



# ANST Newsletter

June 8, 2009

Volume 4, Number 1

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## A Word from the Chair...

Dear ANST members,

As we approach the June 2009 Annual Meeting, I am proud to inform you the ANST Technical Group has applied to become the 19<sup>th</sup> professional division within the American Nuclear Society.

The ANST began as an ANS Technical Group in 2001. Through the hard work and dedication of its founding members (many of whom are still active), the ANST has grown and effectively operated like a professional division for the last several years. The following highlights some of the many accomplishments of the ANST:

- Establishing an annual membership of over 500 or about 5% of the overall ANS membership
- Having approximately 40% student membership – a statistic indicative of the excitement and interest younger people have for space nuclear applications
- Organizing three highly successful embedded topical meetings – Space Nuclear Conference 2005, Space Nuclear Conference 2007, and Nuclear Emerging Technologies for Space 2009
- Organizing the Space Applications track for the International Congress on Advances in Nuclear Power Plants (ICAPP) in 2004, 2006, and 2008
- Providing regular and strong support of student participation at the national meetings and the student conferences
- Providing regular participation at national ANS Teacher's Workshops

While we are proud of the accomplishments, the hard work and dedication will not stop after gaining division status. The most significant future goal for ANST is to have a biennial stand-alone topical beginning in 2011. This conference will most likely occur in the February or March timeframe and include the topics covered by the current ANST space nuclear embedded topical meetings, the former STAIF meetings, and the current SNSF conference. In the next few years, we will leverage our division status to establish funding for scholarship and peer recognition awards.

For these and all the activities that make for a successful division, we need your help. I invite you to take an active role in furthering the success of ANST. Please feel free to contact me or any of the members of the ANST Executive Committee if you can and want to assist in division activities.

On a final note, I would thank everyone who worked so hard to build this technical group into a division. I look forward to working with all of you next year as we build upon our success.

Sincerely,

Leo Bobeck  
Chair ANST, 2008 - 2009

## Coming Events

### *Nuclear and Emerging Technologies for Space (NETS-2009)*

**Embedded Topical Meeting at the ANS 2009 Summer Meeting  
June 14-18, 2009 • Atlanta, GA • Hyatt Regency  
Atlanta Hotel**

The 2009 Nuclear and Emerging Technologies for Space (NETS-2009) meeting is the third topical meeting organized by the ANST, following the highly successful 2005 and 2007 Space Nuclear Conferences. In 2009 this meeting has been renamed to encompass the broad scope of participants from both the aerospace and nuclear fields. Co-sponsorship of this meeting is provided by the American Nuclear Society and the American Institute of Aeronautics and Astronautics.

NASA is currently developing capabilities for unmanned and manned missions to the Moon, Mars, and beyond. Strategies implementing nuclear based power and propulsion technology, as well as radiation shielding protection, may be an integral part of successful missions of these types. NETS-2009 provides a communications network and forum for information exchange for the wide cross section of research and management personnel from government, industry, academia, and the national laboratory system that are involved in space nuclear activities. To this end, the meeting addresses topics ranging from overviews of current programs and plans to detailed issues related to space travel such as nuclear-based power and propulsion systems designs, materials, testing, safety, space environmental effects and nuclear power system radiation shielding for humans and electronic components, and human factor strategies for the safe and reliable operation of nuclear power and propulsion plants.

The full-length, peer-reviewed papers for NETS-2009 will be presented in technical sessions at the NETS-2009 meeting on Tuesday, June 15 and Wednesday, June 16. Papers will be published in the CD-Rom meeting proceedings; publications for NETS-2009 are being sponsored by Lockheed Martin Space Systems Company. Papers of archival quality will be recommended for publication in a special issue *Nuclear Technology* that will be published after the meeting.

In addition to the technical sessions, NETS will host an **Opening Plenary** on Monday, June 15 (1:00 – 4:00 pm, Hanover F and G) that boasts key speakers from government, industry and academia. An additional **Special Session on Nuclear Thermal Propulsion** will be held on Tuesday, June 16 (8:30 – 11:30 am, Hanover C and D) dedicated to the discussion of historical applications and key areas for research and development.

The space nuclear community is currently making plans to hold NETS-2011 as a stand-alone topical meeting in the Spring of 2011. If you would like to participate in this conference in any capacity – session organizer, session chair, paper reviewer, etc. – or if you believe that your organization/company might be interested in the conference – providing meeting sponsorship or participating in an industry Expo held during the meeting – please contact Shannon Bragg-Sitton at [sitton@tamu.edu](mailto:sitton@tamu.edu). Please visit <http://anst.ans.org> for updates and details!

*Aerospace  
Nuclear  
Science &  
Technology*

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*A Technical  
Group of the  
American  
Nuclear  
Society*

Sessions at the 2009 ANS Annual Meeting that are a part of the NETS-2009 embedded topical meeting include:

**MONDAY, JUNE 15, 2009 • 1:00 P.M.**

NETS-2009 Opening Plenary (Hanover F and G)

**TUESDAY, JUNE 16, 2009 • 8:30 A.M.**

Special Session: Nuclear Thermal Propulsion Systems (Hanover C and D)

**TUESDAY, JUNE 16, 2009 • 1:00 P.M.**

Fission Surface Power System and Component Design (Hanover C)

Radioisotope Power Systems Technology and Development (Hanover D)

System Design and Materials Consideration for Nuclear Thermal Propulsion (Hanover E)

**WEDNESDAY, JUNE 17, 2009 • 8:30 A.M.**

Simulation and Modeling of Fission Power Systems (Hanover C)

Power Conversion Technologies for Space Applications (Hanover D)

Lunar and Mars Exploration Architecture and Considerations for Space Bases (Hanover E)

**WEDNESDAY, JUNE 17, 2009 • 1:00 P.M.**

Hardware Fabrication and Testing in Support of Space Fission Systems Development (Hanover C)

Utilization of Surface Fission Energy Sources and Radiation Protection and Shielding Considerations (Hanover D)

Major Challenges and Opportunities for Space Exploration (Hanover E)

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## 2009 ANST Sponsored Meetings

### **Space Nuclear Systems Forum – 2009**

The ANST helped to organize the first Space Nuclear Systems Forum (SNSF) in February 2009. Held at the Gilruth Center at NASA Johnson Space Center, the SNSF enabled productive dialogue among technical system designers and potential user groups for both fission and radioisotope power systems. The two-and-one-half day training forum included plenary sessions with invited speakers and small working group sessions for focused discussion. Participants hailed from various NASA centers, national labs, industry, and academia, and the small group format allowed for significant discussion opportunities.

Highlights of the meeting included an opening session and introduction to the meeting topics, chaired by **Fred Tarantino**, *President, Universities Space Research Association*. Other speakers included:

Welcome from NASA Johnson Space Center

**Steve Poulos**, *Deputy Director of Engineering, NASA Johnson Space Center*

Opening Address

**Steve Johnson**, *Director, Space Nuclear Systems and Technology Division, Nuclear Science and Technology Directorate, Idaho National Laboratory*

Exploration Technology Development Program

**John Warren**, *Program Executive, Advanced Capabilities Division, Exploration Technology Development Program, NASA Headquarters*

Fission Surface Power (FSP) for Lunar Exploration

**Don Palac**, *Project Manager, Fission Surface Power, NASA Glenn Research Center*

Potential RPS Science Mission Applications

**Leonard Dudzinski**, *Program Executive, Radioisotope Power Systems Program, NASA HQ*

Radioisotope Power Systems (RPS)

**Steve Johnson**, *Space Nuclear Division Director, Idaho National Laboratory*

Nuclear Thermal Propulsion (NTP): Past History & Recent Activities

**Stan Borowski**, *Chief, Propulsion & Controls Systems Analysis Group, NASA GRC*

Each topic presented during the opening session was followed by a focused break-out session that allowed more in-depth, small group discussion on key areas of needed research, development, testing and enabling technologies for desirable missions in the areas of fission power, radioisotope power, and nuclear thermal propulsion systems.

Chaired by **John Scott**, *Energy Conversion Branch Chief at NASA Johnson Space Center*, a large group discussion was conducted to address the impact of increased power availability – enabled by nuclear systems – on a proposed lunar outpost, Martian outpost, and science mission architectures.

Lunar Architecture Team Status

**Cal Seaman**, *NASA Johnson Space Center*

Power Requirements for Mobility

**Dan Harrison**, *NASA Johnson Space Center*

Power Requirements for Life Support Systems

**Dan Barta**, *NASA Johnson Space Center*

Power Requirements for *In Situ* Resource Utilization and Cryogenics

**Jerry Sanders**, *NASA Johnson Space Center*

Mars Architecture Studies

**Bob Cataldo**, *NASA Glenn Research Center*

Plans are currently under way for SNSF-2010, which will maintain the same small-group discussion format adopted for SNSF-2009 and will be held in the February 2010 timeframe. Please visit <http://anst.ans.org> or <http://www.csnr.usra.edu/> for updates and details!

SNSF-2009 meeting organizers and technical chairs included:

Shannon Bragg-Sitton, *Texas A&M University*

Michael Houts, *NASA Marshall Space Flight Center*

Steven D. Howe, *Idaho National Laboratory, Center for Space Nuclear Research*

John Scott, *NASA Johnson Space Center*

Sponsored by the Idaho National Laboratory, SNSF-2009 was also supported by the Universities Space Research Association (USRA), the Center for Space Nuclear Research (CSNR), the National Aeronautics and Space Administration (NASA), the American Nuclear Society (ANS) and the American Institute of Aeronautics and Astronautics (AIAA).

## Future ANST Sponsored Meetings

NETS-2009 and the next SNSF, currently planned for February 2010, represent part of a larger transitional plan to support the space nuclear and advanced power and propulsion community – filling the gap left by the highly successful STAIF conferences. The planned format will incorporate both ANS and AIAA - reaching out to both the nuclear and the space communities.

In 2011, ANST expects to hold a stand-alone topical meeting that incorporates the SNS Forum and the previously embedded SNC / NETS to ensure a strong technical component to the meeting and to address the needs of the space nuclear community.

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## ANS Teacher's Workshop

The ANS has a high school science teacher's workshop at every annual and summer meeting lead by Chuck Vincent from ANS HQ. This workshop is attended by 20-40 teachers from the local area of the meeting and they get school district credit for taking the workshop.

Dr. Robert Singleterry has participated in many of the workshops over the years as the Aerospace Nuclear Science and Technologies representative. He has an hour to introduce the subject of nuclear stuff in space to the teachers. This nuclear stuff ranges from why space is different from terrestrial situations (gravity, vacuum, environment, radiation, cost, etc....) to how NASA can help the teachers do their job better and even support them and some students over the year with relevant work. While the nuclear aspect of space is far from having real hardware or experiments to demonstrate, just the fact that the subject is introduced to them allows them to intelligently talk about the subject to their students.

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## 2009 – 2010 ANST Officers and Executive Committee

ANST welcomes the newly elected Officers and Executive Committee members joining the ANST leadership following the ANS Annual Meeting in June.

### OFFICERS (2009 - 2010)

**Leo Bobek**

University of Massachusetts Lowell

**Past Chair**

E-Mail: [Leo\\_Bobek@uml.edu](mailto:Leo_Bobek@uml.edu)

**Martin Sattison**

Idaho National Laboratory

**Chair**

E-Mail: [Martin.Sattison@inl.com](mailto:Martin.Sattison@inl.com)

**Shannon Bragg-Sitton**

Texas A&M University

**Vice-Chair/Chair-Elect**

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**Paul Edelmann**

Los Alamos National Laboratory

**Secretary**

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**Dion Sunderland**

Anatech, Inc.

**Treasurer**

E-Mail: [dion@anatech.com](mailto:dion@anatech.com)

Additionally, ANST welcomes two new members to the Executive Committee: Ross F. Radel and Steven D. Howe, and two returning members, Shannon Bragg Sitton (Vice Chair) and Robert Singleterry. Continuing Executive Committee members include Martin B. Sattison, Paul G. Edelmann, Dion J. Sunderland, Eric C. Alderson, Leo M. Bobek, Jeffrey A. Halfinger, Heather J. MacLean, Jon B. Pearson, James Werner and Steven A. Wright.

We welcome aboard Jasmina L. Vujic, our new Board Liaison, and we extend our thanks to Sharon Kerrick, our staff liaison, for her support.

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## NASA Announces Europa Jupiter System Mission

The Europa Jupiter System Mission (EJSM) was announced in February 2009 with an expected 2020 launch date. The mission is a collaboration between the European Space Agency (ESA) and NASA to explore the Jupiter system with a particular focus on the moons Europa and Ganymede. The mission will be comprised of two distinct spacecraft – the Jupiter Europa Orbiter (JEO) and the Jupiter Ganymede Orbiter (JGO).

JEO will be the NASA component of the EJSM. JEO will be designed to further the major discoveries of the Galileo and Voyager missions to Europa, with a special focus on its ocean. The orbiter will be designed and constructed to withstand the intense radiation environment in Europa orbit, and is expected to have 11 science instruments designed for extensive surface and sub-surface mapping and analysis. JEO will be powered by a radioisotope power system.

JGO is the ESA component of the EJSM. The JGO will be designed and constructed for the more moderate radiation environment outside of the Europa orbit. It is expected to be a solar powered orbiter designed with 10 science instruments for study of Jupiter and the inner satellites, and for extensive mapping of Ganymede.

Additional details may be found at the NASA website: <http://opfm.jpl.nasa.gov/>

*Chair's Note – While we still await a defining mission for space nuclear power, the EJSM has many aspects of interest to ANST members, including a radioisotope power system and technologies to meet the radiation challenges of a Jupiter and Europa orbit.*

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## 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](mailto:dion@anatech.com). Articles should be ~500 words. Accompanying photos and figures are welcome, and should be sent as separate JPEG files.

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