Final Program

SPACE TECHNOLOGY & APPLICATIONS INTERNATIONAL FORUM (STAIF-2005)

February 13 - 17, 2005

"FORWARD WITH A NEW AGE OF EXPLORATION"

CONFERENCE ON THERMOPHYSICS IN MICROGRAVITY

CONFERENCE ON COMMERCIAL / CIVIL NEXT GENERATION SPACE TRANSPORTATION

22nd SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION

CONFERENCE ON HUMAN/ROBOTIC TECHNOLOGY AND
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3rd SYMPOSIUM ON SPACE COLONIZATION

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Hilton Albuquerque, Southwest Ballroom

Exhibit Hours:	Monday, February 14,	9:00 - 12:30 pm	1:30 – 5:00 pm
	Tuesday, February 15,	7:45 - 12:30 pm	1:30 – 7:00 pm
	Wednesday, February 16,	7:45 - 12:30 pm	1:30 – 4:30 pm

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AWARDS AND OUTREACH

SCHREIBER-SPENCE ACHIEVEMENT AWARD

2005 AWARD COMMITTEE: **Ted Swanson** (chair), NASA Goddard Space Flight Center; **Kenneth R. Johnson** (co-chair), Jet Propulsion Laboratory; **Stan Borowski**, NASA Glenn Research Center; **Lawrence DeFillipo**, Science Applications International Corporation; **Stanley Gunn**, Rocketdyne (Retired); **Eric Rice,** Orbital Technologies Corporation (ORBITEC); **Harrison Schmitt**, Consultant; and **Robert Wiley,** US Department of Energy.

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-2005 Banquet. 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 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." 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.

Recipients of the Schreiber-Spence Space Achievement Award:

1988	Raemer E. Schreiber	1995	Martin Marietta Astro Space RTG Team	2003	Robert L. Forward
1988	Roderick W. Spence			2003	Teledyne Transit/ Nimbus/ Pioneer/Viking/ RTG Team
1990	Jerome Mullein	1996	SNAP-10A Team		
1990	William E. Wright	1996	Gary L. Bennett	2004	Robert W. Brussard
1991	Stanley V. Gunn	1997	Wesley T. Huntress	**2005**	**Ronald J. Sovie**
1992	Harold B. Finger	1998	The Cassini Mission Power Source Team		**Franklin P. Durham and Keith Boyer**
1993	Robert T. Carpenter				
1993	James J. Lombardo	1999	NSTAR Team and SCARLET Team		
1994	George Gryaznov, Russia				
1994	Victor Ya. Poupko, Russia	2002	Robert L. Wiley		

MANUEL LUJAN, JR. STUDENT PAPER AWARD

2005 AWARD COMMITTEE: **Jonathan Stabb** (Chair), NASA Goddard Space Flight Center; **Jack Chan,** Lockheed Martin; **Travis Knight,** University of South Carolina; **Mike Pauken,** Jet Propulsion Laboratory; **Bob Reid,** Los Alamos National Laboratory; **Thomas Reinarts,** NASA Kennedy Space Center; **Emanuel Tward,** Northrop Grumman; **Hamed Saber,** University of New Mexico; and **Jim Woodward,** California State University, Fullerton.

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

Recipients of the Manuel Lujan, Jr. Student Paper Award:

1988-Vladimir Valentakovich, University of California at LA
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1990-John Metzger, ISNPS, University of New Mexico
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1996-Jean-Michel Tournier, ISNPS, University of New Mexico
1998-Jeffrey S. Allen, University of Dayton
1999-Gerrit Wölk, University of Bremen, Germany
1999-Thomas L. Mahood, California State University
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2001-Eric Choiniere, University of Michigan
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OUTSTANDING PAPER AWARD

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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 2004 AWARD

(a) The recipient of the STAIF-2004 award in the Conference on Commercial/Civil Next Generation Space Transportation is **Dennis Ray Wingo,** Orbital Recovery Corporation, Washington, DC, for his presentation "On Orbit Servicing and the Future of Commercial Space Flight."

(b) The recipients of the STAIF-2004 award in the 21st Symposium on Space Nuclear Power and Propulsion are **John Matonic, John Brown, Liz Foltyn, Lawrence Garcia, Ron Hart, David Herman, Jeff Huling, M.E. Lisa Pansoy-Hjelvik, Fritz Sandoval, and Diane Spengler,** Los Alamos National Laboratory, Los Alamos, NM, for their paper entitled "Heat Source Neutron Emission Rate Reduction Studies – Water Induced HF Liberation."

(c) The recipient of the STAIF-2004 award in the 1st Symposium on New Frontiers and Future Concepts is **Gregory Meholic,** Hermosa Beach, CA, for his paper entitled "A Novel View of Spacetime Permitting Faster-Than-Light Travel."

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**, Cibola High School; **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**. 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 held Monday, February 14, 2005, 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 "Titan Traveler." The Design Competition judging will take place at this special session. Winners will receive prizes at the STAIF-2005 2nd Plenary Session, held Monday, February 14. The Space Design Competition is coordinated by **Mr. Jeff King**, UNM-ISNPS.

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-2005)**: Conf. on Thermophysics in Microgravity; Conf. on Commercial/Civil Next Generation Space Transportation; 22nd Symp. on Space Nuclear Power and Propulsion; Conf. on

Human/Robotic Technology and the National Vision for Space Exploration; 3rd Symp. on Space Colonization; 2nd Symp. on New Frontiers and Future Concepts.
AIP Conf. Proceedings 746, (1-vol. hardcover book), ISBN 0-7354-0230-2 ..... $290.00
CD-ROM Version, ISBN 0-7354-0230-0……$145.00

Proc. Space Technology and Applications International Forum **(STAIF-2004)**: Conf. on Thermophysics in Microgravity; Conf. on Commercial/Civil Next Generation Space Transportation; 21st Symp. on Space Nuclear Power and Propulsion; Conf. on Human Space Exploration; 2nd Symp. on Space Colonization; 1st Symp. on New Frontiers and Future Concepts.
AIP Conf. Proceedings 699, (1-vol. hardcover book), ISBN 0-7354-0171-3 ..... $290.00
CD-ROM Version, ISBN 0-7354-0172-0……$145.00

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

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

HILTON ALBUQUERQUE

Guest rooms have been reserved at the Hilton Albuquerque, located in the University District, for those who identify themselves as participants of STAIF-2005. The rates are:

ROOM RATES

Single Occupancy $68.00
Double Occupancy $68.00
Triple Occupancy $68.00
Quadruple Occupancy $68.00

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

Hilton Albuquerque, 1901 University Blvd. NE, Albuquerque, NM 87102-1713
(505) 884-2500, Fax: (505) 880-1196, Toll Free Reservations: 1-800-774-1500

All group-rate reservation requests must be received by the hotel no later than FEBRUARY 1, 2005. Attendees must identify themselves as participants of STAIF-2005, and provide our Group ID code, **STAIF-5;** 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. Cancellations must be made seventy-two (72) hours prior to arrival to avoid billing or forfeiting the deposit received.

REGISTRATION AND FEES

Hilton Albuquerque, Garden Room

Registration: Sunday, February 13, 4:30 pm - 7:30 pm
Monday, February 14, 7:00 am - 5:30 pm
Tuesday, February 15, 7:00 am - 7:00 pm
Wednesday, February 16, 7:00 am - 4:30 pm
Thursday, February 17, 7:30 am - 10:30 am

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-2005 Conferences, MSC01-1120, FEC Room 239, 1 University of New Mexico, Albuquerque, NM 87131-0001, (505) 277-2813 or (505) 277-0446.

	Early (postmarked on or before 12/20/ 2004)	**Late** (postmarked after 12/ 20/ 2004)
OPEN TECHNICAL MEETING(a)	$450.00	$495.00
ONE DAY REGISTRATION (b)	$350.00	$380.00
STUDENT (C)	$175.00	$190.00
ADDITIONAL LUNCHEON TICKET(D)	$35.00	$35.00

(a) Open Technical Meeting Full Registration Fee: Includes Sessions, Tuesday banquet, 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. (Banquet tickets are not included, but are available for purchase).
(c) Student Registration: **TO QUALIFY, INDIVIDUALS MUST SHOW PROOF OF FULL TIME ENROLLMENT** for the 2005 Spring Semester. Pre-registrants should enclose a copy of their 2005 spring schedules. Registration fee includes a set of Proceedings on CD ROM and coffee breaks.
(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 16, 2005. NO REFUNDS WILL BE ISSUED after JANUARY 16, 2005. All refunds will be made promptly by mail.

AWARDS BANQUET

Sponsored by the Boeing Company

One banquet 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 banquet tickets*. Guest banquet tickets will ***not*** be included in the host's registration packet.

Banquet: Tuesday, February 15, 2005, 7:30 pm - 9:30 pm, New Mexico Ballroom, Hilton Albuquerque.

Guest Speaker: Donna Shirley, Director of the Science Fiction Museum and Hall of Fame in Seattle, WA; and President, Managing Creativity.

CHAIRS' AND SPEAKERS' BREAKFAST

All STAIF-2005 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 Monday through Wednesday.

AUDIO / VISUAL EQUIPMENT

One (1) LCD Data Projector, and one (1) screen will be provided at all sessions. A slide or overhead 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 14, 6:00 pm – 7:30 pm, Parlor C/D.

Technical Program Committees

TUESDAY, February 15, 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, Parlor A/B
Conf. on Commercial/Civil Next Generation Space Transportation, Rio Grande Room
Symp. on Space Nuclear Power and Propulsion, New Mexico Ballroom (S)
Conf. on Human/Robotic Tech. and the National Vision for Space Exploration, Parlor G/H
Symp. on Space Colonization, New Mexico Ballroom (N)
Symp. on New Frontiers and Future Concepts, Parlor E/F

Executive Program Committee

WEDNESDAY, February 16, 12:30 pm - 1:30 pm, Zuni Boardroom

PROGRAM ACTIVITIES

SUNDAY, February 13, 2005

4:30 pm - 7:30 pm **Registration**, Garden Room

MONDAY, February 14, 2005

7:00 am - 7:45 a.m. **Speakers' Breakfast,** Ranchers Club of New Mexico
7:00 am - 5:30 pm **Registration,** Garden Room
7:30 am - 8:00 am **Secondary School Special Session Registration,** Rio Grande Room
8:00 am - 8:15 am **Welcoming and Opening Remarks,** New Mexico Ballroom
8:00 am - 12:00 noon **Secondary School Special Session,** Rio Grande Room
8:00 am - 12:00 noon **Space Design Competition,** Promenade
8:15 am - 9:45 am **Plenary Session I,** New Mexico Ballroom
9:45 am - 10:00 am **Coffee Break,** Southwest Ballroom
10:00 am - 12:30 pm **Plenary Session II,** New Mexico Ballroom
12:30 pm - 1:45 pm **Lunch Break**
1:45 pm - 3:45 pm **Technical Sessions** (see table of contents or centerfold for time and room)
3:45 pm - 4:00 pm **Coffee Break,** Southwest Ballroom
4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)
6:00 pm - 7:30 pm **Joint Steering and Executive Committee Meeting,** Parlor C/D

TUESDAY, February 15, 2005

7:00 am - 7:45 am **Speakers' Breakfast,** Rio Grande Room
7:00 am - 7:00 pm **Registration,** Garden Room
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,** Southwest Ballroom
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, Parlor A/B
Conf. on Commercial, Civil Next Generation, Rio Grande Room
Symp. on Space Nuclear Power and Propulsion, New Mexico Ballroom (S)
Conf. on Human/Robotic Tech. and the Nations Vision for Space Exploration, Parlor G/H
Symp. on Space Colonization, New Mexico Ballroom (N)
Symp. on New Frontiers and Future Concepts, Parlor E/F

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,** Southwest Ballroom
4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)
7:00 pm - 7:30 pm **No-Host Cocktail Reception,** Promenade
7:30 pm - 9:30 pm **Awards Banquet,** New Mexico Ballroom, ***sponsored by the Boeing Company***

WEDNESDAY, February 16, 2005

7:00 am - 7:45 am **Speakers' Breakfast,** Rio Grande Room
7:00 am - 4:30 pm **Registration,** Garden Room
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,** Southwest Ballroom
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,** Zuni Boardroom
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,** Southwest Ballroom
4:00 pm - 6:00 pm **Technical Sessions** (see table of contents or centerfold for time and room)

THURSDAY, February 17, 2005

7:00 am - 7:45 am **Speakers' Breakfast,** Rio Grande Room
7:00 am - 10:30 am **Registration,** Garden Room
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,** Southwest Ballroom
10:30 am - 12:30 pm **Technical Sessions** (see table of contents or centerfold for time and room)

WELCOMING AND OPENING REMARKS

Monday, February 14, 8:00 am - 8:15 am, New Mexico Ballroom

Robert Sackheim, STAIF-2005 General Chair, NASA Marshall Space Flight Center
James H. Crocker, STAIF-2006 General Chair, Lockheed Martin Space Systems Company
Louis Caldera (invited), President, University of New Mexico
Joseph L Cecchi, Dean, School of Engineering, University of New Mexico

PLENARY SESSION I: FORWARD WITH A NEW AGE OF EXPLORATION

Monday, February 14, 8:15 am – 9:45 am, New Mexico Ballroom

Robert Sackheim, Chair
Assistant Director and Chief Engineer
Space Propulsion Systems
NASA Marshall Space Flight Center
Huntsville, AL

James Crocker, Co-Chair
Vice President
Civil Space
Lockheed Martin Space Systems Co.
Denver, CO

Douglas Cook, Deputy Assistant Administrator, Exploration Systems, NASA Headquarters, Washington, DC
Laurie Leshin, Director, Center for Meteorite Studies, Arizona State University, Tempe, AZ
Charles Elachi, Director, Jet Propulsion Laboratory, Pasadena, CA

PLENARY SESSION II: ENABLING A NEW AGE OF EXPLORATION

Monday, February 14, 10:00 am - 12:30 pm, New Mexico Ballroom

Mike Sander, Chair
Manager
Exploration Systems and Technology
Jet Propulsion Laboratory
Pasadena, CA

Joseph Mills, Co-Chair
Vice President
Space Science
The Boeing Company
Houston, TX

Michael D. Griffin, Head, Space Department, Johns Hopkins University Applied Physics Laboratory, Laurel, MD
Peggy Nelson, Vice President and Program Manager of Prometheus, Northrop Grumman Space Technology, Redondo Beach, CA
James H. Crocker, Vice President, Civil Space, Lockheed Martin Space Systems Company, Denver, CO
Charles H. Allen, Vice President, Space Exploration Systems, The Boeing Company

SPACE DESIGN COMPETITION AND SECONDARY SCHOOL SPECIAL SESSION

Monday, February 14, 8:00 am - 12:00 pm, Rio Grande Room

Irene L. El-Genk, Chair
Cibola High School
Albuquerque, NM

Jeff King, Co-Chair
University of New Mexico, ISNPS
Albuquerque, NM

Welcome, Irene El-Genk, Cibola High School and Kathy Kirkpatrick, Retired, APS
Judging of the Secondary School Space Design Competition, Jeffrey C. King
View STAIF-2005 Exhibits
Speakers, to be announced

TECHNICAL SESSIONS

MONDAY, FEBRUARY 14, 2005

A01. LESSONS LEARNED FROM THE VARIABLE EMITTANCE EXPERIMENT ON ST5

Monday, February 14, 2005, 1:45 - 3:45 p.m. - Parlor A/B

Chairs: Ted Swanson, NASA Goddard Space Flight Center, Greenbelt, MD
Tung T. Lam, The Aerospace Corporation, El Segundo, CA

F01. POTENTIAL FRONTIERS

Monday, February 14, 2005, 1:45 - 3:45 p.m. - Parlor E/F

Chairs: Charles Suchomel, Air Force Research Laboratory, Wright-Patterson AFB, OH
David Goodwin, US Department of Energy, Washington, DC

1:45 pm - The GEM (Gravity-Electro-Magnetism) Theory of Field Unification and its Application to Human Flight and Gravity Wave Production and Detection
John Brandenburg, Florida Space Institute-University of Central Florida, Kennedy Space Center, Florida

2:15 pm - The Biefeld Brown Effect and the Global Electric Circuit
Gary V. Stephenson, Seculine Consulting, Bellevue, WA

2:45 pm - Analysis of the Demonstration of the Gertsenshtein Effect
Gary V. Stephenson, Seculine Consulting, Bellevue, WA

3:15 pm - Warp-Drives: The Dreams and Realities Part I: A Problem Statement and Insights
P.A. Murad, Department of Defense, Vienna, VA

D01. OVERVIEW OF HUMAN AND ROBOTIC EXPLORATION STRATEGIES, ARCHITECTURES AND ISSUES

Monday, February 14, 2005, 1:45 - 3:45 p.m. - Parlor G/H

Chairs: John Mankins, NASA Headquarters, Washington, DC
Garry Lyles, NASA Headquarters, Washington, DC

1:45 pm - Opening Options for the Vision: Exploration Systems Research and Technology
John Mankins, NASA Headquarters, Washington, DC

2:15 pm - Modular, Adaptive, Reconfigurable Systems: Technology for Sustainable, Reliable, Effective, and Affordable Space Exploration
Jaime Esper, NASA Goddard Space Flight Center, Greenbelt, MD

2:45 pm - Run-Time Reconfigurable System Over Wireless Network
Will Hua Zheng, Savio N Chau, Neville Marzwell, Jet Propulsion Laboratory, Pasadena, CA

3:15 pm - Environmental Resistance in the Mars Atmosphere
Bruce A. Pint and Peter F. Tortorelli, Oak Ridge National Laboratory, Oak Ridge, TN

C01. OPENING SESSION

Monday, February 14, 2005, 1:45 - 3:45 p.m. - New Mexico Ballroom South

Chairs: George R. Schmidt, NASA Marshall Space Flight Center, Huntsville, AL
R. Joseph Cassady, Aerojet, Washington, DC

1:45 pm - Introduction and Overview of Conference
George R. Schmidt, NASA Marshall Space Flight Center, Huntsville, AL

2:15 pm - ESA Plans for Nuclear Power and Propulsion
Gerhard Schwehm, Head of Planetary Missions Division, SCI-SB ESA-ESTEC

2:45 pm - Russian Plans for Nuclear Power & Propulsion
Samit Bhattacharyya, RenMar Enterprises Inc., Naperville, IL

3:15 pm - NASA HQ-Overview of Project Prometheus
Victoria Friedensen, NASA Headquarters, Washington, DC

E01. OPENING SESSION

Monday, February 14, 2005, 1:45 - 3:45 p.m. - New Mexico Ballroom North

Chairs: Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI
Edward McCullough, The Boeing Company, Huntington Beach, CA

1:45 pm - Space Tourism
Eric Rice, Orbital Technologies Corporation, Madison, WI

2:05 pm - Space Exploration
Bob Cassanova, NASA Institute for Advanced Concepts, Atlanta, GA

2:25 pm – Space Bases
Wendell Mendell, NASA Johnson Space Center, Houston, TX

2:45 pm – Space Resources Utilization
Clyde Parrish, NASA Kennedy Space Center, Cape Canaveral, FL

3:05 pm – Space Settlements
Anita Gale, The Boeing Company, Nassau Bay, TX

3:25 pm – Terraforming
Penny Boston, New Mexico Institute of Mining and Technology, Socorro, NM

B0-1. OPENING SESSION: COMMERCIAL SPACE

Monday, February 14, 2005, 1:45 - 3:45 p.m. - Rio Grande Room

Chairs: William Gaubatz, SpaceAvailable, LLC, Newport Beach, CA
Joerg Kreisel, JOERG KREISEL International Consultant, Aachen, Germany

1:45 pm - Commercial Space - Its Drivers and Issues
Joerg Kreisel, JOERG KREISEL International Consultant, Aachen, Germany

2:15 pm - Future Markets for Commercial Space: The Fault Lies Not in Our Stars, But in Ourselves
Henry Hertzfeld, George Washington University, Washington DC

2:45 pm - Perspective of a Japanese Space SME
Dragi Trifunovich, Astro Research Corporation, Japan

3:15 pm - X PRIZE CUP - Opening Personal Space

William Gaubatz, X PRIZE Foundation, Santa Monica, CA

A02. THERMAL CONTROL MATERIAL TECHNOLOGIES FOR FUTURE SPACECRAFT

Monday, February 14, 2005, 4:00 - 6:00 p.m. - Parlor A/B

Chairs: Rengasamy Ponnappan, Air Force Research Laboratory, Wright-Patterson AFB, OH
Jeffrey R. Didion, NASA Goddard Space Flight Center, Greenbelt, MD

4:00 pm - Multifunctional Carbon-Carbon Foam-Core Space Radiator Development
Suraj P. Rawal, Kevin S. Johnson, and Kevin Makowski, Lockheed Martin Space Systems Co., Denver, CO

4:30 pm - Carbon Fiber Composites for Spacecraft Thermal Management Opportunities
John J. Banisaukas, Cytec Carbon Fibers, Cumming, GA; Chris D. Levan, Cytec Carbon Fibers, Greenville, SC; Suraj P. Rawal, Lockheed Martin Space Systems, Denver, CO; Edward M. Silverman, Northrop Grumman Space Technology, Redondo Beach, CA; Roland J. Watts, Air Force Research Laboratory, Wright-Patterson AFB, OH

5:00 pm - Materials Opportunity for Spacecraft and Aerospace Thermal Management
Roland J. Watts, Mark Kistner, Air Force Research Laboratory, Wright-Patterson AFB, OH; Andriana M. Druma, Khurial Alam, Ohio University, Athens, OH

5:30 pm - Heat Flux-Based Emissivity Measurement
Saeed Moghaddam, John Lawler, Collin McCaffery, Advanced Thermal and Environmental Concepts Inc., College Park, MD; Jungho Kim, University of Maryland, College Park, MD

F02. ADVANCED CONCEPTS AND NEAR TERM TECHNOLOGIES-I

Monday, February 14, 2005, 4:00 - 6:00 p.m. - Parlor E/F

Chairs: R. Clive Woods, Iowa State University, Ames, IA
James F. Woodward, California State University, Fullerton, CA

4:00 pm - High-Frequency Gravitational Wave (HFGW) Generation by Means of X-ray Lasers and Detection by Coupling Linearized GW to EM Fields
Robert M.L. Baker, Jr., GRAVWAVE, LLC and Transportation Sciences Corporation, Playa del Rey, CA; and Fang-Yu Li, Chongqing University, Chongqing, People's Republic of China

4:30 pm - Gravitational Wave Generation Using Acoustic Resonators and Detection Using Coupled Resonance Chambers
R. Clive Woods, Iowa State University, Ames, IA; Robert M.L. Baker, Jr., GRAVWAVE, LLC, Playa del Rey, CA

5:00 pm - Superconductor Permanent Magnets for Advance Propulsion Applications
Phil Putman, Yuxiang Zhou, Texas Center for Superconductivity and Advanced Materials, Houston, TX; and Tony Robertson, NASA Marshall Space Flight Center, Huntsville, AL

5:30 pm - Weight Measurements of High-Temperature Superconductors during Phase Transition in Stationary, Non-Stationary Condition and under ELF Radiation

Martin Tajmar, Klaus Hense, Klaus Marhold, ARC Seibersdorf Research, Austria; Clovis de Matos, ESA-HQ, Paris, France

C02. THERMOPHOTOVOLTAIC POWER CONVERSION TECHNOLOGY - I

Monday, February 14, 2005, 4:00 - 6:00 p.m. - Parlor G/H

Chairs: Susan Murray, Emcore Corporation, Albuquerque, NM
Edward Brown, Lockheed Martin, Schenectady, NY

4:00 pm - Test Performance Results for an 80 Watt Thermophotovoltaic Energy System

E.J. Brown, S.R. Burger, L.R. Danielson, M.W. Dashiell, D.M. DePoy, J.M. Dolatowaski, P.M. Fourspring, J.E. Oppenlander, J.R. Parrington, K.D. Rahner, W.F. Topper, J.L. Vell, Lockheed Martin Corporation, Niskayuna, NY

4:30 pm - Frequency Selective Surface Bandpass Filters Applied to Radioisotope Thermophotovoltaic Generators

W.E. Horne, Mark D. Morgan, W. Paul Horne, and Vasan S. Sundaram, EDTEK, Inc., Kent, WA

5:00 pm - Thermophotovoltaic Converter Performance for Radioisotope Power Systems

Christopher J. Crowley, Nabil A. Elkouh, Creare Inc., Hanover, NH; Susan Murray, Emcore Corporation, Albuquerque, NM; Donald L. Chubb, NASA Glenn Research Center, Cleveland, OH

5:30 pm - The Effect of Non-Uniform Illumination on Thermophotovoltaic Array Performance

Jane E. Oppenlander, Jeffrey L. Vell, Lee R. Danielson, Michael W. Dashiell, David M. DePoy, Lockheed Martin, Schenectady, NY

C03. SPACE NUCLEAR POWER SYSTEMS: SIMULATION AND MODELING

Monday, February 14, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom South

Chairs: Robert L. Cataldo, NASA Glenn Research Center, Cleveland, OH
Dennis Pelaccio, Science Applications International Corporation, Highlands, CO

4:00 pm - DynMo: Dynamic Simulation Model for Space Reactor Power Systems

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

4:30 pm - Dynamic Modeling and Control of Nuclear Reactors Coupled to Closed-Loop Brayton Cycle Systems Using SIMULINK ™

Steven A. Wright, Travis Sanchez, Sandia National Laboratories, Albuquerque, NM

5:00 pm - Temperature Distributions in LMR Fuel Pin Bundles as Modeled by COBRA-IV-I

Steven A. Wright, Sherry Stout, Sandia National Laboratories, Albuquerque, NM

5:30 pm - Modification of Monteburns to Evaluate Space Reactors at Criticality Throughout the Burnup Cycle

Holly R. Trellue, Los Alamos National Laboratory, Los Alamos, NM

C04. RADIOISOTOPE POWER SYSTEMS TECHNOLOGY AND DEVELOPMENT

Monday, February 14, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom North

Chairs: Richard R. Furlong, US Department of Energy, Germantown, MD
Lawrence E. DeFillipo, Science Applications International Corporation, Reston, VA

4:00 pm - NASA's Program For Radioisotope Power System Research and Development
George R. Schmidt, NASA Marshall Space Flight Center, Huntsville, AL; Robert L. Wiley, Rebecca L. Richardson, Richard R. Furlong, U.S. Department of Energy, Germantown, MD

4:30 pm - DOE & Boeing Rocketdyne-Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) Status
Richard Rovang, The Boeing Company, Canoga Park, CA

5:00 pm – Stirling Radioisotope Generator (SRG110) Status
Jack Chan, Lockheed Martin Space Systems Company, King of Prussia, PA

5:30 pm - NASA Radioisotope Power Conversion Technology NRA Overview
David J. Anderson, NASA Glenn Research Center, Cleveland, OH

B1-1. COMMERCIAL SPACE WORKSHOP: BUSINESS

Monday, February 14, 2005, 4:00 - 6:00 p.m. - Rio Grande Room

Chairs: Joerg Kreisel, JOERG KREISEL International Consultant, Aachen, Germany
Kirby Ikin, Asia Pacific Aerospace Consultants, St. Ives NSW, Australia

4:00 pm - Critical Issues in Space Insurance and Risk Management
Kirby Ikin, Asia Pacific Aerospace Consultants, Australia

4:30 pm - Business Models & Financing Make Space Ventures Top or Flop
Joerg Kreisel, JOERG KREISEL International Consultant, Aachen, Germany

5:00 pm - Successfully Developing A Private Space Program
James William Benson, SpaceDev, Inc., Steamboat Springs, CO

5:30 pm - Emerging Roles For Non-Traditional Companies in the Commercial Space Business Sector
Rick Sanford, CISCO Systems, Herndon, VA

TUESDAY, FEBRUARY 15, 2005

A03. TWO-PHASE THERMAL CONTROL SYSTEMS

Tuesday, February 15, 2005, 8:00 - 10:00 a.m. - Parlor A/B

Chairs: Charles Dan Butler, NASA Goddard Space Flight Center, Greenbelt, MD
Tung T. Lam, The Aerospace Corporation, El Segundo, CA

8:00 am - Development of Electrohydrodynamic (EHD) Micropumps for Cryogenic Applications
Parisa Foroughi, Michael M. Ohadi, University of Maryland, College Park, MD; Yuan Zhao, John Lawler, Advanced Thermal and Environment Concepts Inc., College Park, MD

8:30 am - A Statistical Comparison of Various Fluids for a Drift Flux Model in Reduced Gravity Two-Phase Slug Flow
Cable Kurwitz, Frederick Best, Texas A&M University, College Station, TX

9:00 am - Computational Modeling of Spray Cooling: Current Status and Future Challenges
R. Paneer Selvam, University of Arkansas, Fayetteville, AR; Lanchao Lin, Universal Energy Systems, Inc., Dayton, OH; Rengasamy Ponnappan, Air Force Research Laboratory, Wright-Patterson AFB, OH

9:30 am – Panel Discussion

D02. ESTABLISHING A ROAD MAP TO FUTURE HUMAN AND ROBOTIC TECHNOLOGY

Tuesday, February 15, 2005, 8:00 - 10:00 a.m. - Parlor E/F

Chairs: John Mankins, NASA Headquarters, Washington, DC
Douglas Craig, NASA Headquarters, Washington, DC

8:00 am - Advanced Technology Lifecycle Analysis System (ATLAS) Technology Tool Box (TTB)
Monica M. Doyle, Science Applications International Corporation, Schaumburg, IL; Daniel A. O'Neil, NASA Marshall Space Flight Center, Huntsville, AL; Carissa B. Christensen, The Tauri Group, Alexandria, VA

8:30 am - Creating Communications, Computing, and Networking Technology Development Road Maps for Future NASA Human and Robotic Missions
Kul Bhasin, NASA Glenn Research Center, Cleveland, OH; Jeffrey L. Hayden, Infinite Global Infrastructures, L.L.C., West Chicago, IL

9:00 am - NASA Exploration Systems Technology Maturation Program Overview
Nantel Suzuki and Robert Wegeng, NASA Headquarters, Washington DC

9:30 am - Overview of NASA's In-Space Technology Experiment Program (In-STEP) and its Role in Future NASA Exploration Systems
Carlos S. Campos, NASA Headquarters, Washington, DC

C05. RADIOISOTOPE ENERGY CONVERSION AND ELECTRIC PROPULSION APPLICATIONS

Tuesday, February 15, 2005, 8:00 - 10:00 a.m. - Parlor G/H

Chairs: Steven Oleson, NASA Glenn Research Center, Cleveland, OH
David Myers, Lockheed Martin, Littleton, CO

8:00 am – REP Spacecraft Design Concept Considerations
Daryl A. Edwards, NASA Glenn Research Center, Cleveland, OH; Douglas I. Fiehler, QSS Group Incorporated, Cleveland, OH

8:30 am - Advanced Radioisotope Power System for Electric Propulsion Missions
R. Joseph Cassady, Aerojet, Washington, DC; Alex Kristalinski, Aerojet, Redmond, WA; Jack Chapman, Greg Duba, General Dynamics – Electric Boat, Groton, CT

9:00 am - The Innovative Interstellar Explorer "Vision Mission"
R. L. McNutt, Jr., R. E. Gold, S. M. Krimigis, E. C. Roelof, J. C. Leary, Johns Hopkins University, Laurel, MD; M. Gruntman, University of Southern California, Los Angeles, CA; G. Gloeckler, P. L. Koehn, University of Michigan, Ann Arbor, MI; W. S. Kurth, The University of Iowa, Iowa City, IA; S. R. Oleson, NASA Glenn Research Center, Cleveland, OH; D. Fiehler, QSS group, Inc., Cleveland, OH

9:30 am - Radioisotope Power Systems with Skuterudite-Based Thermoelectric Converters
Mohamed S. El-Genk and Hamed H. Saber, University of New Mexico, Albuquerque, NM

C06. SPACE NUCLEAR REACTOR POWER SYSTEMS - I

Tuesday, February 15, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom South

Chairs: Paul Pickard, Sandia National Laboratories, Albuquerque, NM
Donald B. King, Sandia National Laboratories, Albuquerque, NM

8:00 am - ZPPR-16 & 20 Benchmark Review and Assessment
Thomas F. Marcille, Los Alamos National Laboratory, Los Alamos, NM

8:30 am - Use of Beryllium and Beryllium Oxide in Space Reactors
L.L. Snead and S.J. Zinkle, Oak Ridge National Laboratory, Oak Ridge, TN

9:00 am - Evidence of Annealed Proton Damage From a ZnS:Mn-Based Phosphor Paint
N.P. Bergeron, W.A. Hollerman, University of Louisiana at Lafayette, LA; S.M. Goedeke, S.W. Allison, Oak Ridge National Laboratory, Oak Ridge, TN; C.I. Muntele, D. Ila, Alabama A&M University, Normal, AL

9:30 am – Panel Discussion

E02. SPACE BASES

Tuesday, February 15, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom North

Chairs: Wendell W. Mendell, NASA Johnson Space Center, Houston, TX
Michael B. Duke, Colorado School of Mines, Golden, CO

8:00 am - Technical Feasibility Assessment of Lunar Base Mission Scenarios
Trygve "Spike" Magelssen, Futron Corporation, Bethesda, MD; Eligar Sadeh, University of North Dakota, Grand Forks, ND

8:30 am – Space Bases for Transportation Support
Thomas C. Taylor, Walter P. Kistler, Bob Citron, Lunar Transportation Systems Inc, Bellavue, WA; Alex Gimarc, Global Outpost, Las Cruces, NM; Gene Meyers, Space Island Group, Inc, West Covina, CA

9:00 am – Lunar Settlement Initiation: The Catalyst of Helium-3 and Other Resources
Harrison Schmitt, University of Wisconsin, Madison, WI

9:30 am – An ISRU-intensive Lunar Base Development Scenario
Michael B. Duke, Javier Diaz, Paul van Susante, Colorado School of Mines, Golden, CO

A04. THERMAL CONTROL FOR DEEP SPACE MISSIONS

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - Parlor A/B

Chairs: Gajanana C. Birur, Jet Propulsion Laboratory, Pasadena, CA
Charles Dan Butler, NASA Goddard Space Flight Center, Greenbelt, MD

10:30 am - The Use of Heat Flux Gages for Hot Wall TPS Applications
Forrest Strobel, Josh Gudgeon, ITT Industries Advanced Engineering Services, Huntsville, AL; Tom Reinarts, NASA Kennedy Space Center, FL; Gerald Russell, AMRDEC, Redstone Arsenal, AL

11:00 am - Robust Cooling of High Heat Fluxes Using Hybrid Loop Technology
Jon Zuo, Chanwoo Park, David Sarraf, Advanced Cooling Technologies, Inc., Lancaster, PA; Anthony Paris, Jet Propulsion Laboratory, Pasadena, CA

11:30 am - Development of Mechanical Pump Based Fluid Loop Technologies for Thermal Control of Future Mars Rovers
Gajanana C. Birur, Anthony D. Paris, Pradeep Bhandari, David Bame, Mauro Prina, Michael T. Pauken, and Keith S. Novak, Jet Propulsion Laboratory, Pasadena, CA

12:00 noon - Development and Testing of a Miniaturized Multi-Evaporator Hybrid Loop Heat Pipe
David C. Bugby, Edward J. Kroliczek, James S. Yun, Swales Aerospace, Beltsville, MD

F03. ADVANCED CONCEPTS AND NEAR TERM TECHNOLOGIES-II

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - Parlor E/F

Chairs: R. Clive Woods, Iowa State University, Ames, IA
James F. Woodward, California State University, Fullerton, CA

10:30 am - Application of High-Frequency Gravitational Waves (HFGWs)
Robert M.L. Baker, Jr., GRAVWAVE, LLC and Transportations Sciences Corporation, Playa Del Rey, CA

11:00 am - Chaotic Bits (Chabits) in Quantum and Chaos Computing
Ciprian Ciubotariu, Universite Laval, Quebec, Canada; Carmen-Iuliana Ciubotariu, University of Calgary, Canada; Corneliu Ciubotariu, Technical University “Gh. Asachi” of Iasi, Romania

11:30 am - Gravitational Wave (GW) Radiation Pattern at the Focus of a High-Frequency GW (HFGW) Generator and Aerospace Applications
Robert M.L. Baker, Jr.,GRAVWAVE, LCC and Transportation Sciences Corporation, Playa del Rey, CA; Eric W. Davis, Warp Drive Metrics, Las Vegas, NV; R.C. Woods, Iowa State University, Ames, IA

12:00 noon - Gravitational Wave Propulsion
Giorgio Fontana, University of Trento, Povo, Italy

C07. NUCLEAR POWER AND PROPULSION CONCEPTS

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - Parlor G/H

Chairs: James H. Lee, Jr., Los Alamos National Laboratory, Los Alamos, NM
Samit Bhattacharyya, RenMar Enterprises Inc., Naperville, IL

10:30 am - Segmented Thermoelectric Multicouple Converter Technology Development
Jack Mondt, Ken Johnson, Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, CA; Mohamed El-Genk, University of New Mexico, Albuquerque, NM; Patrick Frye and Bill Determan, The Boeing Company, Canoga Park, CA

11:00 am - Electric Propulsion System Design Trades For Nuclear Powered Spacecraft
Kristi de Grys, Aerojet, Redmond, WA

11:30 am - Merit: A New Approach for a Large Scale Space Infrastructure Based on Resources from Mars
J. Powell, G. Maise, and John Paniagua, Plus Ultra Technologies, Shoreham, NY

12:00 noon - NERVA-Derived Concept for a Bimodal Nuclear Thermal Rocket
Steven P. Fusselman, Patrick E. Frye, Stanley V. Gunn, Calvin Q. Morrison, The Boeing Company, Canoga Park, CA; Stanley K. Borowski, NASA Glenn Research Center, Cleveland, OH

C08. SMALL RADIOISOTOPE POWER CONCEPTS AND APPLICATIONS - I

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom South

Chairs: Robert Abelson, Jet Propulsion Laboratory, Pasadena, CA
Tibor Balint, Jet Propulsion Laboratory, Pasadena, CA

10:30 am - Benefit of Small Radioisotope Power Systems for NASA Exploration Missions
George R. Schmidt, NASA Marshall Space Flight Center, Huntsville, AL; Robert D. Abelson, Jet Propulsion Laboratory, Pasadena, CA; Robert L. Wiley, U.S. Department of Energy, Germantown, MD

11:00 am - Exploring Europa with a Surface Lander Powered by a Small Radioisotope Power System (RPS)
Robert D. Abelson and James H. Shirley, Jet Propulsion Laboratory, Pasadena, CA

11:30 am - An Adjunct Galilean Satellite Orbiter Concept Using a Small Nuclear Power Source
James E. Randolph, Robert D. Abelson, Leon Alkalai, David H. Collins, William V. Moore, Jet Propulsion Laboratory, Pasadena, CA

12:00 noon - Small-RPS Enabled Mars Rover Concept
Tibor S. Balint, Jet Propulsion Laboratory, Pasadena, CA

C09. SPACE REACTOR SHIELD DESIGN METHODS AND TECHNOLOGIES

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom North

Chairs: Steven A. Wright, Sandia National Laboratories, Albuquerque, NM
John Wheeler, US Department of Energy, Germantown, MD

10:30 am - Evaluation of Advanced Materials for Space Reactor Shielding
E.M. Haney, J.P. Blanchard,University of Wisconsin, Madison, WI; J.J. Yugo, Oak Ridge National Laboratory, Oak Ridge, TN

11:00 am - A Comparison of Fast-Spectrum and Moderated Space Fission Reactors
David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

11:30 am - Optimum Reflector Configurations for Minimizing Fission Power Peaking in a Lithium-Cooled, Liquid-Metal Reactor with Sliding Reflectors
Michael L. Fensin, University of Florida, Gainesville, FL; David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

12:00 noon - Effect of Neutron Absorbers Mixed in or Coating the Fuel of a 1-MWt Lithium-Cooled Space Reactor
Benjamin W. Amiri, University of Florida, Gainesville, FL; David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

B1-2. COMMERCIAL SPACE WORKSHOP: LEGAL, REGULATORY AND STANDARDS

Tuesday, February 15, 2005, 10:30 a.m. - 12:30 p.m. - Rio Grande Room

Chairs: Frans von der Dunk, Leiden University, Leiden, The Netherlands
Tare Brisibe, Freelance Consultant, Surrey, UK

10:30 am - European Developments in Space and Space Communications: Legal and Policy Aspects
Frans G. von der Dunk, International Institute of Air and Space Law, Leiden, The Netherlands

11:00 am - Regulatory Hurdles for Satellite Communications Around the World
Les Tennen, Law Firm of Sterns & Tennen, Phoenix, AZ

11:30 am - Satellite Aeronautical Public Correspondence: International Legal and Regulatory Considerations
Tare Brisibe, Consultant, United Kingdom

12:00 noon - Contractual Know-How - A Key to Commercial Success
Joerg Kreisel, JOERG KREISEL International Consultant, Aachen, Germany

C10. THERMAL ENERGY TRANSPORT AND HEAT REJECTION TECHNOLOGY

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - Parlor A/B

Chairs: William Determan, The Boeing Company, Canoga Park, CA
Jean-Michel Tournier, University of New Mexico, Albuquerque, NM

1:30 pm - Radiator Heat Pipes with Carbon-Carbon Fins and Armor for Space Nuclear Reactor Power Systems
Jean-Michel Tournier and Mohamed El-Genk, University of New Mexico, Albuquerque, NM

2:00 pm - Loop Heat Pipe Radiator Trade Study for the 300-550K Temperature Range
William G. Anderson, Advanced Cooling Technologies, Lancaster, PA; Walter Bienert, Consultant, Lutherville, MD

2:30 pm - Alkali Metal Technology for JIMO Applications
Claude B. Reed, Ken Natesan, Yoichi Momozaki, Argonne National Laboratory, Argonne, IL

3:00 pm - Electromagnetic Pump Technology for Space Flight Applications
William R. Determan, The Boeing Company, Canoga Park, CA

F04. POTENTIAL FRONTIERS REVISITED

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - Parlor C/D

Chairs: Paul Murad, U.S. Department of Defense, Vienna, VA
Glen A. Robertson, NASA Marshall Space Flight Center, Huntsville, AL

1:30 pm - Teleportation via Wormhole-Stargates
Eric W. Davis, Institute for Advanced Studies, Austin TX

2:00 pm – Propulsion Challenges and Mach Effects
James F. Woodward, California State University, Fullerton, CA

2:30 pm - Gravitational Waves and Superconductivity
R. Clive Woods, Iowa State University, Ames, IA

3:00 pm - Universal Entanglement, Moessbauer Qubits, Equivalence and Mach's Principles and, All That
Ciprian Ciubotariu, Universite Laval, Laval, Quebec, Canada

D03. HUMAN/ROBOTIC TECHNOLOGY: DRIVERS AND OPTIONS TO MEET THE NEEDS OF OTHER APPLICATIONS

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - Parlor E/F

Chairs: Christopher Moore, NASA Headquarters, Washington, DC
Jaime Esper, NASA Goddard Space Flight Center, Greenbelt, MD

1:30 pm - Toward Sustainable and Affordable Space Exploration: The Role of NASA's Space Product Development Program
Franklin D. Schowengerdt, NASA Headquarters, Washington, DC

2:00 pm - Autonomous Assembly of Modular Structures in Space and on Extraterrestrial Locations
Dean C. Alhorn, NASA Marshall Space Flight Center, Huntsville, AL

2:30 pm - Semi-Autonomous Telerobotic Manipulation: A Viable Approach for Space Structure Deployment and Maintenance
Young S. Park, Hyosig Kang, Thomas F. Ewing, Argonne National Laboratory, Argonne, IL; Eric L. Faulring, Brian P. DeJong, Michael A. Peshkin, J. Edward Colgate, Northwestern University, Evanston, IL

3:00 pm - Lightweight Nonmetallic Thermal Protection Materials Technology
Peter G. Valentine, Timothy W. Lawrence and Michael K. Gubert, NASA Marshall Space Flight Center, Huntsville, AL; Frank S. Milos, NASA Ames Research Center, Moffett Field, CA; Stanley R. Levine, NASA Glenn Research Center, Cleveland, OH, Craig W. Ohlhorst, NASA Langley Research Center, Hampton, VA; John R. Koenig, Southern Research Instititute, Birmingham, AL

C11. POWER REQUIREMENTS AND SYSTEMS FOR HUMAN LUNAR AND MARS EXPLORATION

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - Parlor G/H

Chairs: Robert L. Cataldo, NASA Glenn Research Center, Cleveland, OH
Dennis Pelaccio, Science Applications International Corporation, Highlands, CO

1:30 pm - Review of Power Systems Requirements of Past Exploration Mission Studies
Robert L. Cataldo, NASA Glenn Research Center, Cleveland, OH

2:00 pm - Preliminary Design of a Manned Nuclear Electric Propulsion Vehicle Using Genetic Algorithms
Ryan W. Irwin, Purdue University, West Lafayette, IN, Michael L. Tinker, NASA Marshall Space Flight Center, Huntsville, AL

2:30 pm - Effects of Oxygen and Boron on the Mechanical Behavior of Tantalum
E.P. George, J.R. DiStefano, Oak Ridge National Laboratory, Oak Ridge, TN

3:00 pm – Panel Discussion

C12. SPECIAL SESSION: CASSINI - VOYAGE TO THE RINGED WORLD

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - New Mexico Ballroom South

Chairs: Robert T. Mitchell, Jet Propulsion Laboratory, Pasadena, CA
Robert Berry, Lockheed Martin Space Systems Company, Denver, CO

1:30 pm - The Cassini-Huygens Mission to Saturn and Titan
Earl H. Maize, Jet Propulsion Laboratory, Pasadena, CA

2:00 pm - The Cassini Spacecraft Design and Operations
Julie Webster, Jet Propulsion Laboratory, Pasadena, CA

2:30 pm - Power and Propulsion for the Cassini Mission
Kevin S. Johnson and Robert D. Cockfield, Lockheed Martin Space Systems Company, Denver, CO

3:00 pm - The Cassini-Huygens Mission: Its Science and Instruments
Scott G. Edgington, Jet Propulsion Laboratory, Pasadena, CA

E03. SPACE EXPLORATION

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - New Mexico Ballroom North

Chairs: Robert Cassanova, NASA Institute for Advanced Concepts, Atlanta, GA
Edward McCullough, The Boeing Company, Huntington Beach, CA

1:30 pm - Revolutionary Architectures and Concepts for Space Exploration

Robert Cassanova, Diana Jennings, NASA Institute for Advanced Concepts, Atlanta, GA; Ron Turner, ANSER Analytic Services, Inc., Arlington, VA

2:00 pm - Micro Asteroid Prospector Powered by Energetic Radioisotopes: MAPPER
Steven D. Howe and Gerald P. Jackson, Hbar Technologies, LLC, West Chicago, IL

2:30 pm - The Plasma Magnet for Sailing the Solar Wind
John Slough, University of Washington, Seattle, WA

3:00 pm - A Concept Mission: Microbots for Large-Scale Planetary Surface and Subsurface Exploration
S. Dubowsky, K. Iagnemma, S. Liberatore, D.M. Lambeth, J.S. Plante, Massachusetts Institute of Technology, Cambridge, MA; P.J. Boston, New Mexico Institute of Mining and Technology, Socorro, NM

B1-3. COMMERCIAL SPACE WORKSHOP: TECHNOLOGY

Tuesday, February 15, 2005, 1:30 - 3:30 p.m. - Rio Grande Room

Chairs: Robert Richards, Optech, Toronto, Ontario, Canada
Dan King, Macdonald Robotics, Brampton, Ontario, Canada

1:30 pm - Technology Transfer for Space Technologies
Henry R. Hertzfeld, George Washington University, Washington DC

2:00 pm - New Design Philosophies & Technologies Changing the Economics: On-Orbit Servicing & On-Orbit Assembly on the Frontier of Commercial Space
Dennis Ray Wingo, Orbital Recovery Corporation, Washington, DC

2:30 pm - Value Application of Technology: Key to Commercial Success
Dan King, MDA, Brampton, Ontario, Canada

3:00 pm – Next Generation Space Lidar System for Orbital Operations and Planetary Exploration
Robert Richards, Optech, Toronto, Ontario, Canada; Christian Sallaberger, Dan King, MDA, Brampton, Ontario, Canada

A05. VARIABLE EMITTANCE COATINGS AND APPLICATIONS

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - Parlor A/B

Chairs: Donya M. Douglas, NASA Goddard Space Flight Center, Greenbelt, MD
Stephen Hess, Sensortex, Inc., Kennett Square, PA

4:00 pm - Evaluation of an Electrochromic Device for Variable Emittance in Simulated Space Conditions
Rebekah L. Puterbaugh, Alexander G. Mychkovsky, Rengasamy Ponnappan, Air Force Research Laboratory, Wright-Patterson AFB, OH; Nikolai Kislov, Eclipse Energy Systems, Inc., St. Petersburg, FL

4:30 pm - Electrostatic Switchable Appliqué
William Biter, Stephen Hess, Sung Oh, Sensortex Inc, Kennett Square, PA

5:00 pm - Effect of Variable Emittance Coatings on the Operation of a Miniature Loop Heat Pipe

Donya M. Douglas, Jentung Ku, Laura Ottenstein, Theodore Swanson, NASA Goddard Space Flight Center, Greenbelt, MD; Steve Hess, Sensortex, Inc., Kennett Square, PA; Ann Darrin, Johns Hopkins University, Laurel, MD

5:30 pm - High Reflectivity Materials for the HPALM Solar Power System
R. Corpuz, General Atomics, San Diego, CA

D04. TRANSFORMATIONAL CONCEPTS AND TECHNOLOGIES: NEARER TERM NEEDS - I

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - Parlor E/F

Chairs: Nantel Suzuki, NASA Headquarters, Washington, DC
Neville Marzwell, Jet Propulsion Laboratory, Pasadena, CA

4:00 pm - Micro-Inspector Spacecraft for Space Exploration Missions
David Collins, Leon Alkalai, Juergen Mueller, Jet Propulsion Laboratory, Pasadena, CA

4:30 pm - Innovative Robot Archetypes for In-Space Construction and Maintenance
Fredrik Rehnmark, Lockheed Martin Space Operations, Houston, TX; Robert O. Ambrose, Myron Diftler, Joshua Mehling, Lyndon Bridgwater, S. Michael Goza, Christopher Culbert, NASA Johnson Space Center, Houston, TX; Brett Kennedy, Jet Propulsion Laboratory, Pasadena, CA; Nicolaus Radford, Oceaneering Space Systems, Houston, TX

5:00 pm - Integrated System Health Management with Networked Intelligent Elements
Fernando Figueroa, NASA Stennis Space Center, MS; John Schmalzel, Rowan University, Glassboro, NJ; Daniel Duncavage, NASA Johnson Space Center, Houston, TX

5:30 pm - Enabling New Operations Concepts for Lunar and Mars Exploration
John Jaap and Theresa Maxwell, NASA Marshall Space Flight Center, Huntsville, AL

C13. HIGH POWER ELECTRIC PROPULSION AND ENERGY CONVERSION

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - Parlor G/H

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

4:00 pm - Principal VASIMR Results and Present Objectives
Tim W. Glover, Franklin R. Chang-Diaz, Jared P. Squire, Verlin P. Jacobson, NASA Advanced Space Propulsion Laboratory, Houston, TX; D. Gregory Chavers, NASA Marshall Space Flight Center, Huntsville, AL; Mark D. Carter, Oak Ridge National Laboratory, Oak Ridge, TN

4:30 pm - High Power Helicon Propulsion Experiments
Timothy Ziemba and John Slough, MSNW, Bellevue, WA; Robert Winglee, University of Washington, Seattle, WA

5:00 pm - Recent Progress in Silicon-Based MEMS Field Emission Thrusters
Roger X. Lenard and Stanley H. Kravitz, Sandia National Laboratories, Albuquerque, NM; Martin Tajmar, Austrian Research Centers, Seibersdorf, Austria

5:30 pm - Advanced Thermophotovoltaic Devices for Space Nuclear Power Systems

Bernard Wernsman, Robert G. Mahorter, Richard Siergiej, Samuel D. Link and Rebecca J. Wehrer, Bechtel Bettis, Inc., West Mifflin, PA, Sean J. Belanger and Patrick Fourspring, Lockheed Martin, Schenectady, NY; Susan Murray and Fred Newman, EMCORE Photovoltaics, Albuquerque, NM; Dan Taylor, Bandwidth Semiconductor, Hudson, NM; and Tom Rahmlow, Rugate Technologies, Oxford, CT

C14. THERMOPHOTOVOLTAIC POWER CONVERSION TECHNOLOGY - II

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom South

Chairs: Susan Murray, Emcore Corporation, Albuquerque, NM
Edward Brown, Lockheed Martin, Schenectady, NY

4:00 pm - Integrated Bandpass Filter Contacts for GaSb Thermophotovoltaic Cells

B. Xu, V.S. Sundaram, M.D. Morgan, and W.E. Horne, EDTEK Inc., Kent, WA

4:30 pm - New Performance Levels for TPV Front Surface Filters

Thomas D. Rahmlow Jr., Jeanne E. Lazo-Wasem, Edward J. Gratrix, Rugate Technologies, Inc., Oxford, CT; Patrick M. Fourspring, David M. DePoy, Lockheed Martin Company, Schenectady, NY

5:00 pm - Theoretical Analysis of Thermophotovoltaic Diode Performance with Temperature

Hassan Ehsani, Paul Baldasaro, John Beausang, Edward Brown, Lee Danielson, Mike Dashiell, Greg Nichols, and Kevin Rahner, Lockheed Martin, Schenectady, NY

5:30 pm - Development of Thermophotovoltaic Devices Optimized for High Temperature Operation

Frederick D. Newman, Susan L. Murray, Scott P. Endicter, Daniel J. Aiken, Gerald R. Girard, Michele Turner and Paul R. Sharps, EMCORE Photovoltaics, Albuquerque, NM

C15. POTENTIAL ROBOTIC MISSIONS INVOLVING NUCLEAR POWER OR PROPULSION

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom North

Chairs: Bill J. Nesmith, Jet Propulsion Laboratory, Pasadena, CA
Leonard A. Dudzinski, NASA Headquarters, Washington, DC

4:00 pm - JIMO Follow-On Mission Studies

Celeste Satter, Jet Propulsion Laboratories, Pasadena, CA

4:30 pm - Results of the JIMO Follow-On Destinations Parametric Studies

Muriel A. Noca, Jet Propulsion Laboratory, Pasadena, CA; Kurt J. Hack, NASA Glenn Research Center, Cleveland, OH

5:00 pm - A Non-NEP Implementation of NASA's "Neptune Orbiter With Probes" Vision Mission

Thomas R. Spilker, Jet Propulsion Laboratory, Pasadena, CA

5:30 pm - A Waverider Application of an Advanced Nuclear Power Source

James E. Randolph, Tracy J. Leavens, and Robert N. Miyake, Jet Propulsion Laboratory, Pasadena, CA; Matthew R. Davis, California Polytechnic State University, San Luis Obispo, CA

B1-4. INTERNATIONAL COOPERATION ON COMMERCIAL SPACE & FUTURE PROJECTS

Tuesday, February 15, 2005, 4:00 - 6:00 p.m. - Rio Grande Room

Chairs: Dan King, Macdonald Robotics, Brampton, Ontario, Canada
Robert Richards, Optech, Toronto, Ontario, Canada

4:00 pm - International Cooperation and Space Commercialization
Dragi Trifunovich, Astro Research Corporation, Japan

4:30 pm – International LunaMars: A Framework Proposal for the International Exploration of the Moon and Mars
Robert Richards, Optech, Canada; Francois Spiero, CNES; Bernard Foing, ESA; Kohtaro Matsumoto, JAXA; U.R. Rao, ISRO; Brig. Gen. Simon P. Worden, Univ. of Michigan & USAF (ret.); Gary Martin, NASA HQ; Ramin Khadem, ISU and INMARSAT (ret.); Jim Burke, ISU and Jet Propulsion Laboratory (ret.); Regina North, NASA Johnson Space Center

5:00 pm - International Collaboration: Extracting the Best Value for Customers
Dan King, MDA, Brampton, Ontario, Canada

5:30 pm - Recent Activities and Plans toward the Future Reusable Space Transportation System in JAXA
Kenji Fujii, Shinji Ishimoto, Japan Aerospace Exploration Agency, Tokyo, Japan

WEDNESDAY, FEBRUARY 16, 2005

C16. THERMIONIC TECHNOLOGY AND APPLICATIONS

Wednesday, February 16, 2005, 8:00 - 10:00 a.m. - Parlor A/B

Chairs: Hal Streckert, General Atomics, San Diego, CA
Steve Adams, Air Force Laboratory, Wright-Patterson AFB, OH

8:00 am - Thermionic Performance of Rhenium Emitters
Jean-Louis Desplat, General Atomics, San Diego, CA

8:30 am - Cylindrical Inverted Multi-Cell (CIM) Thermionic Converter for Solar Power and Propulsion Systems
Martin R. Martinez, Oleg Izhvanov, Bill Robertson, Paul N. Clark, Holger H. Streckert, and Jean-Louis Desplat, General Atomics, San Diego, CA

9:00 am - Thermal Analysis and Design Optimization of Space Solar Thermionic Power System
P.N. Clark, W. Robertson, R. Corpuz, and H.H. Streckert, General Atomics, San Diego, CA

9:30 am - Advanced Thermionic Converter Technology Development
James R. Luke, New Mexico Institute of Mining and Technology, Albuquerque, NM

F05. NEAR TERM PROPULSION CONCEPTS -THE AIR-BREATHING MISSION

Wednesday, February 16, 2005, 8:00 - 10:00 a.m. - Parlor E/F

Chairs: Robert H. Frisbee, Jet Propulsion Laboratory, Pasadena, CA
David Goodwin, US Department of Energy, Washington, DC

8:00 am - Tweaking Flux Capacitors
James F. Woodward, California State University, Fullerton, CA

8:30 am - Combining MHD Airbreathing and Fusion Rocket Propulsion for Earth-to-Orbit Flight
H.D. Froning, Jr., Flight Unlimited, Flagstaff, AZ; G.H. Miley, Nie Luo, Yang Yang, and E. Burton, University of Illinois, Urbana, IL; H. Momota, NPL Associates, Champaign, IL

9:00 am - Regenerative Aerobraking
Robert W. Moses, NASA Langley Research Center, Hampton, VA

9:30 am - Concept for Space Technology Advancement
Jeremiah J. Hansen, Fredricksburg, VA

C17. THERMOELECTRIC POWER CONVERSION TECHNOLOGY AND APPLICATIONS

Wednesday, February 16, 2005, 8:00 - 10:00 a.m. - Parlor G/H

Chairs: Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, CA
Ctirad Uher, University of Michigan, Ann Arbor, MI

8:00 am - Improvements in Materials and Processes for Segmented BiTe/PbTe-BiTe/TAGS/PbSnTe based Thermoelectric Generators

Laffite A. Flanders, Richard W. Drinker, Ben Heshmatpour, and David S. Moul, Teledyne Energy Systems, Inc., Hunt Valley, MD; Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, CA; Karen L. Tuttle, NASA Glenn Research Center, Cleveland, OH

8:30 am - Performance Test Results of a Skutterudite-Based Unicouple with a Metallic Coating

Hamed H. Saber, Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM; Thierry Caillat, Jet Propulsion Laboratory, Pasadena, CA

9:00 am - Development of Aerogel for Use in Thermoelectric Technology

Jeff Sakamoto, Jay Paik, Steve Jones, Thierry Caillat and Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, California; Winny Dong, California Polytechnic State University, Pomona, CA

9:30 am - Performance of a Skutterudite-based Segmented Unicouple with a Metallic Coating Near Hot Junction

Hamed H. Saber and Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM

C18. SPACE NUCLEAR REACTOR POWER SYSTEMS - II

Wednesday, February 16, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom South

Chairs: Richard T. Wood, Oak Ridge National Laboratory, Oak Ridge, TN
James Paul Holloway, University of Michigan, Ann Arbor, MI

8:00 am - Power Reactor for Surface Terminal Operations (PRESTO)

A. L. Qualls, S. R. Greene, E. D. Blakeman, K. W. Childs, D. W. Sparks, Oak Ridge National Laboratory, Oak Ridge, TN

8:30 am - Autonomous Reactor Control Using Model Based Predictive Control for Space Propulsion Applications

Shannon M. Bragg-Sitton and James Paul Holloway, University of Michigan, Ann Arbor, MI

9:00 am - State Identification in Nonlinear Systems

James Paul Holloway, University of Michigan, Ann Arbor, MI

9:30 am - Autonomy Characteristics for Space Reactor Applications

Richard T. Wood, Oak Ridge National Laboratory, Oak Ridge, TN

E04. SPACE RESOURCE UTILIZATION ON MARS

Wednesday, February 16, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom North

Chairs: Clyde F. Parrish, NASA Kennedy Space Center, FL
Adam P. Bruckner, University of Washington, Seattle, WA

8:00 am - Spiral Development of a Deep Drill for Planetary Exploration Leveraging Terrestrial Mining

D.S. Boucher, Northern Centre for Advanced Technology Inc., Ontario, Canada; Jim Richard, Electric Vehicle Controllers Ltd., Hanmer, Ontario, Canada; Eric Edwards, Xiphos Technologies Inc.

8:30 am – Temperature Dependence of Gas-Phase Membrane Permeability

Paul A. Jennings, Florida Institute of Technology, Melbourne, FL; Clyde Parrish, Edgardo Santiago, NASA Kennedy Space Center, FL

9:00 am - In-Situ Resource Utilization (ISRU) Robotic Precursor Missions for Human Exploration of Mars
Gerald B. Sanders, NASA Johnson Space Center, Houston, TX; Donald Rapp, Jet Propulsion Laboratory, Pasadena, CA

9:30 am - Microchannel Reactors for ISRU Applications
Susana Carranza, Darby B. Makel, Brandon Blizman, Benjamin J. Ward, Makel Engineering Inc., Chico, CA

A06. HIGH CAPACITY HEAT REJECTION SYSTEMS

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - Parlor A/B

Chairs: Michael N. Nikitkin, Swales Aerospace, Beltsville, MD
Jeffrey R. Didion, NASA Goddard Space Flight Center, Greenbelt, MD

10:30 am - Start-Up Performance of A Loop Heat Pipe With Variable Heating Patterns and Periodic Cycles
G. Wang, D. Nikanpour, D. Mishkinis, Canadian Space Agency, Quebec, Canada; E. MacDonald, T. Kaya, Carleton University, Ottawa, Ontario, Canada

11:00 am - High Temperature Heat Rejection System for Large Heat Loads; Architecture and Trade Study Results
Michael N. Nikitkin, Swales Aerospace, Beltsville, MD; Robert W. Allen, The Boeing Company, Canoga Park, CA

11:30 noon - Spray Cooling and the Next Generation of NASA Space Flight
Eric Silk, NASA Goddard Space Flight Center, Greenbelt, MD

12:00 noon – Panel Discussion

C19. REFRACTORY METAL SYSTEM DESIGN, MANUFACTURING AND FABRICATION

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - Parlor E/F

Chairs: R. William Buckman, Refractory Metals Technology, Pittsburgh, PA
Todd Leonhardt, Rhenium Alloys, Inc., Elyria, OH

10:30 am - Biaxial Creep Testing of High-Temperature Superalloy and Refractory Metal Alloys
L. L. Rishel, A. J. Mueller, R. F. Luther, J. Kundrat, Bechtel Bettis, Inc., West Mifflin, PA; R. Buck, Advanced Steel Technology, LLC, Trafford, PA

11:00 am - Mechanical Properties of Nb-1Zr Weldments
Michael Santella, Jeffery McNabb, Alan Frederick, Oak Ridge National Laboratory, Oak Ridge, TN

11:30 am - Assessment of Chemical Compatibility Issues for Nb-1Zr in Space Power Systems Using Brayton Cycles
P.F. Tortorelli, S.J. Pawel, and J.R. DiStefano, Oak Ridge National Laboratory, Oak Ridge, TN

12:00 noon - Prototype Rhenium Component for Stirling Engine Power Conversion
Todd Leonhardt, Rhenium Alloys, Inc., Elyria, OH; and Frank Ritzert, NASA Glenn Research Center, Cleveland, OH

C20. ADVANCED NUCLEAR CONCEPTS AND TECHNOLOGIES - I

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - Parlor G/H

Chairs: George H. Miley, University of Illinois, Urbana, IL
J. Boise Pearson, NASA Marshall Space Flight Center, Huntsville, AL

10:30 am - The Gasdynamic Mirror Fusion Propulsion System – Revisited
Terry Kammash, Ricky Tang, University of Michigan, Ann Arbor, MI

11:00 am - Deceleration of Antiprotons in Support of Antiproton Storage/Utilization Research
Steven D. Howe, Gerald P. Jackson, Hbar Technologies, LLC, West Chicago, IL; J.Boise Pearson, NASA Marshall Space Flight Center, Huntsville, AL; Raymond A. Lewis, RLewis Co., Boalsburg, PA

11:30 am - Environmental Benefits From IEC Fusor Use on Earth and Mars
Viva M. Cundliffe, Strategic Visionary Alternatives, Ltd., Golden, B.C., Canada; George H. Miley, University of Illinois, Urbana Champaign, IL

12:00 noon – Panel Discussion

C21. SMALL RADIOISOTOPE POWER CONCEPTS AND APPLICATIONS - II

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom South

Chairs: Robert Abelson, Jet Propulsion Laboratory, Pasadena, CA
Tibor Balint, Jet Propulsion Laboratory, Pasadena, CA

10:30 am - Trade-Off Study of STC 70 W Stirling Engine
Songgang Qiu, Jack E. Augenblick, Allen A. Peterson, Stirling Technology Company, Kennewick, WA

11:00 am - Searching for Subsurface Lunar Water Ice using a Nuclear-Powered Rover
James E. Randolph, Robert D. Abelson, Knut I. Oxnevad, James H. Shirley, Jet Propulsion Laboratory, Pasadena, CA

11:30 am - SMART Power Systems for ANTS Missions
P.E. Clark, L3 Communications GSI, Chantilly, VA; S.R. Floyd, S.A. Curtis, M.L. Rilee, NASA Goddard Space Flight Center, Greenbelt, MD

12:00 noon - Deployable Mini-Payload Missions Enabled by Small Radioisotope Power Systems (RPSs)
Robert D. Abelson and Celeste M. Satter, Jet Propulsion Laboratory, Pasadena, CA

E05. SETTLEMENTS & PLANETARY TERRAFORMING

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom North

Chairs: Anita Gale, Space Settlement Design Competitions, Nassau Bay, TX
Penelope Boston, New Mexico Institute of Mining and Technology, Socorro, NM

10:30 am - Space Based Commerce: A Driver towards a Space Based Community
Ronald Kohl, R.J. Kohl & Associates, Inc., Jefferson, MD

11:00 am - Prospects for Revolutionary Technology for Space Colonization
Edward McCullough, The Boeing Company, Huntington Beach, CA

11:30 am - Ecological Community Development in a Lunar Ecopoiesis Test Bed Facility: Key Concepts
Penelope Boston, New Mexico Tech University, Socorro, NM; P. Todd, SHOT, Inc., Greenville, IN

12:00 noon - The New Mars Synthesis: A New Concept Of Mars Geo-Chemical History
J.E. Brandenburg, Florida Space Institute-University of Central Florida, NASA Kennedy Space Center, FL

B2-1. CREW EXPLORATION VEHICLE NEEDS AND ARCHITECTURES

Wednesday, February 16, 2005, 10:30 a.m. - 12:30 p.m. - Rio Grande Room

Chair: Phil Sumrall, NASA Marshall Space Flight Center, Huntsville, AL

10:30 am - Human Rating Consideratons for the CEV Launch Vehicle
Gary Langford, NASA Marshall Space Flight Center, Huntsville, AL; Harold Robertson, NASA Johnson Space Center, Houston TX

11:00 am - National Vision for Exploration and the Role of the Crew Exploration Vehicle (CEV)
John Hutt, NASA Headquarters, Washington, DC

11:30 am - Orbital Space Plane Lessons Learned Applicable to the Crew Exploration Vehicle
Volker Roth, The Boeing Company, Huntsville, AL

12:00 noon - Orbital Space Plane (OSP) Lessons Learned Applicable to the CEV
Robert Ford, Lockheed Martin, Denver, CO

A07. LAUNCH VEHICLE AND RE-ENTRY THERMAL PROTECTION SYSTEMS

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - Parlor A/B

Chairs: Thomas R. Reinarts, NASA Kennedy Space Center, FL
Gerald Russell, U.S. Army AMRDEC, Redstone Arsenal, AL

1:30 pm - Development of a Passive Flow Coalescence Device for Two-Phase Phase Separation Under Microgravity
Filip Finodeyev and Melissa Ghrist, Frederick Best, Texas A&M University, College Station, TX

2:00 pm - Advanced Ceramic Materials for Sharp Hot Structures: Material Development and On-Ground Arc-Jet Qualification Testing on Scaled Demonstrators
L. Scatteia, G. Tomassetti, G. Rufolo, F. De Filippis, G. Marino, Italian Aerospace Research Center, Capua (CE), Italy

2:30 pm - Wireless Impact Monitoring System for the Return to Flight Mission
Kevin Champaigne and Michael Walcer, Invocon, Inc., Conroe, TX

3:00 pm - NASA Reentry Material Technology Ground Test and Evaluation Status

Gerald Russell, Bruce Moylan, AMRDEC, Redstone Arsenal, AL; Forrest Strobel, Joe Raymond, ITT Industries Advanced Engineering Services, Huntsville, AL; Jimmy Lee, Susan Spencer, Tony Oneil, NASA Marshall Space Flight Center, Huntsville, AL

F06. FAR TERM PROPULSION CONCEPTS - THE DEEP SPACE MISSION

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - Parlor E/F

Chairs: Glen A. Robertson, NASA Marshall Space Flight Center, Huntsville, AL
H. David Froning, Jr., Flight Unlimited, Flagstaff, AZ

1:30 pm - Manipulating the Vacuum Scalar Field with Superconductors: A Search for Exotic Material
Glen A. Robertson, Gravi Atomi Research, Madison, AL

2:00 pm - Quantum Vacuum Pathway Theory
Eric John Habegger, Davis Systems, Lakeport, CA

2:30 pm - Extracting Energy from Cosmic Electromagnetic Fields and Plasmas by a Chaotic Gun Effect for Relativistic Charged Particles
Ciprian Ciubotariu, Universite Laval, Quebec, Canada; Carmen-Iuliana Ciubotariu, University of Calgary, Canada; Corneliu Ciubotariu, Technical University "Gh. Asachi" of Iasi, Romania

3:00 pm - Overview of Theories and Experiments on Electromagnetic Inertia Manipulation Propulsion
Hector H. Brito, Instituto Universitario Aeronáutico, Cordoba, Argentina; Sergio A. Elaskar, Universidad Nacional de Cordoba, Argentina

C22. MISSION/SYSTEMS SAFETY AND RELIABILITY

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - Parlor G/H

Chairs: Joseph A. Sholtis, Sholtis Engineering & Safety Consulting, Tijeras, NM
Lyle L. Rutger, US Department of Energy, Washington, DC

1:30 pm - Consideration of Lower Allowable Impact Temperature for DOP-26 Iridium Alloy Fueled Clads
Emanuel A. Skrabek, Orbital Sciences Corporation, Germantown, MD

2:00 pm - Preliminary Identification and Characterization of Potential Mission Accident Scenarios and Environments to Help Guide Boeing's Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) Design and Development Effort
J.A. Sholtis, Sholtis Engineering and Safety Consulting, Tijeras, NM

2:30 pm - Spectral Shift Absorbers for Fast Spectrum Space Nuclear Reactors
Jeffrey C. King and Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM

3:00 pm - A Time-Step Reactivity Analysis Based on Various Impact Scenarios
Roger X. Lenard, Kurt Metzinger, Sandia National Laboratories, Albuquerque, NM; Matthew Humberstone, New Mexico State University, Las Cruces, NM; Travis Sanchez, New Mexico Institute of Mining and Technology, Socorro, NM; David Louie, Omicron Inc., Albuquerque, NM

C23. DYNAMIC POWER CONVERSION TECHNOLOGY - I

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - New Mexico Ballroom South

Chairs: Graydon Yoder, Jr., Oak Ridge National Laboratory, Oak Ridge, TN
David A. Nordling, The Boeing Company, Canoga Park, CA

1:30 pm - Feasibility Study of a Nuclear-Stirling Power Plant for the Jupiter Icy Moons Orbiter
Paul C. Schmitz, Power Computing Solutions, Inc., Avon, OH; Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH; Barry Penswick, L. Barry Penswick Consulting, Stevenson, WA

2:00 pm - A Self-Circulating Heat Exchanger for Use in Stirling and Thermoacoustic-Stirling Engines
Scott Backhaus, Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM

2:30 pm - A New Paradigm for High-Power Stirling Applications
Maurice A. White, Stirling Technology Company, Kennewick WA

3:00 pm - Evaluation of Liquid Metal Rankine Power Conversion Systems for Space Applications
G.L. Yoder, J.J. Carbajo, R.W. Murphy, A.L. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN; M.P. Moriarty, F.J. Widman, K.J. Metcalf, The Boeing Company, Canoga Park, CA; M. Nikitkin, Swales Aerospace, Beltsville, MD

C24. NUCLEAR FUEL AND HEAT SOURCE TECHNOLOGY I

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - New Mexico Ballroom North

Chairs: Ken M. Chidester, Nuclear Fuel Technology Associates, LLC, St. George, UT
Samim Anghaie, University of Florida, Gainesville, FL

1:30 pm - Fueling and Testing Capabilities for Radioisotope Power Systems at Argonne National Laboratory-West
S.W. Sorrell, K.R. Rosenberg, S.G. Johnson, Argonne National Laboratory-West, Idaho Falls, ID

2:00 pm - Thermal Analysis of Step 2 GPHS for Next Generation Radioisotope Power Source Missions
David R. Pantano and Dennis H. Hill, Lockheed Martin Space Systems Company, King of Prussia, PA

2:30 pm - Photochemical Oxidation of Oxalate, Hydroxylamine, and Urea in Pu-238 Process Streams
Kristy Long, Gordon Jarvinen, Doris Ford, Los Alamos National Laboratory, Los Alamos, NM

3:00 pm - The Effect of Annealing on the Structure and Mechanical Properties of Mo - 47.5 Wt. % Re Alloy Sheet
John A. Shields, Jr., H.C. Starck Inc., Cleveland, OH

B2-2. LOW COST SMALL LAUNCH VEHICLES AND THE FALCON PROGRAM - I

Wednesday, February 16, 2005, 1:30 - 3:30 p.m. - Rio Grande Room

Chairs: David Weeks, NASA Marshall Space Flight Center, Huntsville, AL
Robert Sackheim, NASA Marshall Space Flight Center, Huntsville, AL

1:30 pm - The Future for Small Launch Vehicles
Robert Sackheim, John R. London III, David J. Weeks, NASA Marshall Space Flight Center, Huntsville, AL;

2:00 pm - An Air-Launched Low-Cost Launch Vehicle
Gary C Hudson, AirLaunch LLC, Reno, NV

2:30 pm - Hybrid Propulsion Applicability for Responsive Small Launch Vehicles
Robert Simms, Lockheed Martin, New Orleans, LA

3:00 pm - The Falcon Launch Vehicle: Capabilities, Status and Manifest
Gwynne E. Shotwell, Hans J. Koenigsmann, Brian Bjelde, Steven Davis, Space Exploration Technologies, Inc., El Segundo, CA

A08. INTERMEDIATE AND HIGH TEMPERATURE HEAT PIPES - I

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - Parlor A/B

Chairs: Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM
Angirasa Devarakonda, SEST, Inc., Cleveland, OH

4:00 pm - Intermediate Temperature Water Heat Pipe Tests
Angirasa Devarakonda, Daxi Xiong and Duane E. Beach, NASA Glenn Research Center, Cleveland, OH

4:30 pm - Sodium Compatibility Tests of MA-ODS 754 and MA-ODS 956 Alloys
Robert S. Reid and Tom Sena, Los Alamos National Laboratory, Los Alamos, NM; Joseph P. Nehrbauer, Lockheed Martin Corporation, Schenectady, NY

5:00 pm - Multiple Restart Tests of a Stainless Steel Sodium Heat Pipe Module
James Martin, Omar Mireles and Robert Reid, NASA Marshall Space Flight Center, Huntsville, AL

5:30 pm – Panel Discussion

D05. TRANSFORMATIONAL CONCEPTS AND TECHNOLOGIES: NEARER TERM NEEDS - II

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - Parlor E/F

Chairs: Nantel Suzuki, NASA Headquarters, Washington, DC
Neville Marzwell, Jet Propulsion Laboratory, Pasadena, CA

4:00 pm - Technology Challenges for Deep-Throttle Cryogenic Engines for Space Exploration
Kendall K. Brown, Karl W. Nelson, NASA Marshall Space Flight Center, Huntsville, AL

4:30 pm - How to Extend the Capabilities of Space Systems for Long Duration Space Exploration Systems

Neville I. Marzwell, Jet Propulsion Laboratory, Pasadena, CA, Robert D. Waterman and Susan J. Waterman, NASA Kennedy Space Center, FL; Kalmanje KrishnaKumar, NASA Ames Research Center, Moffett Field, CA

5:00 pm - Autonomous Operations for the Crew Exploration Vehicle – Trade Study Design Considerations

James M. Crawford, NASA Ames Research Center, Moffett Field, CA; Charles R. Weisbin, Jet Propulsion Laboratory, Pasadena, CA

5:30 pm - Humanoids for Lunar and Planetary Operations

Adrian Stoica, Jet Propulsion Laboratory, Pasadena, CA

C25. ADVANCED NUCLEAR CONCEPTS AND TECHNOLOGIES - II

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - Parlor G/H

Chairs: James J. Martin, NASA Marshall Space Flight Center, Huntsville, AL
Terry Kammash, University of Michigan, Ann Arbor, MI

4:00 pm - Antimatter Driven Sail for Deep Space Missions

Steven D. Howe and Gerald P. Jackson, Hbar Technologies, LLC, West Chicago, IL

4:30 pm - Antiproton Powered Gas Core Fission Rocket

Terry Kammash, University of Michigan, Ann Arbor, MI

5:00 pm - Advancements in Dense Plasma Focus (DPF) for Space Propulsion

Robert Thomas, Yang Yang, G.H. Miley, University of Illinois at Urbana-Champaign, Urbana, IL; F.B. Mead, Air Force Research Laboratory, Edwards AFB, CA

5:30 pm - RF Stabilization for Storage of Antiprotons

J Boise Pearson, NASA Marshall Space Flight Center, Huntsville, AL; Raymond A. Lewis, RLewis Company, Boalsburg, PA

C26. 100-WATT CLASS DYNAMIC POWER CONVERSION TECHNOLOGY - I

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom South

Chairs: Richard K. Shaltens, NASA Glenn Research Center, Cleveland, OH
Patrick E. Frye, The Boeing Company, Canoga Park, CA

4:00 pm - An Advanced Turbo-Brayton Converter for Radioisotope Power Systems

Mark V. Zagarola, Michael G. Izenson, Jeffrey J. Breedlove, Creare Incorporated, Hanover, NH; George M. O'Connor, Andrew C. Ketchum, The Boeing Company, Canoga Park, CA; Richard L. Jetley and James K. Simons, Ball Aerospace & Technologies Corp, Boulder, CO

4:30 pm - Reliability of Radioisotope Stirling Convertor Liner Alternator

Ashwin Shah, Igor Korovaichuk, Sest, Inc., Middleburg Heights, OH; Steven M. Geng and Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

5:00 pm - Development of a Stirling System Dynamic Model with Enhanced Thermodynamics

Timothy F. Regan, Edward J. Lewandowski, Sest, Inc., Middleburg Heights, OH

5:30 pm - Overview 2004 of NASA-Stirling Convertor CFD Model Development and Regenerator R&D Efforts

Roy C. Tew, Rodger W. Dyson, NASA Glenn Research Center, Cleveland, OH; Scott D. Wilson, Rikako Demko, Sest, Inc., Middleburg Heights, OH

C27. NUCLEAR FUEL AND HEAT SOURCE TECHNOLOGY - II

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - New Mexico Ballroom North

Chairs: Timothy Frazier, US Department of Energy, Germantown, MD
Diane J. Spengler, Los Alamos National Laboratory, Los Alamos, NM

4:00 pm - Ion Exchange Automatic Elution System Used in the Full-Scale Aqueous Scrap Purification of Plutonium-238 Dioxide
John H. Matonic, Jonathan G. Teague, Diane J. Spengler, Peter Dinh, Los Alamos National Laboratory, Los Alamos, NM

4:30 pm - Analysis of the Effect of Time, Temperature, and Fuel Age on Helium Release from 238-Plutonium Dioxide Fuel
Chadwick D. Barklay, University of Dayton, Dayton, OH; Daniel P. Kramer, University of Dayton Research Institute, Dayton, OH; Joseph D. Ruhkamp, JDR Engineering Associates, Miamisburg, OH

5:00 pm - Recovery of $^{238}PuO_2$ by Molten Salt Oxidation Processing of $^{238}PuO_2$ Contaminated Combustibles (Part II)
Mary Lynn Remerowski, C. Dozhier, K. Krenek, C.E. VanPelt, M.A. Reimus, D. Spengler, J. Matonic, L. Garcia, E. Rios, F. Sandoval, D. Herman, R. Hart, B. Ewing, M. Lovato, J.P. Romero, Los Alamos National Laboratory, Los Alamos, NM

5:30 pm - Determination and Assessment of Graded Safeguards Categories for Potential Space Reactor Fuels
Paul G. Edelmann, Los Alamos National Laboratory, Los Alamos, NM

B2-3. LOW COST SMALL LAUNCH VEHICLES AND THE FALCON PROGRAM - II

Wednesday, February 16, 2005, 4:00 - 6:00 p.m. - Rio Grande Room

Chairs: David Weeks, NASA Marshall Space Flight Center, Huntsville, AL
Robert Sackheim, NASA Marshall Space Flight Center, Huntsville, AL

4:00 pm - The Scorpius® Next Generation Low-Cost Space Transportation System
Robert Conger, Shyama Chakroborty, James Wertz, Microcosm Inc., El Segundo, CA

4:30 pm - Orbital Express Advanced Technology Demonstration Leading the Way to In-Space System Servicing
Margaret Ryan, The Boeing Company, Huntington Beach, CA

5:00 pm - Exploration Architectures and the Crew Exploration Vehicle
Dallas Bienhoff, The Boeing Company, Arlington, VA

5:30 pm – Panel Discussion

THURSDAY, FEBRUARY 17, 2005

C28. REACTOR POWER SYSTEM CONCEPTS

Thursday, February 17, 2005, 8:00 - 10:00 a.m. - Parlor A/B

Chairs: David I. Poston, Los Alamos National Laboratory, Los Alamos, NM
John Wheeler, US Department of Energy, Germantown, MD

8:00 am - Proposed Design and Operation of a Heat Pipe Reactor using the Sandia National Laboratories Annular Core Test Facility and Existing UZrH Fuel Pins
Steven A. Wright, Ronald J. Lipinski, Tara Pandya, Curtis Peters, Sandia National Laboratories, Albuquerque, NM

8:30 am - Effects of Gadolinium and Europium on the Design and Submersion Criticality of a Fast Spectrum Space Reactor
Jeffrey C. King and Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM

9:00 am - A Gas-Cooled-Reactor Closed-Brayton-Cycle Demonstration with Nuclear Heating
Ronald J. Lipinski, Steven A. Wright, Daniel J. Dorsey, Joshua Williamson, Sandia National Laboratories, Albuquerque, NM; Curtis D. Peters, Nicholas Brown, Jennifer Jablonski, University of New Mexico, Albuquerque, NM

9:30 am - SCoRe - Concepts of Liquid Metal Cooled Space Reactors for Avoidance of Single-Point Failure
Mohamed El-Genk, Steven Hatton, Charles Fox, Jean-Michel Tournier, University of New Mexico, Albuquerque, NM

F07. THEORETICAL CONSIDERATIONS, WARP DRIVES FASTER THAN LIGHT SPEED TRAVEL AND OTHER CONCEPTS

Thursday, February 17, 2005, 8:00 - 10:00 a.m. - Parlor E/F

Chairs: Frank Mead, Air Force Research Laboratory, Edwards AFB, CA
Paul Murad, U.S. Department of Defense, Vienna, VA

8:00 am - Heim Quantum Theory for Space Propulsion Physics
Walter Dröscher, Leopold-Franzens Universität Innsbruck, Innsbruck, Austria; Jochem Häuser, University of Applied Sciences, Salzgitter, Germany

8:30 am - The Four Space-Times Model of Reality
Girogio Fontana, University of Trento, Povo, Italy

9:00 am - Warp Drives: The Dreams and the Realities - Part II: Potential Solutions
P.A. Murad, Department of Defense, Vienna, VA

9:30 am - A Perspective of Practical Interstellar Exploration: Using Field Propulsion and Hyper-Space Navigation Theory
Y. Minami, NEC Patent Service, Ltd., Tokyo, Japan

C29. TESTING IN SUPPORT OF SPACE REACTOR DEVELOPMENT

Thursday, February 17, 2005, 8:00 - 10:00 a.m. - Parlor G/H

Chairs: Melissa Van Dyke, NASA Marshall Space Flight Center, Huntsville, AL
Larry Foulke, Bechtel Bettis, Inc., West Mifflin, PA

8:00 am - Use of High Spatial Resolution Fiber-Optic Shape Sensors to Monitor the Shape of Deployable Space Structures
Roger G. Duncan and Matthew T. Raum, Luna Innovations Inc., Blacksburg, VA; David P. Cadogan, ILC Dover, Inc., Frederica, DE; and Joseph R. Blandino, James Madison University, Harrisonburg, VA

8:30 am - Thermal Characterization of a Simulated Fission Engine via Distributed Fiber Bragg Gratings
Roger G. Duncan, Robert S. Fielder, Ryan J. Seely, Carrie L. Kozikowski and Matthew T. Raum, Luna Innovations, Inc., Blacksburg, VA

9:00 am - Application of a Systems Engineering Approach to Support Space Reactor Development
Scott Wold, WCTS, Idaho Falls, ID

9:30 am - Hardware Progress Made in the Early Flight Fission Test Facilities (EFF-TF) To Support Near-Term Space Fission Systems
Melissa Van Dyke and James Martin, NASA Marshall Space Flight Center, Huntsville, AL

C30. 100-WATT CLASS DYNAMIC POWER CONVERSION TECHNOLOGY - II

Thursday, February 17, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom South

Chairs: Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH
Joseph E. Stoyack, Lockheed Martin Space Systems Company, King of Prussia, PA

8:00 am - Overview of NASA Magnet and Linear Alternator Research Efforts
Steven M. Geng, Gene E. Schwarze, NASA Glenn Research Center, Cleveland, OH; Janis M. Niedra, QSS Group, Inc., Cleveland, OH

8:30 am - Supporting Development for the Stirling Radioisotope Generator and Advanced Stirling Technology Development at NASA GRC
Lanny G. Thieme and Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

9:00 am - Development of the Sunpower 35 W_e Free-Piston Stirling Convertor
J. Gary Wood and Neill Lane, Sunpower, Inc., Athens, OH

9:30 am - Advanced 80 W_e Stirling Convertor Development Progress
J. Gary Wood, Sunpower, Inc., Athens, OH; Cliff Carroll, The Boeing Company, Canoga Park, CA; L.B. Penswick, Stevenson, WA

E06. SPACE TOURISM

Thursday, February 17, 2005, 8:00 - 10:00 a.m. - New Mexico Ballroom North

Chairs: Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI
Christopher Lee Martens, Mutual Space, Ltd., Crestline, CA

8:00 am – Selling Space: Taking Adventure to a Higher Level
Jane Reifert, Incredible Adventures, Inc., Sarasota, FL

8:30 am – The XP Spaceplane – A Near Term Multi-purpose Suborbital RLV
Charles Lauer, Rocketplane Limited, Inc., Lansing, MI

9:00 am – Habitation Testbed for Space Tourism
Thomas C. Taylor, Alex Gimarc, Bruce Pittman, Global Outpost, Las Cruces, NM; John Spencer, Space Tourism Society; Gene Meyers, Space Island Group, Inc., West Covina, CA

9:30 am – Advanced Low-Cost Rocket Propulsion Technologies for Space Tourism Vehicles
Eric Rice, Orbital Technologies Corporation (ORBITEC), Madison, WI

A09. INTERMEDIATE AND HIGH TEMPERATURE HEAT PIPES - II

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - Parlor A/B

Chairs: Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM
Angirasa Devarakonda, SEST, Inc., Cleveland, OH

10:30 am - Water Heat Pipe Radiator Trade Study for the 300-550K Temperature Range
William G. Anderson, Advanced Cooling Technologies, Lancaster, PA; Ted Stern, ATK-Composites, San Diego, CA

11:00 am - Evaluation of Heat Pipes in the Temperature Range of 450 to 700 K
William G. Anderson, Advanced Cooling Technologies, Inc., Lancaster, PA

11:30 am - Thermo-Physical Properties of Intermediate Temperature Heat Pipe Fluids
Angirasa Devarakonda, SEST/NASA Glenn Research Center, Cleveland, OH; William G. Anderson, Advanced Cooling Technologies, Lancaster, PA; Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM

12:00 noon - Flow Visualization within the Evaporator of Planar Loop Heat Pipe
Junwoo Suh, Debra Cytrynowicz, Praveen Medis, Frank M. Gerner, H. Thurman Henderson, University of Cincinnati, Cincinnati, OH

D06. TRANSFORMATIONAL CONCEPTS AND TECHNOLOGIES: FARTHER TERM OPPORTUNITIES

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - Parlor E/F

Chairs: Christopher Moore, NASA Headquarters, Washington, DC
David V. Smitherman, NASA Marshall Space Flight Center, Huntsville, AL

10:30 am - Overview of Advanced Space Technology Program
Christopher Moore, NASA Headquarters, Washington, DC

11:00 am - Hybrid Robotic Habitat for Lunar Exploration
David Smitherman, Daniel Dunn, NASA Marshall Space Flight Center, Huntsville, AL; Masoud Rais-Rohani, Mississippi State University, Mississippi State, MS; Don Perkinson, Sverdrup, Huntsville, AL

11:30 am - Achieving the Space Vision through Government Incentive and Rapid Prototyping
David P. Gump, Transformational Space Corporation LLC, Reston, VA

12:00 noon - Advanced Propulsion and TPS for a Rapidly-Prototyped CEV
Gary C. Hudson, Transformation Space Corporation LLC, Reno, NV

C31. SMALL RADIOISOTOPE POWER CONCEPTS AND APPLICATIONS - III

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - Parlor G/H

Chairs: Robert Abelson, Jet Propulsion Laboratory, Pasadena, CA
Tibor Balint, Jet Propulsion Laboratory, Pasadena, CA

10:30 am - Thermal and Structural Analysis of Micro-Fabricated In-Volute Regenerators
Songgang Qiu and Jack E. Augenblick, Stirling Technology Company, Kennewick WA

11:00 am - Small Stirling Cycle Convertors
Barry Penswick, Sest, Inc., Middleburg Heights, OH; Jeffery Schreiber, NASA Glenn Research Center, Cleveland, OH

11:30 am - Advanced Superlattice BiTe-PbTe/TAGS Milliwatt Radioisotope Power System
Richard W. Drinker and Ben Heshmatpour, Teledyne Energy Systems, Inc., Hunt Valley, MD; Anil Reddy, Research Triangle Institute, Research Triangle Park, NC; G. Jeffrey Snyder, Jet Propulsion Laboratory, Pasadena, CA; Karen L. Tuttle, NASA Glenn Research Center, Cleveland, OH

12:00 noon - Thermal Analysis of a Small-RPS Concept for the Mars NetLander Network Mission
Tibor S. Balint and Nickolas Emis, Jet Propulsion Laboratory, Pasadena, CA

C32. DYNAMIC POWER CONVERSION TECHNOLOGY - II

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom South

Chairs: Michael Barrett, NASA Glenn Research Center, Cleveland, OH
Bill Harper, Honeywell, Tempe, AZ

10:30 am - Design and Off-Design Performance of 100kWe-Class Brayton Power Conversion Systems
Paul K. Johnson and Lee Mason, NASA Glenn Research Center, Cleveland, OH

11:00 am - Operational Results of a Closed Brayton Cycle Test-Loop
Steven A. Wright, Ronald J. Lipinski, Nicholas Brown, Sandia National Laboratories, Albuquerque, NM; Robert Fuller, Kenneth Nichols, Barber Nichols, Arvada, CO

11:30 noon - Verification of a 2 kWe Closed-Brayton-Cycle Power Conversion System Mechanical Dynamics Model
Damian R. Ludwiczak, Dzu K. Le, Anne M. McNelis, Albert C.Yu, Sergey Samorezov, and Dave S. Hervol, NASA Glenn Research Center, Cleveland, OH

12:00 am - Brayton Power Conversion System Study to Advance Technology Readiness for Nuclear Electric Propulsion - Phase I
Patrick E. Frye and Robert Allen, The Boeing Company, Canoga Park, CA; Rex Delventhal, NASA Glenn Research Center, Cleveland, OH

E07. SPACE RESOURCE UTILIZATION ON THE MOON

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - New Mexico Ballroom North

Chairs: Clyde F. Parrish, NASA Kennedy Space Center, FL
Gerald B. Sanders, NASA Johnson Space Center, Houston, TX

10:30 am - Solar Thermal Power System for Lunar ISRU Processes
Takashi Nakamura, Physical Sciences, Inc., San Ramon, CA; Constance L. Senior, Physical Sciences Inc., Andover, MA

11:00 am - Validation of a Bucket Wheel Excavator Design as a Primary Mechanism for Mining Lunar Regolith
D.S. Boucher, Marcel Viel, Northern Centre for Advanced Technology Inc., Ontario, Canada; Jim Richard, Electric Vehicle Controllers Ltd., Hanmer, Ontario, Canada

11:30 am - Carbon Reduction of Lunar Regolith for Oxygen Production
Robert J. Gustafson, Eric E. Rice and Brant C. White, Orbital Technologies Corporation (ORBITEC), Madison, WI

12:00 noon - Granular Materials and the Risks They Pose for Success on the Moon and Mars
R. Allen Wilkinson, NASA Glenn Research Center, Cleveland, OH; Robert P. Behringer, Duke University, Durham, NC; James T. Jenkins and Michel Y. Louge, Cornell University, Ithaca, NY

B3-1. SPACEPORTS AS COMMERCIAL VENTURES

Thursday, February 17, 2005, 10:30 a.m. - 12:30 p.m. - Rio Grande Room

Chairs: John William Dettmer, Consultant, Albuquerque, NM
Richard Kestner, White Sands Missile Range, WSMR, NM

10:30 am – Commercial Space Transportation in the National Airspace System
Shelia Helton-Ingram, Federal Aviation Administration, Washington, DC

11:00 am - Space Development in New Mexico; The X Prize Cup and Beyond
Richard Kestner, New Mexico Office of Space Commercialization, Santa Fe, NM

11:30 am - White Sands Missile Range-America's Inland Spaceport and Birthplace of US Space and Missile Activities
Richard Kestner, White Sands Missile Range, WSMR, NM

12:00 noon – Panel Discussion

INDEX OF AUTHORS AND PRESENTERS