Global Climate. For presentation at The Seventh Annual Global Warming International Conference and Expo, Vienna, Austria, April 1–3, 1996.

NOEVER, D.A. ES76
CRONISE, R.J. ES76
MATSOS, H.C. ES76
Optimized Group Contribution Methods for Predicting Chemical Biodegradation and Eye Irritancy. For publication in Toxicological and Environmental Chemistry, Bayreuth, Germany.

NOEVER, D.A. ES76
MATSOS, H.C. ES76
CRONISE, R.J. ES76
LOOGER, L.L. ES76
RELWANI, R.A. ES76
JOHNSON, J.U. Alabama A&M University
Computerized In Vitro Test for Chemical Toxicity Based on Tetrahymena Swimming Patterns. For presentation at The Second International Conference on Environmental and Industrial Toxicology, Bangkok, Thailand, December 9–13, 1996.

NOLEN, A.M. EH12
ROBINSON, J.H. ED52
Aluminum Foam as Orbital Debris Shielding. For presentation at AIAA Space Programs and Technologies Conference, Huntsville, AL, September 24–26, 1996.

NONEMAN, S.R. EO02
NAHAY, E. Teledyne Brown

NONEMAN, S.R. EO02

NOVAK, H.L. USBI
HALL, P.B. EH14
Development of Environmentally Compatible Solid Film Lubricants. For presentation at Second Aerospace Technology Conference, Huntsville, AL, August 6–8, 1996.

NURRE, G.S. ED12
WHORTON, M.S. ED12
KIM, Y. ED12
EDBERG, D. McDonnell Douglas
BOUCHER, R. McDonnell Douglas
SCHENCK, D.

OGLE, K.Y. ED62
ERICKSON, R.J. ED62
Oxygen Generation Technology Tests at MSFC. For presentation at 26th International Conference on Environmental Systems, Monterey, CA, July 8–11, 1996.

OJAKANGAS, G.W. University of Minnesota
ANDERSON, B.J. EL54
ANZ-MEADOR, P.D. Lockheed
The Contribution of Solid Rocket Motors to the Large-Particle Orbital Debris Population. For publication in Journal of Spacecraft and Rockets.

ORR, M.F., JR. ED23

OWENS, S.M. University of Albany
ULLRICH, J.B.
PANOMAREV, I.Y.
XIAO, Q.F.
CARTER, D. ES76
SISK, R.C. ES76
GIBSON, W.M.

PACIESAS, W.S. UAH
HARMON, B.A. ES84
FISHMAN, G.J. ES84
ZHANG, S.N. USRA
ROBINSON, C.R. USRA
Galactic Center. For publication in IAU Circular No. 6284, Cambridge, MA.

PALEY, M.S. USRA
FRAZIER, D.O. ES76
Photodeposition of Polydiacetylene Thin Films for Photonic Applications in 1-g and in Microgravity. For presentation at SPIE’s Annual Meeting, Denver, CO, August 4–9, 1996.

PALOSZ, W. ES75
Removal of Oxygen From Electronic Materials by Vapor Phase Processes. For presentation at 10th American Conference on Crystal Growth, Vail, CO, August 4–9, 1996.

GRASZA, K. Fisk University
CHEN, K.-T. Fisk University
ZHANG, Y. Fisk University
HU, Z. Fisk University
BURGER, A. Fisk University
Growth and Characterization of Cadmium-Zinc Telluride Crystals Grown by Seeded PVT. For presentation at 10th American Conference on Crystal Growth, Vail, CO, August 4–9, 1996.

PALOSZ, W. ES75
GEORGE, M.A. Fisk University
COLLINS, E.E. Fisk University
CHUNG, H. SUNY
RAGHOTHAMACHAR, B. SUNY
DUDLEY, M. SUNY

PETRUZZO, J.J., III UAH
SMITH, A.E. UAH
GREGORY, J.C. UAH
THOBURN, C. ES84
AUSTIN, R.W. ES84
PARNELL, T. ES84
CHRISTL, M. ES84
ROBERTS, E. ES84
Scintillating Optical Fiber Calorimeter (SOFICAL) Detector. For presentation at SPIE’s International Symposium on Optical Science, Engineering, and Instrumentation, Denver, CO, August 4–9, 1996.

PAVELITZ, S.D. Sverdrup Technology
ANDERSON, B.J. EL23
JAMES, B.F. EL23

PECK, J.A. ED23
Shape Optimization of Actively Controlled Mirror Segments. For publication in AIAA Journal.

PENDLETON, G.N. UAH
MALLOZZI, R.S. UAH
PACIESAS, W.S. UAH
BRIGGS, M.S. UAH
PREECE, R.D. UAH
KOSHUT, T.M. UAH
HIRACK, J.M. ES84
MEEGAN, C.A. ES84
FISHMAN, G.J. ES84
ET AL.
The Intensity Distribution for Gamma-Ray Bursts Observed With BATSE. For publication in Astrophysical Journal, Chicago, IL.

PENDLETON, G.N. UAH
CARRASQUILLO, R.L. ED62
FRANKS, G.D. ED62
FREDERICK, K.R. ED62
KNOX, J.C. ED62
LONG, D.A. ED62
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PARRISH, K.J. ED62

PETRUZZO, J.J., III UAH
SMITH, A.E. UAH
GREGORY, J.C. UAH
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AUSTIN, R.W. ES84
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BONNELL, J.  Cornell University
ARNOLDY, R.L. University of New Hampshire
DEEHR, C.  University of Alaska
STEINBECK-NEILSEN, H.  University of Oslo
ET AL.
Rocket Sounding of the Cleft, With the Help of Near Real Time IMF and Solar Wind Data From the ISTP Wind Satellite. For presentation at 1996 Spring American Geophysical Union, Baltimore, MD, May 20–24, 1996.

PORTER, J.G.  ES82
FALCONER, D.A.  ES82 (NRC)
MOORE, R.L.  ES82
HARVEY, K.L.  SPRC
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SHIMIZU, T.  University of Tokyo
Microflaring in Sheared Core Magnetic Fields and Episodic Heating in Large Coronal Loops. For presentation at 188th AAS SPD, Madison, WI, June 9–13, 1996.

POWERS, W.T.  EB22
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WALLACE, T.L.  Vanderbilt University
Validation of UV-VIS Atomic Spectral Model for Quantitative Prediction of Number Density, Temperature, and Broadening Parameter. For presentation at 22nd JANNAF Combustion Committee Meeting, Marshall Space Flight Center, AL, October 24–25, 1995, and for publication in the conference proceedings.

PREECE, R.D.  UAH
BRIGGS, M.S.  UAH
PENDLETON, G.N.  UAH
PACIESAS, W.S.  UAH
MATTESON, J.L. University of California
BAND, D.L.  University of California
Skelton, R.T. University of California
MEEGAN, C.A.  ES84

PRESTWICH, A.H. Smithsonian Astrophysical
JOY, M.  ES84
LUGINBUHL, C.B. U.S. Naval Observatory
SULKANEN, M.  ES84
NEWBERRY, M.  Axion Research
PUSEY, M.L. ES76
Anion Effects on Lysozyme Crystallization. For presentation at American Chemical Society Meeting, New Orleans, LA, March 24-28, 1996.

QUATTROCHI, D.A. ES41
Cities as Urban Ecosystems: A Remote Sensing Perspective. For presentation at PECORA 13 Symposium, Sioux Falls, SD, August 19-22, 1996.

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QIU, H.-L. Louisiana State University
ZHAO, W. Louisiana State University

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ROARK, W. Mevace Corp.
PEARCY, G. Mevace Corp.
Thermal Diffusion Experiment “Chuck” — Payload of STABLE. For presentation at SPIE Conference on Space Processing of Materials, Denver, CO, August 4-9, 1996.

RAMACHANDRAN, R. ES41
RAGHAVAN, R. ES41
GOODMAN, S.J. ES41
Estimating Ice Water Content Using Observed Lightning. For presentation at 10th International Conference on Atmosphere Electricity, Osaka, Japan, June 10-14, 1996.

RAMSEY, B.D. ES84
New Developments in X-Ray Detector Systems. For presentation at 50th Anniversary of Tata Institute of Fundamental Research, Bombay, India, August 12-17, 1996.

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AUSTIN, R.A. USRA
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MINAMITANI, T. USRA
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WEISSKOPF, M.C. ES84

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KAVAYA, M.J. EB53
Special Relativity Corrections to the Point of Return, Receiving Angles, and the Doppler Shift for Space-Based Lidars. For publication in Journal of Optical Society of America.

RICHARDSON, R.W. Ohio State University
SUBRAMANIAN, V.V. Ohio State University
PAGAN, J. Ohio State University
NUNES, A.C., JR. EH23

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RINSLAND, C.F. LaRC
MAHIEU, E. University of Liege
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GUNSON, M.R. JPL
SALAWITCH, R.J. JPL
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GOLDMAN, A. University of Denver
ABRAMS, M.C. Systems and Applied Sciences Corp.
ABBAS, M.M. ES41
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RINSLAND, C.P.  
GUNSON, M.R.  
SALAWITCH, R.J.  
MICHIESEN, H.A.  
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ROBINSON, M.B. ES76
Containerless Processing in Reduced Gravity Using the TEMPS Facility. For presentation at AIAA Conference, Huntsville, AL, September 24–27, 1996.

ROMAINE, S.E. Harvard-Smithsonian
BRUNI, R.J. Harvard-Smithsonian
CLARK, A.M. Harvard-Smithsonian
PODGORSKI, W.A. Harvard-Smithsonian
ZHOU, Y. Harvard-Smithsonian
SCHULTZ, D. Harvard-Smithsonian
SCHWARTZ, D.A. Harvard-Smithsonian
VAN SPEYBROECK, L. Harvard-Smithsonian
SHAPIRO, A.P. EB52
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Monitoring Program for the Coating of the AXAF Flight Optics. For presentation at SPIE 1996 International Symposium on Optical Science, Engineering and Instrumentation, Denver, CO, August 4–9, 1996.

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RICKMAN, D. ES41

ROGERS, J.R.
ROGERS, J.R. ES76
ROBINSON, M.B. ES76
Containerless Processing in Reduced Gravity Using the TEMPS Facility. For presentation at SPIE—International Society for Optical Engineering, Denver, CO, August 1996.

ROMER, M. New Mexico Highlands
WILSON, F. New Mexico Highlands
TOWNSEND, C. New Mexico Highlands
MYERS, T. New Mexico Highlands
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Space Welding: On the Agenda. For presentation at 33rd Space Congress, Cocoa Beach, FL, April 23–26, 1996.

RUSSELL, K. EB53
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CHAPPELL, J.H. New England Advanced
The Solar X-Ray Imager (SXI) Detector Characterization. For presentation at SPIE, GOES–8 and Beyond, Denver, CO, August 4–9, 1996.

RUSSELL, S.S. EH13N
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Science Applications International

BUTLER, B.L. 
Science Applications International

KUBLIN, T. STUCKER, M. 
PS04

The NASA Solid Propulsion Integrity Program (SPIP) CD-ROM Information System Database. For presentation at JANNAF S&MBS Meeting, Tampa, FL, December 4–8, 1995.

SANGHADASA, M. BARR, T.A., Jr. WU, B. CLOMENIL, D. TONG, Y. BHAT, K.N. CLARK, R.D. PENN, B. 
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SCARL, E. McCALL, K. 
Boeing EB12


SCHILLER, S. LUVALL, J.C. JUSTUS, J. 
South Dakota State ES44 ES44

 Calibration of MODTRAN3 With PGAMS Observational Data for Atmospheric Corrections Applications. For presentation at SPIE—The International Society for Optical Engineering, Orlando, FL, April 17–21, 1996.

SCHMIEDER, B. ROVIRA, M. SIMNETT, G.M. FONTENLA, J.M. TANDBERG-HANSSEN, E. SHIBATA, K. GOUHB, L. 
Observatoire de Paris University of Birmingham Observatoire de Paris University of Birmingham Observatoire de Paris Harvard-Smithsonian

Subflares and Surges in AR 2/44 During SMM. For publication in Astronomy and Astrophysics Journal.

SCHMIEDER, B. ROVIRA, M. SIMNETT, G.M. VAN DRIEL-GESZTELYI, L. TANDBERG-HANSSEN, E. SHIBATA, K. GOUHB, L. 
Observatoire de Paris University of Birmingham Observatoire de Paris ES01 NAO Japan


SCHONBERG, W.P. WILLIAMSEN, J.E. FROST, C. 
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Hole Size and Crack Length Following Orbital Debris Penetration of Space Station Module Walls at 6.5 and 11.5 km/sec. For presentation at 20th International Symposium on Space Technology and Science, Gifu, Japan, May 19–26, 1996.

SCHONBERG, W.P. DAVENPORT, Q. SERRANO, J. GALA, D. LIQUORNOK, D.J. HAYAMI, R.A. WILLIAMSEN, J.E. 
UAH UAH UAH UAH UAH UAH ED52

Modeling the Internal Effects Within a Habitable Module Due to Perforation by an Orbital Debris Particle. For presentation at Sixth Annual AAS/AIAA Space Flight Mechanics Meeting, Austin, TX, February 11–15, 1996.

SCHONBERG, W.P. WILLIAMSEN, J.E. 
UAH ED52


SCHONBERG, W.P. WILLIAMSEN, J.E. 
UAH ED52

Space Station Module Wall Hole Size and Crack Length Following Orbital Debris Penetration. For presentation at Space 96: The Fifth International Conference and Exposition on
Engineering, Construction, and Operations in Space, Albuquerque, NM, June 1–6, 1996.

SCHONBERG, W.P. UAH
WILLIAMSEN, J.E. ED52

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Spaceborne Digital Video—Perched on the High Dive of Interactive Ops. For presentation at AIAA Space Programs and Technology Conference, Huntsville, AL, September 24–26, 1996.

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CATALINA, A. University of Alabama
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WANG, J.-C. Alabama A&M University
Seeded Growth of HgZnTe by Directional Solidification Using an Initial Composition Profile Simulating a “Diffusion-Boundary” Layer. For publication in Journal of Crystal Growth, Amsterdam, The Netherlands.

SHA, Y.-G. ES71
SU, C.-H. ES75
LEHOCZKY, S.L. ES75
Seeded Growth of HgZnTe by Directional Solidification Using Initial Composition Profile Simulating a “Diffusion-Boundary” Layer. For presentation at 10th American Conference on Crystal Growth, Vail, CO, Aug. 4–9, 1996.

LEHOCZKY, S.L. ES75
Thermophysical and Thermodynamic Properties of Hg$_{1-x}$Zn$_x$Te Pseudobinary Melts II: Thermal Diffusivity and Conductivity of Hg$_{1-x}$Zn$_x$Te Solids and Melts. For publication in Journal of Applied Physics, Argonne, IL.

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FOWLER, P.H. University of Bristol

SMITH, A.W. ED34
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SMITH, D.D. ES76
Cancellation of Nonlinear Absorption in Composite Materials. For presentation at Optical Society of America, Rochester, NY, October 20–24, 1996.

SMITH, D.D. ES76
FISCHER, G. University of Rochester
BOYD, R.W. University of Rochester
GREGORY, D.A. UAH
Cancellation of Photo-Induced Absorption in Metal Nanoparticle Composites Through a Counterintuitive Consequence of Local Field Effects. For publication in Journal of the Optical Society of America B, Washington, DC.
SMITH, O.E. Computer Sciences Corp.
ADELFANG, S.I. Computer Sciences Corp.
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CHEN, L. University of Washington
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LUMMERZHEIM, D. University of Alaska
REES, M.H. University of Alaska

Observations of Dayside Aurora. For presentation at 1996 Huntsville Workshop, Guntersville, AL, September 1996.

SPANNER, S. Sverdrup
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Evaluation of Two Fractal Methods for Magnetogram Image Analysis. For publication in Solar Physics, Boston, MA.

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STONE, N.H. ES83
An Early Assessment of Science Results From the TSS–1R Mission. For presentation at AIAA Conference, Huntsville, AL, September 1996.

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GILCHRIST, B.E. University of Michigan
HARDY, D.A. PL/PGSG
MARIANI, F. Second University of Rome, Italy

SU, C.-H. ES75
LEHOCZKY, S.L. ES75
The Influence of Reduced Gravity on the Crystal Growth of Electronic Materials. For publication in Microgravity Science and Technology, Bremen, Germany.

SU, C.-H. ES75
SHAA, Y.-G. USRA
LEHOCZKY, S.L. ES75
SZOFRAN, F.R. ES75
GILLIES, D.C. ES75
COBB, S.D. ES75
SCRIPA, R.N. UAH
Crystal Growth of Selected II–VI Semiconducting Alloys by Directional Solidification 1, Ground-Based Experiments. For publication in Journal of Materials Science, London, UK.

SU, C.-H. ES75
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GILLIES, D.C. ES75
COBB, S.D. ES75
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SU, C.-H. ES75
SHAA, Y.-G. USRA
MAZURUK, K. USRA
LEHOCZKY, S.L. ES75
Thermophysical and Thermodynamic Properties of Hg1–xZnxTe Pseudobinary Melts 1: Phase Diagram, Density, Heat Capacity, and Enthalpy of Mixing. For publication in Journal of Applied Physics, Argonne, IL.

SU, C.-H. ES75
SHAA, Y.-G. USRA
LEHOCZKY, S.L. ES75
MAZURUK, K. USRA
GILLIES, D.C. ES75
COBB, S.D. ES75
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SHAA, Y.-G. USRA
LEHOCZKY, S.L. ES75
MAZURUK, K. USRA
GILLIES, D.C. ES75
COBB, S.D. ES75
SCRIPA, R.N. UAH
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<th>Name</th>
<th>Institution</th>
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<tr>
<td>SULKANEN, M.E.</td>
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<td>KOLODZIEJCZAK, J.J.</td>
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<td>SULLIVAN, R.M.</td>
<td>ED24</td>
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<td>STOKES, E.H.</td>
<td>Southern Research</td>
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<tr>
<td>A Model for the Effusion of Water in Carbon Phenolic Composites. For presentation at ASME International Mechanical Engineers Conference and Exposition, Atlanta, GA, November 17–21, 1996.</td>
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<td>SUNKARA, H.B.</td>
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<td>WEISSMAN, J.M.</td>
<td>University of Pittsburgh</td>
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<td>FRAZIER, D.O.</td>
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<td>University of Pittsburgh</td>
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<td>SWANSON, G.R.</td>
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<td>SWANSON, G.R.</td>
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<td>ZACHARY, L.W.</td>
<td>Iowa State University</td>
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<td>TALIA, G.E.</td>
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<td>NUNES, A.C.</td>
<td>EH23</td>
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<td>TEGMARK, M.</td>
<td>Max-Planck Institute</td>
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<td>HARTMANN, D.H.</td>
<td>Clemson University</td>
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<td>BRIGGS, M.S.</td>
<td>UAH</td>
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<td>HAKKILA, J.</td>
<td>Mankato State University</td>
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<td>MEEGAN, C.A.</td>
<td>ES84</td>
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<tr>
<td>Improved Limits on Gamma-Ray Burst Repetition. For publication in Astrophysical Journal Letters, Chicago, IL.</td>
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<td>TINKER, M.L.</td>
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<td>TINKER, M.L.</td>
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<tr>
<td>Nonlinearities Due to Joint Friction and Clearance in a Structural Dynamic Test Fixture. For presentation at 1996 International Mechanical Engineering Congress and Exposition, Atlanta, GA, November 17–22, 1996.</td>
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<td>TOMSICK, J.</td>
<td>Columbia University</td>
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<td>SILVER, E.</td>
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<td>WEISSKOPF, M.</td>
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<td>ELSNER, R.</td>
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<td>ZIOCK, K.</td>
<td>LLNL</td>
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<td>TROUT, D.H.</td>
<td>EL23</td>
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<tr>
<td>Investigation of the Bulk Current Injection Technique by Comparison to Induced Currents From Radiated Electromagnetic Fields. For presentation at IEEE Symposium for EMC, Santa Clara, CA, August 1996.</td>
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<td>ULLRICH, J.B.</td>
<td>X-Ray Optical Systems</td>
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<td>OWENS, S.M.</td>
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<td>XIAO, Q.F.</td>
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<td>PANOMAREV, I.Y.</td>
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<td>CARTER, D.</td>
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VAN DER HOOFT, F. University of Amsterdam
KOUVELIOTOU, C. USRA
VAN PARADIJS, J. UAH
RUBIN, B.C. USRA
CRARY, D.J. ES84
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Low-Frequency QPO in the X-Ray Transient GRO J1719–24. For publication in Astronomy and Astrophysics, Heidelberg, Germany.

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FINCKENOR, M. EH15
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Space Environmental Effects Testing Capabilities at MSFC. For presentation at 1996 AIAA Space Programs and Technologies Conference and Exhibit, Huntsville, Alabama, September 24–26, 1996.

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HARRINGTON, F. ED01

Static Test Induced Loads Verification Beyond Elastic Limit. For presentation at 37th SDM Conference, Salt Lake City, UT, April 15–17, 1996.

VERDERAIME, V. ED01
VAUGHAN, R. ED01

U-Groove Aluminum Weld Strength Improvement. For presentation at 37th SDM Conference, Salt Lake City, UT, April 15–17, 1996.

VOLZ, M.P. ES75
MAZURUK, K. ES75

Damping of Natural Convection in Liquid Gallium With a Rotating Magnetic Field. For presentation at 10th American Conference on Crystal Growth, Vail, CO, August 4–9, 1996.

VOLZ, M.P. ES75
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Thermoconvective Instability in a Rotating Magnetic Field. For publication in Physics of Fluids Journal, Woodbury, NY.

VOLZ, M.P. ES75
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WATING, D.A. ES75
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SU, C.-H. ES75
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SPEYBROECK, L.V. Smithsonian Astrophysical
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Energetic Electrons Observed on TSS–1R, Their Dependence on Spacecraft Voltage and Relationship to Tether Current. For presentation at 1996 Fall American Geophysical Union Meeting, San Francisco, CA, December 1996.

WRIGHT, H.B. Boeing
ELROD, W. NASA
International Space Station U.S. Laboratory Outfitting. For presentation at SAE 26th International Conference on Environmental Systems, Monterey, CA, July 8–11, 1996.

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Compiled by Joyce E. Turner Waits

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Teresa H. Washington
Director
Human Resources and Administrative Support Office
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Standard Form 298 (Rev. 2-89) Prescribed by ANSI Std. 239-18
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