STAIF 2001: FINAL PROGRAM

SPACE TECHNOLOGY AND APPLICATIONS INTERNATIONAL FORUM (STAIF-2001)

February 11 - 14, 2001
Albuquerque, NM

"Space Exploration and Transportation: Journey into the Future"

CONFERENCE ON SPACE EXPLORATION TECHNOLOGY

CONFERENCE ON THERMOPHYSICS IN MICROGRAVITY

CONFERENCE ON INNOVATIVE TRANSPORTATION SYSTEMS FOR EXPLORATION OF THE SOLAR SYSTEM AND BEYOND

CONFERENCE ON COMMERCIAL/CIVIL NEXT GENERATION SPACE TRANSPORTATION

18th SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION

SPACE RADIATION AND ENVIRONMENTS EFFECTS TRACK

Cosponsored by:

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Organized by:

INSTITUTE FOR SPACE AND NUCLEAR POWER STUDIES
School of Engineering, University of New Mexico
Albuquerque, New Mexico 87131-1341
(505) 277-0446, http://www-chne.unm.edu/isnps

PETE V. DOMENICI
NEW MEXICO

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United States Senate
WASHINGTON, DC 20510–3101

October 4, 2000

Participants in STAIF-2001

Welcome:

I want to add my welcome to all the participants in the 2001 International Forum for Space Technology and Applications in Albuquerque. This Forum includes the 18th Symposium on Space Nuclear Power and Propulsion, reflecting a long history of national focus on this area and the expertise in New Mexico pertaining to these issues.

During your visit in New Mexico, I hope you can interact with the scientists and engineers in New Mexico from our fine research universities, national and federal laboratories, and many high technology businesses. Many of their studies complement the topics that will be discussed in your Conference.

Space programs continue to capture the imagination of America, and each success only adds to their fascination. Your Conference will be exploring many of the future tools and opportunities on which these programs must depend. In past years, this Conference has been well appreciated by the technical community, and I anticipate that this year will be no different.

While you're in New Mexico, I hope you can take a little extra time and sample the historic, cultural and outdoor wonders of our great State.

Sincerely,

Pete V. Domenici
United States Senator

HEATHER WILSON
1ST DISTRICT, NEW MEXICO

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http://www.house.gov/wilson/

January 10, 2001

Dear Members, Guests and Delegates:

Welcome to Albuquerque, New Mexico for the Space Technology and Applications International Forum (STAIF-2001). The theme for this year is "Space Exploration and Transportation: Journey into the Future." By participating in this forum you have shown an interest in expanding your knowledge, skills, and abilities. The STAIF – 2001 forum provides the opportunity visit and observe exhibits, attend interesting conferences, and network with other professionals exploring the challenges of space technology. This year the following conferences will be:

- Conference on Space Exploration Technology
- Conference on Thermophysics and Microgravity
- Conference on Innovative Transportation Systems for Exploration of the Solar System and Beyond
- Conference on Commercial/Civil Next Generation Space Transportation
- 18th Symposium on Space Nuclear Power and Propulsion
- Space Radiation and Environment Effects Track

This agenda provides a diversity of timely and challenging topics to address important aspects of current and future programs of space technology. It is my hope that you find this forum productive and successful in the promotion of professional collaboration essential in optimizing our progress as we journey into the frontiers of space.

Congratulations on your attendance at STAIF –2001. Enjoy your time in the Land of Enchantment.

Sincerely,

Heather Wilson
Member of congress

P.S. Please feel free to contact me by email, ask.heather@mail.house.gov or visit my web site at www.house.gov/wilson for the latest information from Congress

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

OFFICE OF THE MAYOR
JIM BACA

January 3, 2001

Dear Honored Guests:

As Mayor of the City of Albuquerque, it is a great privilege for me to extend warm greetings and welcome you to Albuquerque and the "Land of Enchantment." Albuquerque is honored to host the **2001 Space Technology and Applications International Forum.** We are delighted to host your organization, and wish all participants a successful forum.

New Mexico plays a big part in space and nuclear power research and I hope that the participants attending the forum will be able to find the time to interact with the scientists and engineers from our fine Universities, laboratories and many high technology businesses. This conference has always been well appreciated by the technical community and Albuquerque is pleased to provide the facilities to assist in making the event a great success.

For those of you visiting from out of town, I encourage you to take advantage of everything Albuquerque has to offer. Explore our art, history and cultural attractions. The Albuquerque Museum, Old Town and other art galleries will provide you with a window into Albuquerque's rich history as well as our vibrant and unique art community.

I trust that you will find the natural beauty and enchantment of Albuquerque, coupled with our unparalleled hospitality and cultural diversity, as a perfect setting to your conference.

The people of Albuquerque and of New Mexico are ready to assist in making your visit as enjoyable as possible. Best wishes on an enjoyable stay and productive meeting.

Sincerely,

Jim Baca
Mayor

THE UNIVERSITY OF NEW MEXICO
ALBUQUERQUE, NEW MEXICO 87131-0001

OFFICE OF THE PRESIDENT

December 18, 2000

Welcome!

Welcome to the Space Technology and Applications International Forum, STAIF-2001, and to the "Land of Enchantment." The Forum is announcing several new areas within this year's program and I hope that you will take advantage of all the opportunities this provides to you.

I hope also that you will have time to visit the University of New Mexico campus. UNM is the largest university in New Mexico, serving approximately 25,000 students. It is a university that has experienced phenomenal growth in the visibility and impact of its research programs in recent years, along with a dramatic rise in the number of its academic programs that have been ranked among the nation's best. In the past two years alone, UNM students have received a Rhodes scholarship, two Marshall scholarships, three Truman scholarships, and five Goldwater Scholar awards. UNM has truly become one of the nation's fastest rising public universities.

These successes have been driven, as they are at all universities, by an exceptional faculty. However, we are also fortunate in having the opportunity to collaborate with some of the world's premier scientists and engineers who are located nearby in the state's two national laboratories and at Kirtland Air Force Base. New Mexico has become an outstanding scientific resource for the entire nation and UNM is proud to be a growing part of this thriving scientific community.

Please take the time to come see us and again I wish you great success in this year's Space Technology and Applications International Forum-2001.

Sincerely,

William C. Gordon
President

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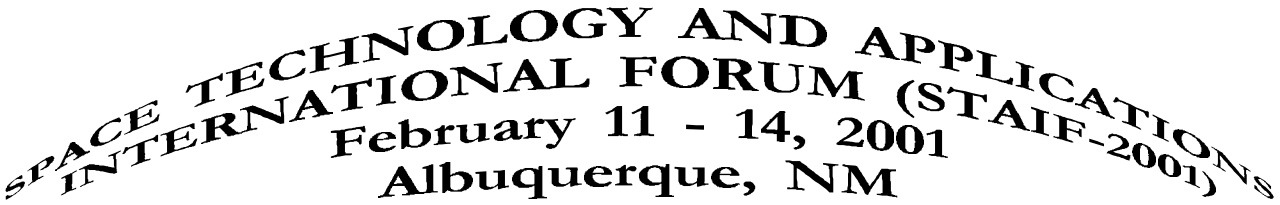

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Albuquerque Hyatt Regency Hotel
Pavilion IV, V, and IV
MONDAY, February 12, 10:00-10:20, 2:30–5:00 and 6:30-8:30; **TUESDAY**, February 13, 9:45 -12:00,1:00-5:00 and 7:00-10:00;
WEDNESDAY, February 14, 10:00-12:00 and 1:00-5:00

MONDAY:	**EXHIBITS CLOSED DURING PLENARIES**	
	OPEN HOURS:	10:00 – 10:20 A.M. (MORNING BREAK)
		2:30 – 5:00 P.M.
		6:30 – 8:30 P.M. (GUIDED EVENING TOURS)
TUESDAY:	**EXHIBITS CLOSED DURING PLENARIES**	
	OPEN HOURS:	9:45 A.M. – 12:00 NOON
		1:00 – 5:00 P.M.
		7:00 – 9:00 P.M. (BANQUET RECEPTION)
WEDNESDAY:	**EXHIBITS CLOSED DURING PLENARIES**	
	OPEN HOURS:	10:00 A.M. – 12:00 NOON
		1:00 – 5:00 P.M.

Air Force Research Laboratory
American Institute of Physics
The Boeing Company
Innovative Nuclear Space Power and Propulsion Institute
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NASA Glenn Research Center
NASA Marshall Space Flight Center
NASA Marshall Space Flight Center/Small Business Programs
NASA Marshall Space Flight Center/TReK
Orbital Sciences Corporation
Stirling Technology Company
Swales Aerospace
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AWARDS AND OUTREACH

SCHREIBER-SPENCE ACHIEVEMENT AWARD

2001 AWARD COMMITTEE: **Jack Mondt** (chair), Jet Propulsion Laboratory, **Stan Borowski**, NASA Glenn Research Center, **Robert Cockfield,** Lockheed Martin; **Jim Fountain**, The Boeing Company; **Stanley V. Gunn**, Rocketdyne (Retired), **Gary Payton**, NASA Headquarters, **Don Rapp**, Jet Propulsion Laboratory, **Harrison Schmitt**, Consultant, **Ronald J. Sovie**, NASA Glenn Research Center, **Jess Sponable**, Universal Space Lines, and **John Wheeler**, 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-2001 Luncheon. The awardee(s) is expected to attend the STAIF Conference, at which the award is given, and to address the attendees on a relevant topic. The award honors Raemer E. Schreiber and Roderick W. Spence for their pioneering and technical contributions to concepts and designs for nuclear propulsion in space during their tenure at Los Alamos National Laboratory.

NOMINATION: Nominations for the 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 nuclear power and propulsion.

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 the 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
1988 Roderick W. Spence
1990 Jerome Mullein
1990 William E. Wright
1991 Stanley V. Gunn
1992 Harold B. Finger
1993 Robert T. Carpenter
1993 James J. Lombardo
1994 George Gryaznov, Russia
1994 Victor Ya. Poupko, Russia
1995 Martin Marietta Astro Space RTG Team
1996 SNAP-10A Team
1996 Gary L. Bennett
1997 Wesley T. Huntress
1998 The Cassini Mission Power Source Team
1999 NSTAR Team and SCARLET Team

MANUEL LUJAN, JR. STUDENT PAPER AWARD

AWARD COMMITTEE: **Tom Reinarts** (Chair), NASA Kennedy Space Center; **Les Begg,** General Atomics; **Robert Cataldo**, NASA Glenn Research Center; **Gilbert Chew,** Science Applications International Corporation; **William Emrich, Jr.**, NASA Marshall Space Flight Center; **Greg Matloff**, New York University/ New York City Technical College; **Lyle Rutger**, US Department of Energy; **Jonathan Stabb**, NASA Kennedy Space Center; **Jean-Michel Tournier,** University of New Mexico/Institute for Space & Nuclear Power Studies, and **Ralph Zee**, Auburn University.

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 awards committee.

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

The recipient of the Best Student Paper Award at STAIF-2000 is Jeffrey C. King, University of New Mexico, for his paper entitled "A Review of Refractory Materials for Vapor-Anode AMTEC Cells." His co-author and advisor is Regents Professor Mohamed S. El-Genk. This award will be recognized at the STAIF-2001 Luncheon.

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

1988-Vladimir Valentakovich, University of California at LA
1989-John McGhee, ISNPS, University of New Mexico
1990-John Metzger, ISNPS, University of New Mexico
1991-Theodore Tessner, Oregon Graduate Institute of Science
1992-Christopher S. Murray, ISNPS, University of New Mexico
1992-Ronald A. Pawlowski, Oregon State University
1992-Bernard R. Wernsman, ISNPS, University of New Mexico
1993-Jonathan Witter, Massachusetts Institute of Technology
1994-David I. Poston, University of Michigan
1995-Jun Liu, Auburn University
1996-James R. Luke, ISNPS, University of New Mexico
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
2000-Jeffrey C. King, ISNPS, University of New Mexico

OUTSTANDING PAPER AWARD

AWARD COMMITTEE: **Joseph A. Sholtis, Jr**. (Chair), Sholtis Engineering & Safety Consulting; **Timothy Barth**, NASA Kennedy Space Center; **William J. Dettmer**, Consultant; **Jim Fountain**, The Boeing Company; **Rob Hoyt**, Tethers Unlimited; **George Miley,** University of Illinois; **Nick Morley**, Air Force Research Laboratory; **R. Ponnappan**, AFRL/PRPG; **Dave Poston,** Los Alamos National Laboratory; **Theodore Swanson**, NASA Goddard Space Flight Center; **Derek Tidman,** Advanced Launch Corporation; **Brenda Ward,** NASA Johnson Space Center; and **Kevin Watson,** NASA Johnson Space Center.

The Space Nuclear Power and Propulsion Outstanding Paper Award was established in 1992 by The University of New Mexico's Institute for Space and Nuclear Power Studies (ISNPS) to recognize outstanding technical contributions to the fields of all hosted conferences and symposia of the Space

Technology and Applications International Forum (STAIF). The recognition of an outstanding contribution is based upon the written paper published in the STAIF Proceedings and the content of the presentation at the meeting. The award is presented by ISNPS upon the recommendation of the STAIF Award Committees.

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

NOMINATION AND EVALUATION CRITERIA: The paper and the content of the presentation represents a technical contribution that (1) has an influential impact on the field of the topic of the conference or symposia in which it was presented, (2) has lasting technical value, and (3) is likely to be built upon and referenced by their peers. The primary emphasis in the selection of the award will be based on the written paper. In the case of a close decision, input from subcommittee members who heard the oral presentation and the session chair and co-chair may be used to render a final decision. The paper must be well written, well organized, and have appropriate references and acknowledgments. The paper must also present a complete and scientifically sound analysis. The STAIF Outstanding Paper Award is presented for technical contributions. While overview and historical papers are important for the historical archives, they will not be considered for the award. The author(s) must be a major technical contributor to the work. The paper should also acknowledge all major technical contributors to the work who are not co-authors.

RECIPIENT OF 2000 AWARD: **The recipients of the STAIF-2000 award are L.Thieme NASA GRC, S.Qiu STC, and M.White STC for their paper, entitled: "Technology Development for a Stirling Radioisotope Power System."**

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 $1,200 per year and tuition waivers for up to three years. RECIPIENTS OF 2001 SCHOLARSHIPS: **Jason Brown, Thomas Gamble, Kelly Kuhn, and Doug Pete**, **University of New Mexico**

OUTREACH ACTIVITIES / SECONDARY SCHOOL SPECIAL SESSION

EDUCATION OUTREACH ADVISORY BOARD MEMBERS: **Randi Buck**, UNM-Regional Science Fair; **Susan Dibble**, Desert Ridge Middle School, **Irene El-Genk, Chair**, West Mesa High School; **Mohamed S. El-Genk**, UNM-ISNPS; **Susan Ostlie**, Madison Middle School; **Carla Rogers**, UNM-ISNPS, **Steve Seiffert**, Consultant; **Gary Stiler**, Jefferson Middle School; and **Rose Thome**, Albuquerque. 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; NASA National Space Grant Colleges and Fellowship Program; and the American Nuclear Society, Trinity Section. Special session activities are coordinated by **Irene El-Genk**, West Mesa High School, Albuquerque, NM, who is a member of the Education and Outreach Advisory Board (EOAB), at the Institute for Space and Nuclear Power Studies. Secondary school science students and teachers from New Mexico who participated in the Space Design Competition are invited to attend and participate in this session to be held Monday, February 12, 2001, 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 "Moonbase for the New Millenium." The Design Competition judging will take place at this special session. Winners will receive prizes at the STAIF-2001 luncheon, held Monday, February 12. The Space Design Competition is coordinated by **Mr. Jeff King**, UNM-ISNPS

PUBLICATIONS

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

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

Attendees will be given a 50% discount off the list price for the current proceedings, STAIF-2001; discount good for 30 days from the start of the STAIF-2001 meeting. Attendees will also be given a 40% discount off the list price on all other CPs exhibited at STAIF-2001 (titles-on-display list); discount good for 30 days from start of STAIF-2001 meeting.

NON-attendees visiting the STAIF webpage will be given a pre-publication discount of 35% off the list price for the STAIF-2001 proceedings, either print or CD-ROM version. This is effective till the 15th of March 2001.

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

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

Proceedings of the 10th Symposium (1993) (3-vol. hardback set), ISBN # 156396-137-7, AIP Conf. Proceedings #271..... $275.00

A Critical Review of Space Nuclear Power & Propulsion (1984-1993) (Anniversary Issue), AIP Press, ISBN # 1-56396-3175 .... $ 75.00

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

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

Proc. Space Technology and Applications International Forum (STAIF-96): 1st Conf. on Commercial Development of Space; 1st Conf. on Next Generation Launch Systems, 2nd Spacecraft Thermal Control Symposium, and 13th Symposium on Space Nuclear Power and Propulsion (1996) (3-vol. hardback set), ISBN # 1-56396-562-3, AIP Conf. Proc.# 361 ..... $275.00

Proc. Space Technology and Applications International Forum (STAIF-97): 1st Conf. on Future Science and Earth Science Missions; 1st Conf. on Synergistic Power and Propulsion Systems Technology; 1st Conf. on Applications of Thermophysics in Microgravity; 2nd Conf. on Commercial Development of Space; 2nd Conf. on Next Generation Launch Systems; 14th Symposium on Space Nuclear Power and Propulsion (1997) (3-vol. Hardback set), ISBN # 1-56396-679-4, AIP Conf. Proc # 387..... $295.00

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) (3-vol. Hardback set), ISBN # 1-56396-747-2, AIP Conf. Proc. # 420..... $320.00

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 & Breakthrough Physics;Conf. on Next Generation Launch Systems; 16th Symposium on Space Nuclear Power and Propulsion (1999), AIP Conf. Proc. No. 458, (2-vol. Hardback set), ISBN # 156396-846-0 ..... $300.00

CD-ROM Version, ISBN # 156396-879-7 ..... $200.00

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 Comercial/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..... $300.00

CD-ROM Version, ISBN 156396-920-3 ..... $200.00

Proc. Space Technology and Applications International Forum (**STAIF-2001**): Space Exploration Technology Conf.; Conf. on Thermophysics in Microgravity; Conf. on Innovative Transportaion Systems for Exploration of the Solar System and Beyond;; Conf. on Comercial/Civil Next Generation Space Transportation; 18th Symposium on Space Nuclear Power and Propulsion; Space Radiation and Environment Effects Track, AIP Conf. Proceedings 552, (1-vol. Hardcover set), ISBN 1-56396-980-7 ..... $280.00

CD-ROM Version, ISBN 1-56396-981-5 ..... $150.00

Publications available from Orbit Book Company, P. O. Box 9542, Melbourne, FL 32902-9542, Phone: (407) 724-9542

Space Nuclear Power Systems (1984 - 1989) –set..... $500.00

HOTEL ACCOMMODATIONS

HYATT REGENCY HOTEL

Guest rooms have been reserved at the Hyatt Regency Albuquerque, located in downtown Albuquerque, NM, for those who identify themselves as participants of STAIF-2001. The rates are:

RATES

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

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

Hyatt Regency Albuquerque, 330 Tijeras, NW, Albuquerque, NM 87102

(505) 842-1234, Fax: (505) 766-6710, Toll Free Reservations: 1-800-233-1234

All group-rate reservation requests must be received by the hotel no later than JANUARY 19, 2001. Attendees must identify themselves as participants of STAIF-2001, 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.

CONFERENCE REGISTRATION AND FEES

Albuquerque Hyatt Regency Hotel, 2nd Floor

Registration: Sunday, February 11, 4:30 pm - 7:30 pm Tuesday, February 13, 7:30 am- 4:30pm
Monday, February 12, 7:00 am - 5:00 pm Wednesday, February 14, 7:30am - 4:30pm

ALL ATTENDEES AND EXHIBITORS MUST REGISTER AND PAY A REGISTRATION FEE: Cash, corporate or personal checks, Visa and MasterCard will be accepted. Payment by a personal or corporate check should be made payable to: INSTITUTE FOR SPACE AND NUCLEAR POWER STUDIES, STAIF-2001 Conferences, Farris Engineering Center, Room 239, The University of New Mexico, Albuquerque, NM 87131-1341, (505) 277-2813 or (505) 277-0446.

	Early (postmarked on or before 1/12/2001)	**Late** (postmarked after 1/12/2001)
OPEN TECHNICAL MEETING(a)	$390.00	$460.00
ONE DAY REGISTRATION (b)	$280.00	$340.00
STUDENTS (c)	$90.00	$90.00
STUDENT (WITH PROCEEDINGS)	$135.00	$135.00
ADDITIONAL LUNCHEON TICKET(d)	$25.00	$25.00
ADDITIONAL BANQUET TICKET(d)	$25.00	$25.00

(a) Open Technical Meeting Full Registration Fee: Includes Sessions, Monday Luncheon and Tuesday Evening 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. (Luncheon tickets are extra).

(c) Student Registration: **TO QUALIFY, INDIVIDUALS MUST SHOW PROOF OF FULL TIME ENROLLMENT** for the 2001Spring Semester. Pre-registrants should enclose a copy of their 2001 spring schedules. Registration fee includes Tuesday evening banquet, and coffee breaks. (Luncheon tickets are extra.)

(d) Additional luncheon tickets can be purchased on-site if available.

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 17, 2001. NO REFUNDS WILL BE ISSUED after JANUARY 17, 2001. All refunds will be made promptly by mail.

BANQUET AND LUNCHEON

In addition to the reception, one luncheon ticket will be included with each full registration. A name badge will be appropriate admittance to the reception. Additional tickets must be purchased in advance. Please be certain that you and each of your guests have registered.

LUNCHEON: MONDAY, February 12, 2001, 11:45 pm - 1:30 pm, Grand Pavilion, Albuquerque Hyatt Regency Hotel.

BANQUET RECEPTION: TUESDAY, February 13, 2001, 7:00 pm – 9:00 pm, Grand Pavilion, Albuquerque Hyatt Regency Hotel.

SESSION CHAIRS' AND SPEAKERS' BREAKFAST

All STAIF-2001 speakers and session chairs are requested to attend the Speakers' Breakfast on the day of their session or presentation to discuss the session arrangements and guidelines. The breakfast is hosted by UNM's Institute for Space and Nuclear Power Studies. A Speakers' Preparation Room is available in Boardroom East.

AUDIO VISUAL EQUIPMENT

An overhead projector and screen will be provided at all sessions. A slide projector will also be provided on request without charge. Additional A.V. equipment must be ordered through Institute personnel, in advance, and paid for by the author. Please call (505) 277-2813 with special requests.

SCHEDULE OF PROGRAM ACTIVITIES

Albuquerque Hyatt Regency Hotel

SUNDAY, February 11, 2001

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

MONDAY, February 12, 2001

7:00 am	-	7:45 a.m.	***Speakers' Breakfast - Sendero Ballroom***
7:00 am	-	4:30 pm	**Registration,** 2nd Floor
7:30 am	-	8:00 am	**Secondary School Special Session Registration,** Fiesta Ballroom
8:00 am	-	8:30 am	**Welcome and Opening Remarks,** Grand Pavilion
8:00 am	-	12:00 pm	**Secondary School Special Session,** Fiesta Ballroom
8:30 am	-	10:00 am	**Plenary Session I** , Grand Pavilion
10:00 am	-	10:20 am	***Coffee Break – Prefunction Area***
10:20 am	-	12:00 pm	**Plenary Session II,** Sendero Ballroom
12:00 pm	-	1:45 pm	***Awards Luncheon - Grand Pavilion***
2:00 pm	-	4:00 pm	**Conference Opening Sessions, (see table of contents or centerfold for time and room)**
4:00 pm	-	4:20 pm	***Coffee Break – Grand Pavilion***
4:20 pm	-	6:20 pm	**Technical Sessions (see table of contents or centerfold for time and room)**
6:30 pm	-	8:00 pm	**Joint Steering and Executive Committee Meeting,** Sage I, First Floor

TUESDAY, February 13, 2001

7:00 am	-	7:45 a.m.	***Speakers' Breakfast - Sendero Ballroom***
7:00 am	-	4:30 pm	**Registration,** 2nd Floor
8:00 am	-	9:45 am	**Plenary Session III,** Grand Pavilion
9:45 am	-	10:15 am	***Coffee Break – Prefunction Area***
10:15 am	-	12:15 pm	**Technical Sessions (see table of contents or centerfold for time and room)**
12:15 pm	-	1:15 pm	***Lunch Break***
12:15 pm	-	1:15 pm	**STAIF Technical Program Committee Meetings** **Space Exploration Technology Conference,** Sendero II **Conf. on Thermophysics in Microgravity,** Enchantment E & F **Conf. on Innovative Transportation Systems for Exploration of the Solar System & Beyond,** Sendero I **Conf. on Commercial/Civil Next Generation,** Enchantment C & D **18th Symposium on Space Nuclear Power and Propulsion,** Enchantment A & B **Space Radiation and Environments Effects Track,** Sendero III
1:15 pm	-	3:15 pm	**Technical Sessions (see table of contents or centerfold for time and room)**
3:15 pm	-	3:30 pm	***Coffee Break – Grand Pavilion***
3:30 pm	-	5:30 pm	**Technical Sessions (see table of contents or centerfold for time and room**)
6:00 pm	-	7:00 pm	**Hardware, Multimedia Display Session,** Fiesta Ballroom
7:00 pm	-	9:00 pm	***Forum Banquet - Grand Pavilion***

WEDNESDAY, February 14, 2001

7:00 am	-	7:45 am	***Speakers' Breakfast - Grand Pavilion***
7:30 am	-	4:30 pm	**Registration,** 2nd Floor
8:00 am	-	10:00 am	**Technical Sessions (see table of contents or centerfold for time and room**)
10:00 am	-	10:20 am	***Coffee Break – Prefunction Area***
10:20 am	-	12:20 pm	**Technical Sessions (see table of contents or centerfold for time and room**)
12:20 pm	-	1:20 pm	***Lunch Break***
12:20 pm	-	1:20 pm	**Joint Advisory and Executive Committee Meeting,** Sage I, 1st Floor
1:20 pm	-	3:20 pm	**Technical Sessions (see table of contents or centerfold for time and room**)
3:20 pm	-	3:40 pm	***Coffee Break – Grand Pavilion***
3:40 pm	-	5:40 pm	**Technical Sessions (see table of contents or centerfold for time and room**)
5:45 pm		7:00 pm	**Executive Committee Meeting,** Fiesta 1 & 2

COMMITTEE MEETINGS

STEERING AND EXECUTIVE COMMITTEE

MONDAY, February 12, 6:30 pm - 8:00 pm, Sage I

TECHNICAL PROGRAM COMMITTEES

TUESDAY, February 13, 12:15 pm - 1:15 pm

(All Session Chairs and Co-Chairs are committee members. Lunch is available for purchase)

Conf. on Space Exploration Technology, Sendero II; **Conf. on Thermophysics in Microgravity,** Enchantment E & F; **Conf. on Innovative Transportation Systems for Exploration of the Solar System and Beyond,** Sendero I; **Conf. on Commercial/Civil Next Generation Space Transportation,** Enchantment C & D; **18th Symposium on Space Nuclear Power and Propulsion,** Enchantment A & B; **Space Radiation and Environments Effects Track,** Sendero III

ADVISORY AND EXECUTIVE TECHNICAL PROGRAM COMMITTEE

WEDNESDAY, February 14, 12:20 pm - 1:20 pm, Sage I, 1st Floor

EXECUTIVE COMMITTEE MEETING

WEDNESDAY, February 14, 5:45 pm - 7:30 pm, Fiesta 1 & 2

PROGRAM ACTIVITIES

WELCOMING AND OPENING REMARKS

MONDAY, February 12, 8:00 am - 8:30 am, Grand Pavilion

Earl Wahlquist, STAIF General Chair, US Department of Energy
William C. Gordon, President, The University of New Mexico
Joseph Cecchi, Interim Dean, School of Engineering, The University of New Mexico

STAIF-2001 PLENARY SESSIONS

PLENARY SESSION I: Views From the Top

MONDAY, February12, 8:30 am – 10:00 am, Grand Pavilion

Earl Wahlquist, Chair
Associate Director, Office of Engineering and Technology Development
US Department of Energy

Arnauld Nicogossian, Co-Chair
Chief Health & Medical Officer
NASA Headquarters

G. Scott Hubbard, Mars Program Director, NASA Headquarters

PLENARY SESSION II: Programs & Technology

MONDAY, February 12, 10:20 am - 12:00 pm, Sendero Ballroom

Robert Sackheim, Chair
Assistant Director
NASA Marshall Space Flight Center

Bonnie J. Dunbar, Co-Chair
Associate Director for University Research and Affairs
NASA Johnson Space Center

Bonnie J. Dunbar, Associate Director for University Research and Affairs, NASA Johnson Space Center
Robert Sackheim, Assistant Director, NASA Marshall Space Flight Center
Mike Mott, Vice President/General Manager, Boeing Reusable Space Systems, The Boeing Company
Noel Hinners, Vice President, Flight Systems, Lockheed Martin Astronautics

PLENARY SESSION III: Space Exploration

TUESDAY, February 13, 8:00 am - 9:45 am, Grand Pavilion

Les Johnson, Chair
Project Manager
NASA Marshall Space Flight Center

Doug Cooke, Co-Chair
Manager, Advanced Development Office
NASA Johnson Space Center

Gary Martin, Director of Advanced Projects, NASA Headquarters
Robert Forward, Vice President and Chief Scientist, Tethers Unlimited, Inc.
John Young, Associate Director (Technical), NASA Johnson Space Center

OUTREACH ACTIVITIES

SECONDARY SCHOOL SPECIAL SESSION

MONDAY, February 12, 8:00 am - 12:00 pm, Fiesta Room

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

Jeff King, Co-Chair
UNM-Institute for Space and Nuclear Power Studies
Albuquerque, NM

Welcome, Irene El-Genk, West Mesa High School, Albuquerque, NM
Judging of the Secondary School Space Design Competition, Jeffrey C. King, UNM-ISNPS, Albuquerque, NM
View STAIF-2001 Exhibits
Announcement of Space Design Competition Winners, Jeffrey C. King, UNM-ISNPS, Albuquerque, NM
Speaker

CONFERENCE OPENING SESSIONS

CONFERENCE ON SPACE EXPLORATION TECHNOLOGY

MONDAY, February 12, 2:00 pm – 4:00 pm, Sendero Ballroom I

Doug Cooke, Chair
NASA Johnson Space Center, Houston, TX

G. Scott Hubbard, Co-Chair
NASA Headquarters, Washington, DC

CONFERENCE ON THERMOPHYSICS IN MICROGRAVITY
ROUND TABLE ON SPECIALS

MONDAY, February 12, 2:00 pm – 4:00 pm, Sendero Ballroom III

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

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

A Brief Overview of the Contributions to be Presented
Ad A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands

Round Table Discussion: Lessons Learned with Loop Heat Pipe Applications
Ted Swanson (Moderator), NASA Goddard Space Flight Center, Greenbelt, MD
Ad A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands
Dan Butler, Jentung Ku, NASA Goddard Space Flight Center, Greenbelt, MD
Michael Nikitkin, Walter Bienart, Dynatherm Corporation Inc., Hunt Valley, MD
Dave Wolf, Swales Aerospace, Beltsville, MD

CONFERENCE ON INNOVATIVE TRANSPORTATION SYSTEMS FOR EXPLORATION OF THE SOLAR SYSTEM AND BEYOND

MONDAY, February 12, 2:00 pm – 4:00 pm, Sendero Ballroom II

Les Johnson, Chair
NASA Marshall Space Flight Center, Huntsville, AL

Robert Forward, Co-Chair
Tethers Unlimited, Inc,.Clinton, WA

New Technologies for In-Space Transportation
Les Johnson, NASA Marshall Space Flight Center, Huntsville, AL

Solar Sails
Charles Garner, Jet Propulsion Laboratory, Pasadena, CA

Electrodynamic Tethers
Brian Gilchrist, University of Michigan, Ann Arbor, MI

Momentum Transfer Tethers
Kirk F. Sorensen, NASA Marshall Space Flight Center, Huntsville, AL

18TH SYMPOSIUM ON SPACE NUCLEAR POWER AND PROPULSION - OPENING SESSION

MONDAY, FEBRUARY 12, 2:00 pm – 4:00 pm, Enchantment Ballroom

Robert Wiley, Chair
Booz-Allen & Hamilton, Arlington, VA

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

NASA HQ Missions Summary
Earle Huckins, NASA Headquarters, Washington, DC

DOE Space Nuclear Programs
Earl Wahlquist, US Department of Energy, Germantown, MD

Power Rich Exploration
Franklin Chang-Diaz, NASA Johnson Space Center, Houston, TX

NASA Perspective
Robert Sackheim, NASA Marshall Space Flight Center, Huntsville, AL

TECHNICAL SESSIONS

MONDAY, FEBRUARY 12, 2001

[A01] Exploration Architectures

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Sendero Ballroom I

Benton C. Clark, Chair
Lockheed Martin
Denver, CO

Bret Drake, Co-Chair
NASA Johnson Space Center
Houston, TX

4:25 pm - Mars-Earth Rapid Interplanetary Tether Transport (MERITT) Architecture
Robert L. Forward, Tethers Unlimited, Inc., Clinton, WA; Gerald D. Nordley, Sunnyvale, CA

4:49 pm - Mars Atmosphere Resource Recovery System (MARRS)
Christopher England, Engineering Research Group, Sierra Madre, CA

5:13 pm - Exploring Venus by Solar Airplane
Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH

5:37 pm - Silicon PV Cell Production On The Moon as the Basis for a New Architecture for Space Exploration
Michael B. Duke, Colorado School of Mines, Golden, CO; Alex Ignatiev and Alex Freundlich, University of Houston, Houston, TX; Sanders D. Rosenberg, In Space Propulsion, Ltd., Sacramento, CA; Darby Makel, Makel Engineering, Inc., Sacramento, CA

6:01 pm - Mars Robotic Outpost: A Concept for Next Decade Exploration
Tracy D. Williams, Jennifer M. Owens, Robert W. Easter, Omar R. Mireles, Steve. A Ramsey, Jet Propulsion Laboratory, Pasadena, CA; Carl W. Palko, The Aerospace Corporation, Los Angeles, CA

[C01] Propellantless Propulsion: Momentum Transfer Tethers I

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Sendero Ballroom II

Robert P. Hoyt, Chair
Tethers Unlimited, Inc.
Lynnwood, WA

Brian Tillotson, Co-Chair
Boeing Company, The
Seattle, WA

4:25 pm - Tether-Debris Interactions in Low Earth Orbit
Phillip D. Anz-Meador, Viking Science and Technology, Inc., Houston TX

4:49 pm - Tether Survivability and Collision Avoidance: Is LEO the Right Place for Tethered Systems?
William J. Cooke, Computer Sciences Corporation, NASA Marshall Space Flight Center, Huntsville, AL; David B. Spencer, Pennsylvania State University, University Park, PA; and B. Jeffrey Anderson and Robert M. Suggs, ED44 Environments Group, Marshall Space Flight Center, AL

5:13 pm - Integrated Test Rig for Tether Hardware, Real-Time Simulator and Control Algorithms: Robust Momentum Transfer Validated
M. Kruijff and E.J. van der Heide, Delta-Utec Space Research and Consultancy, Leiden, The Netherlands

5:37 pm - Field Emission Array Cathodes for Electrodynamic Tether Applications
Colleen M.Marrese, Jet Propulsion Laboratory, Pasadena, CA

6:01 pm - Multi-site Mars Exploration Using Tethers
Brian Tillotson, Kent, WA

[B01] Fundamentals of Two-Phase Flow and Heat Transfer In Microgravity

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Sendero Ballroom III

Frederick R. Best, Chair
Texas A&M Center for Space Power
College Station, TX

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

4:25 pm - Fundamentals of Gravity Level Dependent Two-Phase Flow and Heat Transfer - A Tutorial
A.A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands

4:49 pm - Thermal-Gravitational Modelling and Scaling of Two-Phase Heat Transport Systems from Micro-Gravity to Super-Gravity Levels
A.A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands

5:13 pm - Modelling and Scaling of Oscillating or Pulsating Heat Transfer Devices Subjected to Earth Gravity and to High Acceleration Levels
A.A.M. Delil, National Aerospace Laboratory NLR, Emmeloord, The Netherlands

5:37 pm - Modeling and Testing of Two-Phase Flow in Manifolds Under Microgravity Conditions
Frederick Best and Cable Kurwitz, Texas A&M University, College Station, TX

6:01 pm - Open Discussion on Fundamentals of Two-Phase Flow and Heat Transfer In Microgravity
Informative and interactive discussion involving speakers as well as the attendees is to take place during this time slot. Speakers and session chairs will sit at the head table and each will be given one minute for opening comments. Then, questions will be invited from the attendees. Session Chairs should avoid long discussions to allow as many questions as possible to be addressed.

[E01] Potential Missions

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Enchantment Ballroom A & B

Bill J. Nesmith, Chair
Jet Propulsion Laboratory
Pasadena, CA

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

4:25 pm - Radioisotope-Powered Mars Rover
Howard J. Eisen, Jet Propulsion Laboratory, Pasadena, CA

4:49 pm - The Pascal Mars Network: A Milliwatt Power Mission
Marcus S. Murbach, NASA Ames Research Center, Moffett Field, CA

5:13 pm - Advanced Radioisotope Power Sources for Future Deep Space Missions
Erik N. Nilsen, Jet Propulsion Laboratory, Pasadena, CA

5:37 pm - A Radioisotope Powered Cryobot for Penetrating the Europan Ice Shell
Wayne F. Zimmerman, Scott Bryant, John Zitzelberger, Bill Nesmith, Jet Propulsion Laboratory, Pasadena, CA

6:01 pm - Interstellar Travel - Challenging Propulsion and Power Technologies for the Next 50 Years
Sarah A. Gavit, Paulett C. Liewer, Richard A. Wallace, Juan A. Ayon, and Robert H. Frisbee, Jet Propulsion Laboratory, Pasadena, CA

[E02] Advanced Concepts I

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Enchantment Ballroom C & D

George H. Miley, Chair
University of Illinois
Urbana, IL

J. Boise Pearson, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL

4:25 pm - Systems-Level Modeling of a Beam-Core Matter-Antimatter Annihilation Propulsion System
Robert H. Frisbee, Jet Propulsion Laboratory, Pasadena, CA

4:49 pm - Design and Preliminary Testing of a High Performance Antiproton Trap (HiPAT)
James J. Martin, NASA Marshall Space Flight Center, Huntsville, AL; Raymond A. Lewis, R. Lewis Company, Huntsville, AL; Kevin Kramer and Kirby Meyer, Penn State University, University Park, PA; Gerald A. Smith, Synergistic Technologies, Inc., Los Alamos, NM

5:13 pm - High Density Storage of Antimatter for Space Propulsion Applications
Gerald A. Smith and Dan P. Coughlin, Synergistic Technologies, Los Alamos, NM and Penn State University, University Park, PA

5:37 pm - On New Generations of Solar Propulsive Systems for Space
Anatoly Sukhodolsky, General Physics Institute of Russian Academy of Sciences, Moscow, Russia

6:01 pm - Propulsion Using a Stable Plasma Thruster
Clint Seward, Electron Power Systems, Inc., Acton, MA

[A02] Humans and Machines

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Enchantment Ballroom E & F

Reid L. Kress, Chair
University of Tennessee
Knoxville, TN

Dimi Apostolopoulos, Co-Chair
Carnegie Mellon University
Pittsburgh, PA

4:25 pm - Robotic Outposts as Precursors to a Manned Mars Habitat
Terry Huntsberger, Paulo Pirjanian, and Paul S. Schenker, Jet Propulsion Laboratory, Pasadena, CA

4:49 pm - Achievability for Telerobotic Systems
Reid Kress, Bill Hamel, The University of Tennessee, Knoxville, TN; John Draper, Oak Ridge National Laboratory, Oak Ridge, TN

5:13 pm - Integrated Design Of a Telerobotic Workstation
Jennifer L. Rochlis, NASA Johnson Space Center, Houston, TX; John-Paul Clarke, Massachusetts Institute of Technology, Cambridge, MA

5:37 pm - Reality Browsing: Using Information Interaction and Robotic Autonomy for Planetary Exploration
Peter W. Coppin, Michael D. Wagner, and Scott Thayer, Carnegie Mellon University, Pittsburgh, PA

6:01 pm - Open Discussion of Humans and Machines
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[D01] Existing and Growth Markets

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Fiesta Room I & II

Clayton Mowry, Chair
Satellite Industry Association
Alexandria, VA

4:25 pm - Potential Hurdles or Gateways in the Commercial Space Transportation Market
Eric W. Stallmer, Space Transportation Association, Arlington, VA

4:49 pm - Trends in the Commercial Launch Services Industry
Ethan E. Haase, International Launch Services, McLean, VA

5:13 pm - The Global Demand for Launch Services
Phil McAlister, Casey Mace, Futron Corporation, Bethesda, MD

5:37 pm - Small Launch Vehicle Industrial Base
Ronald J. Grabe, Launch Systems Group, Dulles, VA

6:01 pm - Open Discussion of Existing and Growth Markets
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E03] Nuclear System Testing Progress/Results I

Monday, February 12, 2001, 4:20 - 6:20 p.m. - Fiesta Room III & IV

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

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

4:25 pm - Phase 1 Space Fission Propulsion System Testing and Development Progress
Melissa Van Dyke, Michael Houts, Kevin Pedersen, Thomas Godfroy, Ricky Dickens, Pat Salvail, NASA Marshall Space Flight Center, Huntsville, AL; David Poston, Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM; Peter Ring, Advanced Methods and Materials, Sunnyvale, CA

4:49 pm - Results of 30 kWt Safe Affordable Fission Engine (SAFE-30) Primary Heat Transport Testing
Kevin Pedersen, Melissa Van Dyke, Michael Houts, Thomas Godfroy, James Martin, Ricky Dickens, Eric Williams, Roger Harper, Pat Salvail, NASA Marshall Space Flight Center, Huntsville, AL; Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM

5:13 pm - Safe Affordable Fission Engine (SAFE 30) Module Conductivity Test Thermal Model Correlation
Jose Roman, NASA Marshall Space Flight Center, Huntsville, AL

5:37 pm - Mechanism to Ensure Safety of Fission System During Launch
Thomas Godfroy, Bruce Patton, Michael Houts, Kevin Pedersen, NASA Marshall Space Flight Center, Huntsville, AL; Peter Ring, Advanced Methods and Materials, Sunnyvale, CA

6:01 pm - Development of Core Cladding Fabrication Techniques for Phase I Fission Propulsion Systems
Patrick G. Salvail, NASA Marshall Space Flight Center, Huntsville, AL; Robert S. Reid, Los Alamos National Laboratory, Los Alamos, NM; and Peter J. Ring, Advanced Methods & Materials, Inc., San Jose, CA

TUESDAY, FEBRUARY 13, 2001

[C02] Propellantless Propulsion: Solar Sails

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Sendero Ballroom I

Charles E. Garner, Chair
Jet Propulsion Laboratory
Pasadena, CA

Manfred Leipold, Co-Chair
Kayser-Threde GmbH
München, Germany

10:20 am - Solar Sail Passive Attitude Stability and Control
Christel B. van de Kolk, Analyticon Limited, Herts, United Kingdom; and Gary A. Flandro, University of Tennessee, UTSI, Tullahoma, TN

10:44 am - Near-Term Mission Applicatons for Low Performance Solar Sails
Colin R. McInnes, University of Glasgow, Scotland, UK

11:08 am - Solar Sail Technology Development and Application to Fast Missions to the Outer Heliosphere
Manfred Leipold, Kayser-Threde GmbH, Munchen, Germany

11:32 am - Carbon Solar Sails for High Acceleration
Timothy R. Knowles, Energy Sciences Laboratories Inc., San Diego, CA

11:56 am - Design for a Solar Sail Demonstration Mission
Humphrey W. Price, Juan Ayon, Martin Buehler, Charles Garner, Gerhard Klose, Edward Mettler, Barry Nakazono, George Sprague, Jet Propulsion Laboratory, Pasadena, CA

[A03] The Science of Exploration

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Sendero Ballroom II

Jim Garvin, Chair
NASA Headquarters
Washington, DC

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

10:20 am - Humans as Optimal Sample Return Explorers
Jim Garvin, NASA Goddard Space Flight Center, Greenbelt, MD

10:44 am - Searching for Life: the Case for Halobacteria on Mars
Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH

11:08 am - A Study of Orientation in a Zero Gravity Environment by Means of Virtual Reality Simulation
Hirofumi Aoki and Ryuzo Ohno, Tokyo Institute of Technology, Yokohama, Japan; and Takao Yamaguchi, National Space Development Agency of Japan, Ibaraki-ken, Japan

11:32 am - NASA Light Emitting Diode Medical Applications From Deep Space to Deep Sea
Harry T. Whelan, Ellen V. Buchmann, Noel T. Whelan, Scott G. Turner, Joan Cwiklinski, Glenn A. Meyer, Lisa Gould, Mary Kane and Gina Chen, Medical College of Wisconsin, Milwaukee, WI; Vita Cevenini and Helen Stinson, NASA Marshall Space Flight Center, Huntsville, AL; Ron Ignatius and Todd Martin, Quantum Devices, Inc., Barneveld, WI; Brian Hodgson, Children's Hospital of Wisconsin, Milwaukee, WI and USMCR, Marietta, GA; James Caviness, Submarine Squadron ELEVEN, San Diego, CA

11:56 am - Open Discussion of The Science of Exploration
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E04] Nuclear System Testing Progress/Results II

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Sendero Ballroom III

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

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

10:20 am - Rhenium Compatibility with Uranium Dioxide at Elevated Temperatures
Travis Knight, Djamel Kaoumi, and Samim Anghaie, University of Florida, Gainesville, FL

10:44 am - Experimental Investigation of W-UF4, W-UF4-UO2, Mo-UF4, and Mo-UF4-UO2 Systems Performance at Temperatures Above 2000K
Samim Anghaie, University of Florida, Gainesville, FL

11:08 am - Sodium Heat Pipe Module Test for the SAFE-30 Reactor Prototype
Robert S. Reid, J. Tom Sena, and Adam L. Martinez, Los Alamos National Laboratory, Los Alamos, NM

11:32 am - Mass Estimates of Very Small Reactor Cores Fueled by Uranium-235, U-233 and Cm-245
Steven A. Wright and Ronald J. Lipinski, Sandia National Laboratories, Albuquerque, NM

11:56 am - Open Discussion of Nuclear System Testing Progress/Results
All participating speakers of both Sessions I and II are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E05] Advanced Concepts II

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Enchantment Ballroom A & B

George H. Miley, Chair
University of Illinois
Urbana, IL

J. Boise Pearson, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL

10:20 am - Wall Protection for The MICF Fusion Propulsion System
Terry Kammash and David Kirtley, The University of Michigan, Ann Arbor, MI

10:44 am - Concept for a Hybrid Uranium Gaseous-Core Laser Reactor
Yasser R. Shaban and George H. Miley, University of Illinois, Urbana, IL

11:08 am - Application of Nuclear Photon Engines for Deep-Space Exploration
Andrey V. Gulevich, Eugeny A. Ivanov, Oleg F. Kukharchuk, Victor Ya. Poupko, and Anatoly V. Zrodnikov, Institute for Physics and Power Engineering, Obninsk, Russia

11:32 am - Concept for a High Performance MHD Airbreathing-IEC Fusion Rocket
H.D. Froning Jr., Flight Unlimited, Flagstaff, AZ; George H. Miley, J. Nadler, Yasser R. Shaban, and E. Burton, University of Illinois, Urbana, IL; H. Momota, NPL, Associates, Champaign, IL

11:56 am - Low Energy Reaction Cell for Advanced Space Power Applications
George H. Miley, University of Illinois, Urbana, IL; and Eric Rice, Orbital Technologies Corp., Madison, WI

[E06] Dynamic Energy Conversion Technology and Applications I

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Enchantment Ballroom C & D

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

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

10:20 am - Tutorial on Free-Piston Stirling Power Conversion Technology
Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

10:44 am - Modular Stirling Radioisotope Power System (RSPS) Using an Advanced Heat Source
David S. Moul, Teledyne Energy Systems, Hunt Valley, MD

11:08 am - Status Update of a Free-Piston Stirling Convertor for Radioisotope Space Power Systems
Maurice White, Songgang Qiu, Jack Augenblick, Allen Peterson, and Frank Faultersack, Stirling Technology Company, Kennewick, WA

11:32 am - Update on the NASA GRC Stirling Technology Development Project
Lanny G. Thieme and Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

11:56 am - Power Characteristics of a Stirling Radioisotope Power System Over the Life of the Mission
Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

[B02] Applications of Two-Phase Thermal Control Systems for Space

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Enchantment Ballroom E & F

Dan Butler, Chair
NASA Goddard Space Flight Center
Greenbelt, MD

Todd Dickey, Co-Chair
Aerospace Corporation
Los Angeles, CA

10:20 am - Two-Phase Frictional Pressure Drop Correlations for Small Tubes
Ing Youn Chen and Kai-Shing Yang, National Yunlin University of Science and Technology, Taiwan; Chi-Chung Wang, Energy & Resources Laboratories Industrial Technology Research Institute, Hsinchu, Taiwan

10:44 am - Evaluation of GLAS Demonstration Model Loop Heat Pipe Thermal Vacuum Performance with Various Fluid Charges
Charles Baker, Orbital Science Corporation, Greenbelt, MD; Dan Butler, Jentung Ku, Eric Grob, Ted Swanson, NASA Goddard Space Flight Center, Greenbelt, MD; Michael N. Nikitkin, Dynatherm Corporation, Hunt Valley, MD

11:08 am - Temperature Oscillations in Loop Heat Pipe Operation
Jentung Ku, Laura Ottenstein, and Mark Kobel, NASA Goddard Space Flight Center, Greenbelt, MD; Paul Rogers, U.S. Army, Warren, MI; Tarik Kaya, International University, Strasbourg, France

11:32 am - Tutorial on Capillary Two Phase Heat Transport Systems
Jentung Ku, NASA Goddard Space Flight Center, Greenbelt, MD

11:56 am - Open Discussion on Applications of Two-Phase Thermal Control Systems for Space
Informative and interactive discussion involving speakers as well as the attendees is to take place during this time slot. Speakers and session chairs will sit at the head table and each will be given one minute for opening comments. Then, questions will be invited from the attendees. Session Chairs should avoid long discussions to allow as many questions as possible to be addressed.

[F01] Space Radiation Environment

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Fiesta Room I & II

Lawrence Townsend, Chair
University of Tennessee
Knoxville, TN

Gautam D. Badhwar, Co-Chair
NASA Johnson Space Center
Houston, TX

10:20 am - Overview of the Space Radiation Environment (Tutorial)
Lawrence Townsend, Gautam Badhwar, University of Tennessee, Knoxville, TN

10:44 am - Galactic Cosmic Radiation Environment Models
Gautam Badhwar, P.M. O'Neill and A.G. Troung, NASA Johnson Space Center, Houston, TX

11:08 am - Solar Energetic Particles and Space Weather
Donald V. Reames, NASA Goddard Space Flight Center, Greenbelt, MD; Allan J. Tylka, Naval Research Laboratory, Washington, DC; Chee K. Ng, University of Maryland, College Park, MD

11:32 am - Energy Spectra of High-Energy SEP Event Protons Derived from Statistical Analysis of Experimental Data on a Large Set of Events
D.A. Mottl, R.A. Nymmik and A.I. Sladkova, Moscow State University, Moscow, Russia

11:56 am - The Balance Between SEP and GCR Particle Fluxes in Interplanetary Space, Depending on Solar Activity Level
N.V. Kuznetsov, R.A. Nymmik and M.I. Panasyuk, Moscow State University, Moscow, Russia

[D02] Financing and Funding the Enterprise

Tuesday, February 13, 2001, 10:15 a.m. - 12:15 p.m. - Fiesta Room III & IV

Frank A. Dibello, Chair
SpaceVest
Reston, VA

10:20 am - Financing and Funding the Enterprise
Frank A. DiBello, SpaceVest, Reston, VA

10:44 am - 21st Centry Strategies for the Commercial Marketing of Business Opportunities in Space
Allen Silberman, Instrumentation Technology Associates, Inc., Exton, PA

11:08 am - Technology Commercialization and Equity Funding
George J. Friberg, Technology Ventures Corporation, Albuquerque, NM

11:32 am - Finance & Its Impact on New Commercial Space Ventures
Joerg Kreisel, GENES GmbH Venture Services, Frechen, Germany

11:56 am - Open Discussion of Financing and Funding the Enterprise
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[C03] Propellantless Propulsion: Innovative Sail Concepts and Missions

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Sendero Ballroom I

Geoffrey A. Landis, Chair
Ohio Aerospace Institute
Cleveland, OH

1:20 pm - Interstellar Flight by Particle Beam
Geoffrey A. Landis, NASA Glenn Research Center, Cleveland, OH

1:44 pm - Multi-Bounce Laser Based Sails
Robert A. Metzger, Quad W. Associates, Atlanta, GA; and Geoffrey Landis, NASA Glenn Research Center, Cleveland, OH

2:08 pm - SailBeam: Space Propulsion by Macroscopic Sail-Type Projectiles
Jordin T. Kare, Kare Technical Consulting, San Ramon, CA

2:32 pm - Laboratory Testing of the Mini-Magnetospheric Plasma Propulsion (M2P2) Prototype
R.M. Winglee, P. Euripides, T. Ziemba and J. Slough, University of Washington, Seattle, WA; D. Gallagher, NASA Marshall Space Flight Center, Huntsville, AL

2:56 pm - Solar Sails: An Answer to Global Warming?
Kenneth I. Roy, The Ultimax Group, Inc., Oak Ridge, TN

[E07] Advanced Concepts and Materials

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Sendero Ballroom II

Samit Bhattacharyya, Chair
Argonne National Laboratory
Argonne, IL

Samim Anghaie, Co-Chair
University of Florida
Gainesville, FL

1:20 pm - A Possible Propellantless Propulsion System
David P. Goodwin, U.S. Dept. of Energy, Germantown, MD

1:44 pm - Thermal Emittance Measurements on Candidate Refractory Materials for Application in Nuclear Space Power Systems
Daniel P. Kramer, James R. McDougal, Roger. G. Miller, Robert A. Booher, Dennis C. McNeil and Edwin I. Howell, BWXT of Ohio, Inc., Miamisburg, OH; Donald A. Jaworske, NASA Glenn Research Center, Cleveland, OH

2:08 pm - Development and Characterization of Solid Solution Tri-Carbides
Travis Knight and Samim Anghaie, University of Florida, Gainesville, FL

2:32 pm - Human Mars Transportation Applications Using Solid Lithium Propellant Nuclear Propulsion
Benjamin B. Donahue, Boeing Space & Communications, Huntsville, AL; Brian Tillotson, Boeing Space & Communications, Seattle, WA

2:56 pm - Advanced Research Interplanetary Exploration Ship (A.R.I.E.S.)
Thomas K. Mullenniex, Ohio State University, Gambier, OH

[A04] Advanced Technology and Systems Design

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Sendero Ballroom III

John Mankins, Chair
NASA Headquarters
Washington, DC

Mark Saunders, Co-Chair
NASA Langley Research Center
Hampton, VA

1:20 pm - Avionics for a Small Satellite
Larry Abbott, David Jochim and Robert Shuler, NASA Johnson Space Center, Houston, TX

1:44 pm - Application Specific InterConnection System for Cutting Edge Packaging Technology
Russell Abbott, Ontario Engineering International, Inc., Riverside, CA

2:08 pm - MultiUse Solar Thermal Power Generators
Russell Abbott, Ontario Engineering International, Inc., Riverside, CA

2:32 pm - 2250-MHz High Efficiency Microwave Power Amplifier (HEMPA)
W. Herbert Sims, NASA Marshall Space Flight Center, Huntsville, AL

2:56 pm - High Energy Solar System Missions Using a Small "Bimodal" Nuclear Thermal/Electric Propulsion System
John P. Riehl, Stanley K. Borowski and Leonard A. Dudzinski, NASA Glenn Research Center, Cleveland OH

[E08] Thermoelectric Technology and Applications

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Enchantment Ballroom A & B

Robert L. Wiley, Chair
Booz-Allen & Hamilton
Arlington, VA

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

1:20 pm - Testing of Milliwatt Power Source Components
Jeff Snyder, Alex Borshchevsky, A. Zoltan, Thierry Caillat, Jean-Pierre Fleurial, Bill Nesmith and J. Mondt, California Institute of Technology, Pasadena, CA; T. McBirney, Swales Aeropspace, Beltsville, MD; N. Elsner, Hi-Z Technology, Inc., San Diego, CA; and L.I. Anatychuk, Institute of Thermoelectricity, Chernivtsi, Ukraine

1:44 pm - High Efficiency Segmented Thermoelectric Unicouples
Thierry Caillat, Alex Borshchevsky, G. Jeffrey Snyder, and Jean-Pierre Fleurial, Jet Propulsion Laboratory, Pasadena, CA

2:08 pm - Thin Film Radioisotope Thermoelectric and Alpha-Voltaic Power Sources
Jean-Pierre Fleurial, Jeffrey Snyder, J. Patel, C.K. Huang, T. Caillat, E.A. Kolawa, Jet Propulsion Laboratory, Pasadena, CA; R. Averback and C. Hill, University of Illinois, Urbana, IL; G. Chen, University of California at Los Angeles, Los Angeles, CA

2:32 pm - Thermomagnetic Coolers Based on Bi and Bi-Sb Nanocomposites
Tito E. Huber and Pierre Constant, Howard University, Washington, DC

2:56 pm - Open Discussion of Thermoelectric Technology and Applications
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E09] Dynamic Energy Conversion Technology and Applications II

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Enchantment Ballroom C & D

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

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

1:20 pm - A Tutorial on Brayton Cycle Space Power Systems
Lee S. Mason, NASA Glenn Research Center, Cleveland, OH

1:44 pm - A Comparison of Brayton and Stirling Space Nuclear Power Systems for Power Levels from 1 Kilowatt to 10 Megawatts
Lee S. Mason, NASA Glenn Research Center, Cleveland, OH

2:08 pm - Analysis of a 360 kWe Recuperated Brayton Cycle Space Power Thermal-to-Electric Conversion System
Roger X. Lenard, Little Prairie Services, Edgewood, NM; Jeff Hansen, Allison Advanced Development Company, Indianapolis, IN

2:32 pm - Solar Refractive Secondary Concentrator Technology Overview
Wayne A. Wong, NASA Glenn Research Center, Cleveland, OH

2:56 pm - TBA
Patrick Frye, The Boeing Company, Canoga Park, CA

[D03] Space Launch Initiative

Tuesday, February 13, 2001, 1:15 - 3:15 p.m. - Enchantment Ballroom E & F

John R. Rogacki, Chair
NASA Marshall Space Flight Center
Huntsville, AL

1:20 pm - Forecasting the Demand for Commercial Telecommunications Satellites
Carissa Bryce Christensen, C.A. Mullins, Linda A. Williams, Futron Corporation, Bethesda, MD

1:44 pm - Price Elasticity of Demand for Launch Vehicles
Linda A. Williams, Carissa Bryce Christensen, Casey Mace, and Emma Nicholson, Futron Corporation, Bethesda, MD

2:08 pm - Market Impacts on Reusable Launch Vehicle Business Viability
Eric Shaw, A. Prince, NASA Marshall Space Flight Center, Huntsville, AL

2:32 pm - Mission Requirements for 2nd Generation Reusable Launch Vehicles
Charles A. Smith, Daniel D. Dumbacher, NASA Marshall Space Flight Center, Huntsville, AL

2:56 pm - 2nd Generation RLV: Program Goals and Acquisition Strategy
J. Bart Graham, NASA Marshall Space Flight Center, Huntsville, AL

[C04] Propellantless Propulsion: Momentum Transfer Tethers II

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Sendero Ballroom I

Robert P. Hoyt, Chair
Tethers Unlimited, Inc.
Lynnwood, WA

Brian Tillotson, Co-Chair
Boeing Company, The
Seattle, WA

3:35 pm - Design of an Artificial Gravity Generating Tethered Satellite System
John H. Hoffman, University of Texas at Dallas, Richardson, TX; Andre Mazzoleni, Texas Christian University, Fort Worth, TX; and Andrew Santangelo, The Michigan Technic Corporation, Holland, MI

3:59 pm - Momentum-Exchange/Electrodynamic-Reboost Tether Facility for Deployment of Microsatellites to GEO and the Moon
Robert P. Hoyt, Tethers Unlimited, Inc., Seattle, WA

4:23 pm - Hypersonic Airplane Space Tether Orbital Launch (HASTOL) System: A Two-Stage Commercial Launch System to Any Orbit
John E. Grant, Boeing Phantom Works, Huntington Beach, CA

4:47 pm - The Bridge to Space Launch System
Thomas A. Mottinger, Leland S. Marshall, Lockheed Martin Space Systems, Denver, CO

5:11 pm - Spinning Tethers for Rapid Orbital Plane Change
Brian Tillotson, Kent, WA

[E10] Nuclear Power for Exploration Missions

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Sendero Ballroom II

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

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

3:35 pm - Development of a Robust Space Power System Decision Model
Gilbert Chew, Dennis G. Pelaccio, Mark Jacobs and Michael Stancati, Science Applications International Corporation, Littleton, CO; Robert Cataldo, NASA Glenn Research Center, Cleveland, OH

3:59 pm - An Analysis and Procedure for Determining Space Environmental Sink Temperatures With Selected Computational Results
Albert J. Juhasz, NASA Glenn Research Center, Cleveland, OH

4:23 pm - The Heatpipe-Operated Mars Exploration Reactor (HOMER)
David I. Poston, Los Alamos National Laboratory, Los Alamos, NM

4:47 pm - Coupled Reactor Kinetics and Heat Transfer Model for Heat Pipe Cooled Reactors
Steven A. Wright, Sandia National Laboratories, Albuquerque, NM; Michael Houts, NASA Marshall Space Flight Center, Huntsville, AL

5:11 pm - Evolutionary Strategy for the Use of Nuclear Electric Propulsion in Planetary Exploration
Muriel Noca, James E. Polk, Jet Propulsion Laboratory, Pasadena, CA; Roger Lenard, Sandia National Laboratories, Albuquerque, NM

[A05] Surface Infrastructure

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Sendero Ballroom III

George Blaisdell, Chair
Cold Regions Research & Engineering Laboratory
Hanover, NH

Michael A. O'Neal, Co-Chair
NASA Kennedy Space Center
Kennedy Space Center, FL

3:35 pm - Space Resources Development For Robotic And Human Exploration And The Long-Term Commercialization of Space
Gerald B. Sanders, NASA Johnson Space Center, Houston, TX

3:59 pm - Extraction of Water from the Regoliths of Mars and the Moon
Michael B. Duke, Colorado School of Mines, CO

4:23 pm - A Model of Stresses Found in a Rock Melt Drill System Produced Glass Liner to Aid in Determining System Viability for Potential Use on Mars
Joshua B. McConnell, Massachusetts Institute of Technology, Cambridge, MA

4:47 pm - A Survey of Alternative Oxygen Production Technologies
Dale E. Lueck and Clyde F. Parrish, NASA Kennedy Space Center, FL; William J. Buttner and Jan M. Surma, Dynacs Engineering Co., Inc., Kennedy Space Center, FL

5:11 pm - Buffer Gas Acquisition and Storage
Clyde F. Parrish and Dale E. Lueck, NASA Kennedy Space Center, FL; Paul A. Jennings, Florida Institute of Technology, Melbourne, FL

[E11] Fusion Space Systems Application

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Enchantment Ballroom A & B

Terry Kammash, Chair
University of Michigan
Ann Arbor, MI

Francis Thio, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL

3:35 pm - Nuclear Pulse Propulsion for Interplanetary Travel
Brice N. Cassenti, United Technologies Research Center, East Hartford, CT

3:59 pm - Gasdynamic Mirror Fusion Propulsion Experiment
William J. Emrich, Jr., NASA Marshall Space Flight Center, Huntsville, AL

4:23 pm - Magnetized Target Fusion for Advanced Space Propulsion
Ronald C. Kirkpatrick, Los Alamos National Laboratory, Los Alamos, NM

4:47 pm - Numerical Simulation of Magnetically-Guided Plasma Flows for the Design of a Fusion Propulsion System
Ioannis G. Mikellides, P.G. Mikellides, and T.M. York, The Ohio State University, Columbus, OH; P.J. Turchi, Los Alamos National Laboratory, Los Alamos, NM

5:11 pm - Interfacial Stability of Converging Plasma Jets for Magnetized Target Fusion
J.T. Cassibry, S.T. Wu, University of Alabama-Huntsville, Huntsville, AL; Y.C.F. Thio, NASA Marshall Space Flight Center, Huntsville, AL

[E12] Dynamic Energy Conversion Technology and Applications III

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Enchantment Ballroom C & D

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

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

3:35 pm - Advanced Radioisotope Heat Source for Stirling Engines
T.J. Dobry, Teledyne Energy System, Hunt Valley, MD; and G. Walberg, Walberg Aerospace, Hampton, VA

3:59 pm - Effect of Inert Cover Gas on Performance of Radioisotope Stirling Space Power System
Robert Carpenter, V. Kumar, C. Or, A. Schock, Orbital Sciences Corporation, Germantown, MD

4:23 pm - Parametric Investigation of Unbalance of an Operating Stirling Convertor Pair with Interface Stiffness and Misalignment
Thomas W. Goodnight, Anne M. McNelis, William O. Hughes, and Mark E. McNelis, NASA Glenn Research Center, Cleveland OH

4:47 pm - A Comparative Reliability Analysis of Free-Piston Stirling Machines
Jeffrey G. Schreiber, NASA Glenn Research Center, Cleveland, OH

5:11 pm - Open Discussion of Dynamic Energy Conversion Technology and Applications
All participating speakers of Sessions I, II and III are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[B03] Spacecraft and Launch Vehicle Thermal Design and Control

Tuesday, February 13, 2001, 3:30 - 5:30 p.m. - Enchantment Ballroom E & F

Thomas R. Reinarts, Chair
NASA Kennedy Space Center
Kennedy Space Center, FL

Michael N. Nikitkin, Co-Chair
Dynatherm Corporation, Inc.
Hunt Valley, MD

3:35 pm - Design, Fabrication and Operational Plan of the Aft Shroud Cooling System for the Hubble Space Telescope
Marc Kaylor, Swales Aerospace Incorporated, Beltsville, MD

3:59 pm - A Prototype Electrohydrodynamic Driven Thermal Control System (EHD-TCS)
Jeffrey R. Didion, NASA Goddard Space Flight Center, Greenbelt, MD

4:23 pm - Thermal Analysis of the MC-1 Chamber/Nozzle
Darrell Davis, NASA Marshall Space Flight Center, Huntsville, AL

4:47 pm - Thermal Characterization of an Epoxy-Based Composite Sandwich Nose Cap Design for the Space Shuttle Solid Rocket Booster
Charles I. Stuckey, bd Systems, Inc., Huntsville, AL; Thomas R. Reinarts, NASA Kennedy Space Center, FL; Darrell Davis, NASA Marshall Space Flight Center, Huntsville, AL

5:11 pm - Calibration of an Analytical Thermal Model for an Epoxy-Based Composite Sandwich Design
Thomas R. Reinarts, NASA Kennedy Space Center, FL; Darrell Davis, NASA Marshall Space Flight Center, Huntsville, AL; Charles I. Stuckey, bd Systems, Inc., Huntsville, AL

Hardware, Multimedia Display Session

Tuesday, February 13, 2001, 6:00 - 7:00 p.m. - Fiesta Room I - IV

Mohamed S. El-Genk, Chair
Institute for Space & Nuclear Power Studies
Albuquerque, NM

Advanced AMTEC Power Unit
Robert K. Sievers and Jan E. Pantolin, Advanced Modular Power Systems, Inc., Ann Arbor, MI

Reactivity of Thin Metal Films on Sodium Beta'' Alumina Ceramic in High Temperature, Low Pressure Sodium Vapor
Roger Williams, A. K. Kisor, M. L. Homer, K. Manatt, Virgil Shields, and Amy Ryan, Jet Propulsion Laboratory, Pasadena, CA

SAFE Reactor Development at Los Alamos
Robert S. Reid, J. Tom Sena, David Poston, Jim Lee, Los Alamos National Laboratory, Los Alamos, NM

500 kWe Lithium-fed Thruster
James Polk, John Blandino, Robert Shotwell, Keith Goodfellow, Jet Propulsion Laboratory, Pasadena, CA; Alok Majumdar, Van Luong, and Frank Zimmerman, NASA Marshall Space Flight Center, Huntsville, AL

Dissected AMTEC Cell
Virgil Shields, Jet Propulsion Laboratory, Pasadena, CA

Systems And Tools Necessary To Enable The Benefits Of The Life Cycle Approach To Payload Processing
Craig Jacobson and Phillip Meade, NASA Kennedy Space Center, FL

Tether Hardware, Flexware and Video Display
Robert P. Hoyt, Robert L. Forward and Gregory W. Heinen, Tethers Unlimited, Inc., Clinton, WA

PASCAL Mars Entry System, Surface Station and Power Supply
Marcus S. Murbach, NASA Ames Research Center, Moffett Field, CA; and Daniel T. Allen, Hi-Z Technology, Inc., San Diego, CA

Materials Processing Telescience Facility and Thermal Carrier System for the Shuttle and International Space Station Microgravity Program
Roy Klusendorf, Brian Loos and Reginald Beer, Oceaneering Space Systems, Houston, TX

WEDNESDAY, FEBRUARY 14, 2001

[C05] Beamed Energy In-Space Propulsion

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Sendero Ballroom I

James N. Benford, Chair
Microwave Sciences
Lafayette, CA

Gregory Benford, Co-Chair
University of California, Irvine
Irvine, CA

8:05 am - Microwave Beam-Driven Sail Flight Experiments
James Benford, Microwave Sciences, Inc., Lafayette, CA; Gregory Benford, Keith Goodfellow, Raul Perez, Abbenford, Inc., Laguna Beach, CA; Henry Harris, Jet Propulsion Laboratory, Pasadena, CA; and Timothy Knowles, Energy Science Laboratories Inc., San Diego, CA

8:29 am - Beam-Riding Sail Dynamics
Gregory Benford, Abbenford Associates, Laguna Beach, CA

8:53 am - Stability and Control of Microwave-Propelled Sails in 1-D
Chaouki T. Abdallah, Edl Schamiloglu, University of New Mexico, Albuquerque, NM; James Benford, Microwave Sciences, Inc., Lafayette, CA; Gregory Benford, University of California, Irvine, CA

9:17 am - 3-D Simulations of Rigid Microwave Propelled Sails Including Spin
Edl Schamiloglu, Chaouki T. Abdallah, Kristina A. Miller, Daniel Georgiev, University of New Mexico, Albuquerque, NM; James Benford, Microwave Sciences, Inc., Lafayette, CA; Gregory Benford, University of California, Irvine, CA; and Gurkirpal Singh, Jet Propulsion Laboratory, Pasadena, CA

9:41 am - Interstellar Beamer Engineering
Richard M. Dickinson, Jet Propulsion Laboratory, Pasadena, CA

[C06] Gun Launch Systems for Cheap Access to Space

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Sendero Ballroom II

Derek A. Tidman, Chair
Advanced Launch Corporation
McLean, VA

Jonathan E. Jones, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL

8:05 am - The Spiral Slingatron Mass Launcher
Derek A. Tidman, Advanced Launch Corporation, McLean, VA

8:29 am - Direct Space Launch Using Ram Accelerator Technology
Carl Knowlen and Adam P. Bruckner, University of Washington, Seattle, WA

8:53 am - The Blast Wave Accelerator-Feasability Study
Dennis Wilson and Zhiqiang Tan, Applied Sciences Inc., Austin, TX

9:17 am - Launch to Space with an Electromagnetic Railgun (Oral Presentation)
Ian R. McNab, The University of Texas, Austin, TX

9:41 am - Laser Launch vs. Cannon Launch: A Comparison
Jordin T. Kare, Kare Technical Consulting, San Ramon, CA

[A06] Commercialization

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Sendero Ballroom III

Daniel C. Tam, Chair
NASA Headquarters
Pasadena, CA

8:05 am - The Business of Space Exploration
Daniel C. Tam, NASA Headquarters, Washington DC

8:29 am - Three Near Term Commercial Markets in Space and Their Potential Role in Space Exploration
Raymond B. Gavert, NASA Headquarters, Washington, DC

8:53 am - TBA
Rick Tumlinson, Space Frontier Foundation

9:17 am - User Considerations for Protecting Intellectual Property on the International Space Station
Michael D. White, Blank Rome Comisky & McCauley LLP, Washington, DC

9:41 am - Utilization of Space Shuttle for Specialized Commercial Mission
Jeremiah O. Salvatore, John H. Konrad, Boeing Satellite Systems, Los Angeles, CA; Wah L. Lim, Hughes Electronics, El Segundo, CA

[E13] Nuclear Propulsion for Human Exploration

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Enchantment Ballroom A & B

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

Thomas J. Hill, Co-Chair
Bechtel BWXT Idaho, LLC
Idaho Falls, ID

8:05 am - Options for Development of Space Fission Propulsion Systems
Michael Houts, Melissa Van Dyke, Thomas Godfroy, Kevin Pedersen, James Martin, Ricky Dickens, Pat Salvail, Ivana Hrbud, NASA Marshall Space Flight Center, Huntsville, AL

8:29 am - Square Lattice Honeycomb Tri-Carbide Fuels for 50 to 250 KN Variable Thrust NTP Design
Samim Anghaie, Travis Knight, Reza Gouw, Eric Furman, University of Florida, Gainesville, FL

8:53 am - Propulsion Architecture Comparison for Human Exploration Mars Missions
Leonard A. Dudzinski, Stanley K. Borowski and Melissa M. McGuire, NASA Glenn Research Center, Cleveland, OH

9:17 am - Human Exploration Missions to the Moon, Mars and Near Earth Asteroids Using "Bimodal" NTR Propulsion
Stanley K. Borowski, Leonard A. Dudzinski, Melissa L. McGuire, NASA Glenn Research Center, Cleveland, OH

9:41 am - A Nuclear Internal Combustion Engine for Space Propulsion
Terry Kammash, The University of Michigan, Ann Arbor, MI

[E14] Missions, Systems, and Safety (Tutorials)

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Enchantment Ballroom C & D

Joseph A. Sholtis, Chair
Sholtis Engineering & Safety Consulting
Tijeras, NM

Lyle L. Rutger, Co-Chair
US Department of Energy
Germantown, MD

8:05 am - The History of Radioisotope Power Systems and Technology Over the Last Four Decades (Tutorial)
Robert Carpenter, Orbital Sciences Corporation, Germantown, MD

8:29 am - Fuel Technology for Radioisotope Heater Units and General Purpose Heat Source (Tutorial)
Liz Foltyn, Los Alamos National Laboratory, Los Alamos, NM

8:53 am - The Safety Analysis and Launch Approval Processes for Space Radioisotope Power Systems (Tutorial)
Lyle L. Rutger, US Department of Energy, Germantown, MD

9:17 am - Toxicology and Health Aspects Associated with Space Radioisotope Fuels (Tutorial)
Mark D. Hoover, Lovelace Respiratory Research Institute, Albuquerque, NM

9:41 am - Open Discussion of Missions, Systems and Safety
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E15] Thermionic Technology and Applications I

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Enchantment Ballroom E & F

Les Begg, Chair
General Atomics
San Diego, CA

Yury V. Nikolaev, Co-Chair
RI SIA LUTCH
Moscow, Russian Federation

8:05 am - Tests of a Conductively Coupled Multi-Cell Thermionic Fuel Element
Jean-Louis Desplat, Holberg Streckert and Thomas Tamoria, General Atomics, San Diego, CA

8:29 am - Growth of Nb-O Single Crystals Using Electron Beam Zone Melting
Hongtao Ma, Jian Hu and Ralph H. Zee, Auburn University, Auburn, AL

8:53 am - Thermionic Fast Spectrum Reactor-Converter on the Basis of Multi-Cell TFE
N.N. Ponomarev-Stepnoi, G.V. Kompaniets, D.N. Poliakov, B.S. Stepennov, Kurchatov Institute, Moscow, Russia; P.V. Andreev, E.E. Zhabotinsky,Krasnaya Zvezda, Moscow, Russia; Yu.V. Nikolaev, and N.V. Lapochkin, Lutch, Podolsk, Russia

9:17 am - Experimental Investigation of High Temperature High Voltage Thermionic Diode for the Space Power Nuclear Reactor
Valery. V. Onufriyev, State Technical University by N.E. Bauman Science and Research Institute of Power Engineering Industry, Moscow, Russia

9:41 am - Experimental Investigation of a Thermionic Converter with Molybdenum Electrodes for Low Temperature Applications
Yoichi Momozaki and Mohamed S. El-Genk, University of New Mexico, Albuquerque, NM

[B04] Thermophysics and Materials Research in Microgravity

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Fiesta Room I & II

Ivan T. Egry, Chair
German Aerospace Center
Cologne, Germany

Jan R. Rogers, Co-Chair
NASA Marshall Space Flight Center
Huntsville, AL

8:05 am - Thermophysical Property Measurements of Liquid Metals in Microgravity
I. Egry, Institut fur Raumsimulation, Koln, Germany

8:29 am - Measurement of Thermophysical Properties of Metallic Melts for High Quality Castings
H.J. Fecht and R.K. Wunderlich, Inst. f. Werkstoffe der Elektrotechnik, Ulm, Germany; M. Meier, Lehrst. f. Aerodyn. u. Stroemungsl., Cottbus, Germany; H.J. Sprenger, Intospace GmbH, Hannover, Germany

8:53 am - Non-Contact Calorimetry of Liquid Metallic Alloys Under Reduced Gravity Conditions
R.K. Wunderlich and H.J. Fecht, University of Ulm, Ulm, Germany

9:17 am - Thermophysical Property Measurement and Materials Research in the NASA/MSFC Electrostatic Levitator
J.R. Rogers, R.W. Hyers, L. Savage, and M.B. Robinson, NASA Marshall Space Flight Center, Huntsville, AL; T. Rathz, University of Alabama, Huntsville, AL

9:41 am - Aerodynamic Levitation: An Approach to Microgravity
Benoit Glorieux and Marie-Louise Saboungi, Argonne National Laboratory, Argonne, IL; Francis Millot and Jean-Claude Rifflet, Centre de Recherche sur les Materiaux a Hautes Temperatures, Orleans, France; and John Enderby, H H Wills Physics Laboratory, Bristol, UK

[D04] Spaceport Developments

Wednesday, February 14, 2001, 8:00 - 10:00 a.m. - Fiesta Room III & IV

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

8:05 am - Closed End Launch Tube (CELT)
Dale E. Lueck and Clyde F. Parrish, NASA Kennedy Space Center, FL

8:29 am - New Opportunities for Suborbital Space Experiments
Edmond F. Gormel, Spaceport Florida Authority, Cape Canaveral, FL

8:53 am - National Coalition of Spaceport States
Tim Huddleston, Aerospace Development Center, Jacksonville, AL

9:17 am - New Mexico's Commercial Space Program
Hanson Scott, New Mexico Office of Space Commercialization, Santa Fe and Las Cruces, NM

9:41 am - Open Discussion
Attendees are invited to join the Presenters and Session Chairs in an open discussion.

[A07] Operations

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Sendero Ballroom I

Anthony D. Griffith, Chair
NASA Johnson Space Center
Houston, TX

Alan B. Binder, Co-Chair
Lunar Research Institute
Tucson, AZ

10:25 am - Advanced EVA Concepts and Requirements
Richard K. Fullerton, NASA Johnson Space Center, Houston, TX

10:49 am - Tuneable Autonomy and Human Interfaces for Free-Flying Servicing Vehicles
Alexander Roger, Teri Welsh and Colin R. McInnes, University of Glasgow, Scotland, UK

11:13 am - Lunar Spaceport Launch and Landing Operational Parameters for Human-Based Activity
Roelof L. Schuiling, NASA Kennedy Space Center, FL

11:37 am - An Opposition Class Piloted Mission to Mars Using Telerobotics for Landing Site Reconnaissance and Exploration
Philip J. Burley, Steven E. Fredrickson, Darby F. Magruder, and John D. Rask, NASA Johnson Space Center, Houston, TX

12:01 pm - Open Discussion of Operations
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[C07] Propellantless Propulsion: Electrodynamic Tethers I, Missions & Mission Concepts

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Sendero Ballroom II

Brian E. Gilchrist, Chair
University of Michigan
Ann Arbor, MI

Sven G. Bilen, Co-Chair
Pennsylvania State University
University Park, PA

10:25 am - Propulsive Small Expendable Deployer System (ProSEDS)
Judy Ballance and Les Johnson, NASA Marshall Space Flight Center, Huntsville, AL

10:49 am - The ElectroDynamic Delivery Experiment (EDDE)
Jerome Pearson, Eugene Levin, and John Oldson, Star Technology and Research, Inc., Mount Pleasant, SC; Joseph Carroll, Tether Applications, Inc., Chula Vista, CA

11:13 am - Current Innovations and Developments of STEP-AIRSEDS: An Electrodynamic Tether Mission
Andrew Santangelo, Richard Sturmfels, Jennifer Probst, Greg Heinen and Jon Van Noord, The Michigan Technic Corporation, Holland, MI

11:37 am - EDOARD: A Tethered Device for Efficient Electrodynamic De-Orbiting of LEO Spacecraft
C. Bruno, L. Schirone and L. Iess, Universita "La Sapienza", Rome, Italy; R. Licata and L. Bussolino, Alenia Spazio, Turin, Italy

12:01 pm - Practicality of Using a Tether for Electrodynamic Reboost of the International Space Station
John H. Blumer, Benjamin B. Donahue, Michael E. Bangham, Boeing Space & Communications Group, Huntsville, AL

[E16] Future Space Nuclear Power Systems to Support Future Crewed Mars Missions: (Tutorials) Requirements/Concepts

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Sendero Ballroom III

Dennis Pelaccio, Chair
Science Applications International Corporation
Littleton, CO

Gary L. Martin, Co-Chair
NASA Headquarters
Washington, DC

10:25 am - Space Nuclear Power Requirements for Emerging Human Mars Mission Propulsion (Tutorial)
Leonard A. Dudzinski, Stanley K. Borowski, Melissa M. McGuire, NASA Glenn Research Center, Cleveland, OH

10:49 am - System Options for Piloted NEP Mars Missions (Tutorial)
Jeffrey A. George, NASA Johnson Space Center, Houston, TX

11:13 am - Enabling Advanced Space Nuclear Electrical Propulsion Systems for Piloted Mars Missions (Tutorial)
Samim Anghaie, University of Florida, Gainesville, FL; Leo Bitteker , Dave Poston, Los Alamos National Laboratory, Los Alamos, NM; Mike Houts, NASA Marshall Space Flight Center, Huntsville, AL

11:37 am - Performance Projections for High Power Nuclear Electric Systems (Tutorial)
Lee S. Mason, NASA Glenn Research Center, Cleveland, OH

[B05] Emerging Thermal Control Technologies for Future Spacecraft

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Enchantment Ballroom A & B

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

Gajanana C. Birur, Co-Chair
Jet Propulsion Laboratory
Pasadena, CA

10:25 am - Advanced Thermal Control Technologies for Space Science Missions at Jet Propulsion Laboratory
Gajanana C. Birur and Timothy P. O'Donnell, Jet Propulsion Laboratory, Pasadena, CA

10:49 am - Conducting Polymer Based Dynamic Electrochromics for Spacecraft Thermal Control
Prasanna Chandrasekhar, Ashwin-Ushas Corporation, Inc., Freehold, NJ; Gajanana C. Birur, Jet Propulsion Laboratory, Pasadena, CA; Ed A. Pierson and Suraj P. Rawal, Lockheed Martin Astronautics, Denver, CO

11:13 am - Development And Testing of a Proptotype Low-Lift Heat Pump for Spacecraft Thermal Control
Lawrence R. Grzyll, Dwight D. Back, Todd C. Gibson, Brian E. Tews, and Robert P. Scaringe, Mainstream Engineering Corporation, Rockledge, FL

11:37 am - Space-Based Radar Antenna Thermal Control
Daniel L. Vrable and Michael D. Vrable, Thermal Management & Materials Technology, Del Mar, CA

12:01 pm - The High Power Cold Shock Phenomena in Loop Heat Pipes
Michael N. Nikitkin and Walter B. Bienert, Dynatherm Corporation Inc., Hunt Valley, MD

[E17] Radioisotope Power Systems I

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Enchantment Ballroom C & D

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

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

10:25 am - Processing and Thermal Properties of Filament Wound Carbon-Carbon Composites for Impact Shell Application
Ralph H. Zee and H. Shyam Gale, Auburn University, Auburn, AL; and Glenn Romanoski and Hsin Wang, Oak Ridge National Laboratory, Oak Ridge, TN

10:49 am - Milliwatt Radioisotope Power Supply for the PASCAL Mars Surface Stations
Daniel T. Allen, Hi-Z Technology Inc., San Diego, CA; and Marcus S. Murbach, NASA Ames Research Center, Moffett Field, CA

11:13 am - Radioisotope Power System Options for Future Planetary Missions
Robert D. Cockfield, Lockheed Martin Astronautics Operations, King of Prussia, PA

11:37 am - Thermal Vacuum Testing of a MHW RTG After 17 Years in Storage
B. Allen Tolson, Gene D. Brewer, Gerald V. Mintz, Tony Reynoso, Barry K. Pugh, Stephen B. Davis, and Timothy J. Hoye, BWXT of Ohio, Inc., Miamisburg, OH

12:01 pm - Chemical Analysis of Plutonium-238 for Space Applications
Amy S. Wong, Los Alamos National Laboratory, Los Alamos, NM

[E18] Alkali-Metal Thermal-To-Electric Technology and Applications I

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Enchantment Ballroom E & F

Tom Hunt, Chair
Advanced Modular Power Systems, Inc.
Ann Arbor, MI

Jean-Michel Tournier, Co-Chair
Institute for Space & Nuclear Power Studies
Albuquerque, NM

10:25 am - Update of the Design of the AMTEC Converter for Use in AMTEC Radioisotope Power Systems
Joseph C. Giglio, Robert K. Sievers and Edward F. Mussi, Advanced Modular Power Systems, Inc., Ann Arbor, MI

10:49 am - Challenges Facing Successful Development of Long Life, High Temperature, High Efficiency/Power AMTECs for Space Applications
Roger Williams, V.B. Shields, M.L. Homer, A.K. Kisor, and M.A. Ryan, Jet Propulsion Laboratory, Pasadena, CA

11:13 am - Analysis of a Vapor Anode, Multi-Tube, Potassium Refractory AMTEC Converter for Space Applications
Mohamed S. El-Genk and Jean-Michel Tournier, University of New Mexico, Albuquerque, NM

11:37 am - Oxidation of Mo-Re at Reduced Oxygen Pressures
J.R. DiStefano and L.D. Chitwood, Oak Ridge National Laboratory, Oak Ridge, TN

12:01 pm - Mathematical Modeling of the Impedance of Single and Multi-cell AMTEC Units
Virgil Shields, Roger Williams, M.A. Ryan, R. Cortez, M.L. Homer, A.K. Kisor, K. Manatt, Jet Propulsion Laboratory, Pasadena, CA

[F02] Radiation Sensitive Components

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Fiesta Room I & II

Charles Barnes, Chair
Jet Propulsion Laboratory
Pasadena, CA

Richard Wilkins, Co-Chair
NASA Center for Applied Radiation Research
Prairie View, TX

10:25 am - Lessons Learned Using COTS Electronics for the International Space Station Radiation Environment
John H. Blumer, Boeing Space & Communications Group, Huntsville, AL

10:49 am - Radiation Effects on DRAM
Gwan Choi, Texas A&M University, College Station, TX

11:13 am - Neutron Beam Facility for Radiation Testing of Electronics at Los Alamos
Steve Wender, B. Takala, R.C. Haight, Los Alamos National Laboratory, Los Alamos, NM

11:37 am - Disorder-Effects in Reduced Dimensional and Quantum Electronics
Bradley Weaver and R. Magno, Naval Research Laboratory, Washington, DC; E.M. Jackson, SFA, Inc., Largo, MD; R. Wilkins and S. Shojah-Ardalan, Prairie View A&M University, Prairie View, TX; A.C. Seabaugh, University of Notre Dame, Notre Dame, IN; B. Brar, Rockwell Science Center, Thousand Oaks, CA; M.O. Manasreh, and Y. Berhane, University of New Mexico, Albuquerque, NM

12:01 pm - Open Discussion of Radiation Sensitive Components
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[D05] Status and Evolution of Today's Fleet

Wednesday, February 14, 2001, 10:20 a.m. - 12:20 p.m. - Fiesta Room III & IV

John C. Schafer, Chair
NASA Headquarters
Washington, DC

10:25 am - ATV - A Complex Propulsion Subsystem UPS and ATV - A Comparison
Peter J. Schiebener, Astrium GmbH, Munich, Germany; Hans-Dieter Schmitz, Michael Rath, Astrium GmbH, Moeckmuehl, Germany

10:49 am - Beyond LEO: The K-1 Active Dispenser
Dick Kohrs, Steve Knowles, Dave Cochran, and Ryan Curtis, Kistler Aerospace Corporation, Kirkland, WA

11:13 am - ISS Cargo Resupply Using the K-1 Vehicle
Steve Knowles and Dick Kohrs, Kistler Aerospace Corporation, Kirkland, WA

11:37 am - Advanced Propulsion Possibilities for Future RLV Fleets
H.D. Froning, Jr., Flight Unlimited, Flagstaff, AZ

12:01 pm - The ROCKOT Launch Vehicle Qualified for Commercial Launches
Mark Kinnersley, EUROCKOT Launch Services GmbH, Bremen, Germany; and Karsten Schefold, Astrium SI, Space Infrastructure, Bremen, Germany

[A08] Supportability I

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Sendero Ballroom I

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

Derek W. Hogarth, Co-Chair
Boeing Company, The
Huntington Beach, CA

1:25 pm - On-Orbit Maintenance Operations Strategy for the International Space Station - Concept and Implementation
Linda P. Patterson, NASA Johnson Space Center, Houston, TX

1:49 pm - The International Space Station On-Orbit Tester
Elizabeth Pierotti and Jitu Atodaria, Honeywell International, Glendale, AZ

2:13 pm - Technology Assessment of Laser-Assisted Materials Processing in Space
Karthik Nagarathnam, Old Dominion Universtiy, Newport News, VA; and Karen M.B. Taminger, NASA Langley Research Center, Hampton, VA

2:37 pm - On-Demand Manufacturing Capability
Cliff Bampton, Rocketdyne Propulsion & Power, Canoga Park, CA; and Scott Schroeder, The Boeing Company, Rockwell Science Center, Thousand Oaks, CA

3:01 pm - Orbital Verification and Observatory Recommissioning
Carl Biagetti, Space Telescope Science Institute, Baltimore, MD

[C08] Propellantless Propulsion: Electrodynamic Tethers II, ED-Tether System Testing and System Components

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Sendero Ballroom II

Brian E. Gilchrist, Chair
University of Michigan
Ann Arbor, MI

Sven G. Bilen, Co-Chair
Pennsylvania State University
University Park, PA

1:25 pm - Long Term Stability Of (Partially) Bare Conductive Tethers: Combined Results From Plasma Chamber Tests And Advanced Simulations
M. Kruijff and E.J. van der Heide, Delta-Utec SRC, Leiden, The Netherlands; G. Vannaroni, M. Dobrowolny, and F. De Venuto, IFSI-CNR, Rome, Italy

1:49 pm - Miniature Plasma Activated Systems for Tether Current Generation
Graeme Aston, Martha B. Aston, John D. Williams, Electric Propulsion Laboratory, Inc., Monument, CO

2:13 pm - Electrodynamic-Tether Time-Domain Reflectometer for Analyzing Tether Faults and Degradation
Sven G. Bilen, The Pennsylvania State University, University Park, PA; and Brian E. Gilchrist, University of Michigan, Ann Arbor, MI

2:37 pm - The Effect of Plasma Density and Emitter Geometry on Space Charge Limits for Field Emitter Array Electron Charge Emission into a Space Plasma
Dave Morris, Brian E. Gilchrist, and Alec D. Gallimore, University of Michigan, Ann Arbor, MI

3:01 pm - Enhancement of Electrodynamic Tether Electron Current Collection Using Radio Frequency Power
Eric Choiniere and Brian E. Gilchrist, University of Michigan, Ann Arbor, MI; and Sven G. Bilen, Pennsylvania State University, University Park, PA

[E19] Space Nuclear Power Flight Systems for Crewed Mars Missions: (Tutorials) Technologies

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Sendero Ballroom III

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

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

1:25 pm - Technology Development Needs for Nuclear Subsystems for Space Applications (Tutorial)
Samit Bhattacharyya, Argonne National Laboratory, Argonne, IL

1:49 pm - Projected Thermal System Technology Capabilities for Piloted Mars Missions (Tutorial)
Eric Golliher, NASA Glenn Research Center, Cleveland, OH

2:13 pm - Advanced Materials Research and Development to Enable Light-Weight, High-Temperature Propulsion and Power Systems (Tutorial)
Randy Bowman, NASA Glenn Research Center, Cleveland, OH

2:37 pm - Technologies - Dynamic Power Conversion (Tutorial)
Richard K. Shaltens, NASA Glenn Research Center, Cleveland, OH

3:01 pm - Power Management and Distribution Systems for Electrically Propelled Interplanetary Vehicles (Tutorial)
James L. Dolce, NASA Glenn Research Center, Cleveland, OH

[C09] Mission Concepts for Rapid Robotic Exploration of the Solar System and Nearby Interstellar Space

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Enchantment Ballroom A & B

Gregory L. Matloff, Chair
Pace University
Brooklyn, NY

Claudio Maccone, Co-Chair
"G. Colombo" Center for Astrodynamics
Torino, Italy

1:25 pm - Preliminary Analysis of Light Sail Systems Engineering Concepts
Travis S. Taylor, Teledyne Brown Engineering, Huntsville, AL; and Brian Landrum, The University of Alabama, Huntsville, AL

1:49 pm - Interstellar Propulsion by SunLensing
Claudio Maccone, Alenia Spazio S.p.A., Torino, Italy

2:13 pm - Persephone: A Non-Nuclear Rendezvous Mission to a Kuiper Belt Object
Gregory L. Matloff, Pace University, New York, NY

2:37 pm - Propulsion Implications of a New Source For the Einstein Equations
David Maker, Huntsville, AL

3:01 pm - Magnetic or Inertial Fusion for Interstellar Propulsion-Expectations and Challenges
Terry Kammash, The University of Michigan, Ann Arbor, MI

[E20] Radioisotope Power Systems II

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Enchantment Ballroom C & D

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

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

1:25 pm - Development Program for Pu-238 Aqueous Recovery Process
M.E. Pansoy-Hjelvik, M. Reimus, G. Silver, M.L. Remerowski, G. Jarvinen, A. Ecclesine, G. Alletzhauser, J. Brock, J.Z. Nixon, P. Moniz, G. Purdy, K.B. Ramsey, and Liz Foltyn, Los Alamos National Laboratory, Los Alamos, NM

1:49 pm - Removal of Pu-238 from Aqueous Process Streams Using a Polymer Filtration Process
Gordon D. Jarvinen, Geraldine M. Purdy, Karen C. Rau, M. L. Remeroski, Mary Ann H. Reimus, Kevin B. Ramsey, Elizabeth M. Foltyn, Barbara F. Smith, and Thomas W. Robison, Los Alamos National Laboratory, Los Alamos, NM

2:13 pm - Purification and Neutron Emission Reduction of Plutonium-238 Oxide by Nitrate Anion Exchange Processing
M.E. Pansoy-Hjelvik, J. Brock, J.Z. Nixon, P. Moniz, G. Silver, and K.B. Ramsey, Los Alamos National Laboratory, Los Alamos, NM

2:37 pm - A High Power, Coated Particle Fuel Compact Radioisotope Heat Unit
Jeffrey C. King and Mohamed S. El-Genk, Institute for Space and Nuclear Power Studies, Albuquerque, NM

3:01 pm - A Roadmap for the Development and Validation of Coated Particle Fuel for Future Space Radioisotope Heater Units (RHUs) and Radioisotope Power Systems (RPSs)
Joseph A. Sholtis, Jr., Sholtis Engineering & Safety Consulting, Tijeras, NM

[E21] Thermionic Technology and Applications II

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Enchantment Ballroom E & F

Les Begg, Chair
General Atomics
San Diego, CA

Yury V. Nikolaev, Co-Chair
RI SIA LUTCH
Moscow, Russian Federation

1:25 pm - The Microminiature Thermionic Converter
Donald B. King, Kevin R. Zavadil, Sandia National Laboratories, Albuquerque, NM; James R. Luke, New Mexico Engineering Research Institute, Albuquerque, NM

1:49 pm - Application of Revised Thermionic Theory to MTC Diodes
Albert C. Marshall, Defense Threat Reduction Agency, Albuquerque, NM; and Donald B. King, Sandia National Laboratories, Albuquerque, NM

2:13 pm - A Novel Thin Film Dispenser Cathode for Thermionic Emission
Kevin R. Zavadil, Donald B. King, and J.A. Ruffner, Sandia National Laboratories, Albuquerque, NM

2:37 pm - Base Materials and Technologies to Maintain Long Service Life and Efficiency of Thermionic Converters and Thermionic Fuel Elements
Yury V. Nikolaev, Anotoly A. Yastrebkov, Alexander S. Gontar, Nikolay V. Lapochkin, Alexander P. Belousenko, David L. Tsetskhladze, State Research Institute of SIA "Lutch", Podolsk, the Russian Federation

3:01 pm - Open Discussion of Thermionic Technology and Applications
All participating speakers of both Sessions I and II are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[F03] Human Exploration and Radiation

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Fiesta Room I & II

Robert C. Singleterry, Jr., Chair
NASA Langley Research Center
Hampton, VA

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

1:25 pm - Interplanetary Crew Doses and Dose Rates for the July 2000 Solar Particle Event
Jennifer L. Hoff and Lawrence W. Townsend, The University of Tennessee, Knoxville, TN; E. Neal Zapp, Wyle Laboratories, Houston, TX

1:49 pm - Non-Invasive, Quantitative, and Remote Detection of Early Radiation Cataracts for Applications in Bio-Astronautics and Bio-Informatics
Rafat R. Ansari and James F. King, NASA Glenn Research Center, Cleveland, OH; Frank J. Giblin, Oakland University, Rochester, MI

2:13 pm - The Booster Applications Facility
David P. Goodwin, U. S. Dept. of Energy, Germantown, MD

2:37 pm - A Monte Carlo Transport Code Study of the Space Radiation Environment Using FLUKA and ROOT
Thomas Wilson, NASA Johnson Space Center, Houston, TX; Lawrence Pinsky, A. Empl, and Jane MacGibbon, University of Houston, Houston, TX; Federico Carminati and Rene Brun, CERN, Geneva, Switzerland; Alfredo Ferrari and Paola Sala, Instituto Nazionale di Fisisa Nucleare, Milan, Italy

3:01 pm - Equivalent Dose During Long-Term Interplanetary Missions Depending on Solar Activity Level
N.V. Kuznetsov, R. A. Nymmik and M.I. Panasyuk, Moscow State University, Moscow, Russia; N.M. Sobolevsky, Russian Academy of Science, Moscow, Russia

[D06] Spaceport Technology

Wednesday, February 14, 2001, 1:20 - 3:20 p.m. - Fiesta Room III & IV

Ken J. Payne, Chair
NASA Kennedy Space Center
Kennedy Space Center, FL

1:25 pm - Human Factors Engineering of Enhanced Spaceport Procedures
Barbara G. Kanki, NASA Ames Research Center, Moffett Field, CA; Tim Barth, Donna Blankmann-Alexander and D. Blake Parker, NASA Kennedy Space Center, FL; Hester Coan, San Jose State University Foundation, Moffett Field, CA

1:49 pm - Informed Maintenance for Next Generation Space Transportation Systems
Jack J. Fox, NASA, Kennedy Space Center, FL

2:13 pm - The Next Generation Space Launch Range
Kevin R. Brown, Command and Control Technologies Corp., Titusville, FL

2:37 pm - Autonomous System for Launch Vehicle Range Safety
Bob Ferrell, NASA Kennedy Space Center, FL; Sam Haley, Lockheed Martin Space Systems Company, Huntsville, AL

3:01 pm - Commercial Free Flyer Satellites and Orbital Re-Entry/Recovery Systems for Low Cost Microgravity Research
John M. Cassanto, Robert B. Hobbs and Michael B. Bem, Instrumentation Technology Associates (ITA) Inc., Exton, PA

[A09] Supportability II

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Sendero Ballroom I

Derek W. Hogarth, Chair
Boeing Company, The
Huntington Beach, CA

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

3:45 pm - Managing NASA's International Space Station Logistics and Maintenance Program
Anthony J. Butina, NASA Johnson Space Center, Houston, TX

4:09 pm - On-Demand Spares Fabrication During Space Missions Using Laser Direct Metal Deposition
Donald Krantz and Sylvia Nasla, MTS Systems Corporation, Eden Prairie, MN; Jeff Byrne and Brian Rosenberger, Lockheed Martin Aeronautics Company

4:33 pm - Lessons Learned from Hubble Space Telescope ExtraVehicular Activity Supportability
Russell L. Werneth, NASA Goddard Space Flight Center, Greenbelt, MD

4:57 pm - Steamlined Payload Processing in the 21st Century
Craig Jacobson and Phillip Meade, NASA Kennedy Space Center, FL

5:21 pm - Open Discussion of Supportability
All participating speakers of both Supportability I and Supportability II are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[C10] Propellantless Propulsion: Electrodynamic Tethers III, ED-Tether Current Collection and Performance

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Sendero Ballroom II

Brian E. Gilchrist, Chair
University of Michigan
Ann Arbor, MI

Sven G. Bilen, Co-Chair
Pennsylvania State University
University Park, PA

3:45 pm - Electron Collection by a Bare Tether: Physical Mechanisms
J.G. Laframboise, York University, Toronto, Canada

4:09 pm - Efficiency of Different Types of ED-Tether Thrusters
Juan R. Sanmartin, Universidad Politecnica de Madrid, Madrid, Spain; Robert D. Estes and Enrico C. Lorenzini, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

4:33 pm - Computation of Current Collection by a Moving Bare Tether
Tatsuo Onishi and Manuel Martinez-Sanchez, Massachusetts Institute of Technology, Cambridge, MA; David L. Cooke, Air Force Research Laboratory, Hanscom AFB, MA

4:57 pm - Current Collection to Long, Thin Probes in a Dense High-Speed Flowing Plasma
Brian E. Gilchrist and Alec D. Gallimore, University of Michigan, Ann Arbor, MI; Sven G. Bilen, The Pennsylvania State University, University Park, PA

5:21 pm - Open Discussion of Propellantless Propulsion: Electrodynamic Tethers III, ED-Tether Current Collection and Performance
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

[E22] Space Nuclear Power Flight Systems for Crewed Mars Missions: (Tutorials) Other Considerations/Panel Discussion

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Sendero Ballroom III

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

Dennis Pelaccio, Co-Chair
Science Applications International Corporation
Littleton, CO

3:45 pm - Electric Propulsion Systems for Piloted Mars Missions (Tutorial)
Steve Oleson, NASA Glenn Research Center, Cleveland, OH

4:09 pm - Safety Considerations for Emerging Missions (Tutorial)
John Lyver, NASA Headquarters, Washington, DC

4:33 pm - Open Panel Discussion
Participating speakers from Special Topic Sessions E16, E19, and E22 will be available to answer questions from the audience associated with future in-space nuclear power flight system concepts and technology capabilities to support emerging crewed Mars missions in an open panel discussion forum format.

[E23] High Power Electric Propulsion

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Enchantment Ballroom A & B

Ivana Hrbud, Chair
NASA Marshall Space Flight Center
Huntsville, AL

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

3:45 pm - Lithium Mass Flow Control for High Power Lorentz Force Accelerators
Andrea D. Kodys, Gregory Emsellem, Leonard D. Cassady and Edgar Y. Choueri, Princeton University, Princeton, NJ; James E. Polk, Jet Propulsion Laboratory, Pasadena, CA

4:09 pm - Overview of Nuclear MHD Power Conversion for Multi-Megawatt Electric Propulsion
Blair M. Smith, Travis W. Knight, Samim Anghaie, University of Florida, Gainesville, FL

4:33 pm - Status of Pulsed Inductive Thruster Research
Ivana Hrbud, Michael LaPointe, Robert Vondra, C. Lee Dailey, Ralph Lovberg, NASA Marshall Space Flight Center, Huntsville, AL

4:57 pm - Design and Fabrication of a 500 kWE-class Lithium Fuelled Lorentz Force Accelerator
James Polk, John Blandino, Robert Shotwell, Keith Goodfellow, Jet Propulsion Laboratory, Pasadena, CA; Alok Majumdar, Van Luong, and Frank Zimmerman, NASA Marshall Space Flight Center, Huntsville, AL

5:21 pm - Multimegawatt Nuclear Electric Propulsion with Gaseous and Vapor Core Reactors with MHD
Travis Knight, New Era Technology, Inc., Gainesville, FL; Samim Anghaie, Blair Smith, University of Florida, Gainesville, FL; Michael Houts, NASA Marshall Space Flight Center, Huntville, AL

[B06] Fluid Physics Research in Microgravity

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Enchantment Ballroom C & D

Michael E. Dreyer, Chair
University of Bremen - Zarm
Bremen, Germany

Jean-Claude Legros, Co-Chair
University of Brussels
Brussels, Belgium

3:45 pm - An Innovative Pumping Technology - Electrohydrodynamic Pumping Through Conduction Phenomenon
Seong-il Jeong and Jamal Seyed-Yagoobi, Texas A&M University, College Station, TX

4:09 pm - Protracted Adiabatic Response of a One-Component Fluid
Richard A. Ferrell, University of Maryland, College Park, MD; Jayanta K. Bhattacharjee, Indian Association for the Cultivation of Science, Calcutta, India

4:33 pm - Applicability of Theoretical Models to the Evaluation of Dynamic Viscosity in Microgravity
Giovanni Latini, R. Cocci Grifoni, G. Passerini, Università di Ancona, Ancona, ITALY

4:57 pm - Non-Desirable Convective Motion in Microgravity Experiments
Valentina M. Shevtsova, Denis E. Melnikov, Jean Claude Legros, Universite Libre de Bruxelles, Brussels, Belgium

5:21 pm - Capillary Rise in Tube Under Compensated Gravity
M. Dreyer, M. Stange, H.J. Rath, University of Bremen - Zarm, Bremen, Germany

[E24] Alkali-Metal Thermal-To-Electric Technology and Applications II

Wednesday, February 14, 2001, 3:40 - 5:40 p.m. - Enchantment Ballroom E & F

Jean-Michel Tournier, Chair
Institute for Space & Nuclear Power Studies
Albuquerque, NM

Tom Hunt, Co-Chair
Advanced Modular Power Systems, Inc.
Ann Arbor, MI

3:45 pm - Advances in Electrode Materials for AMTEC
Amy Ryan, Roger Williams, L. Lara, B. G. Fiebig, R. H. Cortez, A. K. Kisor, Virgil Shields and M. L. Homer, Jet Propulsion Laboratory, Pasadena, CA

4:09 pm - Metallurgical Examination of an AMTEC Unit
Virgil Shields, A.K. Kisor, B. Fiebig, Roger Williams, Amy Ryan and M.L. Homer, Jet Propulsion Laboratory, Pasadena, CA

4:33 pm - Advanced AMTEC Power Unit
Robert Sievers and Jan E. Pantolin, Advanced Modular Power Systems, Inc., Ann Arbor, MI

4:57 pm - Reactivity of Thin Metal Films on Sodium Beta'' Alumina Ceramic in High Temperature, Low Pressure Sodium Vapor
Roger Williams, A. K. Kisor, M. L. Homer, K. Manatt, Virgil Shields, and Amy Ryan, Jet Propulsion Laboratory, Pasadena, CA

5:21 pm - Open Discussion of Alkali-Metal Thermal-to-Electric Technology and Applications II
All participating speakers are invited to join the Session Chairs at the Head Table for an open discussion between the Chairs, the Speakers and all Attendees.

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