FY 2005 Scientific and Technical Reports, Articles, Papers, and Presentations

Compiled by
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June 2007
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National Aeronautics and Space Administration

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June 2007
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 2005 SCIENTIFIC AND TECHNICAL REPORTS,
ARTICLES, PAPERS, AND PRESENTATIONS

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Monitoring the atmospheric composition of a crewed spacecraft cabin is central to successfully expanding the breadth and depth of first-hand human knowledge and understanding of space. Highly reliable technologies must be identified and developed to monitor atmospheric composition. This will enable crewed space missions that last weeks, months, and eventually years. Atmospheric composition monitoring is a primary component of any environmental control and life support system. Instrumentation employed to monitor atmospheric composition must be inexpensive, simple, and lightweight and provide robust performance. Such a system will ensure an environment that promotes human safety and health, and that the environment can be maintained with a high degree of confidence. Key to this confidence is the capability for any technology to operate autonomously, with little intervention from the crew or mission control personnel. A study has been conducted using technologies that, with further development, may reach these goals.

Launch vehicles consume large quantities of propellant quickly, causing the mass properties and structural dynamics of the vehicle to change dramatically. Currently, structural load assessments account for this change with a large collection of structural models representing various propellant fill levels. This creates a large database of models complicating the delivery of reduced models and requiring extensive work for model changes. Presented here is a method to account for these mass changes in a more efficient manner. The method allows for the subtraction of propellant mass as the propellant is used in the simulation. This subtraction is done in the modal domain of the vehicle generalized model. Additional computation required is primarily for constructing the used propellant mass matrix from an initial propellant model and further matrix multiplications and subtractions. An additional eigenvalue solution is required to uncouple the new equations of motion; however, this is a much simpler calculation starting from a system that is already substantially uncoupled. The method was successfully tested in a simulation of Saturn V loads. Results from the method are compared to results from separate structural models for several propellant levels, showing excellent agreement. Further development to encompass more complicated propellant models, including slosh dynamics, is possible.
TM—2004–213604   December 2004

This Technical Memorandum describes the development of several high-strength aluminum (Al) alloys that are compatible with hydrogen peroxide (H₂O₂) propellant for NASA Hypersonic-X (Hyper-X) vehicles’ fuel tanks and structures. The yield strengths for some of these Al-magnesium-based alloys are more than 3 times stronger than the conventional 5254–H112 Al alloy, while maintaining excellent H₂O₂ compatibility similar to class 1 5254 alloy. The alloy development strategy is to add scandium, zirconium, and other transitional metals with unique electrochemical properties, which will not act as catalysts, to decompose the highly concentrated 90 percent H₂O₂. Test coupons are machined from sheet metals for H₂O₂ long-term exposure testing and mechanical properties testing. In addition, the ability to weld the new alloys using friction stir welding has also been explored. The new high-strength alloys could represent an enabling material technology for Hyper-X vehicles, where flight weight reduction is a critical requirement.

TM—2004–213605   December 2004

This Technical Memorandum (TM) presents formal NASA technical reports, papers published in technical journals, and presentations by Marshall Space Flight Center (MSFC) personnel in FY 2003. 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—2005–213609   March 2005
Safe, Affordable Fission Engine- (SAFE-) 100a Heat Exchanger Thermal and Structural Analysis. B.E. Steeve, Structures, Mechanics, and Thermal Department, Engineering Directorate.

A potential fission power system for in-space missions is a heat pipe-cooled reactor coupled to a Brayton cycle. In this system, a heat exchanger (HX) transfers the heat of the reactor core to the Brayton gas. The Safe, Affordable Fission Engine- (SAFE-) 100a is a test program designed to thermally and hydraulically simulate a 95 Btu/s prototypic heat pipe-cooled reactor using electrical resistance heaters on the ground. This Technical Memorandum documents the thermal and structural assessment of the HX used in the SAFE-100a program.

TM—2005–213688   March 2005

This Technical Memorandum covers revolutionary ideas for space radiation shielding that would mitigate mission costs while limiting human exposure, as studied in a workshop held at Marshall Space Flight Center at the request of NASA Headquarters. None of the revolutionary new ideas examined for the first time in this workshop showed clear promise. The workshop attendees felt that some previously examined concepts were definitely useful and should be pursued. The workshop attendees also concluded that several of the new concepts warranted further investigation to clarify their value.

TM—2005–213846   April 2005
International Space Station Bacteria Filter Element Service Life Evaluation. J.L. Perry, Spacecraft and Vehicle Systems Department, Engineering Directorate.

The International Space Station (ISS) uses high-efficiency particulate air filters to remove particulate matter from the cabin atmosphere. Known as bacteria filter elements (BFEs), there are 13 elements deployed on board the ISS’s U.S. segment in the flight 4R assembly level. The preflight service life prediction of 1 yr for the BFEs is based upon engineering analysis of data collected during developmental testing that used a synthetic dust challenge. While this challenge is considered reasonable and conservative from a design perspective, an understanding of the actual filter loading is required to best manage the critical ISS program resources. Testing was conducted on BFEs returned from the ISS to refine the service life prediction. Results from this testing and implications to ISS resource management are provided.

TM—2005–213848   February 2005

In the late 1980s, microgravity researchers began to voice their concern that umbilical-transmitted energy could significantly degrade the acceleration environment of microgravity
space science experiments onboard manned spacecraft. Since umbilicals are necessary for many experiments, control designers began to seek ways to compensate for these “indirect” disturbances.

Hampton et al. used the Kane’s method to develop a model of the active rack isolation system (ARIS) that includes (1) actuator control forces, (2) direct disturbance forces, and (3) indirect, actuator-transmitted disturbances. Their model does not, however, include the indirect, umbilical-transmitted disturbances. Since the umbilical stiffnesses are not negligible, these indirect disturbances must be included in the model. Until the umbilicals have been appropriately included, the model will be incomplete.

This Technical Memorandum presents a nonlinear model of ARIS with umbilicals included. Model verification was achieved by utilizing two commercial-off-the-shelf software tools. Various forces and moments were applied to the model to yield simulated responses of the system. Plots of the simulation results show how various critical points on an ARIS-outfitted international standard payload rack behave under the application of direct disturbances, indirect disturbances, and control forces. Simulations also show system response to a variety of initial conditions.

TM—2005–213902

Method for Determination of <5 ppm Oxygen in Sodium Samples. R.S. Reid, J.J. Martin, and G.L. Schmidt*. Propulsion Research Center, Space Transportation Directorate and *New Mexico Institute of Mining and Technology.

Alkali metals used in pumped loops or heat pipes must be sufficiently free of nonmetallic impurities to ensure long heat rejection system life. Life issues are well established for alkali metal systems. Impurities can form ternary compounds between the container and working fluid, leading to corrosion. This Technical Memorandum discusses the consequences of impurities and candidate measurement techniques to determine whether impurities have been reduced to sufficiently low levels within a single-phase liquid metal loop or a closed two-phase heat transfer system, such as a heat pipe. These techniques include the vanadium wire equilibration, neutron activation analysis, plug traps, distillation, and chemical analysis. Conceptual procedures for performing vanadium wire equilibration purity measurements on sodium contained in a heat pipe are discussed in detail.

TM—2005–214007


Human exploration and utilization of space requires habitats to provide appropriate conditions for working and living. These conditions are provided by environmental control and life support systems (ECLSS) that ensure appropriate atmosphere composition, pressure, and temperature; manage and distribute water, process waste matter, provide fire detection and suppression; and other functions as necessary.

The tables in appendix I of NASA RP–1324 “Designing for Human Presence in Space” summarize the life support functions and processes used onboard U.S. and U.S.S.R/Russian space habitats. These tables have been updated to include information on thermal control methods and to provide additional information on the ECLS systems.

TM—2005–214008

An Assessment of the International Space Station’s Trace Contaminant Control Subassembly Process Economics. J.L. Perry, H.E. Cole,* and H.N. El-Lessy**. Spacecraft and Vehicle Systems Department, Engineering Directorate *The Boeing Company, Huntsville, AL, and **The Boeing Company, Houston, TX.

The International Space Station (ISS) Environmental Control and Life Support System includes equipment specifically designed to actively remove trace chemical contamination from the cabin atmosphere. In the U.S. on-orbit segment, this function is provided by the trace contaminant control subassembly (TCCS) located in the atmosphere revitalization subsystem rack housed in the laboratory module, Destiny. The TCCS employs expendable adsorbent beds to accomplish its function leading to a potentially significant life cycle cost over the life of the ISS. Because maintaining the TCCSs proper can be logistically intensive, its performance in flight has been studied in detail to determine where savings may be achieved. Details of these studies and recommendations for improving the TCCS’s process economics without compromising its performance or crew health and safety are presented and discussed.

TM—2005–214061


Contaminated air, whether in a crewed spacecraft cabin or terrestrial work and living spaces, is a pervasive problem affecting human health, performance, and well-being. The need for highly effective, economical air quality processes spans a wide range of terrestrial and space flight applications. Typically, air quality control processes rely on absorption-based processes. Most industrial packed-bed adsorption processes use activated
carbon. Once saturated, the carbon is either dumped or regener-
ated. In either case, the dumped carbon and concentrated waste
streams constitute a hazardous waste that must be handled safely
while minimizing environmental impact. Thermal catalytic
oxidation processes designed to address waste handling issues
are moving to the forefront of cleaner air quality control and
process gas decontamination processes. Careful consideration
in designing the catalyst substrate and reactor can lead to more
complete contaminant destruction and poisoning resistance.
Maintenance improvements leading to reduced waste handling
and process downtime can also be realized. Performance of a
prototype thermal catalytic reaction based on ultrashort waste
channel, monolith catalyst substrate design, under a variety
of process flow and contaminant loading conditions, is dis-
cussed.

TM—2005–214184 September 2005
In-Space Propulsion: Connectivity to In-Space Fabrication
and Repair. L. Johnson, D. Harris, A. Trausch, G.L.
Matloff,* T. Taylor,** and K. Cutting***. In-Space propulsion
Technology Office, Space Transportation Programs/
Projects Office, *New York City College of Technology,
**BAE Systems, and ***Gray Research.

The connectivity between new in-space propulsion tech-
nologies and the ultimate development of an in-space fabrica-
tion and repair infrastructure are described in this Technical
Memorandum. A number of advanced in-space propulsion
technologies are being developed by NASA, many of which
are directly relevant to the establishment of such an in-space
infrastructure. These include aerocapture, advanced solar-elec-
tric propulsion, solar-thermal propulsion, advanced chemical
propulsion, tethers, and solar photon sails. Other, further term
technologies have also been studied to assess their utility to the
development of such an infrastructure.

TM—2005–214186 September 2005
Advanced Sensor Concepts (MSFC Director’s Fund Final
Report, Project No. 03-11). D.C. Alhorn, D.E. Howard, and
D.A. Smith. Instrument and Payload Systems Department,
Engineering Directorate.

The Advanced Sensor Concepts project was conducted
under the Center Director’s Discretionary Fund at the Marshall
Space Flight Center. Its objective was to advance the technology
originally developed for the Glovebox Integrated Microgravity
Isolation Technology project. The objective of this effort was
to develop and test several new motion sensors. To date, the
investigators have invented seven new technologies during this
endeavor and have conceived several others. The innovative ba-
sic sensor technology is an absolute position sensor. It employs
only two active components, and it is simple, inexpensive, reli-
able, repeatable, lightweight, and relatively unobtrusive. Two
sensors can be utilized in the same physical space to achieve
redundancy. The sensor has micrometer positional accuracy and
can be configured as a two- or three-dimensional sensor. The
sensor technology has the potential to pioneer a new class of
linear and rotary sensors. This sensor is the enabling technology
for autonomous assembly of modular structures in space and
on extraterrestrial locations.

TM—2005–214189 September 2005
Space Shuttle Pad Exposure Period Meteorological Param-
eters STS–1 Through STS–107. B.G. Overbey and B.C.
Roberts. Spacecraft and Vehicle Systems Department,
Engineering Directorate.

During the 113 missions of the Space Transportation Sys-
tem (STS) to date, the Space Shuttle fleet has been exposed to
the elements on the launch pad for ≈4,195 days. The Natural
Environments Branch at Marshall Space Flight Center archives
atmospheric environments to which the Space Shuttle vehicles
are exposed. This Technical Memorandum (TM) provides a
summary of the historical record of the meteorological condi-
tions encountered by the Space Shuttle fleet during the pad
exposure period. Parameters included in this TM are tem-
perature, relative humidity, wind speed, wind direction, sea
level pressure, and precipitation. Extremes for each of these
parameters for each mission are also summarized. Sources
for the data include meteorological towers and hourly surface
observations. Data are provided from the first launch of the

Spotless days are examined as a predictor for the size and timing of a sunspot cycle. For cycles 16–23 the first spotless day for a new cycle, which occurs during the decline of the old cycle, is found to precede minimum amplitude for the new cycle by about ≈34 mo, having a range of 25–40 mo. Reports indicate that the first spotless day for cycle 24 occurred in January 2004, suggesting that minimum amplitude for cycle 24 should be expected before April 2007, probably sometime during the latter half of 2006. If true, then cycle 23 will be classified as a cycle of shorter period, inferring further that cycle 24 likely will be a cycle of larger than average minimum and maximum amplitudes and faster than average rise, peaking sometime in 2010.

A multimegawatt-class nuclear fission powered closed cycle magnetohydrodynamic space power plant using a helium/xenon working gas has been studied, to include a comprehensive system analysis. Total plant efficiency was expected to be 55.2 percent including preionization power. The effects of compressor stage number, regenerator efficiency, and radiation cooler temperature on plant efficiency were investigated. The specific mass of the power generation plant was also examined. System specific mass was estimated to be 3 kg/kWe for a net electrical output power of 1 MWe, 2–3 kg/kWe at 2 MWe, and ≈2 kg/KWe at >3 MWe. Three phases of research and development plan were proposed: (1) Phase I—proof of principle, (2) Phase II—demonstration of power generation, and (3) Phase III—prototypical closed loop test.

A computational method for the analysis of longitudinal-mode liquid rocket combustion instability has been developed based on the unsteady, quasi-one-dimensional Euler equations where the combustion process source terms were introduced through the incorporation of a two-zone, linearized representation: (1) A two-parameter collapsed combustion zone at the injector face, and (2) a two-parameter distributed combustion zone based on a Lagrangian treatment of the propellant spray. The unsteady Euler equations in inhomogeneous form retain full hyperbolicity and are integrated implicitly in time using second-order, high-resolution, characteristic-based, flux-differencing spatial discretization with Roe-averaging of the Jacobian matrix. This method was initially validated against an analytical solution for nonreacting, isentropic duct acoustics with specified admittances at the inflow and outflow boundaries. For small amplitude perturbations, numerical predictions for the amplification coefficient and oscillation period were found to compare favorably with predictions from linearized small-disturbance theory as long as the grid exceeded a critical density (≈100 nodes/wavelength). The numerical methodology was then exercised on a generic combustor configuration using both collapsed and distributed combustion zone models with a short nozzle admittance approximation for the outflow boundary. In these cases, the response parameters were varied to determine stability limits defining resonant coupling onset.
This document contains the proceedings of the Fifth International Symposium on Liquid Space Propulsion, held October 27–30, 2003, in Chattanooga, TN. The International Liquid Space Propulsion Symposia provide the principal forum for all aspects of liquid rocket propulsion. The aim of the symposium series is to gather international experts in the field of liquid rocket engines on a regular basis for presentations and discussions of the current status of research and development. Besides an exchange of information about future trends, it also fortifies existing cooperation and acts as a nucleus to establish networks to enhance international scientific collaboration in the liquid rocket propulsion area.

As a space faring nation, we are at a critical juncture in the evolution of space exploration. NASA has announced its Vision for Space Exploration, a vision of returning humans to the Moon, sending robots and eventually humans to Mars, and exploring the outer solar system via automated spacecraft. However, mission concepts have become increasingly complex, with the potential to yield a wealth of scientific knowledge. Meanwhile, there are significant resource challenges to be met. Launch costs remain a barrier to routine space flight; the ever-changing fiscal and political environments can wreak havoc on mission planning; and technologies are constantly improving, and systems that were state of the art when a program began can quickly become outmoded before a mission is even launched. This Conference Publication describes the workshop and featured presentations by world-class experts presenting leading-edge technologies and applications in the areas of power and propulsion; communications; automation, robotics, computing, and intelligent systems; and transformational techniques for space activities. Workshops such as this one provide an excellent medium for capturing the broadest possible array of insights and expertise, learning from researchers in universities, national laboratories, NASA field Centers, and industry to help better our future in space.
On Structural Design of a Mobile Lunar Habitat With Multi-Layered Environmental Shielding. M. Rais-Rohani. NASA’s Faculty Fellowship Program, Mississippi State University.

This report presents an overview of a Mobile Lunar Habitat (MLH) structural design consisting of advanced composite materials. The habitat design is derived from the cylindrical-shaped U.S. Lab module aboard the International Space Station (ISS) and includes two lateral ports and a hatch at each end that geometrically match those of the ISS Nodes. Thus, several MLH units can be connected together to form a larger lunar outpost of various architectures. For enhanced mobility over the lunar terrain, the MLH uses six articulated insect-like robotic, retractable legs enabling the habitat to fit aboard a launch vehicle. The carbon-composite shell is sandwiched between two layers of hydrogen-rich polyethylene for enhanced radiation shielding. The pressure vessel is covered by modular double-wall panels for meteoroid impact shielding supported by externally mounted stiffeners. The habitat’s structure is an assembly of multiple parts manufactured separately and bonded together. Based on the geometric complexity of a part and its material system, an appropriate fabrication process is proposed.

Strengthen faculty capabilities to enhance the STEM workforce, advance competition, and infuse mission-related research and technology content into classroom teaching; and (5) Increase participation of underrepresented and underserved faculty and institutions in NASA science and technology.

The 2004 NASA Faculty Fellowship Program Research Reports. J.R. Pruitt, G. Karr, L.M. Freeman, and R. Hassan (Program Directors) and J.B. Day (Compiler and Editor). Prepared for the Education Programs Department, Customer and Employee Relations Directorate, The University of Alabama in Huntsville, The University of Alabama, Tuscaloosa, and Alabama A&M University.

For the 40th consecutive year, the NASA Faculty Fellowship Program (NFFP) was conducted at Marshall Space Flight Center (MSFC). The program was sponsored by NASA Headquarters, Washington, DC, and operated under contract by The University of Alabama, The University of Alabama in Huntsville, and Alabama A&M University. 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 June 1 through August 6, 2004. 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 the Agency’s space aeronautics and space science mission; (2) Engage faculty from colleges, universities, and community colleges in current NASA research and development; (3) Foster a greater public awareness of NASA science and technology, and therefore facilitate academic and workforce literacy in these areas; (4)


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WAITE, JR., J.H. University of Michigan
OSTGAARD, N. University of Bergen
DENNERL, K. MPI fur Extraterrestrial Physics
LISSE, C. University of Maryland
ET AL.

Development of Ionic Liquid Monopropellants for In-Space Propulsion—Abstract Only. For presentation at the 53rd JPM/2nd LPS/SP Joint Meeting, Monterey, CA, December 5–8, 2005.

BHARDWAJ, A. NRC
ELSNER, R.F. XD12
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GLADSTONE, G.R. SWRI
BRANDUARDI-RAYMONT, G. UCL, MSSL
CRAVENS, T.E. University of Kansas
FORD, P.G. Center for Space Research


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BURKS, K.H. SD40
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Pope, R.D. Qualis Corp.


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GILLEY, S.D. Tec-Masters, Inc.
HENDRICKS, R.W. Teledyne Brown Engineering
KENDALL, J.P. Teledyne Brown Engineering
RAY, J.A. Teledyne Brown Engineering

Are We There Yet? Developing In Situ Fabrication and Repair (ISFR) Technologies to Explore and Live on the Moon and Mars—Final Paper. For presentation at the AIAA 1st Exploration Conference, Orlando, FL, January 31—February 1, 2005.

BODIFORD, M.P. SD40
MCNALLY, W.L. Morgan Research Corp.


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BROWN, K.K. TD51
NELSON, K.W. TD51


BURNS, L. RAYTHEON
DECKER, L EV13

The Distribution of Cloud to Ground Lightning Strike Intensities and Associated Magnetic Inductance Fields Near the Kennedy Space Center—Final Paper. For presentation at the 43rd AIAA Aerospace Science Meeting, Reno, NV, January 10–13, 2005.

CARPENTER, P.K. XD42/BAE Systems
GILLIES, D.C. XD41


CARPENTER, P.K. XD42/BAE Systems


CARPENTER, P.K. XD42/BAE Systems


CARPENTER, P.K. XD42/BAE Systems


CARPENTER, P.K. XD42/BAE Systems


CARRASQUILLO, R.L. EV50

CARRASQUILLO, R.L. EV50

CARRINGTON, C.K. SP20
DAY, G. Boeing Phantom Works

CARTER, D.L. EV50
TABB, D. EV50
TATARA, J.D. Qualis Corp.
MASON, P.K. Hamilton Sundstrand
Performance Qualification Test of the ISS Water Processor Assembly (WPA) Expendables—Final Paper. For presentation at the 34th International Conference on Environmental Systems (ICES), Rome, Italy, July 11–14, 2005.

CASE, J.T. University of Missouri-Rolla
ROBBINS, J. University of Missouri-Rolla
KHARKOVSKY, S. University of Missouri-Rolla
HEPBURN, F.L. EM20
ZOUGHI, R. University of Missouri-Rolla

CASE, J.T. University of Missouri-Rolla
ROBBINS, J. University of Missouri-Rolla
KHARKOVSKY, S. University of Missouri-Rolla
HEPBURN, F.L. EM20
ZOUGHI, R. University of Missouri-Rolla

CECIL, D. UAH
GOODMAN, S.J. XD11
BOCCIPPIO, D.J. XP11

ZIPSER, E.J. University of Utah
NESBITT, S.W. Colorado State University

CHANDLER, F. The Boeing Company
GRAYSON, G. The Boeing Company
MAZURKIVICH, P. NP60

CHANDLER, M.O. XD12
AVANOV, L.A. XD12

CHANG, H. XD42/UAH
SMITH, D.D. XD42/University of Mexico

CHANG, H. XD42/UAH
SMITH, D.D. XD42/University of New Mexico
FULLER, K.A. National Space Science and Technology Center
DIMMOCK, J.O. UAH
GREGORY, D.A. UAH
FRAZIER, D.O. XD42

CHANG, J. Purple Mountain Laboratory
SCHMIDT, W.K.H. Max-Planck-Institut für Aeronomie
ADAMS, J.H. XD12
AHN, H.S. University of Maryland
BASHINDZHAGYAN, G.L. Moscow State University
BATKOV, K.E. Moscow State University
CHRISTL, M. Louisiana State University
FAZELY, A.F. Southern University
GANEL, O. University of Maryland

CHAVERS, D.G. XD22  
BENGTSON, R. University of Texas at Austin  
BREIZMAN, B. University of Texas at Austin  
CHANG-DIAZ, F. XD22  
JONES, J. XD22  
DOBSON, C. XD22  

Status of Magnetic Nozzle and Plasma Detachment Experiment—Abstract Only. For presentation at the 53rd JPM/2nd LPS/SP Joint Meeting (JANNAF), Monterey, CA, December 5–8, 2005.

CHAVAVERS, D.G. XD22  


CHEN, P.-S. EM03  
MITCHELL, M.L. EM03  

Alloy NASA–HR–1—Final Paper. For publication in Aerospace Structural Metals, Purdue Research Foundation.

CHENG, G.C. UAB  
FARMER, R.C. UAB  


CHEW, G. SAIC  
PELACCIO, D.G. SAIC  
CHIROUX, R. SAIC  
PERVAN, S. SAIC  
RAUWOLF, G.A. SAIC  
WHITE, C. ER11  

Preliminary Assessment of Thrust Augmentation of NEP Based Missions—Extended Abstract. For presentation at the American Institute of Aeronautics and Astronautics—Space 2005 Space Conference, Long Beach, CA, August 30–September 1, 2005.

CHOU, S.-H. XD11  
ZAVODSKY, B. XD11  
LAPENTA, W.M. XD11  
JEDLOVEC, G.J. XD11  


CHOUHARY, D.P. SD50  


CHRISTIAN, H.J. XD11  

Global Lightning Activity—Abstract Only. For presentation at the Cosmosphere and Space Center, Wichita, KA, April 14–15, 2005, and at The Mexican Meteorological Conference, Cancun, Mexico, February 28–March 4, 2005.

CHRISTIAN, H.J. XD11  


CHUNG, Y.T. The Boeing Company  
LO, W. The Boeing Company  
FOWLER, S.B. XP01  
TOWNER, R. Jacobs Sverdrup  


CLINTON, R.G. XD40  
SZOFRAN, F.R. XD40  
BASSLER, J.A. XD40  
SCHLAGHECK, R.A. XD40  
COOK, M.B. XD40  


COFFEY, V.N. XD12  
SINGH, N. UAH  
AVANOV, L.A. XD12  


COFFEY, V.N. XD12  
SINGH, N. UAH  
MILLER, J. UAH  
CHANDLER, M.O. XD12  

Modeled and Observed Relationship Between Ion Energization and the Broadband ELF Spectrum—Abstract Only. For presentation at and conference proceedings of
the American Geophysical Union 2005 Fall Meeting, San Francisco, CA, December 5–9, 2005.

COLE, J.W. XD20
Metallic Hydrogen and Nontube Magnets — Abstract Only.
For presentation at the Army’s National Ground Intelligence Center Workshop (MAD Scientist 2004), Charlottesville, VA, November 3–5, 2004.

COLE, J.W. XD20

COMARAZAMY, D.E. University of Puerto Rico
GONZALEZ, J.E. Santa Clara University
LUVALL, J.C. XD11
RICKMAN, D.L. XD11

COOK, S. NP01
TYSON, R. NP01

COOKE, W.J. EV13
MOSER, D. Morgan Research Corp.

COOKE, W.J. EV13
SWIFT, W.R. Raytheon/EV13
SUGGS, R.M. EV13

COOKE, W.J. EV13
MCNAMARA, H.A. EV13

COSMO, M.L. Harvard-Smithsonian Center for Astrophysics
LORENZINI, E.C. Harvard-Smithsonian Center for Astrophysics
GRAMER, D.J. Orbital Technologies Corp.
HOFFMAN, J.H. The University of Texas
MAZZOLENI, A.P. North Carolina State University

COOK, M.C. Vanderbilt University
ANILKUMAR, A.V. Vanderbilt University
GRUGEL, R.N. XD41
HOFMEISTER, W.H. XD41

CRAVEN, P.O. XD12
LIEMOHN, M. XD12
CHANDLER, M.O. XD12
MOORE, T. XD12

CRAVENS, T.E. University of Kansas
CLARK, J. University of Kansas
BHARDWAJ, A. NRC
ELSNER, R.F. XD12
WAITE, JR., J.H. University of Michigan
ACTON, L.W. Montana State University
MAURELLIS, A.N. Space Research Organization Netherlands
GLADSTONE, G.R. SWRI

CROSSON, W.L. XD11
ESTES, M.E. XD11
KAHN, M. XD11
LAPENTA, W.M. XD11
QUATTROCHI, D.A. XD11
Mesoscale Modeling of Atlanta, GA Utilizing a New High-Resolution Landcover Data Set — Abstract Only. For

CRUZEN, C.A. EO03
DYER, S.V. EO03
GIBBS III, R.E. The Boeing Company
CECH, J.G. Teledyne Brown Engineering


CURRERI, P.A. XD40


In Situ Resources in Space—Abstract Only. For presentation at the National Space and Missile Materials Symposium, Summerlin, NV, June 27–July 1, 2005.

DARDEN, C. National Weather Service Forecast Office
GATLIN, P. National Weather Service Forecast Office
BURKS, J. National Weather Service Forecast Office
GOODMAN, S.J. XD11
BUECHLER, D. The Global Hydrology and Climate Center
HALL, J. The Global Hydrology and Climate Center


DARROUZET, F. Belgian Institute for Space Aeronomy
DE KEYSER, J. Belgian Institute for Space Aeronomy
DECREAU, P. Laboratoire de Physique et Chimie de l'Environnement
GALLAGHER, D.L. XD12
PIERRARD, V. Belgian Institute for Space Aeronomy
LEMAIRE, J. Belgian Institute for Space Aeronomy
DANDOURAS, I. Centre d’Etude Spatiale des Rayonnements

MATSUI, H. Space Science Center
DUNLOP, M. Rutherford Appleton Laboratory
ANDRE, M. Swedish Institute of Space Physics

Analysis of Plasmaspheric Plumes: CLUSTER and IMAGE Observations and Numerical Simulations—Abstract Only. For presentation at and publication in proceedings of the Session C5 of the General Congress of the French Physical Society (SFP) and Belgian Physical Society (BPS), Lille, France, August 29–September 2, 2005.

DAVIS, J.M. XD12
WEST, E.A. XD12
MOORE, R.L. XD12
GARY, G.A. XD12
KOBAYASHI, K. XD12
OBERRIGHT, J.E. GSFC
EVANS, D.C. GSFC
WOOD, H.J. GSFC
SABA, J. LMSAL, GSFC
ALEXANDER, D. Rice University


DAVIS, J.M. XD12
WEST, E.A. XD12
MOORE, R.L. XD12
GARY, G.A. XD12
KOBAYASHI, K. XD12
OBERRIGHT, J.E. GSFC
EVANS, D.C. GSFC
SABA, J. LMSAL, GSFC
ALEXANDER, D. Rice University


DAVIS, S.E. EM10
HERALD, S.D. ICRC Aerospace Services
STOLZFUS, J.M. NASA White Sands Test Facility
ENGEL, C.D. Qualis Corp.
BOHLEN, J.W. Northrop Grumman Integrated Systems
PALM, T. Northrop Grumman Integrated Systems
ROBINSON, J.J. The Boeing Company Phantom Works

DECKER, R.
LEACH, R. Morgan Research Corp.

DECKER, R.
PRICKETT, T.
ROBERTS, B. EV13

DELAY, T.

DICKERSON, T.
MYRABO, L.N. Rensselaer Polytechnic Institute

DING, J.

DISCHINGER, JR., H.C.
MULLINS, J.B. EV11

DISCHINGER, P.

DISCHINGER, P.

DOMINIAK, P.
CISZAK, E.M. XD42

DORNEY, D.J.
SONDAK, D.L. Boston University

DORNEY, S.M.
HAIMES, B. MIT

DOYLE, M.
O’NEIL, D.A. SAIC
A New Family of Ionic Liquids 1-Amino-3-Alkyl-1,2,3-Triazolium Nitrates—Abstract Only. For publication in the Journal of Chemical Crystallography.

DRAKE, G.W.
KAPLAN, G. ERC, INC./AFRL/PRSP
HALL, L. AFRL/PRSP
HAWKINGS, T. AFRL/PRSP
LARUE, J. AFRL/PRSP

ECCLES, W. XD20

ELAM, S. ER32
HOLMES, R. ER32
HICKMAN, R. ER32
MCKECHNIE, T. ER32
THOM, G. ER32

ELAM, S. ER32
HOLMES, R. ER32
REYNOLDS, D. ER32
MCKECHNIE, T. ER32
THOM, G. ER32
VPS Functional Gradient Coatings for Injector Faceplates—Abstract Only. For presentation at the 53rd JANNAF Propulsion Meeting/2nd Liquid Propulsion Subcommittee/1st Spacecraft Propulsion Joint Meeting, Monterey, CA, December 5–8, 2005.

ELSNER, R.F. XD12
BHARDWAJ, A. XD12/NRC
GLADSTONE, G.R. SWRI
WAITE, JR., J.H. University of Michigan
CRAVENS, T.E. University of Kansas
FORD, P.G. Center for Space Research
BRANDUARDI-RAYMONT, G. UCL, MSSL
RAMSAY, G. UCL, MSSL
RAMSEY, B.O. XD12
Chandra X-Ray Observatory Observations of the Jovian System—Abstract Only. For presentation at the Six Years of Science With Chandra Symposium Chandra X-Ray Center, Cambridge, MA, November 2–4, 2005.

ELSNER, R.F. XD12
BHARDWAJ, A. XD12
GLADSTONE, G.R. SWRI
WAITE, JR., J.H. University of Michigan
CRAVENS, T.E. University of Kansas
FORD, P.G. Center for Space Research
BRANDUARDI-RAYMONT, G. UCL, MSSL
RAMSEY, B.O. XD12

EMRICH, W. XD21

EMRICH, W. XD21

EMRICH, W. XD21

ENG, R. XD33
CARPENTER, J. XD33
HAIGHT, H.J. XD33
HOGUE, W.D. XD33
KEGLEY, J.R. XD33
STAHL, H.P. XD33
WRIGHT, E.R. XD33
KANE, D. Trex Advanced Materials
HADAWAY, J. UAH

ENG, R. XD33
CARPENTER, J. XD33
HAIGHT, H.J. XD33
HOGUE, W.D. XD33
KEGLEY, T. XD33
KESTER, T.J. XD32
STAHU, H.P. XD30
WRIGHT, E.R. XD33

Cryogenic Performance of Trex SiC Mirror—Abstract Only. For presentation at the Mirror Technology Days, Huntsville, AL, August 16–18, 2005.

ENGBERG, R.C. ET23
LASSITON, J. ET23


ENGBERG, R.C. ET23


ENGEL, C.D. Qualis Corp.
HERALD, S.D. ICRC Aerospace Services
DAVIS, S.E. EM10

Heated Promoted Combustion—Initial Test Results—Presentation. For presentation at the National Space and Missiles Materials Symposium, Summerlin, NV, June 27–July 1, 2005.

ENGEL, C.D. Qualis Corp.
HERALD, S.D. ICRC Aerospace Services
DAVIS, S.E. EM10


ENGEL, C.D. Qualis Corp.
HERALD, S.D. ICRC Aerospace Services


ENGEL, C.D. Qualis Corp.
HERALD, S.D. ICRC Aerospace Services

DAVIS, S.E. EM10


EVANS, S.W. EM50
STELLINGWERF, R.F. Stellingwerf Consulting
STALLWORTH, R. EV32


EVANS, S.W. EM50
WILLIAMSEN, J.E. Institute for Defense Analyses


FARR, R.A. EV11
SANDERS, T.M. ET11


FARR, R.A. EV11
CHRISTENSEN, D.L. Retired
KEITH, E.L. Retired

The Business Case for Spiral Development in Heavy Launch Vehicle Systems—Final Paper. For presentation...

FARR, R.A. EV11
WILET, J.T. EV23
VITARIUS, P. Freel Innovations

FARR, R.A. EV11
WILET, J.T. EV23
VITARIUS, P. Freel Innovations

FARR, R.A. EV11
WILET, J.T. EV23
VITARIUS, P. Freel Innovations

FARR, R.A. EV11
WILET, J.T. EV23
VITARIUS, P. Freel Innovations

FARR, R.A. EV11
WILET, J.T. EV23
VITARIUS, P. Freel Innovations
FISHMAN, G.J. XD12

FISHMAN, G.J. XD12

FISHMAN, G.J. XD12
PENDLETON, G. Dynetics Corp.

FLACHBART, R.H. ER23
HASTINGS, L.J. ER23
HEDAYAT, A. ER23
NELSON, S.L. ER23
TUCKER, S.P.
Alpha Technology Inc.

FLYNN, K. NP60
GUBERT, M. NP60

FOOTE, J.P. XD21
LITCHFORD, R.J. XD21

FOOTE, J.P. XD21
LITCHFORD, R.J. XD21

FORD, P.G. MIT Kavli Institute for Astrophysics and Space Research
ELSNER, R.F. XD12

FRADY, G. ER41
GALLAGHER, D.L. XD12
ADRIAN, M.L. SD50
LIEMOHN, M. SD50

GALLAGHER, D.L. XD12
GREEN, J.L. XD12

GALLAGHER, D.L. XD12
HORWITZ, J.L. University of Texas in Arlington
PEREZ, J.D. Auburn University
QUENBY, J.J. Blackett Laboratory
Introduction to Particle Acceleration in the Cosmos—Abstract Only. For publication in The Acceleration in Astrophysical Plasma in Geospace and Beyond.

GALLAGHER, D.L. XD12
GREEN, J.L. XD12
SMITH, Z. XD12

GAMAYUNOV, K.V. USRA
KHAZANOV, G.V. XD12
Strong Pitch-Angle diffusion of the Ring Current Ions Induced by Electromagnetic Ion Cyclotron Waves—Abstract Only. For presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, December 5–9, 2005.

GANGOPADHYAY, A.K. Washington University
LEE, G.W. Washington University
KELTON, K.F. Washington University
ROGERS, J.R. Ames Lab/USDOE/Iowa State University
GOLDMAN, A.I. Ames Lab/USDOE/Iowa State University
ROBINSON, D.S. Ames Lab/USDOE/Iowa State University
RATHZ, T.J. UAH
HYERS, R.W. University of Massachusetts

GARY, G.A. XD12
DEMOLIN, P. Observatoire de Paris

GARY, G.A. XD12

GATLIN, P. XD11
GOODMAN, S.J. XD11

GATTIS, G.B. ED21
SHEPARD, W.S. University of Alabama
Smart Structures for Vibration Control on Long-Term Space Exploration and Habitation Missions—Abstract Only. For presentation at the AIAA 1st Space Exploration Conference, Orlando, FL, January 30–February 1, 2005.

GAVRIIL, F. McGill University
KASPI, V.M. McGill University
WOODS, P.M. XD12
LYUTIKOV, M. University of British Columbia

GELFAND, J.D. Harvard-Smithsonian Center for Astrophysics
LYUBARSKY, Y.E. Department of Physics
EICHLER, D. Department of Physics
GAENSLER, B.M. Harvard-Smithsonian Center for Astrophysics
TAYLOR, G.B. Stanford University
GRANOT, J. Stanford University
NEWTON-MCGEE, K.J. University of Sydney/CSIRO
RAMIREZ-RUIZ, E. Institute for Advanced Study
KOUVELIOTOU, C. XD12
WIJERS, R.A.M.J. University of Amsterdam

GHOSH, K.K. Universities Space Research Association (USRA)
SWARTZ, D.A. SD50
TENNANT, A.F. SD50

GODFROY, T.J.  
ER11


GODFROY, T.J.  
ER11


GOODMAN, S.J.  
XD12


GOODMAN, S.J.  
XD11

Pre-Launch Goes-R Risk Reduction Activities for the Geostationary Lightning Mapper—Abstract Only. For

GOODMAN, S.J. XD11
BLAKESLEE, R.J. XD11
BOCCIPPIO, D.J. XD11
CHRISTIAN, H.J. XD11
KOSHAK, W.J. XD11

PETERSEN, W.A. UAH


GORTI, S. SD46
FORSYTHE, E.L. SD46/BAE Systems
PUSEY, M.L. SD46

Kinetic Roughening and Energetics of Tetragonal Lysozyme Crystal Growth: A Preliminary Atomic Force Microscopy Investigation—Abstract Only. For publication in ACTA Crystallographica D.

GRADL, P.R. ER32
STEPHENS, W. MP21


GRANT, J. XD31


GRANT, J. XD31


GRANT, J. XD31


GREENWOOD, T. MP31
TWICHELL, W. Lockheed Martin
FERRARI, D. Lockheed Martin
KUCK, F. Boeing-Rocketdyne


GREGORY, D.A. UAH
HERREN, K.A. XD31

Ion Milling of Sapphire—Abstract Only. For publication in Electrochemical and Solid-State Letters and American Institute of Physics.

GRIFFEY, A.M. IS04


GRIFFEY, K. IS01


GRUGEL, R.N. SD46

High Tensile Strength Amalgams for In-Space Repair and Fabrication—Abstract Only. For presentation at the Continuing the Voyage of Discovery—1st Space Exploration Conference, Orlando, FL, February 2–4, 2005.
GRUDEL, R.N.  
LUZ, P.  
SMITH, G.A.  
SPIVEY, R.  
MINGO, C.  
JETER, L.  
VOLZ, M.P.  


GRUDEL, R.N.  
FINCKE, M.  
SEGRE, P.N.  
OGLE, J.A.  
FUNKHOUSER, G.  
PARRIS, F.  
MURPHY, L.  
GILLIES, D.C.  
HUA, F.  


GRUDEL, R.N.  
TOUANJII, H.  


GUBAREV, M.  
RAMSEY, B.D.  

Protection of Conductive and Non-Conductive Advanced Polymer-Based Paints From Highly Aggressive Oxidative Environments — Abstract Only. For presentation at the 5th International Symposium on Polymer Surface Modification, Toronto, Canada, June 20–22, 2005.

GUDDING, Y.  
NG, R.  
SKANDERIA, Z.  
KLEIMAN, J.  
GRIGOREVSKY, A.  
KISELEVA, L.  
FINCENOR, M.M.  
EDWARDS, D.L.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.

GUDDING, Y.  

Pyroelectric Ceramics for Infrared Detection Applications — Final Paper. For publication in Materials Science.
GWALTNEY, D.A. EI22
FERGUSON, M.I. JPL

GWALTNEY, D.A. EI22
FERGUSON, M.I. JPL

GWALTNEY, D.A. EI22
DUTTON, K. Jacobs Sverdrup

GWALTNEY, D.A. EI22
BRISCOE, J.M. EI21

GWALTNEY, D.A. EI22
DUTTON, K. Jacobs Sverdrup

HAMILTON, J.T. ET01

HAMILTON, J.T. ET01

HAMILTON, J.T. ET01
ASM Student Technology and Career Night—Presentation. For presentation at the American Society of Materials Student Career Night, Huntsville, AL, March 29, 2005.

HAMILTON, J.T. ET01

HAMILTON, J.T. ET01
Test Laboratory 2005. For presentation at the Test Week 2005, Huntsville, AL, June 6–9, 2005.

HARMSEN, E. XD11
LUVALL, J.C. XD11
GONZALEZ, J. XD11

HATHAWAY, D.H. XD12
WILSON, R.M. XD12

HATHAWAY, D.H. XD12

HATHAWAY, D.H. XD12
HATHAWAY, D.H. XD12
CHOUDHARY, D. California State University

HATHAWAY, D.H. XD12
WILLIAMS, P.E. University of Texas
CUNTZ, M. University of Texas

HEATON, A.F. EV40

HEDAYAT, A. ER23
NELSON, S.L. ER23
HASTINGS, L.J. Alpha Technology, Inc.
FLACHBART, R.H. ER23
TUCKER, S.P. ER23

HEDAYAT, A. ER23
NELSON, S.L. ER23
HASTINGS, L.J. Alpha Technology Inc.

HERALD, S.D. ICRC Aerospace Services
ENGEL, C.D. Qualis Corp.
DAVIS, S.E. EM10

HERMILLER, J. Cornerstone Research Group, Inc.
STAHLM, H.P. XD30

HICKMAN, R. ER11
MIRELES, O. ER11
HOUTS, M. ER11

HISSAM, D.A. ER34
LEBERMAN, M. ER34
MCLEROY, R. ERC

HJORTH, J. University of Copenhagen
SOLLERMAN, J. University of Copenhagen/Stockholm University
GOROSABEL, J. Instituto de Astrofisica de Andalucia
GRANOT, J. Kavli Institute
KLOSE, S. Thuringer Landessternwarte
KOUVELIOTOU, C. XD12
MELINDER, J. Stockholm University
RAMIREZ-RUIZ, E. Institute for Advanced Study
STARLING, R. University of Amsterdam
ET AL.

HJORTH, J. University of Copenhagen
WATSON, D. University of Copenhagen
FYNBO, J.P. University of Copenhagen
PRICE, P.A. University of Hawaii
JENSEN, B.L. University of Copenhagen
JORGENSEN, U.G. University of Copenhagen
KUBAS, D. ESO Santiago
GOROSABEL, J. Instituto de Astrofisica de Andalucia
KOUVELIOTOU, C. XD12
The Optical Afterglow of a Short Y-Ray Burst—Abstract Only. For publication in Nature.

HOLDER, D. EV50
FORT, J. Hamilton Sundstrand
BARONE, M. Hamilton Sundstrand
MURDOCH, K. Hamilton Sundstrand
HOLLINGER, G.A. Swarthmore College  
BRISCOE, J.M. EI21  

HOOVER, R.B. XD12  

HOOVER, R.B. XD12  

HOUTS, M.G. NP50  
BRAGG-SITTON, S.M. ER11  
MIRELES, O. ER11  
ET AL.  

HOUTS, M.G. NP50  

HOWELL, J.T. FD02  
FIKES, J.C. SP20  
O’NEILL, M.J. Entech, Inc.  
Novel Space-Based Solar Power Technologies and Architectures for Earth and Beyond—Abstract Only. For presentation at the 56th International Astronautical Congress, Fukuoka, Japan, October 17–21, 2005.

HOWELL, J.T. FD02  
O’NEILL, M.J. Entech, Inc.  
High-Voltage Array Ground Test for Direct-Drive Solar Electric Propulsion—Abstract Only. For presentation at the 56th International Astronautical Congress, Fukuoka, Japan, October 17–21, 2005.

HUEBNER, L.D. NP60  
SAIYED, N.H. NASA Headquarters  
SWINT, M.S. NP60  
Advanced Development Projects for Constellation From the Next Generation Launch Technology Program Elements—Abstract Only. For presentation at the 56th International Astronautical Congress, Fukuoka, Japan, October 17–22, 2005.

HOWARD, R.T. EV21  
JOHNSTON, A.S. EV21  
BRYAN, T.C. EV21  
HULCHER, A.B. ED34  
YOUNG, G. ATK Thiokol Propulsion  
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JOHNSON, L. TD05
HARRIS, D. TD05
TRAUSH, A. TD05
MATLOFF, G.L. Gray Research/New York City College of Technology
TAYLOR, T. BAE Systems
CUTTING, K. Gray Research

JOHNSON, L. NP40
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JOHNSON, L. NP40
JAMES, B. NP40
BAGGETT, R. NP40
MONTGOMERY, S. NP40

JOHNSON, L. NP40
JAMES, B. NP40
BAGGETT, R. NP40
MONTGOMERY, S. NP40

JOHNSON, R.W. Auburn University
STRICKLAND, M. EI42

JONES, G. ER32
PROTZ, C. ER32
TRINH, H.P. ER32
TUCKER, P.K. ER43
NESMAN, T. ER42
HULKA, J. Jacobs Sverdrup

JUSTUS, C.G. Morgan Research Corp.
DUVALL, A.L. Morgan Research Corp.
KELLER, V.W. EV13

KALEMCI, E. University of California
BOGGS, S.E. University of California
KOUVELIOTOU, C. XD12/USRA
FINGER, M.H. USRA ET AL.

KALMANSON, P.C. PRAXIS, INC./Naval Research Laboratory (NRL)
WILCZYNISKI, J. Wile Instruments, LLP
WOOD, K. U.S. NRL
DYMOND, K. U.S. NRL
THONNARD, S. U.S. NRL
SPANN, J.F. XD12
The Optomechanical Design and Operation of the Ionospheric Mapping and Geocoronal Experiment—Abstract Only. For presentation at and publication in the proceedings of the SPIE Optics and Photonics, San Diego, CA, July 31–August 4, 2005.

KESTER, T.J. XD32

KHARKOVSKY, S. University of Missouri-Rolla
CASE, J.T. University of Missouri-Rolla
ABOU-KHOUSA, M.A. University of Missouri-Rolla
ZOUGHII, R. University of Missouri-Rolla
HEPBURN, F.L. EM20
Millimeter Wave Detection of Localized Anomalies in the Space Shuttle External Fuel Tank Insulating Foam — Final Paper. For publication in the Institute of Electronical and Electronics.

KHARKOVSKY, S. University of Missouri-Rolla
HEPBURN, F. EM20
WALKER, J. EM20
ZOUGH, R. University of Missouri-Rolla


KHARKOVSKY, S. University of Missouri-Rolla
CASE, J.T. University of Missouri-Rolla
ZOUGH, R. University of Missouri-Rolla
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SORENSEN, K. XD12

Electrodynamic Tether as a Thruster for MXER Studies — Abstract Only. For presentation at and publication in the proceedings of the 53rd JANNAF Propulsion Meeting/2nd Liquid Propulsion Subcommittee/1st Spacecraft Propulsion Joint Meeting, Monterey, CA, December 5–8, 2005.

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SORENSEN, K. XD12


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KRIVORUTSKY, E.N. NRC
SORENSEN, K. XD12

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KHAZANOV, G.V. XD12
KRIVORUTSKY, E.N. NRC
SORENSEN, K. XD12

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KHAZANOV, G.V. XD12
KRIVORUTSKY, E.N. NRC
SORENSEN, K. XD12

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KHAZANOV, G.V. XD12
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SORENSEN, K. XD12

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KHAZANOV, G.V. XD12
KRIVORUTSKY, E.N. NRC
SORENSEN, K. XD12

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GALLAGHER, D.L. XDI2

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KHODABANDEH, J.W. EII3


KHOSHNEVIS, B. University of Southern California
BODIFORD, M.P. SY10
BURKS, K.H. EII2
ETHRIDGE, E. XDI42
TUCKER, D. XDI31


KNOX, J.C. EV51
CAMPBELL, M. Hamilton Sundstrand
MURDOCH, K. Hamilton Sundstrand
MILLER, L. Jacobs Sverdrup
JENG, F. Lockheed Martin

Integrated Test and Evaluation of a 4-Bed Molecular Sieve (4BMS) Carbon Dioxide Removal System (CDRA), Mechanical Compressor Engineering Development Unit (EDU), and Sabatier Engineering Development Unit (EDU)—Final Paper. For presentation at the International Conference on Environmental Systems (ICES), Rome, Italy, July 11–14, 2005.

KOSHKAK, W.J. XDI1
MACH, D. M. XDI1

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KOUVELIOTOU, C. XD12


KOUVELIOTOU, C. XD12

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KOUVELIOTOU, C. XD12

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KRIVORUTSKY, E.N. NRC


LAL, R.B. XD40
CLINTON, R.G. XD40
FRAZIER, D.O. XD40

Advanced Sensors for NASA's Exploration Missions—Presentation. For presentation at the National Science Foundation (NSF) Workshop on Sensors, Huntsville, AL, June 7, 2005.
LAYMON, C.A. XD11
CROSSON, W.L. XD11
LIMAYE, A. XD11
MANU, A. XD11
ARCHER, F. XD11

Converting Soil Moisture Observations to Effective Values

LEE, G.W. Washington University
GANGOPADHYAY, A.K. Washington University
KELTON, K.F. Washington University
BRADSHAW, R.C. University of Massachusetts
HYERS, R.W. University of Massachusetts
RATHZ, T.J. UAH
ROGERS, J.R. XD42

A Novel Liquid-Liquid Transition in Undercooled Ti-Zr-Ni
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LEE, G.W. Washington University
KIM, T.H. Washington University
SIEVE, B. Ames Laboratory USDOE/Iowa State University
GANGOPADHYAY, A.K. Washington University
HYERS, R.W. University of Massachusetts
RATHZ, T.J. UAH
ROGERS, J.R. XD42
ROBINSON, D.S. Ames Laboratory USDOE/Iowa State University
KELTON, K.F. Washington University
GOLDMAN, A.I. Ames Laboratory USDOE/Iowa State University


LEE, J. XD42
BRADSHAW, R. XD42
ROGERS, J.R. XD42
RATHZ, T. XD42
WALL, J. XD42
CHOO, H. XD42
LIAX, P. XD42
HYERS, R. XD42


LEE, J.A. EM30

Feasibility Assessment for Pressure Casting of Ceramic-Aluminum Composites for NASA's Propulsion Applications—Abstract Only. For presentation at the 29th Con-

LIEE, J.A. EM30


LEE, J.K. XD12
NEWMAN, T.S. XD12
GARY, G.A. XD12

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LEIKMUEHLER, T.O. Honeywell, Inc.
PATEL, H. Honeywell, Inc.
REEVES, D.R. The Boeing Company
HOLT, J.M. EV34


LEOPARD, L. ER30


LIEE, J.K. XD42
RAMACHANDRAN, N. BAE Systems


LEVAN, A. University of Leicester/
Space Telescope Science Institute
FRUCHTER, A. Space Telescope Science Institute
MOBASHER, B. Space Telescope Science Institute
TANVIR, N. University of Hertfordshire
GOROSABEL, J. Space Telescope Science Institute
ROL, E. University of Hertfordshire/University of Amsterdam

KOUVELIOTOU, C. XD12
DELL’ANTONIO, I. Brown University/National Optical Astronomy Observatory

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LEWIS, R.A. R Lewis Company
ROBERTSON, G.A. XD21


LI, C. SU, C-H. LEHOCZKY, S.L. SCRIPA, R.N. BAN, H. LIN, B. SD46 XD42 SD46 SD46 SD46 SD46


Impurity Studies of Cd0.8Zn0.2Te Crystals Using Photoluminescence and Glow Discharge Mass Spectroscopy—Abstract Only. For presentation at the 16th American Conference on Crystal Growth and Epitaxy, Big Sky, MT, July 10–15, 2005.

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LI, C. SU, C-H. LEHOCZKY, S.L. SCRIPA, R.N. BAN, H. LIN, Z-W. BARGHOUTY, A.F. XD42 XD42 XD42 XD42 UAH UAH


LIN, B. UAB
LI, C. SD46


LIN, J. WEST, J.S. WILLIAMS, R.W. TUCKER, P.K. CRAFT-Tech ER43 ER43 ER43 ER43 UAH


LI, J. WEST, J.S. WILLIAMS, R.W. TUCKER, P.K. CRAFT-Tech ER43 ER43 ER43 ER43 UAH


LIN, Z-W. BARGHOUTY, A.F. XD41 UAH


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LIN, Z-W. BARGHOUTY, A.F. XD41 UAH

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LIN, Z-W. UAH


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ADAMS, J.H.

LUVALL, J.C.
RICKMAN, D.L.
QUATTROCHI, D.A.
ESTES, M.E.

MAASHA, R.
GRADL, P.R.
KINNEY, T.
LA VEDE, B.
PECK, J.
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MACLEOD, T.C.
PHILLIPS, T.A.
HO, F.D.
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MAJUMDAR, A.
COLE, H.
CHEN, C.P.

MANDELL, M.J.
KUHARSKI, R.A.
GARDNER, B.M.
KATZ, I.
RANDOLPH, T.
DOUGHERTY, R.
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MANKINS, J.C.
TOURING, D.C.
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MARKUSIC, T.E.
MARTIN, A.K.
MANKINS, J.C.
MARKUSIC, T.E.
MARTIN, A.K.
MARKUSIC, T.E.
MSFC ABSTRACTS, ARTICLES, PAPERS, AND PRESENTATIONS CLEARED FOR DISSEMINATION
/Publicly available. Dates are conference dates.)


MARTIN, A.K. XD22
ESKRIDGE, R.H. XD22
FIMOGNARI III, P.J. UAH

MARTIN, A.K. XD22
ESKRIDGE, R.H. XD22
FIMOGNARI III, P.J. UAH

MARTIN, A.K. XD22
ESKRIDGE, R.H. XD22
LEE, M. XD22
FIMOGNARI III, P.H. UAH

MARTIN, J.J. ER11
REID, R.S. ER11

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MATLIK, J.F. Rolls Royce Corp.
FARRIS, T.N. Purdue University
HAYNES, J. United Technologies Corp.
SWANSON, G.R. EM20
HAM-BATTISTA, G. Jacobs Sverdrup

MATLIK, J.F. Rolls Royce Corp.
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MCCARTY, W. UAH
JEDLOVEC, G.J. XD02

MCGHEE, D.S. ED21

MCNAMARA, H.A. EV13
JONES, J. University of Western Ontario
KAUFFMAN, B. ED44
SUGGS, R.M. EV13
COOKE, W.J. EV13
SMITH, S. ED44/Morgan Research Corp.

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MEM: A Physics-Based Directional Meteoroid Model—Abstract Only. For presentation at the 4th European Conference on Space Debris, Darmstadt, Germany, April 18–20, 2005.

MCNEAL, C. ER22

POPP, C. ER23
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TURPIN, A.A. ER23

WILSON, M. Aerojet PARKER, L.N. ED44/Jacobs Sverdrup


SHEEHY, J.A. ER23 ALSTATT, R.L. ED44/Jacobs Sverdrup
BLEVINS, J.A. ER23 PARKER, L.N. ED44/Jacobs Sverdrup

MEDLEY, S. ER41 MINOW, J.I. EV13 Radiation and Internal Charging Environments for Thin Dielectrics in Interplanetary Space—Abstract Only. For presentation at the 9th Spacecraft Charging Technology Conference, Tsubuka, Japan, April 4–8, 2005.

BROWN, A. ER41 ALSTATT, R.L. ED44/Jacobs Sverdrup
FRADY, G. ER41 PARKER, L.N. ED44/Jacobs Sverdrup

MILTON, M.E. SX10 MIZUNO, Y. XD12
CHRISTL, M. SX10 YAMADA, S. Waseda University

MILTON, M.E. SX10 KOIDER, S. Toyama University

MINOR, J.L. ED03 MOONEY, J.T. UAH
NEWTON, R. NP60 STAHL, H.P. XD30
An Overview of Program Developments for NASA's Space Environments and Effects (SEE) Program—Final Paper.

MINOW, J.I. EV13
ALSTATT, R.L. ED44/Jacobs Sverdrup
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MOONEY, J.T. UAH
STAHL, H.P. XD30


MOORE, R.L. XD12
STERLING, A.C. XD12
FALCONER, D.A. XD12
DAVIS, J.M. XD12


MOORE, R.E. EM10
SCOTT, J.P. EM10
WISE, H. EM10

Considerations for Storage of High-Test Hydrogen Peroxide (HTP) Utilizing Non-Metal Containers—Abstract Only. For presentation at the 8th International Hydrogen Peroxide Propulsion Conference, West Lafayette, IN, September 18–22, 2005.

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STERLING, A.C. XD12
FALCONER, D.A. XD12
GARY, G.A. XD12


MOORE, R.L. XD12
STERLING, A.C. XD12


MORRIS, C.I. XD22


MORRISON, R.H. The Boeing Company
HOLT, J.M. EV34


MOUSHON, B. Jacobs Sverdrup
MCDUFFEE, P. ED03


MULDER, A.D. ER42
SUBBARAMAN, M.R. Boeing-Rocketdyne
LARIVIERE, B.W. Boeing-Rocketdyne


MURDOCH, K. Hamilton Sundstrand Space Systems International, Inc.
GOLDBLATT, L. Hamilton Sundstrand Space Systems International, Inc.

CARRASQUILLO, R.L. EV50
HARRIS, D. SV10


NALETTE, T. Hamilton Sundstrand
REISS, J. Hamilton Sundstrand
FILBURN, T. University of Hartford
SEERY, T. University of Connecticut
WEISS, B. University of Connecticut
SMITH, F. EV51
PERRY, J. EV51

NALL, M. SR10

NERNEY, S. SD50
SUESS, S.T. SD50

NEUMANN, B. HQS
MCMILLAN, V. EDO3

NGUYEN, H. The Boeing Company
CHANDLER, F. The Boeing Company
MAZURKIVICH, P. NP60

NIEMSEN, D. ATK Thiokol Inc.
TOWNSEND, J. ED21
KAPPUS, K. ED21
DRISKILL, T. ED21
TORRES, I. ED21
PARKS, R. ED21

NISHIKAWA, K.I. University of Alabama/Tuscaloosa
NISHIKAWA, K.I. University of Alabama/Tuscaloosa

NISHIKAWA, K.I. University of Alabama/Tuscaloosa
HARDEE, P. University of Alabama/Tuscaloosa
HEDEDAL, C.B. Niels Bohr Institute/Department of Astrophysics
RICHARDSON, G. UAH
SOL, H. LUTH
PREECE, R. UAH
FISHMAN, G.J. XD12

NISHIKAWA, K.I. University of Alabama/Tuscaloosa
HARDEE, P. University of Alabama/Tuscaloosa
HEDEDAL, C.B. Niels Bohr Institute/Department of Astrophysics
RICHARDSON, G. UAH
SOL, H. LUTH
PREECE, R. UAH
FISHMAN, G.J. XD12

NISHIKAWA, K.I. University of Alabama/Tuscaloosa
RAMIREZ-RUIZ, E. Institute for Advanced Study
HARDEE, P. University of Alabama/Tuscaloosa
HEDEDAL, C.B. Niels Bohr Institute/Department of Astrophysics
KOUVEILOTOU, C. XD12
FISHMAN, G.J. XD12

OELGOETZ, P. Boeing Rocketdyne Propulsion and Power

GRADL, P.R. ER32

BRYANT, M. Madison Research Corp.

DANIEL, R. Boeing Rocketdyne

WOFFORD, S. MP21

Systematic Improvements in Leak Detection and Repair Techniques of the Space Shuttle Main Engine Nozzle—Abstract Only. For presentation at the 53rd JPM/2nd LPS/SP Joint Meeting—JANNAF, Monterey, CA, December 5–8, 2005.

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Analysis of a Circular Composite Disk Subjected to Edge Rotations and Hydrostatic Pressure—Final Paper. Thesis to be presented to the Department of Mechanical and Aerospace Engineering, UAH, Huntsville, AL, October 2004.

OSTROGORSKY, A. Rensselaer Polytechnic Institute

MARIN, C. Rensselaer Polytechnic Institute

VOLZ, M.P. XD42

BONNER, W.A. Crystallod, Inc.


OVERBEY, B.G. Raytheon

ROBERTS, B.C. ED44


PALOSZ, W. SD42/BAE Systems

VOLZ, M.P. SD46

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MOTAKEF, S. Cape Simulations, Inc.

SZOFRAN, F.R. SD46


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PARIS, D. NAFP—Clark Atlanta

TREVINO, L.C. EV23

WATSON, M.D. EV23


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TREVINO, L.C. EV23

WATSON, M.D. EV23


PARKER, L.N. ED44/Jacobs Sverdrup

MINOW, J.I. EV13

DAVIS, V.A. SAIC

GARDNER, B.M. SAIC

MANDELL, M.J. SAIC


PARKER, L.N. ED44/Jacobs Sverdrup

MINOW, J.I. EV13

DAVIS, V.A. SAIC

GARDNER, B.M. SAIC

MANDELL, M.J. SAIC

Analysis of Surface Charging for a Candidate Solar Sail Mission Using NASCAP–2K—Abstract Only. For presentation at the 9th Spacecraft Charging Technology Conference, Tsukuba, Japan, April 4–8, 2005.

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DAVIS, V.A. SAIC
MANDELL, M.J. SAIC
GARDNER, B.M. SAIC


PATRICK, M.P. ED12
COOPER, A.E. ED12
POWERS. W.T. ED12


PEARSON, J.B. XD21
LEWIS, R.A. R Lewis Company


PEARSON, J.B. XD21
LEWIS, R.A. R Lewis Company


PERRY, J.L. EV51


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TOMES, K.M. EV51
ROYCHOUDHURY, S. Precision Combustion, Inc.
TATARA, J.D. Qualis Corp.


PIKUTA, E.V. XD12
ITOH, T. RIKEN BioResource Center
HOOVER, R.B. XD12

Anaerobic Decomposition of Cellulose by Alkaliphilic Microbial Community of Owens Lake, California—
PITTMAN, J.V. XD11/USRA
FUEGLISTALER, S. University of Washington
MILLER, T.L. XD11


PITTMAN, J.V. XD11/USRA
ROBERTSON, F.R. XD11
MILLER, T.L. XD11


POLZIN, K.A. XD20
MARKUSIC, T.E. XD20


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MARKUSIC, T.E. XD20


RAMACHANDRAN, N. XD42 Space Laboratory on a Table Top—A Next Generation ECLSS Design and Diagnostic Tool—Abstract Only. For presentation at the 35th International Conference on Environmental Systems (ICES), Rome, Italy, July 11–14, 2005.


RAY, C.S. XD42
REIS, S.T. University of Missouri-Rolla
SENE, F.F. Energy and Nuclear Research Institute
YANG, J.B. University of Missouri-Rolla
PONTUSCHKA, W.M. Physics Institute
GIEHL, J.M. Physics Institute
KIM, C.W. University of Missouri-Rolla
SEN, S. XD42/BAE Systems


RICHARDSON, E.H. NP40
MUNK, M.M. NP40
JAMES, B.F. NP40
MOON, S.A. Gray Research

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RICHMOND, R.C. XD42


RISON, W. New Mexico Institute of Mining and Technology
KREHBIEL, P.R. New Mexico Institute of Mining and Technology
GOODMAN, S.J. XD11
MACGORMAN, D.R. New Mexico Institute of Mining and Technology


ROBERTS, L. MP01


ROBERTSON, B. EI31
WILKerson, D. EI31

ROBERTSON, B. EI31
WILKerson, D. EI31

ROBERTSON, F.R. XD11
WICK, G. NOAA/Environmental Technology Laboratory
BOSILOVICH, M.G. NASA Goddard Space Flight Center


ROBERTSON, F.R. XD11
LU, H.-I. USRA


ROBERTSON, F.R. XD11

Interannual Variability of Tropical Rainfall as Seen from TRMM—Abstract Only. For presentation at and publication in the proceedings of the 5th International Scientific Conference on the Global Energy and Water Cycle, Orange County, CA, June 18–24, 2005.

ROBERTSON, F.R. XD11

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ROBERTSON, F.R. XD11
WICK, G. NOAA/Environmental Technology Laboratory

Jackson, D. NOAA/Environmental Technology Laboratory

BOSILOVICH, M.G. NASA Goddard Space Flight Center

ROBERTSON, G.A. XD21


ROBINSON, P.J. Aerojet

VEITH, E.M. Aerojet

TURPIN, A.A. ER23


ROCKER, M. ER43

Steady-State CFD Simulations of the Modular Combustor Test Article—Abstract Only. For presentation at the 53rd JANNAF Propulsion Meeting/2nd Liquid Propulsion Subcommittee/Space Propulsion Joint Meeting, Monterey, CA, December 5–8, 2005.

RODRIGUEZ, H. The Boeing Company

POPP, C. ER23

REHAGEN, R.J. The Boeing Company


RODRIGUEZ, H. The Boeing Company

POPP, C. ER23


ROLIN, T.D. EI42

HAMMOND, M. SY10

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ROMAN, J.M. NP22

MEACHAM, S.B. NP23

KRUPP, D.R. EV12

THREET, G.E. NP12

BEST, J. EO04

DAVIS, S.R. NASA Headquarters

CRUMBLY, C. NP01

OLSEN, R.A. Morgan Research Corp.

ENGLER, L.M. Morgan Research Corp.

ET AL.


ROMAN, M.C. EV51

WIELAND, P.O. Wieland Service


ROMAN, M.C. EV51

MACUCH, P. Altran Corp.

MCKRELL, T. Altran Corp.

VAN DER SCHIJFF, O.J. CorrConsult

MITCHELL, R. Harvard University


ROSSIGNOL-STRICK, M. Musee National d’Histoire Naturelle, Paris

HOOVER, R.B. XD12

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