ANST Newsletter

May 30, 2007 Volume 2, Number 1

In this Issue...

Aerospace Nuclear Science & Technology

A Technical Group of the American Nuclear Society

A Word from the Chair...

Dear ANST members,

We are about one month from the Space Nuclear Conference 2007 (SNC '07). This is the second conference organized by the Aerospace Nuclear Science and Technology Technical Group (ANST) and it will be held as an embedded topical meeting during the Annual Meeting of the American Nuclear Society (ANS) at Boston, Massachusetts. The SNC'07 is an important milestone for ANST and also for the nuclear aerospace community. This year's conference will include plenary sessions with top-level key speakers on Space Nuclear Power & Propulsion, Radioisotope Power Sources, Key Issues and Challenges and Future Opportunities. More than 60 papers will be presented. We encourage our members' attendance and participation in SNC'07 and we would also like to get your feedback after the conference to make improvements for the future.

ANST annual elections were held in March and our current Vice-Chair William J. Carmack has been elected to Chair for the period 2007-2008. Thomas K. Larson, Leo M. Bobek and Dion J. Sunderland have been elected as Vice-Chair, Secretary and Treasurer respectively for one-year terms. Eric C. Alderson, Paul G. Edelmann, J. Boise Pearson and Martin B. Sattison have been elected to the Executive Committee for a 4 year term. The elected officers will start in their new positions on June 28, 2007. Congratulations to all of them!

I am also pleased to report that ANST membership numbers remain healthy and would like to welcome the new members. As stated in our previous newsletter, ANST needs its membership to be more actively involved with the Technical Group activities. I encourage all ANST members, and in particular the young professionals (and students!), to consider joining one of our technical committees. These committees provide an excellent forum to interact with other colleagues in this field and a valuable experience for your career development. Please also consider attending the ANST Executive Committee meeting that will be held during the ANS annual meeting on Sunday, June 24 from 12:00 PM to 2:00 PM (at the Tufts room). This will be a good opportunity for you to meet your ANST officers and to get introduced to our Technical Group.

We are looking forward to seeing you in Boston!

Sincerely,

Pablo R. Rubiolo
Chair ANST, 2006 - 2007

Coming Events

SPACE NUCLEAR CONFERENCE 2007

Embedded Topical Meeting at the 2007 ANS Annual Meeting

June 24-28, 2007 • Marriot Copley Place • Boston, MA

General Chairs
Mr. Robert Lightfoot, Center Deputy Director, *NASA MSFC*
Vice Admiral John J. Grossenbacher (Ret.), *Laboratory Director, INL*

Technical Program Chairs
Dr. Shannon Bragg-Sitton, *LANL*
Dr. Steven D. Howe, *INL Center for Space Nuclear Research*

Advanced planetary and space exploration will require the development and use of nuclear power and propulsion systems. These systems can range from tens of kilowatts to megawatts of power and could be used to power small landing craft or large manned or unmanned bases, or to propel vehicles in space. Although work in space nuclear power and propulsion has waxed and waned over the decades, it continues to be researched and developed for a variety of space missions. Ongoing activities in the United States cover the full range of nuclear applications, including radioisotope thermoelectric generators, fission surface power and nuclear thermal propulsion. Research and development require collaboration of various laboratories and research centers, including those at NASA, DOE, industry and universities. Although the amount of R&D has dropped since the peak of the most recent effort, the Jupiter Icy Moons Orbiter (JIMO) program under Project Prometheus, there remains an interest from the broader space (and nuclear) community to further develop and utilize nuclear power in Lunar, Martian and interplanetary missions.

Space Nuclear Conference 2007 (SNC '07) will be the second topical meeting organized by the ANST technical group. The first SNC was held in 2005 at the peak of the JIMO program. At that meeting, we saw a significant interest in space nuclear from the broader nuclear community, and SNC'05 hosted almost 100 technical presentations. Although the size of the space nuclear programs in the US has waned somewhat since 2005, SNC'07 will host approximately 60 technical presentations and more than a dozen key speakers. Speakers hail from various laboratories within NASA, DOE, industry and universities, not only from the US but from abroad as well. This success is evidence alone that space nuclear technology remains a potential contributor to future space exploration!

With SNC '07 just around the corner, we have an excellent technical program for attendees. In addition to the technical sessions and two panel discussion sessions, the program will include three plenary sessions highlighting top-level keynote speakers and an additional special session focusing on US and Russian work in space nuclear technology. In the opening plenary, we are proud to welcome key representatives from the US House of Representatives, NASA, the European Space Agency and DOE, while the other plenaries take a more focused approach to a specific topic area.

SNC'07 Program Highlights:

Opening Plenary: Space Nuclear Power & Propulsion

MONDAY, JUNE 25 • 2:30 P.M. – 4:30 P.M.

Session Chairs: Mr. Robert Lightfoot, Center Deputy Director, NASA MSFC
Vice Admiral John J. Grossenbacher (Ret.), Laboratory Director, Idaho National Laboratory

Representative Robert E. Cramer (D, AL) *(invited)*, Member, House Appropriations Committee, U.S. House of Representatives
David Southwood, Science Director, European Space Agency
Douglas Cooke, Deputy Associate Administrator, Exploration Systems Mission Directorate, NASA Headquarters
Vice Admiral John J. Grossenbacher (Ret.), Laboratory Director, INL

Plenary II: Radioisotope Power Sources

TUESDAY, JUNE 26 • 8:00 A.M. - 10:00 A.M.

Robert Lange, Director, Office of Space and Defense, U.S. Department of Energy
Scott Vogt, Manager, Multi-Mission RTG Program, United Technologies
Alan Harmon, Acting Program Executive, Science Mission Directorate, NASA Headquarters

Special Session: Space Nuclear Fuels and Materials Research in Russia and USA

WEDNESDAY, JUNE 27, 2007 • 8:00 A.M. - 10:00 A.M.

Nikolay N. Ponomarev-Stepnoy, Development of Nuclear Power and Propulsion Systems of the First Generation, RRC Kurchatov Institute-Russia
Eugeniy D'yakov, Mixed Carbide and Carbonitride Fuels Development and Testing, LUTCH-Russia
Vladimir Blank, Hyper Quality Synthetic Diamond, Non-carbon, Nano-diamond, TISNCM-Russia
Samim Anghaie, Space Reactor Fuel Development in USA, University of Florida

Closing Plenary: Key Challenges and Future Opportunities

WEDNESDAY, JUNE 27, 2007 • 4:00 P.M. – 6:00 P.M.

Tore Straume, Chief Life Scientist, NASA-Ames Research Center
Frank von Hippel, Professor of Public and International Affairs, Program on Science and Global Security, Princeton University
Final Speaker TBA

We hope that you are able to make time in your schedule to attend the SNC sessions and plenaries!

Visit www.ans.org/goto/space07 for complete details on the technical program, including abstracts of all papers that will be presented. Details on how to register for the meeting can be found at the ANS meetings page, www.ans.org/meetings.

FEATURE ARTICLE

Space Nuclear Technology: Moving Onward and Outward

Space nuclear propulsion and power has been identified for over 50 years as enhancing or enabling for ambitious space missions. Russia has flown over 30 reactors and numerous radioisotope systems. The US flew the SNAP-10A in 1965, and has flown dozens of radioisotope systems (most recently on the "New Horizons" mission to Pluto). In addition to nuclear power systems (NPS), both the US and Russia have conducted extensive development related to nuclear thermal propulsion (NTP). The US conducted over 20 engine-level NTP tests during the Rover/NERVA program.

NASA funding for space nuclear propulsion and power is predicted to be very low for the next several years, possibly less than $20M/yr. However, because of extensive progress made in previous programs (both space and terrestrial) it will still be possible to move towards an eventual flight system. NTP systems could benefit from work related to recapturing NTP fuels technology, or developing fuels for 21st century NTP systems. Near-term component and integrated system development and testing could allow NPS to be available for supporting exploration of the moon and Mars in 2020 and beyond.

Ongoing studies will determine specifically how space nuclear systems will fit into future exploration plans. NTP systems could enable a sustained human presence on Mars, and potentially reduce the cost of constructing and sustaining a lunar outpost. NPS could enable continuous, power-rich operation at any location in the solar system. NPS could be used both on planetary surfaces and for providing power to crew in space.

In addition to the US, several other countries have experience and expertise that could be useful to the development of space nuclear systems. China recently announced it was developing a nuclear-powered lunar rover, although the specifics were not clear. Russia has flown reactors as recently as the late-1980s, with two of their later flights operating at thermal power levels of interest to potential planetary surface applications. The design approach and much of the technology used by the SNAP-10A and Russian reactors could be traceable to 21st century NPS. India and other countries also have existing or emerging capabilities that could be useful to NPS development.

Even with low US funding, the next few years could be exciting times for space nuclear. Stay tuned for details!

By Dr. Samim Anghaie

Director, Innovative Nuclear Space Power and Propulsion Institute, University of Florida

ANST News

Election Updates

ANST would like to welcome the newly elected Officers and Executive Committee members who will be joining the ANST leadership following the ANS Annual Meeting in June.

EXECUTIVE COMMITTEE

OFFICERS (2007 - 2008)

Jon Carmack — **Chair**
Idaho National Laboratory
E-Mail: Jon.Carmack@inl.gov

Tom Larson — **Vice-Chair/Chair-Elect**
Idaho National Laboratory
E-Mail: Thomas.Larson@inl.gov

Leo Bobek — **Secretary**
University of Massachusetts Lowell
E-Mail: Leo_Bobek@uml.edu

Dion Sunderland — **Treasurer**
Anatech, Inc.
E-Mail: Dion@anatech.com

Additionally, ANST welcomes four new members to the Executive Committee. These include:
Eric Alderson, Paul Edelmann, Boise Pearson and Martin Sattison.

While we congratulate and welcome our incoming leadership, ANST would like to thank the outgoing officers, Pablo Rubiolo (Chair) and Robert Singleterry (Treasurer), for their dedication and commitment to the development and success of ANST. Outgoing members of the ANST EC include Shannon Bragg-Sitton and Andy Klein.

Get Involved!

ANST continues to solicit volunteers for its committees. Committee descriptions and contact information can be found on the ANST website, http://anst.ans.org/, at the Officers & Committees link. For additional information on a specific committee, please contact the indicated committee chair.

Articles to Contribute?

Would you like to contribute an article to a future edition of the ANST Newsletter? Just send your draft article in a text or Microsoft Word file to dion@anatech.com. Articles should be ~500 words. Accompanying photos and figures are welcome, and should be sent as separate JPEG files. Articles for the next edition of the ANST Newsletter are due by August 3, 2007.

Aerospace Nuclear Science & Technology
American Nuclear Society
555 N. Kensington Ave.
La Grange Park, IL 60526

E-mail:
anst@ans.org

We're on the Web!
http://anst.ans.org