

**SPACE TECHNOLOGY & APPLICATIONS
INTERNATIONAL FORUM (STAIF-2003)
February 2 - 5, 2003**

“Expanding the Frontiers of Space”

- CONFERENCE ON THERMOPHYSICS IN MICROGRAVITY
- CONFERENCE ON COMMERCIAL / CIVIL NEXT GENERATION SPACE TRANSPORTATION
- 20th SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION
- CONFERENCE ON HUMAN SPACE EXPLORATION
- 1st SYMPOSIUM ON SPACE COLONIZATION

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The Schreiber-Spence Space Achievement Award was established by The University of New Mexico's Institute for Space and Nuclear Power Studies to recognize contributions that have advanced capabilities in space technologies and applications through excellence in pioneering applications, technical contributions, public service, or leadership.

The award consists of a memento and a monetary award of \$2,500 (shared equally if there are multiple awardees who have contributed jointly). The award is given by the Institute when a worthy person (or persons contributing jointly) is identified by the Awards Committee. The award is not given more frequently than, nor necessarily, annually. The Award(s) will be presented at the STAIF-2003 Luncheon. The awardee(s) is expected to attend the STAIF Conference, at which the award is given, and to address the attendees on a relevant topic. The award honors Raemer E. Schreiber and Roderick W. Spence for their pioneering and technical contributions to concepts and designs for nuclear propulsion in space during their tenure at Los Alamos National Laboratory

NOMINATION: Nominations for the

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award can be submitted at any time to The University of New Mexico's Institute for Space and Nuclear Power Studies, c/o Schreiber-Spence Space Achievement Award, on the special nomination form. The final selection for the award will be made based on the criteria described in the award bylaws. A copy of the award bylaws and the nomination form can be obtained by writing to the Institute or by calling (505) 277-0446. Nominations will be retained for consideration for a three-year period.

SELECTION CRITERIA: Strict selection criteria have not been adopted, nor judged to be appropriate, except as they are implicit in the purposes for which the Award has been established and as noted in the first paragraph of these "Guidelines."

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1988 Roderick W. Spence	1994 Victor Ya. Poupko, Russia	
1990 Jerome Mullein	1995 Martin Marietta Astro Space	1999 NSTAR Team and SCARLET Team
1990 William E. Wright	RTG Team	2002 Robert L. Wiley
1991 Stanley V. Gunn	1996 SNAP-10A Team	2003 Robert L. Forward
1992 Harold B. Finger	1996 Gary L. Bennett	2003 Teledyne Transit/Nimbus/Pioneer/Viking/ RTG Team
1993 Robert T. Carpenter	1997 Wesley T. Huntress	
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MANUEL LUJAN, JR. STUDENT PAPER AWARD

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The Manuel Lujan Jr. Student Paper Award was established in 1987 by The University of New Mexico's Institute for Space and

Additionally, contributions are, or have been, substantial and specific, and contributions acknowledged to be worthy of unusual recognition for excellence by those actively engaged in the field of space technologies and applications.

NOMINATION FORM: To be considered by the Award Committee, all sections of the Nomination Form must be completed in compliance with the requirements. The Award Committee will place particular emphasis in its review of the nominations on evidence substantiating the excellence of the contributions noted in the citation and as contained in the basis for the nomination. Nominations can be submitted at any time on the Nomination Form to ISNPS.

Nuclear Power Studies to recognize outstanding contributions by students in the field addressed at all conferences and symposia of the Space Technology & Applications International Forum. Up to two awards could be granted at the forum, with each consisting of a certificate and \$500.00, shared equally if more than one awardee. The award is given by the Institute when worthy contributions are identified by the awards committee.

NOMINATION CRITERIA: Nominations for the award will be based on the quality of the paper published in the STAIF proceedings, as well as on the technical quality and originality of the oral presentation at the annual meeting. For a paper to be considered for the award, it must have the student as the lead author and he, she must have done the majority of the research.

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OUTSTANDING PAPER AWARD

AWARD COMMITTEE: The STAIF-2003 committee will be chaired by **William J. Dettmer**, Consultant. Other committee members include: **Samit Bhattacharyya**, Argonne National Laboratory, **Robert Cassanova**, USRA / NASA Institute for Advanced Concepts, **Timothy Barth**, NASA Kennedy Space Center; **William J. Dettmer**, Consultant; **Michael Duke**, Colorado School of Mines; **Melissa Van Dyke**, NASA Marshall Space Flight Center; **Rob Hoyt**, Tethers Unlimited; **Kent Joosten**, NASA Johnson Space Center; **Thomas Meyer**, University of Colorado; **R. Ponnappan**, AFRL/PRPG; **Dave Poston**, Los Alamos National Laboratory; **Joseph A. Sholtis, Jr.**, Sholtis Engineering & Safety Consulting; **Robert Singletery**, NASA Langley Research Center; **Theodore Swanson**, NASA Goddard Space Flight Center; **Brenda Ward**, NASA Johnson Space Center; and **Kevin Watson**, NASA Johnson Space Center.

The Space Nuclear Power and Propulsion Outstanding Paper Award was established in 1992 by The University of New Mexico's Institute for Space and Nuclear Power Studies (ISNPS) to recognize outstanding technical contributions to the fields of all hosted conferences and symposia of the Space Technology and Applications International Forum (STAIF). The recognition of an outstanding contribution is based upon the written paper published in the STAIF Proceedings and the content of the presentation at the meeting. The award is presented by ISNPS upon the recommendation of the STAIF Award Committees.

NOMINATION AND EVALUATION

PROCEDURE: Contributions from STAIF conferences could be nominated by the session chair and co-chair, or any member of that conference or symposia Outstanding Paper Award Subcommittee. Nomination forms will be given to the session chairs and co-chairs at the speakers' breakfast. Individuals who wish to have their contribution or a colleague's contribution considered may request that a member of the Outstanding Paper Award Committee attend the session in which the presentation will be made. The request must be made in writing to the ISNPS office or to the STAIF Outstanding Paper Award Committee Chair. For consideration, nominations must be received by the ISNPS office or Outstanding Paper Award Committee Chair by the 2nd Friday in February following the STAIF Conference.

NOMINATION AND EVALUATION

CRITERIA: The paper and the content of the presentation represents a technical contribution that (1) has an influential impact on the field of the topic of the conference or symposia in which it was presented, (2) has lasting technical value, and (3) is likely to be built upon and referenced by their peers. The primary emphasis in the selection of the award will be based on the written paper. In the case of a close decision, input from subcommittee members who heard the oral presentation and the session chair and co-chair may be used to render a final decision. The paper must be well written, well organized, and have appropriate references and acknowledgments. The paper must also present a complete and

scientifically sound analysis. The STAIF Outstanding Paper Award is presented for technical contributions. While overview and historical papers are important for the historical archives, they will not be considered for the award. The author(s) must be a major technical contributor to the work. The paper should also acknowledge all major technical contributors to the work who are not co-authors.

RECIPIENTS OF 2002 AWARD

- (a) **The recipients of the STAIF-2002 award in the Conference on Thermophysics in Microgravity** are W. Biter, Sung Oh, Stephen Hess (Sensortex Inc) for their paper, entitled: *“Electrostatic Switched Radiator for Space Based Thermal Control.”*
- (b) **The recipients of the STAIF-2002 award in the Conference on Innovative Transportation for Exploration of the Solar System and Beyond** are Wayne A. Wong (NASA Glenn Research Center) and Charles H. Castle (Analex Corporation) for

their paper, entitled: *“High Temperature Solar Vacuum Testing of Sapphire Refractive Secondary Concentrator.”*

(c) **The recipient of the STAIF-2002 award in the Conference on Commercial/Civil Next Generation Space Transportation** is Eric J. Shaw (NASA Marshall Space Flight Center) for his paper, entitled: *“Economic Principles of Launcher Design.”*

(d) **The recipients of the STAIF-2002 award in the 19th Symposium on Space Nuclear Power and Propulsion** are Yale Chang, Lawrence W. Hunter, David K. Han, Michael E. Thomas, Russell P. Cain, Andrew M. Lennon (John Hopkins University) for their paper, entitled: *“Solid Rocket Motor Fire Tests: Phases 1 and 2;”* and K. E. Gray (Argonne National Laboratory) for his paper *“The Phenomenology of High-Temperature Superconductive Materials.”*

GENERAL ERNEST C. HARDIN SCHOLARSHIP AWARD

This scholarship fund was established in 1986 by The University of New Mexico's Institute for Space and Nuclear Power Studies to recognize outstanding undergraduate and graduate students in engineering and science disciplines with emphasis on space science and technology and related fields. Several awards are offered annually to deserving freshmen and undergraduate students. In addition, awards consist of a certificate of recognition and a monetary sum of \$500 per year, for up to four years. The graduate student award has a monetary value of \$14,000-\$16,000 per year and tuition waivers and health insurance for up to three years.

OUTREACH ACTIVITIES / SECONDARY SCHOOL SPECIAL SESSION

EDUCATION OUTREACH ADVISORY BOARD MEMBERS

Irene El-Genk, Chair, West Mesa High School; **Mohamed S. El-Genk**, UNM-ISNPS; **Steven Hatton**, UNM-ISNPS; **Dan Humphreys**, Public Academy for Performing Arts; **Jeffrey King**, UNM-ISNPS; **Joan Newsom**, Wilson Middle School; and **Susan Ostlie**, Madison Middle School. These sessions are organized by The University of New Mexico's Institute for Space and Nuclear Power Studies and cosponsored by the New Mexico Space Grant Consortium Program at UNM and NASA National Space Grant Colleges and Fellowship Program. Special session activities are coordinated by **Irene El-Genk**, West Mesa High School, Albuquerque, NM, who is a member of the Education and Outreach Advisory Board (EOAB), at the Institute for Space and Nuclear Power Studies. Secondary school science students and teachers from New Mexico who participated in the Space Design Competition are invited to attend and participate in this session to be

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held Monday, February 3, 2003, from 8:00am - 12:00 noon. Space-related topics will be presented by members of the science and engineering community. The Space Design Competition problem is "Asteroid Apocalypse ." The Design Competition judging will take place at this special session. Winners will receive prizes at the STAIF-2003 luncheon, held Monday, February 4. The Space Design Competition is coordinated by **Mr. Jeff King**, UNM-ISONPS.

PUBLICATIONS

Available from the American Institute of Physics, c/o Springer-Verlag New York, Customer Service, 1-800-777-4643, or e-mail orders@springer-ny.com, or mail to Springer-Verlag, P. O. Box 2485, Secaucus, NJ 07096-2485, USA (For North America, add \$4.00 for shipping and handling for the first volume, plus \$1.00 for each additional volume. For orders outside of North America, add \$10.00 for first volume and \$5.00 for each additional volume.)

Proc. Space Technology and Applications International Forum (**STAIF-2003**): Conf. on Thermophysics in Microgravity; Conf. on Commercial/Civil Next Generation Space Transportation; 20th Symp. on Space Nuclear Power and Propulsion; Conf. on Human Space Exploration; 1st Symp. on Space Colonization
AIP Conf. Proceedings 654, (1-vol. hardcover book), ISBN 0-7354-0114-4.....\$280.00
CD-ROM Version, ISBN 0-7354-0115-2\$140.00

Proc. Space Technology and Applications International Forum (**STAIF-2002**): Conf. on Thermophysics in Microgravity; Conf. on Innovative Transportation Systems for Exploration of the Solar System and Beyond; 19th Symp. on Space Nuclear Power and Propulsion; Conf. on Commercial/Civil Next Generation Space Transportation
AIP Conf. Proceedings 608, (1-vol. hardcover book), ISBN 0-7354-0052-0.....\$295.00
CD-ROM Version, ISBN 0-7354-0053-9\$150.00

Proc. Space Technology and Applications International Forum (**STAIF-2001**): Space Exploration Technology Conf.; Conf. on Thermophysics in Microgravity; Conf. on Innovative Transportation Systems for Exploration of the Solar System and Beyond; Conf. on Commercial/Civil Next Generation Space Transportation; 18th Symposium on Space Nuclear Power and Propulsion; Space Radiation and Environments Effects Track,
AIP Conf. Proceedings 552, (1-vol. hardcover book), ISBN 1-56396-980-7.....\$280.00
CD-ROM Version, ISBN 1-56396-981-5\$150.00

Proc. Space Technology and Applications International Forum (**STAIF-2000**): Conf. on International Space Station Utilization; Conf. on Thermophysics in Microgravity; Conf. on Enabling Technology and Required Scientific Developments for Interstellar Missions; Conf. on Commercial/Civil Next Generation Space Transportation; 17th Symposium on Space Nuclear Power and Propulsion (2000)
AIP Conf. Proceedings 504, (2-vol. hardcover set), ISBN 1-56396-919-X\$300.00
CD-ROM Version, ISBN 1-56396-920-3\$200.00

Proc. Space Technology and Applications International Forum (**STAIF-99**): Conf. on International Space Station Utilization; Conf. on Global Virtual Presence; Conf. on Applications of Thermophysics in Microgravity and Breakthrough Physics; Conf. on Next Generation Launch Systems; 16th Symposium on Space Nuclear Power and Propulsion (1999),
AIP Conf. Proceedings 458, (2-vol. hardcover set), ISBN 1-56396-846-0\$300.00
CD-ROM Version, ISBN 1-56396-879-7\$200.00

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Proc. Space Technology and Applications International Forum (**STAIF-98**): 1st Conf. on Global Virtual Presence; 1st Conf. on Orbital Transfer Vehicles; 2nd Conf. on Applications of Thermophysics in Microgravity; 3rd Conf. on Commercial Development of Space; 3rd Conf. on Next Generation Launch Systems; and 15th Symposium on Space Nuclear Power and Propulsion (1998)
AIP Conf. Proceedings 420 (3-vol. hardcover set), ISBN 1-56396-747-2\$320.00

Proc. 12th Symposium on Space Nuclear Power & Propulsion, Conf. on Alternative Power from Space, and Conf. on Accelerator-Driven Transmutation Technologies and Applications (**1995**)
AIP Conf. Proceedings 324 (2-vol. hardcover set), ISBN 1-56396-427-9\$225.00

Proc. 1st Conf. on NASA Centers for Commercial Development of Space (1-vol. hardcover book),
ISBN 1-56396-431-7, AIP Conf. Proceedings 325\$125.00

A Critical Review of Space Nuclear Power & Propulsion (**1984-1993**) (Anniversary Issue), AIP Press, ISBN 1-56396-317-5.....\$ 75.00

Proceedings of the 10th Symposium (**1993**) (3-vol. hardcover set), ISBN 1-56396-137-7,
AIP Conf. Proceedings 271\$275.00

Proceedings of the 9th Symposium (**1992**) (3-vol. hardcover set), ISBN 1-56396-027-3,
AIP Conf. Proceedings 246\$225.00

Proceedings of the 8th Symposium (**1991**) (3-vol. hardcover set), ISBN 0-88318-838-4,
AIP Conf. Proceedings 217\$175.00

Please note that AIP Conf. Proceedings Volume 301 (Space Nuclear Power and Propulsion-**1994**), Volume 361 (**STAIF-1996**), and Volume 387 (STAIF-1997) are out of print.

Available from UNM's Institute for Space and Nuclear Power Studies (Add \$10 for shipping and handling within the U.S., \$25 outside the U.S.)
Transactions of the 2nd - 5th Symposia (1985 - 1989) \$10.00 (each)
Transactions of the 6th Symposium (1989)\$15.00

Publications available from Orbit Book Company, P. O. Box 9542, Melbourne, FL 32902-9542, Phone: (407) 724-9542
Space Nuclear Power Systems (1984-1989) set\$500.00

HOTEL ACCOMMODATIONS

HYATT REGENCY HOTEL

Guest rooms have been reserved at the Hyatt Regency Albuquerque, located in downtown Albuquerque, NM, for those who identify themselves as participants of STAIF-2003. The rates are:

ROOM RATES

Single Occupancy \$104.00	Triple Occupancy \$104.00
Double Occupancy \$104.00	Quadruple Occupancy \$104.00

ATTENDEES ARE RESPONSIBLE FOR MAKING THEIR OWN RESERVATIONS DIRECTLY WITH THE HOTEL.

Hyatt Regency Albuquerque, 330 Tijeras, NW, Albuquerque, NM 87102
(505) 842-1234, Fax: (505) 766-6710, Toll Free Reservations: 1-800-233-1234

All group-rate reservation requests must be received by the hotel no later than JANUARY 12, 2003. Attendees must identify themselves as participants of STAIF-

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2003, otherwise, the hotel will not be able to ensure the quoted group rate or guest room availability. Rates will not be changed at check-in or check-out for attendees who fail to identify their affiliation with this meeting. Guests arriving after 4:00 p.m. must guarantee their reservation with a credit card or one night's deposit; otherwise, the room will automatically be released after 4:00 p.m. Check-in time is 3:00 p.m. and Check-out is 12:00 noon.

REGISTRATION AND FEES

	<i>Albuquerque Hyatt Regency Hotel, 2nd Floor</i>	
Registration:	Sunday, February 2,	4:30 pm - 7:30 pm
	Monday, February 3,	7:00 am - 4:30 pm
	Tuesday, February 4,	7:00 am - 4:30pm
	Wednesday, February 5,	7:30am - 2:30pm

ALL ATTENDEES AND EXHIBITORS MUST REGISTER AND PAY A

REGISTRATION FEE: Cash, corporate or personal checks, Visa and MasterCard will be accepted. Payment by a personal or corporate check should be made payable to: INSTITUTE FOR SPACE AND NUCLEAR POWER STUDIES, STAIF-2003 Conferences, Farris Engineering Center, MSC01-1120, Room 239, The University of New Mexico, Albuquerque, NM 87131-1341, (505) 277-2813 or (505) 277-0446.

	<u>Early</u>	<u>Late</u>
	(postmarked on or before 1/20/ 2003)	(postmarked after 1/ 20/ 2003)
OPEN TECHNICAL MEETING(a)	\$465.00	\$495.00
ONE DAY REGISTRATION (b)	\$320.00	\$360.00
STUDENT (WITH PROCEEDINGS) (c)	\$140.00	\$170.00
ADDITIONAL LUNCHEON TICKET(d)	\$25.00	\$25.00

(a) Open Technical Meeting Full Registration Fee: Includes Sessions, Monday Luncheon, daily coffee breaks, and a set of Proceedings on CD-ROM.

(b) One-Day Registration: Includes Technical Sessions, coffee breaks and a set of Proceedings on CD ROM. (Luncheon tickets are not included, but are available for purchase).

(c) Student Registration: TO QUALIFY, INDIVIDUALS MUST SHOW PROOF OF FULL TIME ENROLLMENT for the 2003 Spring Semester. Pre-registrants should enclose a copy of their 2003 spring schedules. Registration fee includes a set of Proceedings on CD ROM and coffee breaks. (Luncheon tickets are not included, but are available for purchase.)

(d) Additional luncheon tickets can be purchased on-site if available, although pre-purchasing luncheon tickets is encouraged to help provide accurate numbers to the caterer.

CANCELLATIONS AND REFUNDS

Those unable to attend the conferences may receive a refund of their registration fee (less a 20% processing charge) by calling the Institute office at (505) 277-0446 or by email at: isnps@unm.edu no later than January 20, 2003. NO REFUNDS WILL BE ISSUED after JANUARY 20, 2003. All refunds will be made promptly by mail.

LUNCHEON

One luncheon ticket will be included with each full registration. Additional tickets must be purchased in advance. Please be certain that you and each of your guests have registered. All guests must check in at registration to receive their name badge and luncheon tickets. Guest luncheon tickets will **not** be included in the host's registration packet.

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LUNCHEON: MONDAY, February 3, 2003, 12:00 pm - 1:30 pm, Grand Pavilion, Albuquerque Hyatt Regency Hotel.

CHAIRS' AND SPEAKERS' BREAKFAST

All STAIF-2003 speakers and session chairs are requested to attend the hosted Speakers' Breakfast on the day of their session or presentation to discuss the session arrangements and guidelines. A Speakers' Preparation Room will be available Tuesday and Wednesday.

AUDIO / VISUAL EQUIPMENT

One overhead projector, one LCD Data Projector, and one screen will be provided at all sessions. A slide projector will also be provided on request without charge. Additional A/V equipment must be ordered through Institute personnel, in advance, and paid for by the author. Please call (505) 277-0446 with special requests. Attendees must provide their own laptop computers.

COMMITTEE MEETINGS

STEERING AND EXECUTIVE COMMITTEE

MONDAY, February 3, 6:00 pm – 7:30 pm, Boardroom East.

TECHNICAL PROGRAM COMMITTEES

TUESDAY, February 4, 12:30 pm - 1:30 pm

(All Session Chairs and Co-Chairs are committee members. Lunch is available for purchase)
Conf. on Thermophysics in Microgravity, Fiesta III and IV; Conf. on Commercial, Civil Next Generation Space Transportation, Fiesta I and II; 20th Symposium on Space Nuclear Power and Propulsion, Enchantment A & B, Conf. on Human Space Exploration, Enchantment E& F, 1st Symposium on Space Colonization, Enchantment C& D

EXECUTIVE PROGRAM COMMITTEE

WEDNESDAY, February 5, 12:30 pm - 1:30 pm, Boardroom North

PROGRAM ACTIVITIES

Albuquerque Hyatt Regency Hotel

SUNDAY, February 2, 2003

4:30 pm - 7:30 pm **Registration, 2nd Floor**

MONDAY, February 3, 2003

7:00 am - 7:45 a.m. **Speakers' Breakfast - Enchantment Ballroom**
7:00 am - 4:30 pm **Registration, 2nd Floor**
7:30 am - 8:00 am **Secondary School Special Session Registration, Fiesta Ballroom**
8:00 am - 8:30 am **Welcome and Opening Remarks, Grand Pavilion**
8:00 am - 12:00 pm **Secondary School Special Session, Fiesta Ballroom**
8:30 am - 10:00 am **Plenary Session I, Grand Pavilion**
10:00 am - 10:30 am **Coffee Break – Prefunction Area (Co-sponsored by Lockheed Martin)**
10:30 am - 12:00 pm **Plenary Session II, Enchantment Ballroom**
12:00 pm - 1:30 pm **Awards Luncheon - Grand Pavilion**
1:30 pm - 3:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)
3:30 pm - 4:00 pm **Coffee Break – Grand Pavilion (Co-sponsored by Lockheed Martin)**
4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)

STAIF-2003 Final Program

6:00 pm - 7:30 pm **Joint Steering and Executive Committee Meeting**, Boardroom East

TUESDAY, February 4, 2003

7:00 am - 7:45 a.m. **Speakers' Breakfast – Grand Pavilion**

7:00 am - 4:30 pm **Registration**, 2nd Floor

8:00 am - 10:00 am **Technical Sessions** (see table of contents or centerfold for time and room)

10:00 am - 10:30 am **Coffee Break – Prefunction Area**

10:30 am - 12:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)

12:30 pm - 1:30 pm **Lunch Break**

12:30 pm - 1:30 pm **STAIF Technical Program Committee Meetings**

Conf. on Thermophysics in Microgravity, Fiesta III and IV

Conf. on Commercial, Civil Next Generation, Fiesta I and II

20th Symposium on Space Nuclear Power and Propulsion, Enchantment A & B

Conf. on Human Space Exploration, Enchantment E and F

1st Symposium on Space Colonization, Enchantment C and D

1:30 pm - 3:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)

3:30 pm - 4:00 pm **Coffee Break – Grand Pavilion**

4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)

6:00 pm - 7:00 pm **Science Fiction: Where Space and Literature Collide**, Grand Pavilion

8:00 pm - 9:30 pm **Town Hall Meeting on NASA's Nuclear Systems Program**, Grand Pavilion

WEDNESDAY, February 5, 2003

7:00 am - 7:45 am **Speakers' Breakfast - Grand Pavilion**

7:30 am - 2:30 pm **Registration**, 2nd Floor

8:00 am - 10:00 am **Technical Sessions** (see table of contents or centerfold for time and room)

10:00 am - 10:30 am **Coffee Break – Prefunction Area**

10:30 am - 12:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)

12:30 pm - 1:30 pm **Lunch Break**

12:30 pm - 1:30 pm **Executive Committee Meeting**, Boardroom North

1:30 pm - 3:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)

3:30 pm - 3:45 pm **Coffee Break – Prefunction Area**

3:45 pm - 5:45 pm **Technical Sessions** (see table of contents or centerfold for time and room)

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WELCOMING AND OPENING REMARKS

Monday, February 3, 8:00 am - 8:30 am, Grand Pavilion

Michael J. Sander, STAIF General Chair, Jet Propulsion Laboratory

Bonnie J. Dunbar, STAIF General Co-Chair, NASA Johnson Space Center

F. Chris Garcia, President, University of New Mexico

Joseph L. Cecchi, Dean, School of Engineering, University of New Mexico

Plenary Session I: Expanding the Frontiers of Space

Monday, February 3, 8:30 am – 10:00 am, Grand Pavilion

Michael J. Sander, Chair

Mars Science Laboratory,

Project Manager

Jet Propulsion Laboratory

Bonnie J. Dunbar, Co-Chair

Assistant Director, University Research

and Affairs

NASA Johnson Space Center

Gary Martin, Space Architect, NASA Headquarters

Barbara Wilson, Chief Technologist, Air Force Research Laboratory

Plenary Session II: Nuclear Space Power and Propulsion: A Safe and Enabling Technology

Monday, February 3, 10:30 am - 12:00 pm, Enchantment Ballroom

Earl Wahlquist, Chair

Associate Director

Space and Defense Power Systems

DOE Headquarters

Robert Sackheim, Co-Chair

NASA Marshall Space Flight Center

Huntsville, AL

Ray Taylor, Senior Manager for Nuclear Systems Initiative, NASA Headquarters

Earl Wahlquist, Associate Director of Space and Defense Power Systems, DOE

Headquarters

James Crocker, Vice President of Flight Systems, Lockheed Martin Astronautics

OUTREACH ACTIVITIES

SECONDARY SCHOOL SPECIAL SESSION

Monday, February 3, 8:00 am - 12:00 pm, Fiesta Room

Irene L. El-Genk, Chair

West Mesa High School

Albuquerque, NM

Jeff King, Co-Chair

UNM-Institute for Space and Nuclear

Power Studies

Albuquerque, NM

Welcome, Irene El-Genk, West Mesa High School, Albuquerque, NM

Judging of the Secondary School Space Design Competition

Jeffrey C. King, UNM-ISNPS, Albuquerque, NM

View STAIF-2003 Exhibits

Invited Speaker

TECHNICAL SESSIONS

MONDAY, FEBRUARY 3, 2003

[C01] ADVANCED CONCEPTS

Monday, February 3, 2003, 1:30-3:30 pm - Enchantment Ballroom A and B

George H. Miley, Co-Chair
University of Illinois
Urbana, IL USA

Geoffrey A. Landis, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

- 1:30 pm - A Nuclear-Powered Laser-Accelerated Plasma Propulsion System**
Terry Kammash, University of Michigan, Ann Arbor, MI
- 2:00 pm - Fusion Ship II- A Fast Manned Interplanetary Space Vehicle Using Inertial Electrostatic Fusion**
R.L. Burton, N. Richardson, Y. Shaban, G.H. Miley, University of Illinois, Urbana, IL; H. Momota and G.H. Miley, NPL Associates, Inc., Champaign, IL
- 2:30 pm - Ion Dynamic Capture Experiments with the High Performance Antiproton Trap (HiPAT)**
James Martin, Suman Chakrabarti, William H Sims, J Boise Pearson, NASA Marshall Space Flight Center, Huntsville, AL; Raymond Lewis, R. Lewis Company, Huntsville, AL; and Wallace E Fant, Cortez III, Huntsville, AL
- 3:00 pm - On the Performance Prediction and Scale Modelling of a Motorised Momentum Exchange Propulsion Tether**
Matthew P. Cartmell and David S. Neill, University of Glasgow, Glasgow, Scotland; Spencer W. Ziegler, UMIST, Manchester, England

[E01] SPACE TOURISM - I

Monday, February 3, 2003, 1:30-3:30 pm - Enchantment Ballroom C and D

Larry Ortega, Co-Chair
Spaceflight Unlimited
Bellevue, NE USA

Eric Rice, Co-Chair
Orbital Technologies Corporation (ORBITEC)
Madison, WI USA

- 1:30 pm - Survey on the History of Space Tourism**
Larry Ortega, Spaceflight Unlimited, Bellevue, NE
- 2:00 pm - Benefit Estimation Model for Tourist Spaceflights**
Robert A. Goehlich, Technical University Berlin, Berlin, Germany
- 2:30 pm - DARPA, Space Tourism and RASCAL**
Preston Carter, DARPA Tactical Technology Office, Arlington, VA
- 3:00 pm - Panel Discussion with Guest Speaker**

[CD1] FISSION PROPULSION SYSTEMS FOR HUMAN MISSIONS-I

Monday, February 3, 2003, 1:30-3:30 pm - Enchantment Ballroom E and F

Pat Troutman, Co-Chair
NASA Langley Research Center
Hampton, VA USA

Stanley K. Borowski, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

- 1:30 pm - Revolutionary Concepts for Human Outer Planet Exploration (HOPE)**
Patrick A. Troutman, Fred Stillwagen, NASA Langley Research Center, Hampton, VA; Kristen Bethke, Princeton University, Princeton, NJ; Darrell L. Caldwell, Jr., Shawn A. Krizan, Analytical Mechanics Associates, Inc., Hampton, VA; Ram Manvi, Jet Propulsion Laboratory, Pasadena, CA; Chris Strickland, Swales Aerospace, Hampton, VA

2:00 pm - "Bimodal" Nuclear Thermal Rocket (BNTR) Propulsion for Artificial Gravity HOPE Mission to Callisto

Stanley K. Borowski, Melissa L. McGuire, Lee M. Mason, NASA Glenn Research Center, Cleveland, OH; James H. Gilland, Ohio Aerospace Institute, Cleveland, OH; Thomas W. Packard, Analax Corporation, Cleveland, OH

2:30 pm - Bimodal Nuclear Electric Propulsion for Human Missions to the Solar System

L. Dudzinski, S. Borowski, and M. McGuire, NASA Glenn Research Center, Cleveland, OH

3:00 pm - High Power MPD Nuclear Electric Propulsion (NEP) for Artificial Gravity HOPE Missions to Callisto

Melissa L. McGuire, Stanley K. Borowski, Lee M. Mason, NASA Glenn Research Center, Cleveland, OH; James Gilland, Ohio Aerospace Institute, Cleveland, OH

[D01] IN-SPACE HABITATS AND SUPPORTABILITY

Monday, February 3, 2003, 1:30-3:30 pm - Fiesta Ballroom I and II

J. Kevin Watson, Chair
NASA Johnson Space Center
Houston, TX USA

Anthony D'Annunzio, Co-Chair
Naval Air Warfare Center
Lakehurst, NJ USA

- 1:30 pm - The International Space Station Habitat**
Patricia Mendoza Watson and Mike Engle, NASA Johnson Space Center, Houston, TX
- 2:00 pm - Lessons Learned in Maintenance of the International Space Station**
William W. Robbins, Jr., NASA Johnson Space Center, Houston, TX
- 2:30 pm - Machining in Microgravity**
Graylan Vincent, University of Washington, Seattle, WA
- 3:00 pm - Panel Discussion**

[A01] FUNDAMENTALS OF TWO-PHASE FLOW AND HEAT TRANSFER IN MICROGRAVITY

Monday, February 3, 2003, 1:30-3:30 pm - Fiesta Ballroom III and IV

Frederick R. Best, Co-Chair
Texas A&M University
College Station, TX USA

A.A.M. Delil, Co-Chair
National Aerospace Laboratory NLR
Emmeloord, The Netherlands

- 1:30 pm - Tutorial on Quantification of Differences between Single- and Two-Component Two-Phase Flow and Heat Transfer**
A.A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands
- 2:30 pm - Electric Field Effect on Bubble Detachment in Variable Gravity Environment**
Estelle Iacona, The Johns Hopkins University, Baltimore, MD; and Laboratoire EM2C du CNRS et de l'Ecole Centrale Paris, Chatenay-Malabry, France; Cila Herman and Shinan Chang, The Johns Hopkins University, Baltimore, MD
- 3:00 pm - Superluminal Signals**
A.A. Stahlhofen, University of Koblenz, Koblenz, Germany

[B01] COST ANALYSIS TUTORIAL

Monday, February 3, 2003, 1:30-3:30 pm - Boardroom East

- Eric J. Shaw, Chair**
NASA Marshall Space Flight Center, Huntsville, AL USA
- 1:30 pm - Space Transportation Economic Analysis Tutorial**
Eric Shaw, NASA Marshall Space Flight Center, Huntsville, AL

[C02] FISSION PROPULSION SYSTEMS FOR SCIENCE MISSIONS

Monday, February 3, 2003, 4:00-6:00 pm - Enchantment Ballroom A and B

Leonard A. Dudzinski, Co-Chair
NASA Headquarters
Washington DC, WA USA

Michael G. Houts, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

4:00 pm - Nuclear Propulsion Requirements for Science Missions

L. Dudzinski and S. Borowski, NASA Glenn Research Center, Cleveland, OH

4:30 pm - MITEE-B: A Compact Ultra Lightweight Bi-Modal Nuclear Propulsion Engine for Robotic Planetary Science Missions

James Powell, George Maise, and John Paniagua, Plus Ultra Technologies, Inc., Shoreham, NY; Stanley Borowski, NASA Glenn Research Center, Cleveland, OH

5:00 pm - Design and Development of the MITEE-B Bi-Modal Nuclear Propulsion Engine

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

5:30 pm - Application of the MITEE Nuclear Ramjet for Ultra Long Range Flyer Missions in the Atmospheres of Jupiter and the Outer Gas Giants

G. Maise, J. Powell, & J. Paniagua, Plus Ultra Technologies, Inc., Stony Brook, NY

[E02] SPACE TOURISM - II

Monday, February 3, 2003, 4:00-6:00 pm - Enchantment Ballroom C and D

Larry Ortega, Co-Chair
Spaceflight Unlimited
Bellevue, NE USA

Eric Rice, Co-Chair
Orbital Technologies Corporation (ORBITEC)
Madison, WI USA

4:00 pm - Business Context of Space Tourism

Harrison H. Schmitt, University of Wisconsin-Madison, Albuquerque, NM

4:30 pm - The Pioneer Rocketplane XP Aircraft

Mitchell Burnside Clapp, Pioneer Rocketplane, Solvang, CA

5:00 pm - Space Hotels

Chuck Lauer

5:30 pm - Space Stations For Dummies, Part I: Accounting For Space

Christopher Lee Martens, Mutual Space, Ltd., Crestline, CA

[C03] THERMOPHOTOVOLTAIC TECHNOLOGY AND APPLICATIONS

Monday, February 3, 2003, 4:00-6:00 pm - Enchantment Ballroom E and F

Susan Murray, Co-Chair
Emcore Photovoltaics
Albuquerque, NM USA

Edward Brown, Co-Chair
Knolls Atomic Power Laboratory
Niskayuna, NY USA

4:00 pm - The Status of Thermophotovoltaic Energy Conversion Technology at Lockheed Martin Corp.

E.J. Brown, P.F. Baldasaro, S.R. Burger, L.R. Danielson, D.M. DePoy, G.J. Nichols, W.F. Topper, Lockheed Martin Corp., Niskayuna, NY

4:30 pm - 20% Efficient InGaAs, InPAs Thermophotovoltaic Cells

S.L. Murray, C.S. Murray and F.D. Newman, Emcore Photovoltaics, Albuquerque, NM; R.R. Stiergiej, B. Wernsman, & S.A. Derry, Bechtel Bettis Inc., West Mifflin, PA

5:00 pm - Improved Thermophotovoltaic (TPV) Performance Using Dielectric Photon Concentrations (DPC)

P.F. Baldasaro and P.M. Fourspring, Lockheed Martin Corp., Niskayuna, NY

5:30 pm - Radioisotopic Powered Thermophotovoltaic Energy Systems

D.M. DePoy, E.J. Brown, P.F. Baldasaro, L.P. Rice, Lockheed Martin Corp., Niskayuna, NY

[D02] SCIENCE AND TECHNOLOGY OF EXPLORATION - HUMANS, MACHINES, AND HABITATS

Monday, February 3, 2003, 4:00-6:00 pm - Fiesta Ballroom I and II

Kent Joosten, Co-Chair
NASA Johnson Space Center
Houston, TX USA

Thomas Meyer, Co-Chair
University of Colorado
Boulder, CO USA

4:00 pm - Robots and Humans: Synergy in Planetary Exploration

Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH

4:30 pm - Novel Amine-Functional Membrane for Metabolic CO2 Removal from Spacesuit Breathing Loop

Chung-Yi A. Tsai and Xia Tang, United Technologies Research Center, East Hartford, CT; Ipek Guray, Worcester Polytechnic Institute, Worcester, MA; Tim Nalette and Catherine Thibaud-Erkey, Hamilton Sundstrand Space Systems International, Windsor Locks, CT; C. Jeffrey Brinker, Sandia National Laboratories and The University of New Mexico, Albuquerque, NM; George Xomerita, The University of New Mexico, Albuquerque, NM

5:00 pm - Because it is Hard: The Crucible of Space as a Source of Innovation

Michael D. White, Blank Rome Comisky & McCauley LLP, Washington, DC

5:30 pm - Panel Discussion

[A02] THERMAL CONTROL TECHNOLOGIES FOR FUTURE SPACECRAFT

Monday, February 3, 2003, 4:00-6:00 pm - Fiesta Ballroom III and IV

Rengasamy Ponnappan, Co-Chair
Air Force Research Laboratory
Wright-Patterson AFB, OH USA

Jeffrey R. Didion, Co-Chair
NASA Goddard Space Flight Center
Greenbelt, MD USA

4:00 pm - Solar Selective Coatings for High Temperature Applications

Donald A. Jaworske, NASA Glenn Research Center, Cleveland, OH; Dean A. Shumway, Brigham Young University-Idaho, Rexburg, ID

4:30 pm - Sorption Heat Pipe - A New Thermal Control Device for Space Applications

Leonard L. Vasiliev, Leonid L. Vasiliev, Luikov Heat and Mass Transfer Institute, Minsk, Belarus

5:00 pm - Comparison Between Acetone and Ammonia on the Thermal Performance of a Small-Scale Capillary Pumped Two-Phase Loop

Roger R. Riehl, Edson Bazzo, Federal University of Santa Catarina, Florianopolis, Santa Catarina, Brazil

5:30 pm - Development Status of the Mechanically Pumped Two-Phase CO2 Cooling Loop for the AMS-2 TTCS

A.A.M. Delil, A.A. Woering, National Aerospace Laboratory NLR, Emmeloord, The Netherlands; B. Verlaet, National Institute for Nuclear Physics and High Energy Physics NIKHEF, Amsterdam, The Netherlands

[B02] MARKET AND FINANCE

Monday, February 3, 2003, 4:00-6:00 pm - Grand Pavilion Ballroom I

Joerg Kreisel, Co-Chair
Joerg Kreisel International Consultant
Aachen, Germany

Frank A. Dibello, Co-Chair
SpaceVest
Reston, VA USA

4:00 pm - A Market 2 Come: On-Orbit Servicing of Satellites

Joerg Kreisel, Joerg Kreisel International Consultant

4:30 pm - Space Technology and Intellectual Property: Funding Exploration Through Technology Commercialization

William N. Hulsey III, Hughes & Luce, LLP, Austin, TX

5:00 pm - Evolving Markets for Commercial, Civil, and Military Services

Marshall H. Kaplan, Strategic Insight, Ltd., Rockville, MD

5:30 pm - Panel Discussion

[C04] SPECIAL SESSION: VOYAGER REVISITED

Monday, February 3, 2003, 4:00-6:00 pm - Grand Pavilion Ballroom II and III

Gary L. Bennett, Chair

Metaspaces Enterprise, Emmett, ID USA

4:00 pm - Voyager's Grand Tour of the Outer Planets: A 25-Year Celebration

Charles Kohlhasse, Jet Propulsion Laboratory, Pasadena, CA

4:30 pm - Overview Lincoln Experimental Satellite (LES) 8, 9 Missions

Donald C. MacLellan, MIT Lincoln Laboratory, Lexington, MA

5:00 pm - MHW-RTG (Multi-Hundred Watt Radioisotope Thermoelectric Generator)

Lawrence E DeFillipo, Lockheed Martin Corp., King of Prussia, PA

5:30 pm - Panel Discussion

TUESDAY, FEBRUARY 4, 2003

[C05] MISSION / SYSTEMS SAFETY AND RELIABILITY

Tuesday, February 4, 2003, 8:00-10:00 am - Enchantment Ballroom A and B

Joseph A. Sholtis, Co-Chair

Sholtis Engineering & Safety Consulting

Tijeras, NM USA

Lyle L. Rutger, Co-Chair

US Department of Energy

Germantown, MD USA

8:00 am - Solid Rocket Propellant Fire Characterization Test Results

L.W. Hunter, Y. Chang, M.E. Thomas, A.M. Lennon, H.N. Oguz, J.T. Wilkerson, S.C. Walts, R.P. Cain, C.A. Mitchell, D.W. Blodgett, D.H. Terry, and B.G. Carkhuff (all authors at JHU, APL)

8:30 am - A Method for the Analysis of Impact Events Involving Nested Safety Systems

James R. Coleman, Consulting, Sevierville, TN

9:00 am - A Brief Discussion of Uncertainty as It Relates to Space Nuclear Safety Analyses

James R. Coleman, Consulting, Sevierville, TN

9:30 am - Nuclear Systems Initiative: Implementing a Managed Approach to Risk Communication

Victoria P. Friedensen, NASA Headquarters, Washington, D.C.; Sandra L. Dawson, NASA Jet Propulsion Lab, Pasadena, CA

[E03] SPACE COLONIZATION - GOVERNMENTAL, POLITICAL, LEGAL AND OTHER ISSUES

Tuesday, February 4, 2003, 8:00-10:00 am - Enchantment Ballroom C and D

Eligar Sadeh, Co-Chair

University of North Dakota

Grand Forks, ND USA

Thomas Meyer, Co-Chair

University of Colorado

Boulder, CO USA

8:00 am - Human Mission from Planet Earth: Technology Assessment and Social Forecasting the Future of

Eligar Sadeh, University of North Dakota, Grand Forks, ND

8:30 am - Energy Policy for Habitation and Terraforming Mars

Thomas Meyer, University of Colorado, Boulder, CO

9:00 am - The International Space Development Authority

Declan J. O'Donnell, United Societies in Space, Inc., Castle Rock, CO

9:30 am - A System Design for a Compact, Renewable and Energy Efficient, Oxygen, Waste Recycle and Food Supply for Manned Travel to Mars

George F. Erickson, Nanotube Engineering, Los Alamos, NM

[C06] FUELS AND ADVANCED MATERIALS

Tuesday, February 4, 2003, 8:00-10:00 am - Enchantment Ballroom E and F

Samit Bhattacharyya, Co-Chair

Argonne National Laboratory

Argonne, IL USA

Samim Anghaie, Co-Chair

University of Florida

Gainesville, FL USA

8:00 am - High Temperature Cermet Fuels – A Promising Candidate for Space Reactors

S.K. Bhattacharyya, Argonne National Laboratory, Argonne, IL

8:30 am - Review of the Historical Capabilities and Testing of Composite and Cermet Fuels in Los Alamos

Robert J. Hanrahan, Jr., Robert L. Smith III, Jason Morgan, Los Alamos National Laboratory, Los Alamos, NM

9:00 am - An Overview of Development and Testing of Uranium Tri-Carbide Fuels

Samim Anghaie and Travis Knight, University of Florida, Gainesville, FL

9:30 am - Re-establishing Fabrication Capabilities for Space Nuclear Power Systems

Jeffrey Halfinger, BWX Technologies, Lynchburg, VA

[B03] PUBLIC SPACE TRAVEL AND TOURISM

Tuesday, February 4, 2003, 8:00-10:00 am - Fiesta Ballroom I and II

William Gaubatz, Chair

SpaceAvailable, LLC, USA

8:00 am - Public Space Markets – What We Know and What We Don't Know

Derek Webber, Futron Corporation, Bethesda, MD

8:30 am - Potential Effects of Government Regulations on Public Space Travel

Harvey A. Wichman, Claremont McKenna College, Claremont, CA

9:00 am - Developing the Space Destinations – Near Term Possibilities

Paola Favata, University Frientza, Italy

9:30 am - Creating the Future Space Tourism Movement

Tsuyoshi Saotome, Crystal Space Place, Inc., Japan

[A03] THERMAL CONTROL FOR DEEP SPACE MISSIONS

Tuesday, February 4, 2003, 8:00-10:00 am - Fiesta Ballroom III and IV

Gajanana C. Birur, Co-Chair

Jet Propulsion Laboratory

Pasadena, CA USA

Ted Swanson, Co-Chair

NASA Goddard Space Flight Center

Greenbelt, MD USA

8:00 am - MAP Propulsion System Thermal Design

Carol L. Mosier, NASA Goddard Space Flight Center, Greenbelt, MD

8:30 am - Development of a Thermal Control Architecture for the Mars Exploration Rovers

Keith S. Novak, Charles J. Phillips, Gajanana C. Birur, Eric T. Sunada and Michael T. Pauken, Jet Propulsion Laboratory, Pasadena, CA

9:00 am - Active Heat Rejection System on Mars Exploration Rover - Design Changes from Mars Pathfinder

Gani B. Ganapathi, Gajanana C. Birur, Glenn T. Tsuyuki, Paul L. McGrath and Jack D. Patzold, Jet Propulsion Laboratory, Pasadena, CA

9:30 am - Thermal Design Overview of NASA's Next Generation Space Telescope

Keith Parrish, NASA, Greenbelt, MD

[C07] ALKALI-METAL THERMAL-TO-ELECTRIC TECHNOLOGY AND APPLICATIONS - I

Tuesday, February 4, 2003, 8:00-10:00 am - Grand Pavilion Ballroom I

Jean-Michel Tournier, Co-Chair
University of New Mexico
Albuquerque, NM USA

Thomas K. Hunt, Co-Chair
Advanced Modular Power Systems, Inc.
Ann Arbor, MI USA

8:00 am - Development, Evaluation, and Design Applications of an AMTEC Converter Model

Cliff A. Spence, Michael Schuller, Tom R. Lalk, Texas A&M University, College Station, TX

8:30 am - Effect of Long Term, High Temperature Annealing on the Strength of Beta'-Alumina Ceramics

James R. Rasmussen, Advanced Modular Power Systems, Inc., Ann Arbor, MI; Roger M. Williams and Adam K. Kisor, Jet Propulsion Laboratory, Pasadena, CA

9:00 am - AMTEC Response to Changes in Resistive Loading

Robert W. Fletcher and Thomas K. Hunt, Advanced Modular Power Systems, Inc., Ann Arbor, MI

9:30 am - Comparison of Measurement Techniques for Determining the Thermal Emission of Coupons at Elevated Temperatures

Daniel P. Kramer, Roger G. Miller, Edwin I. Howell, BWXT of Ohio, Inc., Miamisburg, OH; Donald A. Jaworske, NASA Glenn Research Center, Cleveland, OH; Kenneth E. Wilkes, Oak Ridge National Laboratory, Oak Ridge, TN

[D03] FAR-TERM PROPULSION CONCEPTS - I

Tuesday, February 4, 2003, 8:00-10:00 am - Grand Pavilion Ballroom II and III

Glen A. Robertson, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL US

Benjamin B. Donahue, Co-Chair
The Boeing Company
Huntsville, AL USA

8:00 am - A Critique of Theoretical Explanations of Gravity Shielding Phenomena

R. Clive Woods, Iowa State University, Ames, IA

8:30 am - Update on an Electromagnetic Basis for Inertia, Gravitation, the Principle of Equivalence, Spin and Particle Mass Ratios

Bernard Haisch, California Institute for Physics and Astrophysics, San Mateo, CA; Alfonso Rueda, California State University, Long Beach, CA; L.J. Nickisch, Mission Research Corp., Monterey, CA; Jules Mollere, Henderson State University, Arkadelphia, AR

9:00 am - It's All Gravity...

P.A. Murad, Vienna, VA

9:30 am - Transient Inertial Effects and Stationary Forces

James F. Woodward, California State University, Fullerton, CA

[B04] INSURING THE ENTERPRISE

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Fiesta Ballroom I and II

Martin, Jared, Chair
The Aerospace Corporation
Los Angeles, CA USA

10:30 pm - Risk Mitigation in the Space Industry

Patricia Maloney, The Aerospace Corporation, Los Angeles, CA

11:00 pm - Experiences In Securing Insurance For A Reusable Rocket: Implications For Commercial RLVs

Jeffrey K. Greason, XCOR Aerospace, Mojave, CA

11:30 pm - Panel Discussion

[C08] FUSION SPACE SYSTEMS AND APPLICATIONS - I

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Fiesta Ballroom III and IV

Terry Kammash, Co-Chair
University of Michigan
Ann Arbor, MI USA

Craig H. Williams, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

10:30 am - Ablation Radiation Shields For Nuclear Fusion Rockets

Luis Coreano and Brice Cassenti, Rensselaer at Hartford and Pratt & Whitney, East Hartford, CT

11:00 am - First Results of the Gasdynamic Mirror Fusion Propulsion Experiment

William J. Emrich, Jr., NASA Marshall Space Flight Center, Huntsville, AL

11:30 am - A Design Study of a p-11B Gasdynamic Mirror Fusion Propulsion System

Chad Ohlandt, Terry Kammash, Kenneth G. Powell, University of Michigan, Ann Arbor, MI

12:00 pm - Antimatter Driven P-B11 Fusion Propulsion System

Terry Kammash, University of Michigan, Ann Arbor, MI; James Martin, Thomas Godfroy, NASA Marshall Space Flight Center, Huntsville, AL

[C09] LOW-COST SPACE EXPLORATION MISSIONS - LESSONS LEARNED

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Enchantment Ballroom A and B

Brad Perry, Co-Chair
NASA Langley Research Center
Hampton, VA USA

Dennis Pelaccio, Co-Chair
Science Applications International Corp.
Littleton, CO USA

10:30 am - Implementing a New Line of Medium-Class, Unmanned Space Exploration Missions

Thomas H. Morgan and Susan M. Niebur, NASA Headquarters, Washington, DC

11:00 am - Considerations and Lessons Learned in Implementing Effective, Low-Cost, Unmanned Space Exploration Missions

R. Brad Perry, NASA Langley Research Center, Hampton, VA; Dennis G. Pelaccio, Science Applications International Corporation, Littleton, CO

11:30 am - NASA's New Millennium Program: Validation of Advanced Technologies in Space

Christopher M. Stevens, Jet Propulsion Laboratory, Pasadena, CA

12:00 pm - Lessons Learned in Sending an Ion-Drive System to Deep Space

D.H. Lehman, Jet Propulsion Laboratory, Pasadena, CA

[E04] SPACE COLONIZATION - AN INTERNATIONAL PLANET EARTH ENDEAVOR

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Enchantment Ballroom C and D

Douglas O'Handley, Chair
Santa Clara University
Sunnyvale, CA USA

10:30 am - The Next Logical Step - Post ISS

Douglas A. O'Handley, Santa Clara University, Santa Clara, CA

11:00 am - Pathways to Colonization

David V. Smitherman, Jr., NASA Marshall Space Flight Center, Huntsville, AL

11:30 am - A View of Future Human Colonies on Mars

Robert J. Gustafson, Eric E. Rice, Daniel J. Gramer, and Brant C. White, Orbital Technologies Corporation, Madison, WI

12:00 pm - New Concepts for Permanently Manned Lunar Bases, Report of the Lunar Base Design Workshop, held in Noordwijk, The Netherlands from 10-21 June 2002

Barbara Imhof, Institut fuer hochbau II, Vienna, Austria; Susmita Mohanty, Moonfront LLC, San Francisco, CA; Hans Jurgen Rombaut, Lunar Architecture, Utrecht, The Netherlands; Paul J. van Susante, Colorado School of Mines, Golden, CO; Jim Volp, ESA, ESTEC, Noordwijk, The Netherlands

[CD2] FISSION PROPULSION SYSTEMS FOR HUMAN MISSIONS - II

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Enchantment Ballroom E and F

Stanley K. Borowski, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

Pat Troutman, Co-Chair
NASA Langley Research Center
Hampton, VA USA

10:30 am - High Power Nuclear Electric Propulsion (NEP) for Cargo and Propellant Transfer Missions in Cislunar Space

Robert D. Falck and Stanley K. Borowski, NASA Glenn Research Center, Cleveland, OH

11:00 am - Use of Liquid Rocket Engine Technologies on a Hybrid Nuclear Propulsion and Power System

Russell Joyner, Pratt and Whitney, West Palm Beach, FL

11:30 am - Deep Space Propulsion Requirements Development

Melvin Bulman, GenCorp Aerojet, Sacramento, CA; Stanley Borowski, NASA Glenn Research Center, Cleveland, OH

12:00 pm - "24 Hours to the Moon" Using LOX-Augmented Nuclear Thermal Rocket (LANTR) Propulsion

Stanley K. Borowski, NASA Glenn Research Center, Cleveland, OH

[C10] FISSION POWER SYSTEMS FOR SCIENCE MISSIONS - I

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Grand Pavilion Ballroom I

David I. Poston, Co-Chair
Los Alamos National Laboratory
Los Alamos, NM USA

Jack Wheeler, Co-Chair
US Department of Energy
Germantown, MD USA

10:30 am - Design Concept for a Nuclear Reactor-Powered Mars Rover

John O. Elliott, Jet Propulsion Laboratory, Pasadena, CA; Ronald J. Lipinski, Sandia National Laboratories, Albuquerque, NM; David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

11:00 am - Reactor Shielding Calculations for the Mars Cryobot Lander (MCL) and Mars Atomic Rover for Geographical Exploration (MARGE)

David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

11:30 am - High Efficiency Thermoelectrics in NEP Reactor Power Systems

Daniel T. Allen, Saeid Ghamaty, and Norbert B. Elsner, Hi-Z Technology, Inc., San Diego, CA

12:00 pm - Conceptual Design of a 100-kWe Space Nuclear Reactor Power System with High-Power AMTEC

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

[C11] FISSION POWER SURFACE SYSTEMS FOR HUMAN MISSIONS

Tuesday, February 4, 2003, 10:30 am-12:30 pm - Grand Pavilion Ballroom II and III

Robert L. Cataldo, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

Steve Hoffman, Co-Chair
NASA Johnson Space Center
Houston, TX USA

10:00 am - SUSSEE- An Ultra Lightweight Nuclear Electric Space Power System Based on Conventional Steam Cycle

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

10:30 am - StarTram - A New Approach for Ultra Low Cost, Ultra High Volume Launch Capability.

James Powell, Plus Ultra Technologies, Stony Brook, NY

11:00 am - Review of Power System Options for Human Planetary Exploration

Robert Cataldo, NASA Glenn Research Center, Cleveland, OH

11:30 am - Power Needs For Planetary Surface Exploration

S. Hoffman and J. George, NASA Johnson Space Center, Houston, TX

[E05] MARS TERRAFORMING

Tuesday, February 4, 2003, 1:30-3:30 pm - Fiesta Ballroom I and II

James Graham, Co-Chair
University of Wisconsin
Madison, WI USA

Thomas Meyer, Co-Chair
University of Colorado
Boulder, CO USA

1:30 pm - Stages in the Terraforming of Mars: the Transition to Flowering Plants

James M. Graham, University of Wisconsin, Madison, WI

2:00 pm - Terraforming Mars: Can We Feed Ourselves If We Go?

James M. Graham and Kandis Elliott, University of Wisconsin, Madison, WI

2:30 pm - Terraforming Mars: The Fluorine Bottleneck and the Importance of Sample Return

Benton C. Clark, Lockheed Martin, Denver, CO

3:00 pm - Artificial Biogeochemical Cycles for Mars

Penelope J. Boston, New Mexico Institute of Mining and Technology, Socorro, NM

[C12] SPACE NUCLEAR TECHNOLOGY - GENERAL II

Tuesday, February 4, 2003, 1:30-3:30 pm - Fiesta Ballroom III and IV

George R. Schmidt, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

Mike Houts, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

1:30 pm - SAFE Testing Nuclear Rockets Economically

Steven D. Howe, Bryan Travis and David K. Zerkle, Los Alamos National Laboratory, Los Alamos, NM

2:00 pm - Nuclear Thermal Rocket Exhaust Conditioning In Open Cycle and Closed Cycle Systems

Stanley V. Gunn, Rocketdyne-Retired, Chatsworth, CA

2:30 pm - Technologies to Improve Ion Propulsion System Life and Efficiency

Ira Katz, John R. Brophy, John R. Anderson, James E. Polk, Jet Propulsion Laboratory, Pasadena, CA

3:00 pm - Fusion Propulsion Through a Magnetic Nozzle and Open Divertor

Craig H. Williams, Ian J. Dux, NASA Glenn Research Center, Cleveland, OH; Pavlos G. Mikellides, Arizona State University, Tempe, AZ; Ioannis G. Mikellides, Science Applications International Corporation, San Diego, CA; Richard A. Gerwin, Los Alamos National Laboratory, Los Alamos, NM

[C13] NUCLEAR SYSTEM DEVELOPMENT AND TESTING PROGRESS / RESULTS

Tuesday, February 4, 2003, 1:30-3:30 pm - Enchantment Ballroom A and B

Melissa Van Dyke, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

Thomas Godfroy, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

1:30 pm - Test Facilities in Support of High Power Electric Propulsion Systems

Melissa Van Dyke, Mike Houts, Thomas Godfroy, Ricky Dickens, James J. Martin, Patrick Salvail, and Robert Carter, NASA Marshall Space Flight Center, Huntsville, AL

2:00 pm - Thermal Stress Calculations for Heatpipe-Cooled Reactor Power Systems

Richard J. Kapernick, Ray M. Guffee, Los Alamos National Laboratory, Los Alamos, NM

2:30 pm - Direct-Drive Gas-Cooled Reactor Power System: Concept and Preliminary Testing

S.A. Wright, R.J. Lipinski, Sandia National Laboratories, Albuquerque, NM; T.J. Godfroy, S.M. Bragg-Sitton, M.K. Van Dyke, NASA Marshall Space Flight Center, Huntsville, AL

3:00 pm - Mechanical Design and Fabrication of a SAFE-100 Heat Exchanger for Use in NASA's Advanced Propulsion Thermal-hydraulic Simulator

Robert W. Carter, Ray M. Guffee, Los Alamos National Laboratory, Los Alamos, NM; Russell L. Rosmait, Pittsburgh State University, Pittsburgh, KS; Pat Salvail, NASA Marshall Space Flight Center, Huntsville, AL

[E06] IN-SITU SPACE RESOURCES UTILIZATION (ISRU) - I

Tuesday, February 4, 2003, 1:30-3:30 pm - Enchantment Ballroom C and D

Michael B. Duke, Co-Chair
Colorado School of Mines
Golden, CO USA

Russell Scott Baird, Co-Chair
NASA Johnson Space Center
Houston, TX USA

- 1:30 pm - ISRU Development Strategy and Recent Activities to Support Near and Far Term Missions**
Russell S. Baird, Gerald B. Sanders, and Thomas M. Simon, NASA Johnson Space Center, Houston, TX
- 2:00 pm - Evaluation of Private Sector Roles in Space Resource Development**
Elisabeth S. Lamassoure, Ramachandra Manvi, and Robert W. Easter, Jet Propulsion Laboratory, Pasadena, CA; Brad R. Blair, Javier Diaz, and Michael B. Duke, Colorado School of Mines, Golden, CO; Mark Oderman and Marc Vaucher, CSP Associates, Inc., Cambridge, MA
- 2:30 pm - Investigation into Uses for Lunar Regolith**
Charles Horton, Carlos Gramajo, Lance Williams, Andenet Alemu, Alex Freundlich, and Alex Ignatiev; University of Houston, Houston, TX
- 3:00 pm - Surface Mine Design and Planning for Lunar Regolith Production**
Leslie Sour Gertsch and Richard E. Gertsch, Michigan Technological University, Houghton, MI

[B05] SPACEPORT DEVELOPMENTS

Tuesday, February 4, 2003, 1:30-3:30 pm - Enchantment Ballroom E and F

John William Dettmer, Chair
New Mexico Space Commission, Albuquerque, NM USA

- 1:30 pm - New Mexico's Commercial Space Program**
Louis Gomez, New Mexico Office of Space Commercialization, Santa Fe, NM
- 2:00 pm - The Road to a Spaceport**
Jay T. Edwards, Oklahoma Space Industry Development Authority, Oklahoma City, OK
- 2:30 pm - C Requirements in the Advanced Spaceport Environment**
Roelof L. Schuiling, NASA Kennedy Space Center, FL
- 3:00 pm - Panel Discussion**

[C14] THERMOELECTRIC TECHNOLOGY AND APPLICATIONS

Tuesday, February 4, 2003, 1:30-3:30 pm - Grand Pavilion Ballroom I

Jean-Pierre Fleurial, Chair
Jet Propulsion Laboratory, Pasadena, CA USA

- 1:30 pm - Progress in the Development of High Efficiency Segmented Thermoelectric Unicouples**
T. Caillat and J.P. Fleurial and G. J. Snyder and J. Sakamoto, Jet Propulsion Laboratory, Pasadena, CA
- 2:00 pm - Thermal Stability Characterization of Skutterudite Antimonides and Phosphides**
J. Sakamoto and V. Shields and T. Caillat, Jet Propulsion Laboratory, Pasadena, CA
- 2:30 pm - Development of High Performance Skutterudite Compositions for Application Temperatures up to 1275K**
V. Shields and J.P. Fleurial and T. Caillat, Jet Propulsion Laboratory, Pasadena, CA
- 3:00 pm - Engineering Nanostructures for Efficient Thermoelectric Power Conversion**
G. Chen, Massachusetts Institute of Technology, Cambridge, MA

[C15] SPACE NUCLEAR SYSTEMS DEVELOPMENT TESTING - LESSONS LEARNED

Tuesday, February 4, 2003, 4:00-6:00 pm - Enchantment Ballroom A and B

Stanley V. Gunn, Chair,
Chatsworth, CA USA

- 4:00 pm - Looking Back on Rover**
C. Paul Robinson, Sandia National Laboratories, Albuquerque, NM
- 4:30 pm - Nuclear Thermal Rocket - An Established Space Propulsion Technology**
Milton Klein, NASA, AEC (retired), Menlo Park, CA
- 5:00 pm - Looking Backward, Looking Forward**
Gary L. Bennett, Emmett, ID
- 5:30 pm - Nuclear Thermal Rocket Ground Test Potential at NASA Glenn's Plum Brook Station**
Robert Kozar, Brian P. Willis, Mark R. Woike, NASA Glenn Research Center, Plum Brook Station, Sandusky, OH

[E07] IN-SITU SPACE RESOURCES UTILIZATION (ISRU) - II

Tuesday, February 4, 2003, 4:00-6:00 pm - Enchantment Ballroom C and D

Michael B. Duke, Co-Chair
Colorado School of Mines
Golden, CO USA

Russell Scott Baird, Co-Chair
NASA Johnson Space Center
Houston, TX USA

- 4:00 pm - Operation, Modeling and Analysis of the Reverse Water Gas Shift Process**
Jonathan E. Whitlow, Florida Institute of Technology, Melbourne, FL; Clyde F. Parrish, NASA Kennedy Space Center, FL
- 4:30 pm - Extraction of Water from the Martian Atmosphere**
Matthew A. Schneider and Adam P. Bruckner, University of Washington, Seattle, WA
- 5:00 pm - Solar Energy for In-Situ Resource Utilization in Space**
Takashi Nakamura, John A. Case, and Connie L. Senior, Physical Sciences Inc., San Ramon, CA
- 5:30 pm - High Temperature Interaction Between H₂, CH₄, NH₃ and Ilmenite**
Giovanni De Maria, Bruno Brunetti, Giuseppe Trionfetti and Daniela Ferro, Università La Sapienza, Roma, Italy

[B06] SPACEPORT TECHNOLOGY

Tuesday, February 4, 2003, 4:00-6:00 pm - Enchantment Ballroom E and F

Kenneth J. Payne, Chair
NASA Kennedy Space Center,
Kennedy Space Center, FL USA

- 4:00 pm - Launch System Testbed: An Innovative Approach for Design and Development of Future Launch Structures**
Bruce T. Vu, NASA Kennedy Space Center, FL; Max Kandula and Ravi Margasahayam, Dynamics Inc., Kennedy Space Center, FL; Danielle M. Ford, Embry-Riddle Aeronautical University, Daytona Beach, FL
- 4:30 pm - Electrochemical Evaluation of Alloys for Spaceport Design**
Luz Marina Calle and Louis G. MacDowell, NASA Kennedy Space Center, FL; Rubiela D. Vinje, Dynacs, Inc., Kennedy Space Center, FL
- 5:00 pm - High Altitude Launch for a Practical SSTO**
Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH; Vincent Denis, International Space University, Strasbourg, France
- 5:30 pm - Intelligent Launch and Range Operations Testbed**
Rodney D. Davis, Kevin R. Brown, Command and Control Technologies, Titusville, FL

[D04] FAR-TERM PROPULSION CONCEPTS - II

Tuesday, February 4, 2003, 4:00-6:00 pm - Fiesta Ballroom I and II

Glen A. Robertson, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

Benjamin B. Donahue, Co-Chair
The Boeing Company
Huntsville, AL USA

4:00 pm - New Experiments with Spinning Metallic Discs

Konstantin Mazuruk and Richard N. Grugel, NASA Marshall Space Flight Center, Huntsville, AL

4:30 pm - Quantum Vehicle Propulsion

Jerry E. Bayles, Gravitational Research, Medford, OR

5:00 pm - Very Large Propulsive Effects Predicted for a 512 kV Rotator

David Maker, Huntsville, AL; Glen A. Robertson, Gravi Atomic Research, Madison, AL

5:30 pm - Panel Discussion

[A04] MISCELLANEOUS TOPICS ON THERMOPHYSICS IN MICROGRAVITY

Tuesday, February 4, 2003, 4:00-6:00 pm - Fiesta Ballroom III and IV

Thomas R. Reinarts, Co-Chair
NASA Kennedy Space Center
Kennedy Space Center, FL USA

Ted Swanson, Co-Chair
NASA Goddard Space Flight Center
Greenbelt, MD USA

4:00 pm - Across-Gimbal and Miniaturized Cryogenic Loop Heat Pipes

D. Bugby, B. Marland, C. Stouffer, and E. Krolczek, Swales Aerospace, Beltsville, MD

4:30 pm - Test Cell for a Novel Planar MEMS Loop Heat Pipe Based on Coherent Porous Silicon

Debra Cytrynowicz, Mohammed Hamdan, Praveen Medis, H. Thurman Henderson, Frank M. Gerner, University of Cincinnati, Cincinnati, OH

5:00 pm - Zero-Gravity Test Results For Ultrasonic Sensing of Air-Liquid Interface in a Vortex Separator

R. Williams, Incipient Systems, Inc., Los Alamos, NM; I. Carron, C. Kurwitz, and F. Best, Texas A&M University, College Station, TX; D. Bray, Don Bray and Associates, Inc., College Station, TX

5:30 pm - Experimental Investigation on Wetting of a Binary Volatile Sessile Drop

K. Sefiane, University of Edinburgh, Edinburgh, UK; L. Tadrist, Laboratoire IUSTI, Marseille, France

[C16] ALKALI-METAL THERMAL-TO-ELECTRIC TECHNOLOGY AND APPLICATIONS - II

Tuesday, February 4, 2003, 4:00-6:00 pm - Grand Pavilion Ballroom I

Jean-Michel Tournier, Co-Chair
The University of New Mexico
Albuquerque, NM USA

Thomas K. Hunt, Co-Chair
Advanced Modular Power Systems, Inc.
Ann Arbor, MI USA

4:00 pm - Recent Developments in Mixed Ionic and Electronic Conducting Electrodes for the Alkali Metal Thermal Electric Converter (AMTEC)

Robert W. Fletcher, Advanced Modular Power Systems, Inc., Ann Arbor, MI; Robert W. Fletcher and Johannes W. Schwank, University of Michigan, Ann Arbor, MI

4:30 pm - High Power AMTEC Converters for Deep-Space Nuclear Reactor Power Systems

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

5:00 pm - Design Optimization of High-Power, Liquid Anode AMTEC

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

5:30 pm - Recent Developments in Mini-Electrode Test Cell Testing

J.R. Rasmussen and T.K. Hunt, Advanced Modular Power Systems, Inc., Ann Arbor, MI

SCIENCE FICTION: WHERE SPACE AND LITERATURE COLLIDE

Tuesday, February 4, 2003, 6:00-7:00 pm - Grand Pavilion

Science fiction has served as an inspiration and a stimulus to space flight, and vice versa. Five well-known science fiction authors will present their views on the relationship between science fiction and science, and will discuss their most recent books. The event will be followed by a book signing.

The authors to be featured are:

(a) **George R. R. Martin**, author of many books including most recently the best-selling "Song of Ice and Fire" series.

(b) **Walter Jon Williams**, author of over seventeen books and innumerable short stories. His most recent book is The Praxis.

(c) **Geoffrey A. Landis**, space scientist and award-winning science fiction writer. His recent novel is Mars Crossing.

(d) **S. M. Stirling** is the author of the popular Draka series, and more recently of the "Island in the Sea of Time" Books.

(e) **Doug Beason** is both a physicist and also a science fiction writer. His recent book, Lethal Exposure, was written in collaboration with Kevin Anderson.

TOWN HALL MEETING ON NASA'S NUCLEAR SYSTEMS PROGRAM

Tuesday, February 4, 2003, 8:00-9:30 pm - Grand Pavilion

All STAIF attendees are invited to attend an evening town hall meeting with members of NASA's Nuclear Systems Program. The program, which is led by NASA Headquarters' Office of Space Science and supported by the Department of Energy, encompasses a broad range of research and development projects in the areas of nuclear power and propulsion. Attendees will have an opportunity to hear brief presentations on key aspects of the program, including objectives and plans, project content, communications and risk reduction. Attendees will also have a chance to ask questions and engage in dialogue with the program staff. This informal information exchange provides a unique opportunity for those interested in learning more about NASA's near and long-term efforts in nuclear power and propulsion. Invited panel participants from NASA include:

(a) **Mr. Alan Newhouse** (Director, Nuclear Systems Program Office)

(b) **Dr. George Schmidt** (Program Executive, Radioisotope Power Systems)

(c) **Mr. John Warren** (Program Executive, Propulsion and Spacecraft Systems)

(d) **Dr. Matthew Forsbacka** (Program Executive, Fission Power Systems)

(e) **Ms. Victoria Friedensen** (Manager, Policy and Communications)

Invited panel members from DOE include:

(a) **Mr. Earl Wahlquist** (Associate Director for Space and Defense Power Systems)

(b) **Mr. Arthur Mehner** (Manager, Radioisotope Power Systems)

(c) **Mr. Richard Furlong** (Lead, Stirling Radioisotope Generator)

(d) **Mr. Jack Wheeler** (Manager, Fission Power Systems)

WEDNESDAY, FEBRUARY 5, 2003

[C17] DYNAMIC ENERGY CONVERSION TECHNOLOGY AND APPLICATIONS - I

Wednesday, February 5, 2003, 8:00-10:00 am - Enchantment Ballroom A and B

Richard K. Shaltens, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

Lee S. Mason, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

8:00 am - Technology Development for a High Performance Brayton Cycle Engine

Paul Gill, Charles T. Kudija, Patrick E. Frye

8:30 am - Technology Development Program for an Advanced Potassium Rankine Power Conversion System Compatible with Several Space Reactor Designs

Bruce B. Bevard and Graydon L. Yoder, Oak Ridge National Laboratory, Oak Ridge, TN

9:00 am - Technology Concept for a Near-Term Closed Brayton Cycle Power Conversion Unit

John Foti, Dave Halsey, Tim Bauch and Glen Smith, Hamilton Sundstrand, Rockford, IL

9:30 am - A Closed Brayton Power Conversion Unit Concept for Nuclear Electric Propulsion for Deep Space Missions

Claude Russell Joyner II, Bruce Fowler, John Matthews, Pratt-Whitney, West Palm Beach, FL

[E08] SPACE COLONIZATION ADVANCED CONCEPTS, INFRASTRUCTURES, AND ARCHITECTURES - I

Wednesday, February 5, 2003, 8:00-10:00 am - Enchantment Ballroom C and D

Robert Cassanova, Co-Chair
USRA , NASA Institute for Advanced Concepts
Atlanta, GA USA

Robert Gustafson, Co-Chair
Orbital Technologies Corporation
Madison, WI USA

8:00 am - Visions and Possibilities for Future Exploration of Space

Robert A. Cassanova , NASA Institute for Advanced Concepts, Atlanta, GA; Ronald E. Turner, ANSER Analytic Services, Inc., Arlington, VA; and Patricia L. Russell, Universities Space Research Association, Columbia, MD

8:30 am - The Initial Nine Space Settlements

Anita E. Gale and Richard P. Edwards, Space Settlement Design Competitions, Nassau Bay, TX

9:00 am - Colonization of Venus

Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH

9:30 am - Implications of Outside-the-Box Technologies on Future Space Exploration and Colonization

Theodore C. Loder III, University of New Hampshire, Durham, NH

[C18] RADIOISOTOPE POWER SYSTEMS - I

Wednesday, February 5, 2003, 8:00-10:00 am - Enchantment Ballroom E and F

Richard R. Furlong, Co-Chair
U.S. Department of Energy
Germantown, MD USA

Robert T. Carpenter, Co-Chair
Orbital Sciences Corporation
Germantown, MD USA

8:00 am - Energy Conversion Options for Advanced Radioisotope Power Systems

Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM

8:30 am - The Art of Dynamic System Testing - As Applied to a Stirling Converter

Songgang Qiu, Stirling Technology Company, Kennewick, WA

9:00 am - Continuing Development for Free-Piston Stirling, Radioisotope Power Systems

Allen A. Peterson, Songgang Qiu, Darin L. Redinger, John E. Augenblick, and Stephen L. Petersen, Stirling Technology Company, Kennewick, WA

9:30 am - Stirling Converter Performance Mapping Test Results for Future Radioisotope Power Systems

Songgang Qiu, Allen A. Peterson, Franklyn Faultersack, Darin L. Redinger, and John E. Augenblick, Stirling Technology Company, Kennewick, WA

[D05] RADIATION I - METHODS IN RADIATION ANALYSIS FOR SPACE EXPLORATION VEHICLES

Wednesday, February 5, 2003, 8:00-10:00 am - Fiesta Ballroom I and II

John W. Wilson, Co-Chair
NASA Langley Research Center
Hampton, VA USA

William Atwell, Co-Chair
The Boeing Company
Houston, TX USA

8:00 am - High-Speed Computational Applications for Space Radiation Shielding Analysis

John E. Nealy, Old Dominion University, Norfolk, VA; Brooke M. Anderson, Swales Aerospace, Hampton, VA; John W. Wilson and Garry D. Qualls, NASA Langley Research Center, Hampton, VA

8:30 am - Reliability Methods for Shield Design Process

R.K. Tripathi and J.W. Wilson, NASA Langley Research Center, Hampton, VA

9:00 am - Development of Collaborative Engineering Environments for Spacecraft Design

Robert C. Singletary, Jr., F. McNeil Cheatwood, Garry D. Qualls, Jaroslaw Sobieszcanski-Sobieski, John W. Wilson, NASA Langley Research Center, Hampton, VA; Bradley D. Johns, Kwok Y. Fan, Swales Aerospace, Hampton, VA; Todd A. Wareing, John McGhee, Shawn Pautz, Los Alamos National Laboratory, Los Alamos, NM; Anil K. Prinja, Frederick Gleicher, University of New Mexico, Albuquerque, NM; Greg Failla, ICEM CFD Engineering, Berkeley, CA

9:30 am - Panel Discussion

[A05] VARIABLE EMITTANCE TECHNOLOGY FOR SPACECRAFT THERMAL CONTROL

Wednesday, February 5, 2003, 8:00-10:00 am - Fiesta Ballroom III and IV

Charlotte M. Gerhart, Co-Chair
Air Force Research Laboratory
Kirtland AFB, NM USA

Rengasamy Ponnappan, Co-Chair
Air Force Research Laboratory
Wright-Patterson AFB, OH USA

8:00 am - Variable Emittance Materials Based on Conducting Polymers for Spacecraft Thermal Control

Prasanna Chandrasekhar, Brian J. Zay, Terrance McQueeny, David A. Ross, Andre Lovis, Ashwin-Ushas Corporation, Lakewood, NJ; Rengasamy Ponnappan, Air Force Research Laboratory, Wright-Patterson AFB, OH; Charlotte Gerhart, Air Force Research Laboratory, Kirtland AFB, NM; Theodore Swanson, Lonny Kauder, Donya Douglas, Wanda Peters, NASA Goddard Space Flight Center, Greenbelt, MD; Gajajana C. Birur, Jet Propulsion Laboratory, Pasadena, CA

8:30 am - Electrostatic Appliqué for Spacecraft Temperature Control

William Biter, Stephen Hess, Sung Oh, Sensortex, Inc., Kennett Square, PA

9:00 am - All-Solid-State Electrochromic Variable Emittance Coatings for Thermal Management in Space

Nikolai Kislov and Howard Groger, Eclipse Energy Systems, Inc., St. Petersburg, FL; Rengasamy Ponnappan, Air Force Research Laboratory, Wright-Patterson AFB, OH

9:30 am - Controlling Variable Emittance (MEMS) Coatings for Space Applications

D. Farrar, W. Schneider, R. Osiander, J.L. Champion, A.G. Darrin, Johns Hopkins University Applied Physics Laboratory, Laurel, MD; D. Douglas and T.D. Swanson, NASA Goddard Space Flight Center, Greenbelt, MD

**[C19] SPACE NUCLEAR SYSTEMS TECHNOLOGY
DEMONSTRATION MISSIONS**

Wednesday, February 5, 2003, 8:00-10:00 am - Grand Pavilion Ballroom I

Leonard A. Dudzinski, Co-Chair
NASA Headquarters
Washington DC, WA USA

Stanley V. Gunn, Co-Chair,
Chatsworth, CA USA

8:00 am - Nuclear Electric Propulsion Design Factors For Deep Space Robotic Missions

Joe Bonometti, Eric Stewart, Jeff Dilg, Larry Kos and Lee Mason, Marshall Space Flight Center, Huntsville, AL; Gary Langford, Glenn Research Center, Cleveland, OH

8:30 am - The Impact of Mission Performance Requirements on the Development of an Early-Flight Space Fission Reactor

David Poston, Los Alamos National Laboratory, Los Alamos, NM

9:00 am - Hardware Based Technology Assessment in Support of Near-Term Missions

Mike Houts, Melissa Van Dyke, Tom Godfroy, James Martin, Shannon Bragg-Sitton, Ricky Dickens, Pat Salvail, Eric Williams, Roger Harper, Ivana Hrbud, Robert Carter, NASA Marshall Space Flight Center, Huntsville, AL

9:30 am - A 100-kW NaK-Cooled Space Reactor Concept for an Early-Flight Mission

David Poston, Los Alamos National Laboratory, Los Alamos, NM

[C20] HIGH-POWER ELECTRIC PROPULSION - I

Wednesday, February 5, 2003, 8:00-10:00 am - Grand Pavilion Ballroom II and III

Ivana Hrbud, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

James Polk, Co-Chair
Jet Propulsion Laboratory
Pasadena, CA USA

8:00 am - MPD Thruster Performance Analytic Models

James Gilland, Geoffrey Johnston, NASA Glenn Research Center, Cleveland, OH

8:30 am - High Power Nuclear Electric Systems for Fast Outer Planet Missions

Ben Donahue, The Boeing Company, Huntsville, AL

9:00 am - Recent VASIMR Accomplishments

F. Chang-Diaz, NASA Johnson Space Center, Houston, TX

9:30 am - MW-Class Thruster Experiments at NASA GRC

Michael R. LaPointe, Ohio Aerospace Institute, Cleveland, OH

**[C21] DYNAMIC ENERGY CONVERSION TECHNOLOGY AND
APPLICATIONS - II**

Wednesday, February 5, 2003, 10:30 am-12:30 pm - Enchantment Ballroom A and B

Richard K. Shaltens, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

Lee S. Mason, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

10:30 am - Advanced 35 W Free-Piston Stirling Engine for Space Power Applications

J. Gary Wood and Neill Lane, Sunpower, Inc., Athens, OH

11:00 am - Developments in Turbo-Brayton Power Converters

Mark V. Zagarola, Christopher J. Crowley, and Walter L. Swift, Creare Incorporated, Hanover, NH

11:30 am - Thermoacoustic Space Power Converter

Emanuel Tward, Michael Petach, TRW, Redondo Beach, CA; Scott Backhaus, Los Alamos National Laboratory, Los Alamos, NM

12:00 pm - Reliability Assessment Approach for Stirling Convertors and Generators

Ashwin R. Shah, Sest, Inc., Middleburg Heights, OH; Jeffrey G. Schreiber, Edward Zampino and Timothy Best, NASA Glenn Research Center, Cleveland, OH

[E10] IN-SITU SPACE RESOURCES UTILIZATION (ISRU) - III

Wednesday, February 5, 2003, 10:30 am-12:30 pm - Enchantment Ballroom C and D

Michael B. Duke, Co-Chair
Colorado School of Mines
Golden, CO USA

Russell Scott Baird, Co-Chair
NASA Johnson Space Center
Houston, TX USA

10:30 am - Solar Cells Using Lunar Resources

Alex Freundlich, Charles Horton, Andenet Alemu, Carlos Gramajo, Lance Williams, Alex Ignatiev, University of Houston, Houston, TX

11:00 am - The Development of ISRU and ISSE Technologies Leveraging Canadian Mining Expertise

Dale S. Boucher, Northern Centre for Advanced Technology Inc, Sudbury, Ontario, Canada; Jim Richard, Electric Vehicle Controllers Ltd., Hammer, Ontario, Canada; Erick Dupuis, Canadian Space Agency, St-Hubert, Quebec, Canada

11:30 am - ISRU Reactant, Fuel Cell Based Power Plant for Robotic and Human Mobile Exploration

Russell S. Baird, Gerald Sanders, Thomas Simon, and Kerri McCurdy, NASA Johnson Space Center, Houston, TX

12:00 pm - Optimized ISRU Propellants for Propulsion and Power Needs for Future Mars Colonization

Eric E. Rice, Robert J. Gustafson, Daniel J. Gramer, Martin J. Chiaverini, Ronald R. Teeter, and Brant C. White, Orbital Technologies Corporation (ORBITEC), Madison, WI

[C22] POTENTIAL FUTURE SCIENCE MISSIONS

Wednesday, February 5, 2003, 10:30 am-12:30 pm - Enchantment Ballroom E and F

Bill J. Nesmith, Co-Chair
Jet Propulsion Laboratory
Pasadena, CA USA

Ronald J. Lipinski, Co-Chair
Sandia National Laboratories
Albuquerque, NM USA

10:30 am - Mission Concept for a Nuclear Reactor-Powered Mars Cryobot Lander

John O. Elliott, Jet Propulsion Laboratory, Pasadena, CA; Ronald J. Lipinski, Sandia National Laboratories, Albuquerque, NM; David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

11:00 am - A Fission Powered Mars Telecommunications Orbiter Mission Concept

Erik N. Nilsen, Jet Propulsion Laboratory, Pasadena, CA

11:30 am - Reaching the Outer Planets with Nuclear Electric Propulsion: Trades and Sensitivities

Muriel A. Noca, Robert C. Moeller, Jet Propulsion Laboratory, Pasadena, CA

12:00 pm - NEPTanS; A Shuttle-Tended NEP Interplanetary Transportation System

John O. Elliott, Roy Y. Nakagawa, Thomas R. Spilker, Jet Propulsion Laboratory, Pasadena, CA; Ronald J. Lipinski, Sandia National Laboratories, Albuquerque, NM; David I. Poston, Los Alamos National Laboratory, Los Alamos, NM; Dean W. Moreland, NASA Johnson Space Center, Houston, TX

**[E09] SPACE COLONIZATION - ECONOMIC DRIVERS AND
JUSTIFICATIONS**

Wednesday, February 5, 2003, 10:30 am-12:30 pm - Fiesta Ballroom I and II

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

10:30 am - Space Colonization--Benefits for the World

W.H. Siegfried, The Boeing Company, Huntington Beach, CA

11:00 am - Space Colonization - Economic Drivers and Justifications

Gordon Woodcock, Gray Research, Inc., Huntsville, AL

11:30 am - Triggering Events for the First Space Settlement

Anita E. Gale and Richard P. Edwards, Space Settlement Design Competitions, Nassau Bay, TX

**[E11] SPACE COLONIZATION ADVANCED CONCEPTS,
INFRASTRUCTURES, AND ARCHITECTURES - II**

Wednesday, February 5, 2003, 1:30-3:30 pm - Enchantment Ballroom E and F

Robert Cassanova, Co-Chair

**USRA , NASA Institute for Advanced Concepts
Atlanta, GA, USA**

Robert Gustafson, Co-Chair

**Orbital Technologies Corporation
Madison, WI, USA**

1:30 pm - Tailored Force Fields for Space-Based Construction

Narayanan M. Komerath, Sameh S. Wanis, Joseph Czechowski, Georgia Institute of Technology, Atlanta, GA

2:00 pm - Distributed Power Sources for Mars Colonization

George H. Miley and Yasser Shaban, University of Illinois, Urbana, IL

2:30 pm - Architecture Studies for Commercial Production of Propellants From the Lunar Poles

Michael B. Duke, Javier Diaz, Brad R. Blair, Colorado School of Mines, Golden, CO; Mark Oderman and Marc Vaucher, CSP Associates, Inc., Cambridge, MA

3:00 pm - Space Colonization Using Space-Elevators from Phobos

Leonard M. Weinstein, NASA Langley Research Center, Hampton, VA

**[D06] RADIATION II - RADIATION ANALYSIS FOR GATEWAY
AND DEEP SPACE MISSIONS**

Wednesday, February 5, 2003, 1:30-3:30 pm - Fiesta Ballroom I and II

John W. Wilson, Co-Chair

**NASA Langley Research Center
Hampton, VA, USA**

William Atwell, Co-Chair

**The Boeing Company
Houston, TX, USA**

1:30 pm - Immersive Shield Design of a Gateway Space Station Concept

Chris A. Sandridge, Brooke M. Anderson, NASA Langley Research Center, Hampton, VA; Aric R. Aumann, Analytical Services and Materials, Inc., Hampton, VA

2:00 pm - Radiation Shielding Analysis for Deep Space Missions

Giovanni De Angelis, John E. Nealy, Old Dominion University, Norfolk, VA; Martha S. Clowdsley, College of William and Mary, Williamsburg, VA; Robert C. Singleterry, Ram K. Tripathi, John W. Wilson, NASA Langley Research Center, Hampton, VA

2:30 pm - Gateway, LI Modeling and Radiation Analysis

Brooke M. Anderson, Swales Aerospace, Hampton, VA; John E. Nealy, Old Dominion University, Hampton, VA; James R. Geffre, NASA Johnson Space Center, Houston, TX; Garry D. Qualls, Pat Troutman, NASA Langley Research Center, Hampton, VA; Shawn A. Krizan, Analytical Mechanics Associates, Inc., Hampton, VA

3:00 pm - Deep Space Environment and Shielding

J.W. Wilson, NASA Langley Research Center, Hampton, VA; J.E. Nealy, G. de Angelis, Old Dominion University, Norfolk, VA; M.S. Clowdsley, College of William and Mary, Williamsburg, VA; F.F. Badavi, Christopher Newport University, Newport News, VA

[A07] BOILING IN MICROGRAVITY

Wednesday, February 5, 2003, 1:30-3:30 pm - Fiesta Ballroom III and IV

Walter Grassi, Co-Chair

**Universita di Pisa
Pisa, Italy College Park, MD USA**

Jungho Kim, Co-Chair

University of Maryland

1:30 pm - Effect of Non-Ionic Surfactants on Nucleate Pool Boiling

J. P. Kizito, R. Balasubramaniam, M.J. Boggess, NASA Glenn Research Center, Cleveland, OH; K.J. Stebe, Johns Hopkins University, Baltimore, MD

2:00 pm - Heater Size and Gravity Effects on Pool Boiling Heat Transfer

Jungho Kim and Christopher Henry, University of Maryland, College Park, MD

2:30 pm - Bubble Behavior in Subcooled Pool Boiling of Water under Reduced Gravity

Koichi Suzuki, Motohiro Suzuki, Saika Takahashi, Hiroshi Kawamura, Tokyo University of Science, Chiba, Japan; Yoshiyuki Abe, The National Institute of Advanced Industrial Science and Technology, Ibaragi, Japan

3:00 pm - A Fundamental Study Regarding the Control Of Nucleate Boiling in a Complex Magnetizable Fluid By an Applied Magnetic Field, in Microgravity Conditions

Floriana D. Stoian, Gheorghe Pop, Virgil Stoica, Oana Marinica, "Politehnica" University of Timisoara, Timisoara, Romania; Doina Bica and Ladislau Vékás , Romanian Academy-Timisoara Branch, Timisoara, Romania

[B08] SPACE LAUNCH INITIATIVE TECHNOLOGY

Wednesday, February 5, 2003, 1:30-3:30 pm - Grand Pavilion Ballroom I

Sheryl Kittredge, Co-Chair

**NASA Marshall Space Flight Center
Huntsville, AL USA**

Charles A. Smith, Co Chair

**NASA Marshall Space Flight Center
Huntsville, AL, USA**

1:30 pm - Systems Engineering Approach to Technology Integration for NASA's 2nd Generation Reusable Launch Vehicle

Sheryl Kittredge, Dale Thomas, Marc Verhage, Charles Smith, Leann Thomas, NASA Marshall Space Flight Center, Huntsville, AL

2:00 pm - The Successful Development of an Automated Rendezvous and Capture (AR&C) System for The National Aeronautics and Space Administration

Fred D. Roe and Richard T. Howard, NASA Marshall Space Flight Center, Huntsville, AL

2:30 pm - Advanced Checkout, Control, and Maintenance System (ACCMS) Breakthrough Technologies

Cary Peadar, NASA Kennedy Space Center, KSC, Florida

3:00 pm - Next Generation Launch Technologies Program Propulsion Activities Overview

Shayne Swint, NASA Marshall Space Flight Center, Huntsville, AL

[C26] HIGH-POWER ELECTRIC PROPULSION - II

Wednesday, February 5, 2003, 1:30-3:30 pm - Grand Pavilion Ballroom II and III

Ivana Hrbud, Co-Chair

**NASA Marshall Space Flight Center
Huntsville, AL USA**

James Polk, Co-Chair

**Jet Propulsion Laboratory
Pasadena, CA USA**

1:30 pm - Hydrodynamic Electrode Model for MPD Thruster

Subrata Roy, Kettering University, Flint, MI

2:00 pm - Technologies for High Power, High Specific Impulse Ion Thrusters

James Polk, Jet Propulsion Laboratory

2:30 pm - End-to-End Demonstrator of the Safe Affordable Fission Engine (SAFE)

30: Power Conversion and Ion Engine Operation

Ivana Hrbud, Melissa Van Dyke, Mike Houts, NASA Marshall Space Flight Center, Huntsville, AL; Keith Goodfellow, Jet Propulsion Laboratory, Pasadena, CA

3:00 pm - Numerical Simulations of the Pulsed Inductive Thruster

Pavlos G. Mikellides, Arizona State University, Tempe, AZ

[C27] DYNAMIC ENERGY CONVERSION TECHNOLOGY AND APPLICATIONS - IV

Wednesday, February 5, 2003, 3:45-5:45 pm - Enchantment Ballroom A and B

Richard K. Shaltens, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

Lee S. Mason, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

3:45 pm - Overview of NASA Multi-Dimensional Stirling Converter Code Development and Validation Effort

Roy C. Tew and James E. Cairelli, NASA Glenn Research Center, Cleveland, OH; Mounir B. Ibrahim, Cleveland State University, Cleveland, OH; Terrence W. Simon, University of Minnesota, Minneapolis, MN; and David Gedeon, Gedeon Associates, Athens, OH

4:15 pm - Development of a Dynamic, End-to-End Free Piston Stirling Converter Model

Timothy F. Regan, Sest, Inc., Middleburg Heights, OH; Scott S. Gerber, Zin Technologies, Inc., Brookpark, OH; Mary Ellen Roth, NASA Glenn Research Center, Cleveland, OH

4:45 pm - Radiator Concepts for Nuclear Powered Brayton Conversion Systems

Devarakonda Angirasa, SEST, Inc., Cleveland, OH; Lee S. Mason and Richard K. Shaltens, NASA Glenn Research Center, Cleveland, OH

5:15 pm - Concepts for a Capillary-Pumped Heat Engine

R.B. Williams, Los Alamos National Laboratory, Los Alamos, NM

[E12] SPACE BASES

Wednesday, February 5, 2003, 3:45-5:45 pm - Enchantment Ballroom C and D

Wendell W. Mendell, Co-Chair
NASA Johnson Space Center
Houston, TX USA

Geoffrey A. Landis, Co-Chair
NASA Glenn Research Center
Cleveland, OH USA

3:45 pm - Business Approach To Lunar Base Activation

Harrison H. Schmitt, University of Wisconsin-Madison, Albuquerque, NM

4:15 pm - Space Base: Design Problem Identification

Laurie Barlow, L.Barlow & Co., South Pasadena, CA

4:45 pm - AQUAPLEX: An Environmentally Aware Model Lunar Settlement

Darel Preble, Space Solar Power Institute, Jonesboro, GA

5:15 pm - An Interplanetary Rapid Transit System Between Earth and Mars

Kerry Nock, Angus McDonald, Paul Penzo, and Chris Wyszowski, Global Aerospace Corporation, Altadena, CA; Michael Duke, Robert King, Lee Johnson, Colorado School of Mines, Golden, CO; Mark Jacobs and Jerry Rauwolf, Science Applications International Corporation, Schaumburg, IL

[C28] RADIOISOTOPE POWER SYSTEMS - II

Wednesday, February 5, 2003, 3:45-5:45 pm - Enchantment Ballroom E and F

Richard R. Furlong, Co-Chair
U.S. Department of Energy
Germantown, MD USA

Robert T. Carpenter, Co-Chair
Orbital Sciences Corporation
Germantown, MD USA

3:45 pm - Radioisotope Power Systems for NASA Space Science Missions

Therese M. Griebel, Raynor Taylor, NASA Headquarters, Washington, DC; Bernard Edwards, NASA Goddard Space Flight Center, Greenbelt, MD; Steve Oleson, NASA Glenn Research Center, Cleveland, OH

4:15 pm - Coated Particle Fuel Compact-General Purpose Heat Source for Advanced Radioisotope Power Systems

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

4:45 pm - Tutorial: Safety and Launch Approval

Lyle Rutger, US Department of Energy, Germantown, MD

[D07] RADIATION III - RADIATION ANALYSIS FOR LEO AND PLANETARY SURFACE MISSIONS

Wednesday, February 5, 2003, 3:45-5:45 pm - Fiesta Ballroom I and II

John W. Wilson, Co-Chair
NASA Langley Research Center
Hampton, VA USA

William Atwell, Co-Chair
The Boeing Company
Houston, TX USA

3:45 pm - ISS as a Platform for Environmental Model Evaluation

Craig P. Hugger, Swales Aerospace, Hampton, VA; Garry D. Qualls and John W. Wilson, NASA Langley Research Center, Hampton, VA; Frank A. Cuccinotta and Mark R. Shavers, NASA Johnson Space Center, Houston, TX; Neil Zapp, Lockheed Martin, Houston, TX

4:15 pm - Space Radiation Shielding Calculation Models for LEO Satellites

Myung-Won Shin, Myung-Hyun Kim, Kyung Hee University, Gyeonggi-do, Korea

4:45 pm - The Martian Radiation Environment Experiment (MARIE) on the 2001 Mars Odyssey Spacecraft

William Atwell, The Boeing Company, Houston, TX

5:15 pm - Surface Environments for Exploration

M.S. Cloudsley, College of William and Mary, Williamsburg, VA; G. DeAngelis, Old Dominion University, Norfolk, VA; F.F. Badavi, Christopher Newport University, Newport News, VA; J.W. Wilson, R.C. Singleterry, and S.A. Thibeault, NASA Langley Research Center, Hampton, VA

[A08] HIGH TEMPERATURE HEAT PIPE TECHNOLOGY

Wednesday, February 5, 2003, 3:45-5:45 pm - Fiesta Ballroom III and IV

Robert S. Reid, Co-Chair
Los Alamos National Laboratory
Los Alamos, NM USA

Donald M. Ernst, Co-Chair
Thermacore International, Inc
Lancaster, PA USA

3:45 pm - SAFE-100 Module Fabrication and Test

Peter J. Ring and Edwin D. Sayre, Advanced Methods and Materials, Sunnyvale, CA; J.Tom Sena, Los Alamos National Laboratory, Los Alamos, NM

4:15 pm - SAFE-100 Module Processing Methodology

Patrick G. Salvail and Robert W. Carter, NASA Marshall Space Flight Center, Huntsville, AL

4:45 pm - Transient Thermohydraulic Heat Pipe Modeling: Incorporating THROUGHPUT into the CAESAR Environment

Michael L. Hall, Los Alamos National Laboratory, Los Alamos, NM

5:15 pm - SAFE Alkali Metal Heat Pipe Reliability

Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM

[B09] STANDARDS AND OPERATIONS

Wednesday, February 5, 2003, 3:45-5:45 pm - Grand Pavilion I

Jay P. Penn, Co-Chair
The Aerospace Corporation
Los Angeles, CA USA

L. Dale Thomas, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL USA

3:45 pm - Standards and Certification Processes for Reusable Space Transportation

James E. French, American Institute of Aeronautics and Astronautics, Reston, VA

4:15 pm - Development of NASA Technical Standards Program Relative to Enhancing Engineering Capabilities

Paul S. Gill, NASA Marshall Space Flight Center, Huntsville, AL; William W. Vaughan, University of Alabama, Huntsville, AL

4:45 pm - Water Detection and Removal From Shuttle Tiles

Robert C. Youngquist, NASA Kennedy Space Center, FL

5:15 pm - Panel Discussion

[C29] FISSION POWER SYSTEMS FOR SCIENCE MISSIONS - II

Wednesday, February 5, 2003, 3:45-5:45 pm - Grand Pavilion Ballroom II and III

Jack Wheeler, Co-Chair
US Department of Energy
Germantown, MD USA

David I. Poston, Co-Chair
Los Alamos National Laboratory
Los Alamos, NM USA

3:45 pm - Pin-Type Gas Cooled Reactor for Nuclear Electric Propulsion

Steven A. Wright and Ronald J. Lipinski, Sandia National Laboratories, Albuquerque, NM

4:15 pm - Liquid Metal Cooled Reactor for Space Power

Abraham Weitzberg, Potomac, MD

4:45 pm - The Design of a Nb1Zr SAFE-400 Space Fission Reactor

David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

5:15 pm - Design Development Analyses in Support of a Heatpipe-Brayton Cycle Heat Exchanger

Melissa Corley, Stanford University, Stanford, CA; Ray M. Guffee, Richard J. Kapernick, Los Alamos National Laboratory, Los Alamos, NM; Alok Majumdar, Dalton Nguyen, Brian Steeve, Melissa Van Dyke, Marshall Space Flight Center, Huntsville, AL

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