

STAIF-2007 – FEBRUARY 11-15, 2007

TECHNICAL SESSIONS

STAIF-2007 – February 11-15, 2007 Technical Sessions.....	1
Monday, February 12, 2007.....	3
[E01] Space Colonization - Opening Session I.....	3
[C01] Space Nuclear Power and Propulsion Opening Session.....	3
[D01] Human & Robotic Opening Session.....	3
[F01] Potential Frontiers.....	4
[C05] Propulsion Systems Concepts.....	4
[E02] Space Colonization - Opening Session II.....	4
[D02] Architecture Studies.....	5
[C17] Thermal Energy Transport and Heat Rejection Technology.....	5
[F02] Advanced Technologies for Terrestrial (Earth, Lunar, and Mars) and Relativistic Environments Based on Propulsion and Power.....	5
Tuesday, February 13, 2007.....	6
[A03] Two-Phase Thermal Control Systems.....	6
[E03] Space Exploration.....	6
[C07] Materials for Space Nuclear Power and Propulsion Systems.....	6
[D03] Advanced Operations and In-Situ Resource Utilization.....	7
[C18] Space Reactors and Shield Design Methods and Technologies.....	7
[F03] Propulsion and Power Concepts for Taming the Solar System.....	8
[E04] Space Bases on the Moon.....	8
[C03] Terrestrial Programs and Technologies with Space Application.....	8
[D04] Advanced Materials, Structures, and Mechanisms.....	9
[C09] Nuclear Thermal Rockets: Past, Present and Future.....	9
[F04] Experimental Results and New Concepts within Current Physical Models I.....	10
[E05] Space Resource Utilization on the Moon.....	10
[C10] Dynamic Power I: < Kilowatt Class.....	10
[D05] Novel Concepts.....	11
[C16] Integration and Utilization of Surface Fission Energy Sources.....	11
[F05] Innovative Theories and Concepts for Communication.....	11
[A06] High-Capacity Heat Rejection Systems.....	12
[E06] Space Resource Utilization on Mars.....	12
[C12] Radioisotope Power Systems Applications.....	12
[F06] Theoretical Considerations - Warp Drives, FTL Speed Travel and Others I.....	13
[C08] Space Nuclear Reactor Power Systems and Concepts.....	13
Wednesday, February 14, 2007.....	13
[A02] Thermal Control Technologies for Future Spacecraft.....	13
[E12] In Situ Space Resource Utilization.....	14
[C13] Nuclear Thermal Rocket Technology and Integration.....	14
[D06] Advanced Avionics and Software.....	14
[C26] Advanced Energy Storage Technologies.....	15
[F08] Experimental Results and New Concepts within Current Physical Models II.....	16
[E08] Biotechnology and Medicine for Space Colonization.....	15
[C20] Dynamic Power II: > Kilowatt Class.....	15
[D09] Advanced Thermal Technologies and Systems.....	16
[C21] Safety and Reliability.....	16
[A04] Thermal Control for Lunar and Deep Space Missions.....	17
[E09] Large Scale Processes and Technologies for Colonization.....	17
[C25] Fission Surface Power Component Technology Development I.....	17
[D08] Environmental Control and Life Support Technologies and Systems.....	18
[C04] Ongoing Radioisotope-Enabled Missions.....	18
[CE01] Public Outreach.....	18
[A07] Advances in Spray Cooling.....	19

Preliminary Technical Program

[E10] Terraforming, Domed Ecosystems and Planetary	19
[C22] Non-Nuclear Testing and Evaluation II.....	19
[D10] Advanced Power and Propulsion Technologies and Systems	20
[C24] Radioisotope Power Systems Technology and Development.....	20
Thursday, February 15, 2007	20
[A08] Advanced Heat Pipes and Other Emerging Technologies	20
[E11] Space Resource Utilization on the Moon II.....	21
[C27] Fission Surface Power Component Technology Development II.....	21
[C11] Thermoelectric Power Conversion Technology and Applications	22
[F09] Theoretical Considerations - Warp Drives, FTL Speed Travel and Others II	22
[A05] Smart Materials and Coatings for Thermal Control.....	22
[E07] Space Settlements/Colonies	23
[CE02] Lunar Environmental Effects & Mitigation	23
[C02] Reactor Systems Concepts for Surface Power	23
[F07] An International Outlook on Far Term Propulsion and Power	23
Index of Authors and Session Chairs.....	25

MONDAY, FEBRUARY 12, 2007

[A01] Current Topics in Thermal Control

Monday, February 12, 2007, 1:45 - 3:45 p.m. - Parlor A

- Chairs:** Ted Swanson, NASA Goddard Space Flight Center, Greenbelt, MD, USA
Tung T. Lam, The Aerospace Corporation, Los Angeles, CA, USA
- 1:45 pm - *Trends in Thermal Control Technology Development***
Ted Swanson, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 2:15 pm - *Orion Crew Exploration Vehicle Thermal Control System Architecture***
Gary Adamson and Mark Caron, Hamilton Sundstrand, Windsor Locks, CT, USA

[E01] Space Colonization - Opening Session I

Monday, February 12, 2007, 1:45 - 3:45 p.m. - Parlor B/C

- Chairs:** Edward McCullough, The Boeing Company, Huntington Beach, CA, USA
Klaus Heiss, High Frontier, Alexandria, VA, USA
- 1:45 pm - *The Space Colonization Technical Committee Policy Statement for a Robust Implementation of the President's Space Exploration Initiative***
Edward McCullough, Boeing Phantom Works, Huntington Beach, CA, USA; Klaus P. Heiss, High Frontier, Alexandria, VA, USA; Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI, USA
- 2:15 pm - *The Space Colonization Technical Committee Exploration Position Statement***
Edward McCullough, The Boeing Company, Huntington Beach, CA, USA
- 2:45 pm - *Ares 1 and Ares 5 - An Overview***
Phil Sumrall, NASA Marshall Space Flight Center, AL, USA
- 3:15 pm - *Current Knowledge on the Existence and Distribution of H₂O on Mars***
Greg Mungas, Jet Propulsion Laboratory, Pasadena, CA, USA

[C01] Space Nuclear Power and Propulsion Opening Session

Monday, February 12, 2007, 1:45 - 3:45 p.m. - Ballroom D

- Chairs:** Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA, USA
Michael G. Houts, NASA Marshall Space Flight Center, Marshall Space Flight Center, AL, USA
- 1:45 pm - *Opening Session Welcome***
Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA, USA
- 2:00 pm - *NASA Radioisotope Power System Program***
Alan Harmon, NASA Headquarters, Washington, DC, USA
- 2:30 pm - *NASA Prometheus Power and Propulsion***
John Warren, NASA Headquarters, Washington, DC, USA
- 2:45 pm - *DOE Space Nuclear Program***
Robert Lange, Department of Energy Headquarters, Germantown, MD, USA
- 3:00 pm - *Q & A Panel***

[D01] Human & Robotic Opening Session

Monday, February 12, 2007, 1:45 - 3:45 p.m. - Ballroom E

- Chairs:** John C. Mankins, Artemis Innovation Management Solutions LLC, Ashburn, VA, USA
Christopher Moore, NASA Headquarters, Washington, DC, USA
- 1:45 pm - *Technology for the Lunar Architecture***
Christopher Moore, NASA Headquarters, Washington, DC, USA
- 2:15 pm - *Precursor Robotic Exploration of the Moon***
Benjamin Neumann, NASA Headquarters, Washington, DC, USA

Preliminary Technical Program

3:15 pm - ETDP Program

Frank Peri, NASA Langley Research Center, Hampton, VA, USA

3:45 pm - Robots and Humans in Spaceflight: Technology, Evolution, and Interplanetary Travel

Roger Launius, National Air and Space Museum, Smithsonian Institution, Washington, DC, USA; Howard E. McCurdy, School of Public Affairs, The American University, Washington, DC, USA

[F01] Potential Frontiers

Monday, February 12, 2007, 1:45 - 3:45 p.m. - Parlor G/H

Chairs: Charles Suchmel, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA
Franklin B. Mead, Air Force Research Laboratory, Edwards AFB, CA, USA

1:45 pm - Progress in Quantum Vacuum Engineering Propulsion

Fabrizio Pinto, InterStellar Technologies Corporation, Monrovia, CA, USA

2:15 pm - Exploring Gravity and Gravitational Wave Dynamics Part I: Gravitational Anomalies

Paul Murad, Department of Defense, Vienna, VA, USA

2:45 pm - Revolutionary Design for Astronaut Exploration - Beyond the Bio-Suit System

Dava J. Newman, and Marita Canina, Massachusetts Institute of Technology, Cambridge, MA, USA; Guillermo L. Trotti, Trotti and Associates, Inc., Marblehead, MA, USA

3:15 pm - Inertial Mass Dependency on Local Vacuum Fluctuation Mean Free Path

Harold G. White, League City, TX, USA

[C05] Propulsion Systems Concepts

Monday, February 12, 2007, 4:00 - 6:00 p.m. - Franciscan Room

Chairs: James Polk, Jet Propulsion Laboratory, Pasadena, CA, USA
Ivana Hrbud, Purdue University, West Lafayette, IN, USA

4:00 pm - Application of Solar-Electric Propulsion to Robotic Missions in Near-Earth Space

Gordon R. Woodcock and John Dankanich, Gray Research Inc., Huntsville, AL, USA

4:30 pm - Paris to Hektor: A Concept for a Mission to the Jovian Trojan Asteroids

Robert E. Gold, R. L. McNutt Jr., D. H. Napolillo, E. D. Schaefer, J. R. Tanzman, T. J. Hartka, D. S. Mehoke, P. H. Ostdiek, D. F. Persons, L. M. Prockter, and S. R. Vernon, Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, USA; D. I. Fielher, QSS Group, Inc., NASA Glenn Research Center, Cleveland, OH, USA

5:00 pm - A New Capability for Nuclear Thermal Rocket Propulsion Design

Benjamin W. Amiri, Richard J. Kapernick, and Bryan T. Sims, Los Alamos National Laboratory, Los Alamos, NM, USA; Steven P. Simpson, NASA Marshall Space Flight Center, Huntsville, AL, USA

[E02] Space Colonization - Opening Session II

Monday, February 12, 2007, 4:00 - 6:00 p.m. - Parlor B/C

Chairs: Edward McCullough, The Boeing Company, Huntington Beach, CA, USA
Klaus Heiss, High Frontier, Alexandria, VA, USA

4:00 pm - Atlas V Experience Boosts Your Adventure: Launching Space Tourism

Jeff A. Patton, Lockheed Martin Space Systems Company, Denver, CO, USA

4:30 pm - Delta IV Payload Options for Human Exploration

Larry Richardson, The Boeing Company, Huntington Beach, CA, USA

5:00 pm - NASA In-Situ Resource Utilization (ISRU) Implementation and Deployment Strategy

Gerald B. Sanders, Thomas M. Simon, and Landon Moore, NASA Johnson Space Center, Houston, TX, USA; William E. Larson, NASA Kennedy Space Center, FL, USA; Kurt R. Sacksteder and John J. Caruso, NASA Glenn Research Center, Cleveland, OH, USA; Carole McLemore, NASA Marshall Space Flight Center, AL, USA; Kenneth Johnson, Jet Propulsion Laboratory, Pasadena, CA, USA

Preliminary Technical Program

5:30 pm - *Moonbase*

Klaus Heiss, High Frontier, Alexandria, VA, USA

[D02] Architecture Studies

Monday, February 12, 2007, 4:00 - 6:00 p.m. - Ballroom E

Chairs: Douglas Craig, NASA Headquarters, Washington, DC, USA
Robert Wegeng, NASA Headquarters, Washington, DC, USA

4:00 pm - *The Making of a Lunar Outpost - Exploring a Future Case Study*

Ruthan Lewis, National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, MD, USA; Kurt Micheels, Nexterra, Inc., Pensacola, FL, USA; Cathy Dankewicz, Swales Aerospace, Inc., Beltsville, MD, USA

4:30 pm - *Alternative Applications for Exploration System Elements*

Patrick A. Troutman, NASA Langley Research Center, Hampton, VA, USA

5:00 pm - *Space Solar Power – An Update*

John C. Mankins, Artemis Innovation Management Solutions LLC, Ashburn, VA, USA

5:30 pm - *Technology Assessment in Support of Lunar Exploration*

Charles R. Weisbin, William Lincoln, Joe Mrozinski, Hook Hua, Sofia Merida, Kacie Shelton, Virgil Adumitroaie, and Jason Derleth, Jet Propulsion Laboratory, Pasadena, CA, USA; Robert Silberg, Raytheon Corporation, Pasadena, CA, USA

[C17] Thermal Energy Transport and Heat Rejection Technology

Monday, February 12, 2007, 4:00 - 6:00 p.m. - Parlor F

Chairs: Donald M. Ernst, Advanced Cooling Technologies, Inc., Lancaster, PA, USA
R. Scott Downing, Hamilton Sundstrand United Technologies, Rockford, IL, USA

4:00 pm - *High Performance Lightweight Compact Thermal Radiator for Space Vehicles*

Ching-fen Tsai, Julian Prabhu, and Frank Shen, The Boeing Company, Huntington Beach, CA, USA

4:30 pm - *Thermal Energy Storage Technology Developments*

Michael Pauken, Nick Emis, and Brenda Watkins, Jet Propulsion Laboratory, Pasadena, CA, USA

5:00 pm - *An Ultra-Lightweight, High Performance Carbon-Carbon Space Radiator*

W.O. Miller, Mike Wang, Wei Shih, Rogelio Ramirez, Duane Beach, Dennis Youchison, Roger Lenard, Justin Liguori, and Ed Liguor, Allcomp, City of Industry, CA, USA

5:30 pm - *Thermal Energy Reservoirs Derived from Processed Lunar Regolith*

Robert S Wegeng, National Aeronautics and Space Administration, Washington, DC, USA; John C. Mankins, Artemis Innovation Management Solutions LLC, Ashburn, VA, USA; Lawrence A Taylor, Planetary Geosciences Institute, University of Tennessee, TN, USA

[F02] Advanced Technologies for Terrestrial (Earth, Lunar, and Mars) and Relativistic Environments Based on Propulsion and Power

Monday, February 12, 2007, 4:00 - 6:00 p.m. - Parlor G/H

Chairs: John W. Cole, NASA Marshall Space Flight Center, Huntsville, AL, USA
David Goodwin, U.S. Department of Energy, Washington, DC, USA

4:00 pm - *An Overview of the Development of a Capillary Discharge Based Pulsed Plasma Thruster*

Jean-Luc Cambier, M. Young, L. Pekker, and A. Pancotti, United States Air Force Research Laboratory, Edwards AFB, CA, USA

4:30 pm - *Local and System Level Considerations for Plasma-Based Techniques in Hypersonic Flight*

Charles Suchomel and Datta Gaitonde, Aeronautical Sciences Division, Air Force

Preliminary Technical Program

Research Laboratory, Wright Patterson AFB, Dayton, OH,

5:00 pm - *Space Exploration and Conversion of Sunlight to Coherent Light*

Richard L. Fork, and Spencer T. Cole, University of Alabama, Huntsville, AL, USA

5:30 pm - *The Influence of High-Frequency Gravitational Waves Upon Muscles*

Lawrence S. Moy, Manhattan Beach, CA, USA; and Robert M. L. Baker, Jr.,
GRAVWAVE, LLC, Playa del Rey, CA, USA

TUESDAY, FEBRUARY 13, 2007

[A03] Two-Phase Thermal Control Systems

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Parlor A

Chairs: Michael Pauken, Jet Propulsion Laboratory, Pasadena, CA, USA
Scott Garner, Advanced Cooling Technologies, Lancaster, PA, USA

8:00 am - *Gravity Effect on Capillary Limit in a Miniature Loop Heat Pipe with Multiple Evaporators and Multiple Condensers*

Hosei Nagano, JAXA, Yoshinodai, JAPAN; Jentung Ku, NASA Goddard Space Flight Center, Greenbelt, MD, USA

8:30 am - *Spacecraft Thermal Management using Advanced Hybrid Two-Phase Loop Technology*

Chanwoo Park, Aparna Vallury, Jon Zuo, Advanced Cooling Technologies, Inc. Lancaster, PA, USA; Jeffrey Perez, Paul Rogers, U.S. Army TACOM, Warren, MI, USA

9:00 am - *Advanced Thermal Control for Future Space Science Missions or Mars/Lunar Base Household and Research Part I: TC Issues That Deserve More Attention, and and II: Restarted Developments and Novel Research Issues*

A.A.M. Delil, Advanced Aerospace Thermal Control Systems Consultant, AATCS, Emmeloord, Netherlands

9:30 am - *JWST ISIM Harness Thermal Evaluation*

Mark Kobel, Stuart Glazer, Jim Tuttle, NASA/Goddard Space Flight Center, Greenbelt, MD, USA; Mario Martins, Lun Xi, Warren Tolson, Swales Aerospace, Beltsville, MD, USA; Walter Ancarrow, WCA Inc., , Jarrettsville, MD, USA

[E03] Space Exploration

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Parlor B/C

Chairs: Mark Benton, The Boeing Company Space and Intelligence Systems, Los Angeles, CA, USA
Ronald Turner, ANSER, Arlington, VA, USA

8:00 am - *Nanoparticle Electric Propulsion for Space Exploration*

Thomas M. Liu, Louis D. Musinski, Prashant R. Patel, Alec D. Gallimore, Brian E. Gilchrist, and Michael Keidar, University of Michigan, Ann Arbor, MI, USA

8:30 am - *Centaur Application to Robotic and Crewed Lunar Lander Evolution*

Bonnie Birckenstaedt, Bernard F. Kuttler, and Frank Zegler, United Launch Alliance, Denver, CO, USA

9:00 am - *Propellant Selection for CEV and Mars Exploration Vehicles*

Timothy Chen and Edward McCullough, The Boeing Company, Huntington Beach, CA, USA

[C07] Materials for Space Nuclear Power and Propulsion Systems

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Ballroom D

Chairs: Wayne Ohlinger, Bechtel Bettis, Inc., Upper St. Clair, PA, USA
Robert Hickman, NASA Marshall Space Flight Center, Huntsville, AL, USA

Preliminary Technical Program

- 8:00 am - *Thermodynamic Prediction of Compositional Phases Confirmed by Transmission Electron Microscopy on Tantalum-Based Alloy Weldments***
Daniel P. Kramer, and Chadwick D. Barklay, University of Dayton, Dayton, OH, USA;
William E. Moddeman, and Janine C. Birkbeck, Pantex Plant, Amarillo, TX, USA;
Roger G. Miller, and Lawrence F. Allard, Oak Ridge National Laboratory, Oak Ridge,
TN, USA
- 8:30 am - *Investigation of Effects of Neutron Radiation on Tantalum Alloys for Radioisotope Power System Applications***
Chadwick D. Barklay, and Daniel Kramer, University of Dayton Research Institute,
Dayton, OH, USA; Roger Miller, Oak Ridge National Laboratory, Oak Ridge, TN, USA;
Joseph Talnagi, The Ohio State University, Columbus, OH, USA
- 9:00 am - *The Effects Of Neutron Radiation on the Electrical Properties of Si and SiC Schottky Power Diodes***
Jonathan A. Kulisek, and Thomas E. Blue, The Ohio State University, Springfield, OH,
USA
- 9:30 am - *Powder Processing of High Temperature Cermets and Carbides at Marshall Space Flight Center***
Pat Salvail, Binayak Panda, and Robert R. Hickman, Marsahl Space Flight Center,
Huntsville, AL, USA

[D03] Advanced Operations and In-Situ Resource Utilization

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Ballroom E

- Chairs:** Laura O'Connor, NASA Langley Research Center, Hampton, VA, USA
Robert Wegeng, NASA Headquarters, Washington, DC, USA
- 8:00 am - *Extreme Mobility: Next Generation Tetrahedral Rovers***
P.E. Clark, S.A. Curtis, M.L. Rilee, C.Y. Cheung, R. Wesenberg, G. Brown, C.
Cooperrider, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 8:30 am - *Exploration Challenges: Transferring Ground Repair Techniques to Space Flight Application***
Carole A. McLemore, NASA Marshall Space Flight Center, Huntsville, AL, USA; James
P. Kennedy, and Brian W. Evans, Teledyne Brown Engineering, Huntsville, AL, USA;
Frederick A. Rose, bd Systems Inc., Hunstville, AL, USA
- 9:00 am - *Surface Operations: Two Case Studies of Simulated Lunar Operations***
William Bluethmann, Chris Culbert, NASA Johnson Space Center, Houston, TX, USA
- 9:30 am - *NASA In-Situ Resource Utilization (ISRU) Technology and Development Project Overview***
Gerald B. Sanders, NASA Johnson Space Center, Houston, TX, USA; William E.
Larson, NASA Kennedy Space Center, FL, USA; Kurt R. Sacksteder, NASA Glenn
Research Center, Cleveland, OH, USA; Carole McLemore, NASA Marshall Space Flight
Center, AL, USA; Kenneth Johnson, Jet Propulsion Laboratory, Pasadena, CA, USA

[C18] Space Reactors and Shield Design Methods and Technologies

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Parlor F

- Chairs:** J. Boise Pearson, NASA Marshall Space Flight Center, Marshall Space Flight Center,
AL, USA
Shannon Bragg-Sitton, NASA Marshall Space Flight Center, Huntsville, AL, USA
- 8:00 am - *Integral, Shaped Shielding for Fission Reactors on the Lunar/Martian Surface***
David I. Poston, Robert B. Foresman, David D. Dixon, Los Alamos National Laboratory,
Los Alamos, NM
- 8:30 am - *Assessment of Radiation Shielding Requirements for an NTP Conjunction Class Mars Mission***
Tryshanda Moton, Robert C. Chiroux, and Jack Mulqueen, Science Applications
International Corporation, Huntsville, AL, USA

Preliminary Technical Program

9:00 am - *Experimental Evaluation of the Thermal Performance of a Water Shield for a Surface Power Reactor*

J. Boise Pearson, and E. Stewart, NASA Marshall Space Flight Center, Nuclear & Advanced Propulsion Branch, Huntsville, AL, USA; R. Reid, Los Alamos National Laboratory, Nuclear Design and Risk Analysis, Los Alamos, NM, USA

9:30 am - *FRINK - A Code to Evaluate Space Reactor Transients*

David I. Poston, David D. Dixon, Thomas F. Marcille, Benjamin Amiri, Los Alamos National Laboratory, Los Alamos, NM, USA

[F03] Propulsion and Power Concepts for Taming the Solar System

Tuesday, February 13, 2007, 8:00 - 10:00 a.m. - Parlor G/H

Chairs: Eric W. Davis, Institute for Advanced Studies at Austin, Austin, TX, USA
Robert M.L. Baker, Jr., GRAVWAVE, LLC, Playa Del Rey, CA, USA

8:00 am - *Modified Design of Novel Variable-Focus Lens for VHFGW*

R. Clive Woods, Louisiana State University, Baton Rouge, LA, USA

8:30 am - *Surveillance Applications of High-Frequency Gravitational Waves*

Robert M. L. Baker, Jr., Gravewave LLC and Transportation Sciences Corp., Playa del Rey, CA, USA

9:00 am - *Compact Reactor*

Pharis E. Williams, Williams Research, Los Alamos, NM, USA

9:30 am - *Extraction of Thrust from Quantum Vacuum Using Squeezed Light*

Yoshinari Minami, Space Technology Research Office, Yokohama, Japan

[E04] Space Bases on the Moon

Tuesday, February 13, 2007, 10:30 a.m. - 12:30 p.m. - Parlor B/C

Chairs: Klaus Heiss, High Frontier, Alexandria, VA, USA
Paul van Susante, Colorado School of Mines, Golden, CO, USA

10:30 am - *MIC: Magnetically Deployable Structures for Power, Propulsion, Processing, Habitats, and Energy Storage at Manned Lunar Bases*

James Powell, George Maise, John Paniagua, and John Rather, Plus Ultra Technologies, Inc., Stony Brook, NY, USA

11:00 am - *Thermal Protection Systems*

James J. Reuther, NASA Ames Research Center, Moffett Field, CA, USA

11:30 am - *Moon Bases as Initial "Space Society" Trials: Utilizing Astrosociology to Make Space Settlements Livable*

Jim Pass, Astrosociology.com, Huntington Beach, CA, USA

12:00 pm - *What Will We Actually Do On the Moon?*

Brent Sherwood, Jet Propulsion Laboratory, Pasadena, CA, USA

**[C03] Terrestrial Programs and Technologies
with Space Application**

Tuesday, February 13, 2007, 10:30 a.m.-12:30 p.m. - Ballroom D

Chairs: James E. Werner, Idaho National Laboratory, Idaho Falls, ID, USA
Lloyd Jollay, BWX T Y-12, Oak Ridge, TN, USA

10:30 am - *A Wide Range Neutron Detector for Space Nuclear Reactor Applications*

Eduardo Nassif and Miguel Sismonda, IVAP S.E., Bariloche, Rio Negro, Argentina;
Emilio Matatagui, Solydes, Argentina; Stephan Pretorius, Payload Systems Inc,
Cambridge, MA, USA

11:00 am - *Space Propulsion Activities in Brazil*

Lamartine Guimarães, Institute for Advanced Studies, Sao Jose dos Campos, SP, Brazil

11:30 am - *Particle-Particle Interaction in Electromagnetic Fields for Force-Field Tailoring*

Sameh S. Wanis, Thilini Rangedera, Cedric Justin, Narayanan M. Komerath, Georgia

[D04] Advanced Materials, Structures, and Mechanisms

Tuesday, February 13, 2007, 10:30 a.m. - 12:30 p.m. - Ballroom E

Chairs: Laura O'Connor, NASA Langley Research Center, Hampton, VA, USA
Robert Wegeng, NASA Headquarters, Washington, DC, USA

10:30 am - Status of the Space-Rated Lithium-Ion Battery Advanced Development Project in Support of the Exploration Vision

Tom Miller, NASA Glenn Research Center, Cleveland, OH, USA

11:00 am - Layered Metals Fabrication Technology Development for Support of Lunar Exploration at NASA/MSFC

Kenneth G. Cooper, NASA/ Marshall Space Flight Center, Huntsville, AL, USA; James E. Good, MEI Technologies, Inc., Houston, TX, USA; Scott D. Gilley, Tec-Masters, Inc., Huntsville, AL, USA

11:30 am - Friction Stir Welded Thin Wall Cryogenic Tank Skins

David Potter and Mike Holguin, Lockheed Martin Space Systems, Denver, CO, USA;
Jennifer Takeshita, Lockheed Martin Michoud, New Orleans, LA, USA

12:00 pm - Lightweight Structures

Judith J. Watson, NASA Langley Research Center, Hampton, VA, USA

[C09] Nuclear Thermal Rockets: Past, Present and Future

Tuesday, February 13, 2007, 10:30 a.m. - 12:30 p.m. - Parlor F

Chairs: Stanley K. Borowski, NASA Glenn Research Center, Cleveland, OH, USA
Russell Joyner, Pratt and Whitney Rocketdyne, West Palm Beach, FL, USA

10:30 am - Tie Tube Heat Transfer Modeling for Bimodal Nuclear Thermal Rockets

Joshua Clough, Ryan Starkey, and Mark Lewis, University of Maryland, College Park, MD, USA; Tom Lavelle, NASA Glenn Research Center, Cleveland, OH, USA

11:00 am - Returning Humans to the Moon: Comparison of Chemical Engine and Nuclear Rocket Performance as an Earth Departure Stage

Steven D. Howe, Center for Space Nuclear Research, Idaho Falls, ID, USA; Natasha Barra, University of California – Los Angeles, Los Angeles, CA, USA; John Bess, University of Utah, Salt Lake City, UT, USA; Emily Colvin, Nuclear and Radiological Engineering/Medical Physics Program, Georgia Institute of Technology, Atlanta, GA, USA; Paul Cummings, Department of Physics, Embry Riddle Aeronautical University, Prescott, AZ, USA; Brandon Cunningham, Department of Nuclear Engineering, University of Florida, Gainesville, FL, USA; Melissa Ghrist and Kevin Supak, Department of Nuclear Engineering, Texas A&M University, College Station, TX, USA; Ryan Johnson, College of Engineering, Boise State University, Boise, ID, USA; Rob O'Brien, Space Research Centre, University of Leicester, Leicester, United Kingdom; Jeff Perkins, Colorado School of Mines, Golden, CO, USA; Masayuki Yano, School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, USA

11:30 am - Mars Mission Analysis Trades Based on Legacy and Future Nuclear Propulsion Options

Russell Joyner, Pratt & Whitney Rocketdyne, West Palm Beach, FL, USA; Andrea Lentati, Georgia Institute of Technology, Atlanta, GA, USA; Jaclyn Cichon, University of Florida, Gainesville, FL, USA

12:00 pm - Reactivity Effects and Depletion Analysis of a NERVA-Derived Nuclear Thermal Rocket

Benjamin W. Amiri, Michael L. Fensin and Thomas F. Marcille, Los Alamos National Laboratory, Los Alamos, NM, USA

[F04] Experimental Results and New Concepts within Current Physical Models I

Tuesday, February 13, 2007, 10:30 a.m. - 12:30 p.m. - Parlor G/H

Chairs: James F. Woodward, California State University, Fullerton, Fullerton, CA, USA
R. Clive Woods, Louisiana State University, Baton Rouge, LA, USA

10:30 am - *Mach's Principle and Propulsion: Experimental Results*

James F. Woodward, Departments of History and Physics, California State University, Fullerton, CA, USA

11:00 am - *Propulsion from ElectroMagnetic Nonlinear Materials*

Glen A. Robertson, Gravi Atomic Research, Madison, AI, USA

11:30 am - *Mach-Lorentz Thruster Spacecraft Applications*

Paul March, Barrios Technology, Friendswood, TX, USA

12:00 pm - *Measurement of Gravitomagnetic and Acceleration Fields around Rotating Superconductors*

Martin Tajmar, Florin Plesescu, B. Seifert, K. Marhold, Space Propulsion, ARC Seibersdorf research, A-2444 Seibersdorf, Austria

[E05] Space Resource Utilization on the Moon

Tuesday, February 13, 2007, 1:45 - 3:45 p.m. - Parlor B/C

Chairs: William E. Larson, NASA Kennedy Space Center, Kennedy Space Center, FL, USA
Gerald B. Sanders, NASA Johnson Space Center, Houston, TX, USA

1:45 pm - *Vacuum Pyrolysis and Related ISRU Techniques*

Eric Cardiff, Brian R. Pomeroy, and Ian S. Banks, NASA Goddard Space Flight Center, Greenbelt, MD, USA

2:15 pm - *Development of an integrated RVC – LWRD system for RESOLVE*

Janine Captain and Dale Lueck, NASA-KSC, Kennedy Space Center, FL, USA; Kurt Sacksteder NASA-Glenn Research Center, Cleveland, OH, USA

2:25 pm - *Microwave Extraction of Water from Lunar Regolith Simulant*

Edwin C. Ethridge, NASA - Marshall Space Flight Center, Huntsville, AL, USA;
William Kaukler, University of Alabama, Huntsville, AL,

3:15 pm - *Drilling Results in Ice-Bound Simulated Lunar Regolith*

Kris Zacny, David Glaser, Paul Bartlett, Kiel Davis, and Steven Gorevan, Honeybee Robotics Ltd., Moffett Field, CA, USA

[C10] Dynamic Power I: < Kilowatt Class

Tuesday, February 13, 2007, 1:45 - 3:45 p.m. - Ballroom D

Chairs: Richard K. Shaltens, NASA Glenn Research Center, Cleveland, OH, USA
Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH, USA

1:45 pm - *Final Results for the GRC Supporting Technology Development Project for the 110-Watt Stirling Radioisotope Generator (SRG110)*

Lanny G. Thieme and Jeffrey G. Schreiber NASA Glenn Research Center, Cleveland, OH, 44135 USA

2:15 pm - *Advanced Stirling Converter (ASC) Phase III Progress Update*

J. Gary Wood, Kyle Wilson, and Andrew Buffalino, Sunpower Inc., Athens, OH, USA;
Patrick Frye, and Dan Matejczyk, Pratt & Whitney Rocketdyne, Canoga Park, CA, USA;
L. B. Penswick, Consultant, Stevenson, WA, USA

2:45 pm - *Palm Power Free Piston Stirling Engine Control Electronics*

Douglas E. Keiter and Ezekiel Holiday, Sunpower Inc., Athens, OH, USA

3:15 pm - *Structural Benchmark Testing for Stirling Converter Heater Heads*

David L. Krause, and Randy R. Bowman, NASA Glenn Research Center, Cleveland, OH, USA; Sreeramesh Kalluri, Ohio Aerospace Institute, NASA Glenn Research Center, Cleveland, OH, USA

Preliminary Technical Program

[D05] Novel Concepts

Tuesday, February 13, 2007, 1:45 - 3:45 p.m. - Ballroom E

- Chairs:** Christopher Moore, NASA Headquarters, Washington, DC, USA
Robert Wegeng, NASA Headquarters, Washington, DC, USA
- 1:45 pm - *Micro-Inspector Spacecraft Testbed: Breadboard Subsystem Demonstrations***
Juergen Mueller, Leon Alkalai, and Hannah Goldberg, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
- 2:15 pm - *Modular, Multifunctional, and Reconfigurable SuperBot for Space Technology***
W.-M. Shen, Mark Moll, and Behnam Salemi, USC Information Sciences Institute, Marina del Rey, CA USA
- 2:45 pm - *ATHLETE Rover***
Brian Wilcox, Jet Propulsion Laboratory, Pasadena, CA, USA
- 3:15 pm - *Innovative Concepts for Sustained Exploration of Space***
Ron Turner, ANSER, Arlington, VA, USA; Diana Jennings and Robert Cassanova, NASA Institute for Advanced Concepts, Atlanta, GA, USA

[C16] Integration and Utilization of Surface Fission Energy Sources

Tuesday, February 13, 2007, 1:45 - 3:45 p.m. - Parlor F

- Chairs:** John H. Scott, NASA Johnson Space Center, Houston, TX, USA
Michael Houts, NASA Marshall Space Flight Center, AL, USA
- 1:45 pm - *Excavation of Lunar Regolith to Provide Reactor Shielding***
Kurt Sacksteder, Chris Gallo, and Diane Linne, NASA Glenn Research Center, Cleveland, OH, USA
- 2:15 pm - *Application of Artificial-Neural-Tissue Controller to Multirobot Lunar ISRU Operations***
G.M.T. D'Eleuterio, Jekanthan Thangavelautham, and Alexander Smith, Institute for Aerospace Studies, University of Toronto, Toronto, ON, Canada; Dale Boucher, Northern Centre for Advanced Technology, Sudbury, ON, Canada; Jim Richard, Electric Vehicle Controllers Ltd., Val Caron, ON, Canada
- 2:45 pm - *Electrostatic Dust Control on Planetary Surfaces***
Pamela Clark, Catholic University of America, Washington, DC, USA; C.I. Calle, and J.G. Mantovani, NASA/KSC, Cape Kennedy, FL, USA; S.A. Curtis, J.W. Keller, and F.A. Minetto, NASA/GSFC, Greenbelt, MD, USA

[F05] Innovative Theories and Concepts for Communication

Tuesday, February 13, 2007, 1:45 - 3:45 p.m. - Parlor G/H

- Chairs:** Gary Stephenson, Seculine Consulting, Bellevue, WA, USA
Greg Meholic, The Aerospace Corporation, El Segundo, CA, USA
- 1:15 pm - *A Test of De Aquino's 2005 Kinetic Quantum Theory of Gravity***
Gary Stephenson, Seculine Consulting, Bellevue, WA, USA
- 1:45 pm - *The Value Estimation of an HFGW Frequency Time Standard for Telecommunications Network Optimization***
Colby Harper, Seattle, WA, USA and Gary Stephenson, Seculine Consulting, Seattle, WA, USA
- 2:15 pm - *Alternate Communications for Space Travel***
Pharis E. Williams, Williams Research, Los Alamos, NM, 87544 USA
- 2:45 pm - *FTL Quantum Models of the Photon and the Electron***
Richard Gauthier, Engineering Department, Santa Rosa Junior College, Santa Rosa, CA, USA

[A06] High-Capacity Heat Rejection Systems

Tuesday, February 13, 2007, 4:00 - 6:00 p.m. - Parlor A

- Chairs:** Michael N. Nikitkin, Swales Aerospace, Beltsville, MD, USA
Eric Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 4:00 pm -** *Advances in High Temperature Titanium-Water Heat Pipe Technology*
John H. Rosenfeld and Nelson J. Gernert, Thermacore, Inc., Lancaster, PA, USA
- 4:30 pm -** *Optimized Design and Testing of a Graphite Reinforced-Fiber Reinforced Composite Heat Pipe Radiator with Tapered Fins*
R.J. Naumann, University of Alabama, Huntsville, AL, USA; Jim Barth, ATK Space Systems, San Diego, CA, USA; James Marris, Marshall Space Flight Center, AL, USA
- 5:00 pm -** *Optimization of Phase-Change Material Thermal Control Devices*
T. Kelvin Cheung, The Aerospace Corporation, Los Angeles, CA, USA; Benjamin A. Blake, Nifty Analysis and Design, San Francisco, CA, USA
- 5:30 pm -** *High Performance Titanium-Water Heat Pipes for High Temperature Applications*
David Wolf, Michael Nikitkin, Terry Miller, Swales Aerospace, Beltsville, MD, USA

[E06] Space Resource Utilization on Mars

Tuesday, February 13, 2007, 4:00 - 6:00 p.m. - Parlor B/C

- Chairs:** Larry D. Clark, Lockheed Martin, Denver, CO, USA
Adam P. Bruckner, University of Washington, Seattle, WA, USA
- 4:00 pm -** *Multi-MICE: Nuclear Powered Mobile Probes to Explore Deep Interiors of the Ice Sheets on Mars and the Jovian Moons*
George Maise, James Powell, and John Paniagua, Plus Ultra Technologies, Stony Brook, NY, USA; Jesse Powell, Scripps Institution of Oceanography, San Diego, CA, USA
- 4:30 pm -** *Lunar In Situ Materials-Based Surface Structure Technology Development Efforts at NASA/MSFC*
M. R. Fiske, Jacobs Sverdrup, Marshall Space Flight Center, Huntsville, AL, USA; W. McGregor, R. Pope, Qualis Corporation, Marshall Space Flight Center, Huntsville, AL, USA; C. A. McLemore, R. Kaul, G. Smithers, E. Ethridge, NASA Marshall Space Flight Center, Huntsville, AL, USA; H. Toutanji, Civil Engineering Department, University of Alabama in Huntsville, Huntsville, AL, USA
- 5:00 pm -** *Martian Liquid CO₂ and Metabolic Heat Regenerated Temperature Swing Adsorption for Portable Life Support Systems*
Christine S. Iacomini, Tom Morin, and Taber MacCallum, Kathrine Straub-LopezParagon Space Development Corporation, Tucson, AZ, USA; Heather Paul, National Aeronautics and Space Administration, Houston, TX, USA
- 5:30 pm -** *Percussive Penetration of Unconsolidated Granular Media in a Laboratory Setting*
Leslie Gertsch, University of Missouri-Rolla, Rolla, MO, USA

[C12] Radioisotope Power Systems Applications

Tuesday, February 13, 2007, 4:00 - 6:00 p.m. - Parlor F

- Chairs:** Robert Abelson, Jet Propulsion Laboratory, Pasadena, CA, USA
Robert L. Wiley, U.S. Department of Energy, Washington, DC, USA
- 4:00 pm -** *Curie-Montgolfiere Planetary Explorers*
Chris Taylor, Jupiter Research and Development, Houston, TX, USA; Jeremiah Hansen, Spotsylvania, VA, USA
- 4:30 pm -** *Titan Exploration Using a Radioisotopically-Heated Montgolfier Balloon*
John O. Elliott, Kim Reh, and Tom Spilker, Jet Propulsion Laboratory, Pasadena, CA, USA
- 5:00 pm -** *The Europa Explorer - A Fresh Look at Exploring Europa with an RPS-Powered Spacecraft*
Robert Abelson and Karla Clark, Jet Propulsion Laboratory, Pasadena, CA, USA

[F06] Theoretical Considerations - Warp Drives, FTL Speed Travel and Others I

Tuesday, February 13, 2007, 4:00 - 6:00 p.m. - Parlor G/H

- Chairs:** John Brandenburg, Florida Space Institute, Orlando, FL, USA
David Goodwin, U.S. Department of Energy, Washington, DC, USA
- 4:00 pm - *Progress on the GEMS (Gravity Electro-Magnetism-Strong) Theory of Field Unification and Its Application to Space Problems***
J.E. Brandenburg, Florida Space Institute-University of Central Florida, Kennedy Space Center, FL, USA
- 4:30 pm - *Hyperspace for Space Travel***
Giorgio Fontana, University of Trento, Trento, Italy; Paul Murad, Department of Defense, Vienna, VA, USA; and Robert M. L. Baker, Jr., GRAVWAVE®LLC, Playa del Rey, CA, USA
- 5:00 pm - *Fluid Dynamic Simulations of Warp Drive Flight Through Negative Pressure Zero-Point Vacuum***
H.David Froning Jr, Flight Unlimited, Gumeracha, SA, Australia, and Robert L. Roach, Ramat Hashron, Israel
- 5:30 pm - *Can the Present Technology Create Gross Amounts of Negative Energy Density?***
Mohammad Mansouryar, Karaj, Tehran, Iran

[C08] Space Nuclear Reactor Power Systems and Concepts

Tuesday, February 13, 2007, 4:00 - 6:00 p.m. - Franciscan Room

- Chairs:** David I. Poston, Los Alamos National Laboratory, Los Alamos, NM, USA
Bill J. Nesmith, Jet Propulsion Laboratory, Pasadena, CA, USA
- 4:00 pm - *Thermal-Hydraulic Analysis of the Submersion-Subcritical, Safe Space (S⁴) Reactor***
Jeffrey C. King, University of New Mexico, Albuquerque, NM, and University of Missouri, Rolla, MO, USA; Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM, USA
- 4:30 pm - *Low Mass SCoRe-S Designs for Affordable Planetary Exploration***
Steven A. Hatton and Mohamed S. El-Genk, UNM-ISNPS, Albuquerque, NM, USA
- 5:00 pm - *Methods for Determining Operation Lifetime of Space Reactors***
Timothy M. Schriener and Mohamed S. El-Genk, Institute for Space and Nuclear Power Studies and Chemical and Nuclear Engineering Dept., The University of New Mexico, Albuquerque, NM, USA
- 5:30 pm - *PID Control Effectiveness for Surface Reactor Concepts***
David D. Dixon, North Carolina State University, NC, USA; Christopher P. Marsh, United States Naval Academy, MD, USA; David I. Poston, Christopher L. Marsh, Los Alamos National Laboratory, Los Alamos, NM, USA

WEDNESDAY, FEBRUARY 14, 2007

[A02] Thermal Control Technologies for Future Spacecraft

Wednesday, February 14, 2007, 8:00 - 10:00 a.m. - Parlor A

- Chairs:** Jeffrey R. Didion, NASA Goddard Space Flight Center, Greenbelt, MD, USA
Kirk L. Yerkes, USAF Air Force Research Laboratory, Wright-Patterson AFB, OH, USA
- 8:00 am - *Hybrid Two-Phase Mechanical/Capillary Pumped Loop for High-Capacity Heat Transport***
Triem T. Hoang, Dmitriy A. Suhkov, TTH Research, Inc., Laurel, MD, USA; Robert W. Baldauff, Kwok H. Cheung, U.S. Naval Research Laboratory, Washington, DC, USA

Preliminary Technical Program

8:30 am - *Cryogenic Loop Heat Pipes and Applications*

Triem T. Hoang, TTH Research, Inc., Laurel, MD, USA; Jentung Ku, NASA Goddard Space Flight Center, Greenbelt, MD, USA

9:00 am - *Thermal Isothermalization of a Large Panel with an Embedded Loop Heat Pipe*

Triem T. Hoang, TTH Research, Inc., Laurel, MD, USA

9:30 am - *Mathematical Modeling of Loop Heat Pipes and Test Data Verification*

Triem T. Hoang, TTH Research, Inc., Laurel, MD, USA; Jentung Ku, NASA Goddard Space Flight Center, Greenbelt, MD, USA

[E12] In Situ Space Resource Utilization

Wednesday, February 14, 2007, 8:00 - 10:00 a.m. - Parlor B/C

Chairs: Ed McCullough, The Boeing Company, Huntington Beach, CA, USA
Klaus Heiss, High Frontier, Alexandria, VA, USA

8:00 am - *A Quantitative Method For Evaluating Regolith Simulants*

Doug Rickman, National Space Science and Technology Center, NASA Marshall Space Flight Center, Huntsville, AL, USA; Hans Hoelzer, Rick Howard, and Charles Owens, Teledyne Brown Engineering, Huntsville, AL, USA; Paul Carpenter, BAE Systems Analytical and Ordnance Solutions, NASA Marshall Space Flight Center, AL, USA; Laurent Sibille, ASRC Aerospace Corp., NASA Kennedy Space Center, FL, USA

8:30 am - *A Discrete Event Simulation of Crewed Lunar Surface Operations*

Ashok Iyer, Martin Bayer, Andrew Born, Dean Davis, William Findiesen, Puja Gupta, Ashok Iyer, Tina Kim, and, Stephen Vopava, The Boeing Co., Huntington Beach, CA, USA

9:00 am - *Large-Scale ISRU Systems Modeling for 100-Man Moonbase*

Brad R. Blair, and Javier Diaz, Center for Space Resources, Colorado School of Mines, Golden, CO, USA

9:30 am - *Large-Scale Nuclear Power Generation*

Roger X. Lenard, Sandia National Laboratories, Albuquerque, NM, USA

[C13] Nuclear Thermal Rocket Technology and Integration

Wednesday, February 14, 2007, 8:00 - 10:00 a.m. - Ballroom D

Chairs: Stanley V. Gunn, Rocketdyne (Retired), Chatsworth, CA, USA
Harold Finger, Consultant, Chevy Chase, MD, USA

8:00 am - *Nuclear Thermal Rocket Reactors and Engine Systems--An Established Propulsion Technology Developed in the Rover and NERVA Programs*

Richard E. Malenfant, Los Alamos National Laboratory (retired), Albuquerque, NM, USA; Frank P. Durham, Los Alamos National Laboratory (retired), Los Alamos, NM, USA; Milton Klein, NASA/AEC Space Nuclear Systems Office (retired), Menlo Park, CA, USA

8:30 am - *Human Missions to Mars: NASA's Planning for the Future*

Jeff Volosin, NASA Exploration Systems Mission Directorate, NASA Headquarters, Washington D.C. USA

9:00 am - *Issues Concerning the Redevelopment of a Nuclear Thermal Rocket for Application to Lunar, Mars and Deep Space Missions*

Steven D. Howe, Center for Space Nuclear Research, Idaho Falls, ID, USA

9:30 am - *TBD*

Anatoly Koroteev, Keldysh Research Center, Moscow, Russia

[D06] Advanced Avionics and Software

Wednesday, February 14, 2007, 8:00 - 10:00 a.m. - Ballroom E

Chairs: Dana Gould, NASA Langley Research Center, Hampton, VA, USA
Christopher Moore, NASA Headquarters, Washington, DC, USA

Preliminary Technical Program

- 8:00 am - Radiation-Hardened Electronics for Space Exploration (RHESE)**
Michael Watson, Don Frazier, James Adams, Todd MacLeod, Clint Patrick, Andrew Keys, NASA Marshall Space Flight Center, Huntsville, AL, USA; John Cressler, Georgia Institute of Technology, Atlanta, GA, USA; Matt Hancher, NASA Ames Research Center, Moffett Field, CA, USA; Michael Johnson, NASA Goddard Space Flight Center, Greenbelt, MD, USA; Elizabeth Kolawa, Jet Propulsion Laboratory, Pasadena, CA, USA
- 8:30 am - Spacecraft Autonomy Technology: From Mission Operations to Lunar Outposts**
Ari Jonsson, NASA Ames Research Center, Moffett Field, CA, USA
- 9:00 am - The Autonomous Precision Landing and Hazard Detection and Avoidance Technology (ALHAT)**
Chirold D. Epp, NASA Johnson Space Center, Houston, TX, USA; Thomas B. Smith, NASA Johnson Space Center, Houston, TX, USA
- 9:30 am - Automated Rendezvous and Docking System Developments**
Richard T. Howard, NASA Marshall Space Flight Center, AL, USA

[C26] Advanced Energy Storage Technologies

Wednesday, February 14, 2007, 8:00 - 10:00 a.m. - Parlor G/H

- Chairs:** Subbarao (Rao) Surampudi, Jet Propulsion Laboratory, Pasadena, CA, USA
Garry Burdick, Jet Propulsion Laboratory, Pasadena, CA, USA
- 8:00 am - High Power Li-Ion Batteries**
Karmen Nechev, Robert Staniewicz, SAFT America, Cockeysville, MD, USA
- 8:30 am - LI-Ion Batteries for Aerospace Applications**
Frank Puglia, Vincent Yevoli, Yardney Technical Products, Inc./Lithion, Inc., Pawcatuck, CT, USA
- 9:00 am - Direct Methanol Fuel Cells**
S. R. Narayanan, T. Valdez, Jet Propulsion Laboratory, Pasadena, CA, USA
- 9:30 am - Low Temperature Li-Ion Batteries for Space Applications**
Ratnakumar Bugga, Marshall C. Smart, Jet Propulsion Laboratory, Pasadena, CA, USA

[E08] Biotechnology and Medicine for Space Colonization

Wednesday, February 14, 2007, 10:30 a.m. - 12:30 p.m. - Parlor B/C

- Chairs:** Diana Jennings, NASA Institute for Advanced Concepts, Kingston, MA, USA
Ronald Turner, ANSER, Arlington, VA, USA
- 10:30 am - Biotechnology Support for Space Colonization**
Edward D. McCullough, The Boeing Company, Huntington Beach, CA, USA
- 11:00 am - A Minimized Technological Approach towards Human Self Sufficiency off Earth**
Peter A. Curreri, NASA Marshall Space Flight Center, Huntsville, AL, 35812 USA
- 11:30 am - The All Terrain Bio nano Gear for Space Radiation Detection System**
Ajay Ummat and Constantinos Mavroidis, Northeastern University, Boston, MA, USA
- 12:00 pm - Revolutionary Architectures and Concepts for Biotechnology, Life Support and Space Settlement**
Diana E. Jennings, and Robert Cassanova, NASA Institute for Advanced Concepts, Atlanta, GA, USA; Ronald Turner, ANSER Analytic Services, Inc., Arlington, VA, USA

[C20] Dynamic Power II: > Kilowatt Class

Wednesday, February 14, 2007, 10:30 a.m. - 12:30 p.m. - Ballroom D

- Chairs:** Lee S. Mason, NASA Glenn Research Center, Cleveland, OH, USA
Tim Bauch, Hamilton Sundstrand, Rockford, IL, USA
- 10:30 am - New 5 Kilowatt Free-Piston Stirling Space Convertor Developments**
Henry W. Brandhorst, Jr., Space Research Institute, Auburn University, Auburn, AL, USA

Preliminary Technical Program

11:00 am - Comparison of Analytical Predictions and Experimental Results for a Dual Brayton Power System

Paul Johnson, Analex Corp. at NASA Glenn Research Center, Cleveland, OH, USA

11:30 am - Recent Developments in the Recovery of SNAPDYN Technical Data Base

Greg Johnson, Bill Determan, Hamilton Sundstrand, Canoga Park, CA, USA

12:00 pm - Compressor and Turbine Models of Brayton Units for Space Nuclear Power Systems

Bruno M. Gallo, Mohamed S. El-Genk, and Jean-Michel Tournier, University of New Mexico, Albuquerque, NM, USA

[D09] Advanced Thermal Technologies and Systems

Wednesday, February 14, 2007, 10:30 a.m. – 12:30 p.m. - Ballroom E

Chairs: Dana Gould, NASA Langley Research Center, Hampton, VA, USA

Carlos S. Campos, NASA Headquarters, Washington, DC, USA

10:30 am - Cryo Fluids Management

Susan Motil, NASA Glenn Research Center, Cleveland, OH, USA

11:00 am - The Potential Impact of a LEO Propellant Depot on the NASA ESAS Architecture

Dallas Bienhoff, The Boeing Company, Arlington, VA, USA

11:30 am - Active Thermal Control System Development for Exploration

David Westheimer, NASA Johnson Space Center, Houston, TX, USA

12:30 pm - Cryogenic Propellant Depot Experiments, Demonstrations and Applications

Joe T. Howell, John Fikes, NASA, Marshall Space Flight Center, Huntsville, AL, USA;
Mark Henley, The Boeing Company, Phantom Works, Huntington Beach, CA, USA

[C21] Safety and Reliability

Wednesday, February 14, 2007, 10:30 a.m. - 12:30 p.m. - Parlor F

Chairs: Joseph A. Sholtis, Sholtis Engineering & Safety Consulting, Tijeras, NM, USA

Lawrence E. DeFillipo, SAIC, Reston, VA, USA

10:30 am - Probabilities of Ground Impact Conditions of the New Horizons Spacecraft and RTG for Near Launch Pad Accidents

Brian E. McGrath, Dave A. Frostbutter, and Yale Chang, The Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, USA

11:00 am - JHU/APL Breakup Analysis Tool (APLbat) for the New Horizons Radiological Contingency

Matthew Lear, Brian McGrath, Naruhisa Takashima, and Gene Heyler, The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA

11:30 pm - New Horizons Launch Contingency Effort

Yale Chang, Matthew H. Lear, Brian E. McGrath, Gene A. Heyler, Naruhisa Takashima, and W. Donald Owings, The Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, USA

12:00 am - LEO Spacecraft Charging - A New NASA Design Standard

Dale C. Ferguson, NASA Marshall Space Flight Center, Huntsville, AL, USA; G. Barry Hillard, NASA GRC, USA

[F08] Experimental Results and New Concepts within Current Physical Models II

Wednesday, February 14, 2007, 10:30 a.m.- 12:30 p.m. - Parlor G/H

Chairs: Bernd Binder, Quantics, Salem, BW, Germany

Richard Obousy, Baylor University, Waco, TX, USA

8:00 am - Supersymmetry Breaking Casimir Warp Drive

Richard K. Obousy, and Gerald Cleaver, Baylor University, Waco, TX, USA

8:30 am - How a Randall-Sundrum Brane World Effective Potential

Influences Inflation Physics

Preliminary Technical Program

Andrew Walcott Beckwith, APS/Fermi Laboratory Research Contractor, Menlo Park, California, USA

9:00 am - *Towards a Self-Consistent and Controllable Graviton Flux*

Bernd Binder, Quantics, Salem, BW, Germany

9:30 am - *The Connection between Inertial Forces and the Vector Potential*

Mario J. Pinheiro, Instituto Superior Tecnico, Lisboa, Portugal; Alexandre A. Martins, Condensed Matter Physics Center, University of Lisbon, Lisbon, Portugal; Gama Pinto, Lisboa, Portugal

[A04] Thermal Control for Lunar and Deep Space Missions

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Parlor A

Chairs: Charles Dan Butler, NASA Goddard Space Flight Center, Greenbelt, MD, USA
Gani B. Ganapathi, Jet Propulsion Laboratory, Pasadena, CA, USA

1:45 pm - *Thermal Control Architecture for Planetary and Lunar Surface Exploration Micro-Robots*

Brian R. Burg and Dimos Poulidakos, Laboratory for Thermodynamics in Emerging Technologies, ETH, Zurich, Switzerland; Steven Dubowsky, Field and Space Robotics Laboratory, Massachusetts Institute of Technology, Cambridge, MA, USA, and John H. Lienhard V, W. M. Rohsenow Heat and Mass Transfer Laboratory, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA;

2:15 pm - *Thermal Design Considerations for Designing the Next Lunar Lander*

Mathew B. Garrison, Daniel H. Nguyen, Thermal Engineering Branch, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA

2:45 pm - *Lunar Dust on Heat Rejection System Surfaces: Problems and Prospects*

James R. Gaier, and Donald A. Jaworske NASA Glenn Research Center, Cleveland, OH, USA

3:15 pm - *Advanced Cryogenic Propellant Storage Options Applied to Lunar Architecture Studies*

David Plachta, NASA Glenn Research Center, Cleveland, OH, USA

[E09] Large Scale Processes and Technologies for Colonization

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Parlor B/C

Chairs: Roger X. Lenard, Sandia National Laboratories, Albuquerque, NM, USA
John Brandenburg, Florida Space Institute, Orlando, FL, USA

1:45 pm - *The CI Carbonaceous Chondrites as the Missing Old Meteorites of Mars*

John Brandenburg, Florida Space Institute-University of Central Florida, Kennedy Space Center, FL, USA

2:15 pm - *Establishing Large Scale Colony Infrastructure On The Moon And Mars*

Edward McCullough, The Boeing Company, Huntington Beach, CA, USA

2:45 pm - *Establishing Large Scale Colony Infrastructure On The Moon And Mars*

Edward McCullough, The Boeing Company, Huntington Beach, CA, USA

3:15 pm - *On the Possibility of a Persistent Mars Greenhouse, or, Mars and Venus Find Something in Common*

John Brandenburg, Florida Space Institute-University of Central Florida, Kennedy Space Center, FL, USA

[C25] Fission Surface Power Component Technology Development I

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Ballroom D

Chairs: Lee S. Mason, NASA Glenn Research Center, Cleveland, OH, USA
Cheryl L Bowman, NASA Glenn Research Center, Cleveland, OH, USA

1:45 pm - *Material and Fabrication Options for Light Weight Radiators*

Cheryl L Bowman, NASA Glenn Research Center, Cleveland, OH, USA; Mrityunjay

Preliminary Technical Program

Singh, E. Eugene Shin, Gregory Morscher, Ohio Aerospace Institute, Cleveland, OH, USA

2:15 pm - Creep Property Characterization of Potential Brayton Cycle Impeller and Duct Materials

Timothy P. Gabb, John Gayda, NASA Glenn Research Center, Cleveland, OH USA; Anita Garg, University of Toledo, Cleveland, OH

2:45 pm - Variable Conductance Liquid Metal Heat Pipes for Use with Isotope Power Systems - Past & Present

Donald M. Ernst, Advanced Cooling Technologies, Inc., Lancaster, PA, USA

3:15 pm - Post Irradiation Evaluation of Thermal Control Coatings and Solid Lubricants to Support Fission Surface Power Systems

Cheryl Bowman, Donald Jaworske, and Malcolm Stanford, NASA Glenn Research Center, Cleveland, OH, USA; Justin Persinger, and Thomas Blue, Ohio State University, Columbus, OH, USA

[D08] Environmental Control and Life Support Technologies and Systems

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Ballroom E

Chairs: Jitendra Joshi, NASA Headquarters, Washington, DC, USA
Steve Davison, NASA Headquarters, Washington, DC, USA

1:45 pm - Exploration Life Support

B. M. Lawson, NASA Johnson Space Center, Houston, TX, USA

2:15 pm - Water Recovery Systems for Exploration Missions

Karen Pickering, NASA Johnson Space Center, Houston, TX, USA

2:45 pm - Key Technologies for Environmental Monitoring for CEV and LSAM

Gregory Bearman, Jet Propulsion Laboratory, Pasadena, CA, USA

3:15 pm - Atmosphere Revitalization Process Technology Maturation for NASA's Constellation Projects

Jay L. Perry, NASA George C. Marshall Space Flight Center, Marshall Space Flight Center, AL, USA

[C04] Ongoing Radioisotope-Enabled Missions

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Parlor F

Chairs: Ralph McNutt, The Johns Hopkins University, Laurel, MD, USA
Jacklyn R. Green, Jet Propulsion Laboratory, Pasadena, CA, USA

1:45 pm - Jupiter, Saturn and the Sun: Investigations Enabled by Nuclear Power

Karla B. Clark and Richard Terrile, Jet Propulsion Laboratory, Pasadena, CA, USA

2:15 pm - RTG's on Transit

John Dassoulas and Ralph L. McNutt, Jr., Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA

2:45 pm - Voyagers to the Edge of the Solar System and Beyond: Contributions from the MHW-RTGs

Jacklyn R. Green, Jet Propulsion Laboratory, Pasadena, CA, USA

3:15 pm - The New Horizons Mission to Pluto and the Kuiper-Bel

David Y. Kusnierkiewicz, Yanping Guo, Chris Hersman, Glen Fountain, and Steve Vernon, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA

[CE01] Public Outreach

Wednesday, February 14, 2007, 1:45 - 3:45 p.m. - Parlor G/H

Chairs: Alice Wessen, Jet Propulsion Laboratory, Pasadena, CA, USA
Amber Trounce, Boeing-Huntington Beach, Huntington Beach, CA, USA

1:45 pm - TBD

[A07] Advances in Spray Cooling

Wednesday, February 14, 2007, 4:00 - 6:00 p.m. - Parlor A

- Chairs:** Eric Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA
Kirk L. Yerkes, USAF / Air Force Research Laboratory, Wright-Patterson AFB, OH, USA
- 4:00 pm - Influence of the Coulomb Force on Spray Cooling**
John M. Kuhlman, Paul J. Kreitzer, Deepak Mehra, and Donald D. Gray, West Virginia University, Morgantown, WV, USA; Kirk L. Yerkes, U.S. Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, USA
- 4:30 pm - Energy Model Based Spray Cooling Heat Flux Correlation with Emphasis on Spray Characteristics**
Eric A. Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA
- 5:00 pm - Mathematical Model of Two-Phase Flow in Advanced Micro Cooling Modules Incorporating Flow Pattern Phenomena**
Jerry K. Keska and William E. Simon, University of Louisiana, Lafayette, LA, USA
- 5:30 pm - Spray Cooling Modeling: Liquid Film Thickness Effect on Heat Transfer**
R. Paneer Selvam, and Matthew Hamilton, University of Arkansas, Fayetteville, AR, USA; Eric A. Silk, NASA Goddard Space Flight Center, Greenbelt, MD, USA

[E10] Terraforming, Domed Ecosystems and Planetary

Wednesday, February 14, 2007, 4:00 - 6:00 p.m. - Parlor B/C

- Chairs:** Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI, USA
Edward McCullough, The Boeing Company, Huntington Beach, CA, USA
- 4:00 pm - Life on Mars and Relationship to Terraforming Mars**
David S. McKay, NASA Johnson Space Flight Center, Houston, TX, USA
- 4:30 pm - Lunar Atmosphere Development**
Richard R. Vondrak, NASA Goddard Space Flight Center, Greenbelt, MD, USA; Dana H. Crider, Catholic University, Gibsonville, NC, USA
- 5:00 pm - Domes: The Moon and Mars**
John C. Mankins, Artemis Innovation Management Solutions LLC, Ashburn, VA, USA
- 5:30 pm - Constructing a Cosmic Rays Observatory on the Moon for Climate Change Data Measurements**
Piero Spillantini, Univ. of Florence and INFN, Firenze, Italy; Walter Pecorella, INAF, Italy; Alex Ignatiev, University of Houston, Houston, TX, USA; Paul van Susante, Colorado School of Mines, Golden, CO, USA; Klaus P. Heiss, High Frontier, Alexandria, VA, USA

[C22] Non-Nuclear Testing and Evaluation II

Wednesday, February 14, 2007, 4:00 - 6:00 p.m. - Ballroom D

- Chairs:** Bernard Wernsman, Bechtel Bettis, Inc., West Mifflin, PA, USA
Patrick McDaniel, Sandia National Laboratories, Albuquerque, NM, USA
- 4:00 pm - Supercritical Brayton Cycle Nuclear Power System Concepts**
Steven A. Wright, Sandia National Laboratories, Albuquerque, NM, USA
- 4:30 pm - Testing in Support of Fission Surface Power System Qualification**
Mike Houts, Shannon Bragg-Sitton, Anne Garber, Tom Godfroy, Jim Martin, J. Boise Pearson, Melissa Van Dyke NASA Marshall Space Flight Center, Huntsville, AL, USA
- 5:00 pm - Initial Testing of the Stainless Steel NaK-Cooled Circuit (SNaKC)**
Anne Garber, NASA Marshall Space Flight Center, Nuclear & Advanced Propulsion Branch, Huntsville, AL, USA; Thomas J. Godfroy, Los Alamos National Laboratory, Los Alamos, NM, USA
- 5:30 pm - Development of High Fidelity, Fuel-Like Thermal Simulators for Non-Nuclear Testing**

Preliminary Technical Program

Shannon M. Bragg-Sitton, J. Farmer, R. Dickens, M. Adams, and J. Davis, NASA Marshall Space Flight Center, Nuclear and Advanced Propulsion Branch, Huntsville, AL, USA; D. Dixon, and R. Kapernick, Los Alamos National Laboratory, Nuclear Design and Risk Analysis, Los Alamos, NM, USA

[D10] Advanced Power and Propulsion Technologies and Systems

Wednesday, February 14, 2007, 4:00 - 6:00 p.m. - Ballroom E

Chairs: Diane Hope, NASA Langley Research Center, Hampton, VA,
Nantel Suzuki, NASA Headquarters, Washington, DC, USA

4:00 pm - *Novel Rock Detection Intelligence for Space Exploration Based on Non-Symbolic Algorithms and Concepts*

Sule Yildirim, and Ronald L. Beachell, Computer Science Department, Hedmark University College, Norway, Henning Veflingstad, Computer Science Department, Norwegian University of Science and Technology, Trondheim, Norway

4:30 pm - *Fuel Cells*

Mark A. Hoberecht, NASA Glenn Research Center, Cleveland, OH, USA

5:00 pm - *Propulsion and Cryogenics Advanced Development*

Mark Klem, NASA Glenn Research Center, Cleveland, OH, USA

5:30 pm - *Where Space Comes Down to Earth: Test Facilities for Exploration Systems*

Jeffrey Woytach, Jeffrey Chambers, Brian Willis, Gerald Carek, NASA Glenn Research Center, Plum Brook Station, Cleveland, OH, USA; Diane Linne, NASA Glenn Research Center, Cleveland, OH USA

[C24] Radioisotope Power Systems Technology and Development

Wednesday, February 14, 2007, 4:00 - 6:00 p.m. - Parlor G/H

Chairs: Patrick E. Frye, Pratt & Whitney Rocketdyne, Canoga Park, CA, USA
Jaime Reyes, Lockheed Martin, Phoenixville, PA, USA

4:00 pm - *Development of Advanced Stirling Radioisotope Generator for Space Exploration*

Jack Chan, Lockheed Martin Space Systems Company, Philadelphia, PA, USA; J. Gary Wood, Sunpower Inc., Athens, OH, USA; Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH, USA

4:30 pm - *Multi-Watt Small Radioisotope Thermoelectric Generator Conceptual Design Study*

Patrick Frye, William Otting, and William R. Determan, Pratt & Whitney Rocketdyne Inc., Canoga Park, CA, USA

5:00 pm - *Modeling of the Thermal Performance of an Advanced Stirling Converter Concept*

Brian G. Woods, Jiani Wang, John T. DeNoma, Oregon State University, Department of Nuclear Engineering and Radiation Health Physics, Corvallis, OR, USA

5:30 pm - *NASA'S RPS Design Reference Mission Set for Solar System Exploration*

Tibor Balint, Jet Propulsion Laboratory, California Institute of technology, Pasadena, CA, USA

THURSDAY, FEBRUARY 15, 2007

[A08] Advanced Heat Pipes and Other Emerging Technologies

Thursday, February 15, 2007, 8:00 - 10:00 a.m. - Parlor A

Chairs: Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM, USA
D. Angirasa, Goodrich Corporation, Power Systems Division, Twinsburg, OH, USA

8:00 am - *Intermediate Temperature Fluids Life Tests – Theory*

Calin Tarau, David B. Sarraf, and William G. Anderson, Advanced Cooling Technologies, Inc., Lancaster, PA, USA; Ivan E. Locci, NASA Glenn Research Center,

Preliminary Technical Program

Cleveland, OH, USA

8:30 am - *Reversible Electrochemical Mirror (REM) Device for Satellite Thermal Control*

Michael A. Cunningham, D. Morgan Tench and Leslie F. Warren, Jr., Teledyne Scientific Company, Thousand Oaks, CA, USA

9:00 am - *Fabrication and Testing of a Passive Re-Deployable Radiator for Autonomous Thermal Control*

Hosei Nagano, Akira Ohnishi, and Ken Higuchi, Japan Aerospace Exploration Agency/ Institute of Space and Astronautical Science, Sagami-hara, Kanagawa, Japan; Kan Matsumoto, Tokai University, Hiratsuka, Kanagawa, Japan; Yuji Nagasaka, Keio University, Kanagawa, Japan

9:30 am - *Compatibility Studies of Inconel 625 with Lunar Regolith Simulant*

Donald Gillies, Sandor Lehoczyk, NASA, Marshall Spaceflight Center, Huntsville, AL, USA; Witold Palosz, Paul Carpenter, BAE Systems, MSFC, Huntsville, AL, USA; Pat Salvail, STS, MSFC, Huntsville, AL, USA

[E11] Space Resource Utilization on the Moon II

Thursday, February 15, 2007, 8:00 - 10:00 a.m. - Parlor B/C

Chairs: Kevin Payne, Lockheed Martin Space Systems Company, Denver, CO, USA
Timothy Chen, The Boeing Company, Huntington Beach, CA, USA

8:00 am - *Oxygen Production System Models for Lunar ISRU*

Edgardo Santiago-Maldonado, NASA Kennedy Space Center, FL, USA; Jim Kennedy, Teledyne Brown Engineering, NASA Marshall Space Flight Center, AL, USA

8:30 am - *High-Efficiency Extraction and Utilization of Lunar Solar Wind Volatiles*

David E. Petrick, and Steven J. Nieczkoski, Technology Applications Inc., Boulder, CO, USA; Tracy Q. Gardner, Colorado School of Mines, Golden, CO, USA

9:00 am - *Development of a Reactor Model for Chemical Conversion of Lunar Regolith*

Uday Hegde, Suleyman Gokoglu, and R. Balasubramaniam, National Center for Space Exploration Research, NASA Glenn Research Center, Cleveland, OH, USA

9:30 am - *Tribocharging Lunar Simulant in Vacuum for Electrostatic Beneficiation*

James Captain, University of Central Florida, FL, USA; Steve Trigwell, ASRC Aerospace, FL, USA; Ellen Arens, Janine Captain, Carlos Calle, Jacqueline Quinn, NASA Kennedy Space Flight Center, FL, USA; Alex Biris, University of Arkansas at Little Rock, Little Rock, AR, USA

[C27] Fission Surface Power Component Technology Development II

Thursday, February 15, 2007, 8:00 - 10:00 a.m. - Ballroom D

Chairs: Lee S. Mason, NASA Glenn Research Center, Cleveland, OH, USA
Cheryl L Bowman, NASA Glenn Research Center, Cleveland, OH, USA

8:00 am - *High Temperature Stability of Dissimilar Metal Joints in Fission Surface Power Systems*

Ivan Locci, University of Toledo, Toledo, OH, USA; Cheryl Bowman, James Nesbitt, and Frank Ritzert, NASA Glenn Research Center, Cleveland, OH, USA

8:30 am - *Thermal Performance of High Temperature Titanium - Water Heat Pipes by Multiple Heat Pipe Manufacturers*

James Sanzi, SEST Inc., NASA Glenn Research Center, Cleveland, OH, USA

9:00 am - *Gas Foil Bearing Technology Advancements for Closed Brayton Cycle Turbines*

Samuel A Howard, Christopher DellaCorte, Robert J. Bruckner, and Malcolm Stanford, NASA Glenn Research Center, Cleveland, OH, USA; Kevin Radil, US Army Research Laboratory, Adelphi, MD, USA

Preliminary Technical Program

9:30 am - Operational Results from a High Power Alternator Test Bed

Arthur Birchenough, and David Hervol, NASA Glenn Research Center, Cleveland, OH, USA

**[C11] Thermoelectric Power Conversion
Technology and Applications**

Thursday, February 15, 2007, 8:00 - 10:00 a.m. - Parlor F

Chairs: Bahman Heshmatpour, Teledyne Energy Systems, Inc., Hunt Valley, MD, USA
Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, CA, USA

8:00 am - Special Application Thermoelectric Micro Isotope Power Sources

B. Heshmatpour, A. Lieberman, M. Khayat, A. Leanna, T. Dobry, Teledyne Energy Systems, Inc., Hunt Valley, MD, USA

8:30 am - A Look Back at Assembly and Test of the New Horizons Radioisotope Power System

B. Alan Harmon, and William A. Bohne, Space and Defense Power Systems, U.S. Department of Energy, Washington, DC, USA

9:00 am - Small Thermoelectric Radioisotope Power Sources

A. Lieberman, A. Leanna, M. McAlonan, B. Heshmatpour, Teledyne Energy Systems, Inc., Hunt Valley, MD, USA

**[F09] Theoretical Considerations - Warp Drives, FTL
Speed Travel and Others II**

Thursday, February 15, 2007, 8:00 - 10:00 a.m. - Parlor G/H

Chairs: David Maker, Photon Research Associates, Huntsville, AL, USA
Glen A. (Tony) Robertson, Gravi Atomic Research, Madison, AI, USA

8:00 am - Why Should a Superconductor Generate Large Gravitomagnetic Fields

Martin Tajmar, Space Propulsion, ARC Seibersdorf research, A-2444 Seibersdorf, Austria

8:30 am - Exploring Gravity and Gravitational Wave Dynamics Part II: Gravity Models

Paul A. Murad, Vienna, VA, USA

9:00 am - The Schwarzschild Metric Violates the Weak Principle of Equivalence

Raymond Jensen, University of Notre Dame, Notre Dame, IN, USA

9:30 am - Electrostatic 512kV Rotator/Oscillator Propulsion System

David Maker, Huntsville, AL, USA

[A05] Smart Materials and Coatings for Thermal Control

Thursday, February 15, 2007, 10:30 a.m. - 12:30 p.m. - Parlor A

Chairs: Donya M. Douglas, NASA Goddard Space Flight Center, Greenbelt, MD, USA
William J. Biter, Sensortex, Inc., Kennett Square, PA, USA

10:30 am - Variable Emittance Electrochromic Devices for Satellite Thermal Control

Hulya Demiryont, Kenneth C. Shannon III, Eclipse Energy Systems, Inc., St. Petersburg, FL, USA

11:00 am - Performance Results of the ESR from the Space Technology 5 Satellites

William J. Biter, and Sung Oh, Sensortex Inc., Kennett Square, PA, USA

11:30 am - MEMS Shutters for Thermal Control – Flight Validation and Lessons Learned

Dawnielle Farrar, Ann Darrin, and Robert Osiander, The John Hopkins University Applied Physics Laboratory, Laurel, MD, USA; Donya M. Douglas, Ted D. Swanson, and Christine Collins, NASA Goddard Space Flight Center, Greenbelt, MD, USA

12:00 pm - A Space-Based Experiment to Evaluate Performance of Electrostatic Switched Radiator (ESR)

Saeed Moghaddam, John Lawler, and Joseph Currano, ATEC, Inc., College Park, MD, USA; Jung-ho Kim, University of Maryland, College Park, MD, USA

Preliminary Technical Program

[E07] Space Settlements/Colonies

Thursday, February 15, 2007, 10:30 a.m. - 12:30 p.m. - Parlor B/C

- Chairs:** Anita Gale, Space Settlement Design Competitions, Nassau Bay, TX, USA
Richard Edwards, Space Settlement Design Competitions, Nassau Bay, TX, USA
- 10:30 am - *Atlas V: Reliable Human Space Transportation for Space Colonization***
Michael Holguin, Lockheed Martin, Denver, CO, USA
- 11:00 am - *Symbiotic Relationship of Man and Machine in Space Colonization***
Roy Nielsen, r-bok tech, Los Alamos, NM, USA
- 11:30 pm - *Economic Decision Model for NEO Characterization and Mitigation***
Brad R. Blair, Center for Space Resources, Colorado School of Mines, Golden, CO, USA
- 12:00 am - *Optimal Architecture for an Asteroid Mining Mission: System Components and Project Execution***
Ken R. Erickson, Good Samaritan Hospital and Medical Center, Corvallis, OR, USA

[CE02] Lunar Environmental Effects & Mitigation

Thursday, February 15, 2007, 10:30 a.m. - 12:30 p.m. - Ballroom D

- Chairs:** Insoo Jun, Jet Propulsion Laboratory, Pasadena, CA, USA
Michael Houts, NASA Marshall Space Flight Center, AL, USA
- 10:30 am - TBD**

[C02] Reactor Systems Concepts for Surface Power

Thursday, February 15, 2007, 10:30 a.m. - 12:30 p.m. - Ballroom E

- Chairs:** Robert L. Cataldo, NASA Glenn Research Center, Cleveland, OH, USA
Steven B. Dron, Sandia National Laboratories, Albuquerque, NM, USA
- 10:30 am - *Non-Nuclear Validation Test Results of a Closed Brayton Cycle Test-Loop***
Steven Wright, Sandia National Laboratories, Albuquerque, NM, USA
- 11:00 am - *Benefit of Lunar Regolith on Reflector Mass Savings***
Steven A. Hatton and Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM, USA
- 11:30 pm - *Hot Hydrogen Test Facility***
W. David Swank, Jon Carmack, James E. Werner, Robert J. Pink, DeLon C. Haggard, and Ryan Johnson, Idaho National Laboratory, Idaho Falls, ID, USA
- 12:00 pm - *Evaluation of Metal-Fueled Surface Reactor Concepts***
David I. Poston, Thomas F. Marcille, Richard J. Kapernick, and Matthew T. Hiatt, and Benjamin Amiri, Los Alamos National Laboratory, Los Alamos, NM, USA; Mathew Hiatt, Texas A&M University, College Station, TX, USA; Benjamin Amiri, University of Florida, Gainesville, FL, USA

[F07] An International Outlook on Far Term Propulsion and Power

Thursday, February 15, 2007, 10:30 a.m. - 12:30 p.m. - Parlor G/H

- Chairs:** Martin Tajmar, ARC Seibersdorf Research GmbH, Seibersdorf, , Austria
Charles Suchomel, Air Force Research Laboratory, Wright-Patterson AFB, OH, USA
- 10:30 am - *Coupling of an Open Cavity to Microwave Beam: A Possible New Scheme of Detecting High-Frequency Gravitational Waves***
Fangyu Li, Zhenyun Fang, University of Chongqing, Peoples Republic of China; R. M.L. Baker, GRAVWAVE LLC and Transportation Sciences Corporation, Playa Del Rey, CA, USA
- 11:00 am - *CasimirSim - A Tool to Compute Casimir Polder Forces for Nontrivial 3D Geometries***
René Sedmík, Martin Tajmar, ARC Seibersdorf research GmbH., Seibersdorf, A-2444, Austria

Preliminary Technical Program

11:30 am - High-Frequency Gravitational Wave Induced Nuclear Fusion

Giorgio Fontana, University of Trento, Trento, Italy; and Robert M. L. Baker, Jr.,
GRAVWAVE, LLC, Playa del Rey, CA, USA

12:00 pm - Chinese High-Frequency Gravitational Wave Program

Robert M. L. Baker, GRAVWAVE, LLC, Playa del Rey, CA, USA

INDEX OF AUTHORS AND SESSION CHAIRS

Abelson, R.....	12	Canina, M.....	4	Dobry, T.....	22
Adams, J.....	15	Captain, James.....	21	Douglas, D.....	22
Adams, M.....	20	Captain, Janine.....	10, 21	Downing, R.....	5
Adamson, G.....	3	Cardiff, E.....	10	Dron, S.....	23
Adumitroaie, V.....	5	Carek, G.....	20	Dubowsky, S.....	17
Alkalai, L.....	11	Caron, M.....	3	Durham, F.....	14
Allard, L.....	7	Carpenter, P.....	14, 21	Edwards, R.....	23
Amiri, B.....	4, 8, 9	Caruso, J.....	4	El-Genk, M.....	13, 16, 23
Ancarrow, W.....	6	Cassanova, R.....	11, 15	Elliott, J.....	12
Anderson, W.....	20	Cataldo, R.....	23	Emis, N.....	5
Angirasa, D.....	20	Chambers, J.....	20	Erickson, K.....	23
Arens, E.....	21	Chan, J.....	20	Ernst, D.....	5, 18
Baker, R.....	6, 8, 13, 23, 24	Chang, Y.....	16	Ethridge, E.....	10, 12
Balasubramaniam, R.....	21	Chen, T.....	6, 21	Evans, B.....	7
Baldauff, R.....	13	Cheung, C.....	7	Fang, Z.....	23
Balint, T.....	20	Cheung, K.....	13	Farmer, J.....	20
Banks, J.....	10	Cheung, T.....	12	Farrar, D.....	22
Barklay, C.....	7	Chiroux, R.....	7	Fensin, M.....	9
Barra, N.....	9	Cichon, J.....	9	Ferguson, D.....	16
Barth, J.....	12	Clark, K.....	12, 18	Fielher, D.....	4
Bartlett, P.....	10	Clark, L.....	12	Fikes, J.....	16
Bauch, T.....	15	Clark, P.....	7, 11	Findiesen, W.....	14
Bayer, M.....	14	Claver, G.....	16	Finger, H.....	14
Beach, D.....	5	Clough, J.....	9	Fiske, M.....	12
Beachell, R.....	20	Cole, J.....	5	Fleurial, J.-P.....	22
Bearman, G.....	18	Cole, S.....	6	Fontana, G.....	13, 24
Beckwith, A.....	17	Collins, C.....	22	Foresman, R.....	7
Benton, M.....	6	Colvin, E.....	9	Fork, R.....	6
Bess, J.....	9	Cooper, K.....	9	Fountain, G.....	18
Bienhoff, D.....	16	Cooperrider, C.....	7	Frazier, D.....	15
Binder, R.....	16, 17	Craig, D.....	5	Froning, H.....	13
Birchenough, A.....	22	Cressler, J.....	15	Frostbutter, D.....	16
Birkenstaedt, B.....	6	Crider, D.....	19	Frye, P.....	10, 20
Biris, A.....	21	Culbert, C.....	7	Gabb, T.....	18
Birkbeck, J.....	7	Cummings, P.....	9	Gaier, J.....	17
Biter, W.....	22	Cunningham, B.....	9	Gaitonde, D.....	5
Blair, B.....	14, 23	Cunningham, M.....	21	Gale, A.....	23
Blake, B.....	12	Curran, J.....	22	Gallimore, A.....	6
Blue, T.....	7, 18	Curreri, P.....	15	Gallo, B.....	16
Bluethmann, W.....	7	Curtis, S.....	7, 11	Gallo, C.....	11
Bohne, W.....	22	Dankanich, J.....	4	Ganapathi, G.....	17
Born, A.....	14	Dankewicz, C.....	5	Garber, A.....	19
Borowski, S.....	9	Darrin, A.....	22	Gardner, T.....	21
Boucher, D.....	11	Dassoulas, J.....	18	Garg, A.....	18
Bowman, C.....	17, 18, 21	Davis, D.....	14	Garner, S.....	6
Bowman, R.....	10	Davis, E.....	8	Garrison, M.....	17
Bragg-Sitton, S.....	7, 19, 20	Davis, J.....	20	Gauthier, R.....	11
Brandenburg, J.....	13, 17	Davis, K.....	10	Gayda, J.....	18
Brandhorst, H.....	15	Davison, S.....	18	Gernert, N.....	12
Brown, G.....	7	DeFillipo, L.....	16	Gertsch, L.....	12
Bruckner, A.....	12	D'Eleuterio, G.....	11	Ghrist, M.....	9
Bruckner, R.....	21	Delil, A.....	6	Gilchrist, B.....	6
Buffalino, A.....	10	DellaCorte, C.....	21	Gilley, S.....	9
Bugga, R.....	15	Demiryont, H.....	22	Gillies, D.....	21
Burdick, G.....	3, 15	Derleth, J.....	5	Glaser, D.....	10
Burg, B.....	17	Determan, W.....	16, 20	Glazer, S.....	6
Butler, C.....	17	Diaz, J.....	14	Godfroy, T.....	19
Calle, C.....	11, 21	Dickens, R.....	20	Gokoglu, S.....	21
Cambier, J.-L.....	5	Didion, J.....	13	Gold, R.....	4
Campos, C.....	16	Dixon, D.....	7, 8, 13, 20	Goldberg, H.....	11

Preliminary Technical Program

Good, J.	9	Keller, J.	11	Matejczyk, D.	10
Goodwin, D.	5, 13	Kennedy, J.	7, 21	Matsumoto, K.	21
Gorevan, S.	10	Keska, J.	19	Mavroidis, C.	15
Gould, D.	14, 16	Keys, A.	15	McAlonan, M.	22
Gray, D.	19	Khayat, M.	22	McCullough, E.	3, 4, 6, 14, 15, 17
Green, J.	18	Kim, J.	22	McCurdy, H.	4
Guimarães, L.	8	Kim, T.	14	McDaniel, P.	19
Gunn, S.	14	King, J.	13	McGrath, B.	16
Guo, Y.	18	Klein, M.	14	McGregor, W.	12
Gupta, P.	14	Klem, M.	20	McKay, D.	19
Hamilton, M.	19	Kobel, M.	6	McLemore, C.	4, 7, 12
Hancher, M.	15	Kolawa, E.	15	McNutt, R.	4, 18
Hansen, J.	12	Komerath, N.	8	Mead, F.	4
Harmon, A.	3	Koroteev, A.	14	Mehoke, D.	4
Harmon, B.	22	Kramer, D.	7	Meholic, G.	11
Harper, C.	11	Krause, D.	10	Mehra, D.	19
Hartka, T.	4	Kreitzer, P.	19	Merida, S.	5
Hatton, S.	13, 23	Ku, J.	6, 14	Micheels, K.	5
Hegde, U.	21	Kuhlman, J.	19	Miller, R.	7
Heiss, K.	3, 4, 8, 14, 19	Kulisek, J.	7	Miller, T.	9, 12
Henley, M.	16	Kusnierkiewicz, D.	18	Miller, W.	5
Hersman, C.	18	Kuttler, B.	6	Minami, Y.	8
Hervol, D.	22	Lam, T.	3	Minetto, F.	11
Heshmatpour, B.	22	Lange, R.	3	Moddeman, W.	7
Heyler, G.	16	Larson, W.	4, 7, 10	Moghaddam, S.	22
Hickman, R.	6, 7	Launius, R.	4	Moll, M.	11
Higuchi, K.	21	Lavelle, T.	9	Moore, C.	3, 11, 14
Hillard, B.	16	Lawler, J.	22	Moore, L.	4
Hoang, T.	13, 14	Lawson, B.	18	Morin, T.	12
Hoberecht, M.	20	Leanna, A.	22	Morscher, G.	18
Hoelzer, H.	14	Lear, M.	16	Motil, S.	16
Holguin, M.	9, 23	Lehoczky, S.	21	Monon, T.	7
Holiday, E.	10	Lenard, R.	5, 14, 17	Moy, L.	6
Hope, D.	20	Lentati, A.	9	Mrozinski, J.	5
Houts, M.	3, 11, 19, 23	Lewis, M.	9	Mueller, J.	11
Howard, R.	14, 15	Lewis, R.	5	Mulqueen, J.	7
Howard, S.	21	Li, F.	23	Mungas, G.	3
Howe, S.	9, 14	Lieberman, A.	22	Murad, P.	4, 13, 22
Howell, J.	16	Lienhard, J.	17	Musinski, L.	6
Hrbud, I.	4	Liguor, E.	5	Nagano, H.	6, 21
Hua, H.	5	Liguori, J.	5	Nagasaka, Y.	21
Iacomini, C.	12	Lincoln, W.	5	Napolillo, E.	4
Ignatiev, A.	19	Linne, D.	11, 20	Narayanan, S.	15
Iyer, A.	14	Liu, T.	6	Nassif, E.	8
Jaworske, D.	17, 18	Locci, I.	20, 21	Naumann, R.	12
Jennings, D.	11, 15	Lueck, D.	10	Nechev, K.	15
Jensen, R.	22	MacCallum, T.	12	Nesbitt, J.	21
Johnson, G.	16	MacLeod, T.	15	Nesmith, B.	13
Johnson, K.	4, 7	Maise, G.	8, 12	Neumann, B.	3
Johnson, M.	15	Maker, D.	22	Newman, D.	4
Johnson, P.	16	Malenfant, R.	14	Nguyen, D.	17
Johnson, R.	9	Mankins, J.	3, 5, 19	Nieczkoski, S.	21
Jollay, L.	8	Mansouryar, M.	13	Nielsen, R.	23
Jonsson, A.	15	Mantovani, J.	11	Nikitkin, M.	12
Joshi, J.	18	March, P.	10	O'Brien, R.	9
Joyner, R.	9	Marcell, T.	8, 9	Obousy, R.	16
Jun, I.	23	Marhold, K.	10	O'Connor, L.	7, 9
Justin, C.	8	Marris, J.	12	Oh, S.	22
Kalluri, S.	10	Marsh, C.	13	Ohlinger, W.	6
Kapernick, R.	4, 20	Martin, J.	19	Ohnishi, A.	21
Kaukler, W.	10	Martins, A.	17	Osiander, R.	22
Kaul, R.	12	Martins, M.	6	Ostdiek, P.	4
Keidar, M.	6	Mason, L.	15, 17, 21	Otting, W.	20
Keiter, D.	10	Matatagui, E.	8		

Preliminary Technical Program

Owens, C.....	14	Rosenfeld, J.....	12	Thieme, L.....	10
Owings, W.....	16	Sacksteder, K.....	4, 7, 10, 11	Tolson, W.....	6
Palosz, W.....	21	Salemi, B.....	11	Tournier, J.-M.....	16
Pancotti, A.....	5	Salvail, P.....	7, 21	Toutanji, H.....	12
Panda, B.....	7	Sanders, G.....	4, 7, 10	Trigwell, S.....	21
Paniagua, J.....	8, 12	Santiago-Maldonado, E.....	21	Trotti, G.....	4
Park, C.....	6	Sanzi, J.....	21	Trounce, A.....	18
Pass, J.....	8	Sarraf, D.....	20	Troutman, P.....	5
Patel, P.....	6	Schaefer, E.....	4	Tsai, C.-F.....	5
Patrick, C.....	15	Schreiber, J.....	10, 20	Turner, R.....	6, 11, 15
Patton, J.....	4	Schriener, T.....	13	Tuttle, J.....	6
Pauken, M.....	5, 6	Scott, J.....	11	Ummat, A.....	15
Paul, H.....	12	Sedmik, R.....	23	Valdez, T.....	15
Payne, K.....	21	Seifert, B.....	10	Van Dyke, M.....	19
Pearson, J.....	7, 8, 19	Selvam, R.....	19	van Susante, P.....	8, 19
Pecorella, W.....	19	Shaltens, R.....	10	Veflingstad, H.....	20
Pekker, L.....	5	Shannon, K.....	22	Vernon, S.....	4, 18
Penswick, L.....	10	Shelton, K.....	5	Volosin, J.....	14
Perez, J.....	6	Shen, F.....	5	Vondrak, R.....	19
Peri, F.....	4	Shen, W.....	11	Vopava, S.....	14
Perkins, J.....	9	Sherwood, B.....	8	Wang, J.....	20
Perry, J.....	18	Shih, W.....	5	Wang, M.....	5
Persinger, J.....	18	Shin, E.....	18	Wanis, S.....	8
Persons, D.....	4	Sholtis, J.....	16	Warren, J.....	3
Petrick, D.....	21	Sibille, L.....	14	Warren, L.....	21
Pickering, K.....	18	Silberg, R.....	5	Watkins, B.....	5
Pinheiro, M.....	17	Silk, E.....	12, 19	Watson, J.....	9
Pinto, F.....	4	Simon, T.....	4	Watson, M.....	15
Pinto, G.....	17	Simon, W.....	19	Wegeng, B.....	5
Plachta, D.....	17	Simpson, S.....	4	Wegeng, R.....	5, 7, 9, 11
Plesescu, F.....	10	Sims, B.....	4	Weisbin, C.....	5
Polk, J.....	4	Singh, M.....	18	Werner, J.....	8
Pomeroy, B.....	10	Sismonda, M.....	8	Wernsman, B.....	19
Pope, R.....	12	Smart, M.....	15	Wesenberg, R.....	7
Poston, D.....	7, 8, 13	Smith, A.....	11	Wessen, A.....	18
Potter, R.....	9	Smithers, G.....	12	Westheimer, D.....	16
Poulikakos, D.....	17	Spilker, T.....	12	White, H.....	4
Powell, J.....	8, 12	Spillantini, P.....	19	Wilcox, B.....	11
Prabhu, J.....	5	Stanford, M.....	18, 21	Wiley, R.....	12
Pretorius, S.....	8	Starkey, R.....	9	Williams, P.....	8, 11
Prockter, L.....	4	Stephenson, G.....	11	Willis, B.....	20
Puglia, F.....	15	Stewart, E.....	8	Wilson, K.....	10
Quinn, J.....	21	Straub, K.....	12	Wolf, D.....	12
Radli, K.....	21	Sucomel, C.....	4, 5, 23	Wood, J.....	10, 20
Ramirez, R.....	5	Suhkov, D.....	13	Woodcock, G.....	4
Rangedera, T.....	8	Sumrall, P.....	3	Woods, C.....	8
Rather, J.....	8	Supak, K.....	9	Woods, R.....	10
Reh, K.....	12	Surampudi, S.....	15	Woodward, J.....	10
Reid, R.....	8, 20	Suzuki, N.....	20	Woytach, J.....	20
Reuther, J.....	8	Swanson, T.....	3, 22	Wright, S.....	19, 23
Reyes, J.....	20	Tajmar, M.....	10, 22, 23	Xi, L.....	6
Rice, E.....	19	Takashima, N.....	16	Yano, M.....	9
Richard, J.....	11	Takehita, J.....	9	Yerkes, K.....	13, 19
Richardson, L.....	4	Talnagi, J.....	7	Yevoli, V.....	15
Rickman, D.....	14	Tanzman, T.....	4	Yildirim, S.....	20
Rilee, M.....	7	Tarau, C.....	20	Youchison, D.....	5
Ritzert, F.....	21	Taylor, C.....	12	Young, M.....	5
Roach, R.....	13	Taylor, L.....	5	Zacny, K.....	10
Robertson, G.....	10, 22	Tench, D.....	21	Zegler, F.....	6
Rogers, P.....	6	Terrile, R.....	18	Zuo, J.....	6
Rose, F.....	7	Thangavelautham, J.....	11		

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