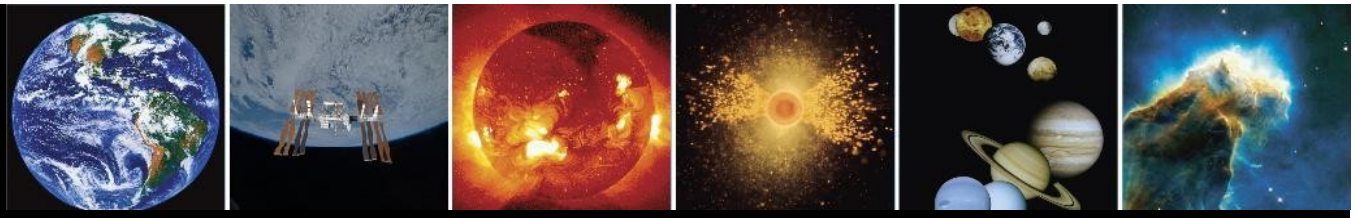
SPACE STUDIES BOARD NEWS



JANUARY—MARCH 2013

Inside This Issue

The other standing committees also strengthened their working relations with their corresponding research divisions at NASA, and I consider the improvement in mutual understanding during a difficult time for NASA to be a very important intangible outcome of the first NRC Space Science Week.

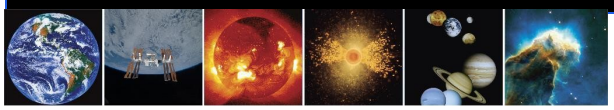
—SSB Chair Charles F. Kennel

From the Chair	2
SSB Membership	3
Lloyd V. Berkner Space Policy Internship	3
SSB Activities	4
SSB Standing Committees	4
First COSPAR Symposium	7
News from the National Academies	8
SSB Staff News	9
Congressional Hearings of Interest	10
SSB Staff	10
SSB Calendar	11
Selected Reports Available from the SSB	12

The SSB's sister Board, the Aeronautics and Space Engineering Board, also publishes a newsletter; visit http://sites.nationalacademies.org/DEPS/ASEB/DEPS_046908 to subscribe or to view past newsletters. SSB's division, the Division on Engineering and Physical Sciences, also publishes a newsletter; visit http://sites.nationalacademies.org/DEPS/DEPS_059299 to subscribe.

JANUARY—MARCH 2013

SPACE STUDIES BOARD NEWS



FROM THE CHAIR

The Space Studies Board convened a meeting of its standing committees on March 8 and 9 of the first of what we hope will be an annual tradition—the NRC's Space Science Week. All four SSB standing committees met in the newly refurbished National Academy of Sciences building on Constitution Avenue in Washington, DC. The session was well attended by our NASA and other federal agency colleagues; John Grunsfeld, the Associate Administrator for the Science Mission Directorate, the leaders of all four NASA science mission offices, and representatives from several other agencies—including USGS, NOAA, and NSF— participated in our discussions. All had hoped that the Administration's budget would have been released by that time, so that our committees and government leaders could consider together its implications for space science. That was, of course, not to be, but we can hope that next year will be different.

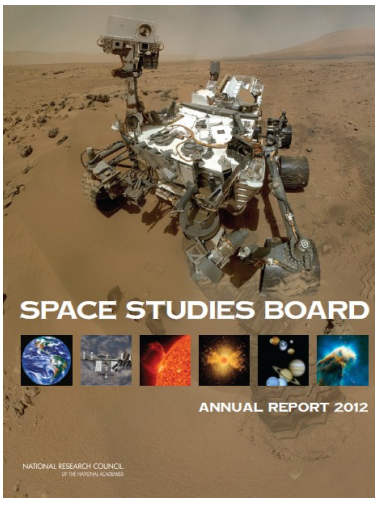
There was a hidden bonus, however, as the standing committees had a greater opportunity to discuss new developments in science as well as longer-range policy issues. Of special interest to me were the interdisciplinary sessions, which would not have been possible unless we had convened all the standing committees at the same time in the same place.

The Committee on Astronomy and Astrophysics (CAA) and the Committee on Astrobiology and Planetary Science (CAPS) met together to discuss the exciting discoveries of Earth-like planets by Kepler. It was clear to this observer that a rich new multi-disciplinary research agenda demanding knowledge and techniques from astrophysics, planetary science, and astrobiology is emerging rapidly. Stay tuned; I hope and trust that SSB can play a constructive role in working with NASA leadership to connect these research programs in a forward-looking way.

The Committee on Solar and Space Physics (CSSP) and the Committee on Earth Science and Applications from Space (CESAS) met together on a policy issue of mutual concern: how best to work with the research to operations transition with NASA's sister agencies, NOAA and USGS. Research projects in both space physics and Earth science now develop useful applications during the conduct of the missions themselves, and it is important to ensure that the societal value of NASA research be realized as promptly as possible.

CESAS also spent an entire day working with Mike Freilich, Director of the NASA's Earth Science Division, to design a potential study of "continuity measurements" for which it is important to provide resilient data streams to practical and policy users as well as researchers. Our "lessons learned" workshop had emphasized the importance of designing the statements of task of our studies, and I felt this was a constructive use of standing committee time. The other standing committees also strengthened their working relations with their corresponding research divisions at NASA, and I consider the improvement in mutual understanding during a difficult time for NASA to be a very important intangible outcome of the first NRC Space Science Week.

On March 18 and 19, Michael Moloney and I put in invited appearances at the 51st Annual Goddard Symposium in Greenbelt, Maryland, a "gathering of the clan" for many in NASA and industry involved with NASA projects. Two things made this year's meeting notable. First was the impact the so-called "sequester" is having on NASA. Extreme travel restrictions dramatically limited the attendance of NASA personnel at what is traditionally one of the more important meetings of the year for NASA; even attendance from Goddard Space Flight Center, just down the road from the conference venue, was limited. The second interesting feature was how much the influence of the SSB and the Aeronautics and Space Engineering Board on NASA programs was referred to by different speakers. I could not help but connect the two in my mind. It is clear that NASA is going to have difficulty convening its own scientists to get the advice and program guidance it needs. If this continues for a long time, it could become a profound threat to the excellence and timeliness of NASA science. The SSB and its standing committees cannot replace the missing advice and guidance, but we hope we can help our NASA colleagues out. We have decided to hold as many of our meetings in Washington, DC, as possible until NASA's travel restrictions become less onerous. NASA will, perforce, hold many more of its meetings electronically, and we hope NASA will also feel free to ask the SSB and standing committees to convene electronic meetings when they need to keep everyone up to date.



Space Studies Board Annual Report—2012

The *Space Studies Board Annual Report* summarizes the activities of the Board and its committees, including summaries of regular reports released during the year. Other features include an overview of the structure and operations of the Board, a cumulative bibliography since 1958, and a DVD Compilation of SSB Reports. The report is posted at <http://www.nationalacademies.org/ssb/ssb.html>. Limited copies are available. See the last page of this newsletter to order a copy.

Credit: White House photo; Ryan K Morris, National Science and Technology Medals Foundation.

We are deeply saddened to learn of the recent passing of Space Studies Board member **Yvonne C. Brill**, an aerospace consultant retired from RCA Astro Electronics. She was honored with the 2010 National Medal of Technology and Innovation for innovation in rocket propulsion systems for geosynchronous and low Earth orbit communication satellites, which greatly improved the effectiveness of space propulsion systems. A member of the National Academy of Engineering, she served on numerous NRC and NAE committees, including the Committee on Air Force/Department of Defense Aerospace Propulsion, the Committee on Strategic Assessment of Earth-to-Orbit Propulsion Options, and the Committee to Study the Advanced Solid Rocket Quality and Test Program.

SSB MEMBERSHIP

* Dr. Yvonne C. Brill passed away on March 27, 2013.

For more information on SSB membership, visit our website at <http://www.nationalacademies.org/ssb>.

LLOYD V. BERKNER SPACE POLICY INTERNSHIPS

WE ARE CURRENTLY ACCEPTING APPLICATIONS FOR INTERNSHIPS FOR THE AUTUMN 2013 PROGRAM

The goal of the Lloyd V. Berkner Space Policy Internship program is to provide promising undergraduate and graduate students with the opportunity to work in the area of civil space research policy in the nation's capital, under the aegis of the SSB.

Established in 1958 to serve as the focus of the interests and responsibilities in space research for the National Academies, the Board provides an independent, authoritative forum for information and advice on all aspects of space science and applications, and it serves as the focal point within the National Academies for activities on space research. It oversees advisory studies and program assessments, facilitates international research coordination, and promotes communications on space science and science policy between the research community, the federal government, and the interested public. The SSB also serves as the U.S. National Committee for the International Council for Science Committee on Space Research (COSPAR).

The Lloyd V. Berkner Space Policy Internships, named after the first chair of the SSB, are offered twice annually. The summer program is restricted to undergraduates, and the autumn program is open to both undergraduate and graduate students.

The SSB is now accepting applications from both undergraduate and graduate students for its autumn 2013 program. The deadline for applications is June 7, 2013. Successful candidates will be contacted no later than July 5, 2013.

Individuals seeking a Lloyd V. Berkner Space Policy Internship must have the following minimum qualifications:

- *Be a registered student at a U.S. university or college;*
- *Have completed his/her junior year, majoring in physical science or engineering (other areas considered on a case-by-case basis);*
- *Have long-term career goals in space science research, applications, or policy;*
- *Possess good written and verbal communications skills and a good knowledge of his/her particular area of study;*
- *Be capable of responding to general guidance and working independently; and*
- *Be familiar with the internet and basic research techniques (familiarity with Microsoft Office, as well as HTML, is highly desirable but not essential).*

NOTE: SELECTION OF INTERNS AND INITIATION OF PROGRAM IS DEPENDENT ON AVAILABILITY OF FUNDS.

Visit http://sites.nationalacademies.org/SSB/ssb_052239 to learn more about the internship program and to get application information.

SSB ACTIVITIES

THE BOARD AND ITS STANDING COMMITTEES

The **Space Studies Board (SSB)** met on April 4-5 at the Keck Center in Washington, DC. The first day was a joint session with the Aeronautics and Space Engineering Board. The Boards received a briefing from Al Carnesale, Chair of the NRC report *NASA's Strategic Direction and the Need for a National Consensus.* They then received briefings and updates from Charlie Bolden, NASA Administrator; Senate and House staff, including Jeff Bingham, Richard Obermann, Diana Simpson, and Ann Zulkosky; Marshall Porterfield, Division Director of NASA's Space Life and Physical Sciences Research and Applications Division; and William Gertenmaier, Associate Administrator Human Exploration and Operations Division. On the second day, the SSB received an update from Chuck Gay, Deputy Associate Administrator, NASA Science Mission Directorate (SMD), and then had a discussion with him and several other representatives from SMD, including Mike Freilich (Earth Science), Vicki Elsbernd (Heliophysics), Jim Green (Planetary), Paul Hertz (Astrophysics), and Geoff Yoder (JWST). The Board then received updates from Jean-Pierre Swings, European Space Science Committee Chair; the chairs or representatives of the SSB standing committees; Len Fisk, the U.S. Representative to the Committee on Space Research (COSPAR); and Charlie Baker, NOAA's Deputy Assistant Administrator for Satellite and Information Services. The Board's next meeting will be held November 5-7 in Washington, DC. The Executive Committee will meet August 8-9 in Washington, DC. Visit <http://www.nas.edu/ssb> to stay up to date on board, workshop, and study committee meetings and developments.

A report summarizing the discussions and dialog that took place at the November 2012 workshop **Lessons Learned in Decadal Planning in Space Science** is being prepared and is expected to be released in Spring of 2013. At the workshop, hosted by the SSB in collaboration with the Board on Physics and Astronomy, participants reviewed and discussed key aspects of the most recent NRC decadal surveys in space science with the goal of identifying lessons learned and best practices. More information on the workshop is available at <http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_070954> and video of the workshop is available at <http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_070954>. A follow-on study is under consideration.

On March 6-8 the SSB's four standing committees held the first **NRC Space Science Week.** The first day consisted of a plenary session which allowed all four committees to meet together for a keynote presentation from John Grunsfeld, NASA Associate Administrator for Science on the current state of the NASA Science Mission Directorate, a view from Capitol Hill from Jeff Bingham, a briefing on the current status and expected evolution of launch services for SMD from James Norman, and a panel discussion with the leadership of the standing committees. In the afternoon there were two breakout sessions, one was a meeting of CAA and CAPS on Exoplanet Science; and the other was a meeting of the CSSP and CESAS on sustaining observations and the research to operations (R2O) challenge. The CAA/CAPS session allowed committee members representing communities that intersect on this issue to discuss issues in exoplanet research and receive briefings on Kepler, Radial Velocity surveys, the architecture and demographics of planetary systems, modeling of exoplanets, and the science of exoplanets and their systems. The CSSP/CESAS session allowed committee members representing communities that rarely meet to examine common needs, and frequent challenges, in sustaining or transitioning to operations particular climate, weather (terrestrial and space), and land use/land change observations. Briefing the committee and/or participating in roundtable discussions were representatives from NASA (ESD and HPD), NOAA (NWS), NSF (GEO/AGS), USGS (Climate and Land Use Change), and OSTP. The next two days were devoted to the individual standing committee business (see more information below).

The **Committee on Astronomy and Astrophysics (CAA)** met in-person on March 6-8 as part of the first-ever NRC Space Science Week. The CAA received an update on the progress of the James Webb Space Telescope, as well as programmatic updates on NASA's Astrophysics Program from division director Paul Hertz; NSF's Division of Astronomical Sciences from division director Jim Ulvestad; and the Department of Energy's Office High Energy Physics from associate director Jim Siegrist. A wide range of issues that pertained to both individual agencies and the nation's overall astronomy and astrophysics endeavors were discussed. Among the more prominent issues discussed was the status of the decadal survey-recommended WFIRST mission and progress being made on the AFTA study that is evaluating the suitability of using one of the 2.4-m telescope assets made available in 2012 by the NRO. The CAA also discussed the overall portfolios for NASA, NSF, and DOE, and crosscutting issues for the agencies like the status and future of the current ground-based optical/infrared observation

More information on the SSB and ASEB Board Meetings is at http://sites.nationalacademies.org/SSB/SSB_054577 (SSB) and http://sites.nationalacademies.org/DEPS/ASEB/DEPS_058923 (ASEB)

SSB STANDING COMMITTEES

Committee on Astrobiology and Planetary Science (CAPS)

Philip R. Christensen, Arizona State University (Co-Chair)
J. Gregory Ferry, Pennsylvania State University (Co-Chair)

Committee on Astronomy and Astrophysics (CAA)
(joint with the Board on Physics and Astronomy)

Paul L. Schechter, MIT (Co-Chair)
David N. Spergel, Princeton University (Co-Chair)

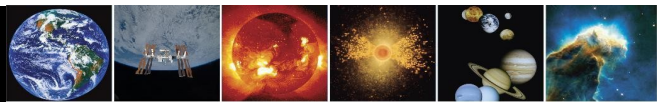
Committee on Earth Science and Applications from Space (CESAS)

Mark R. Abbott, Oregon State University (Chair)
Joyce E. Penner, University of Michigan (Vice Chair)

Committee on Solar and Space Physics (CSSP)

J. Todd Hoeksema, Stanford University (Co-Chair)
Mary K. Hudson, Dartmouth College (Co-Chair)

For more information, go to http://sites.nationalacademies.org/SSB/ssb_052296



SSB ACTIVITIES, ***CONTINUED***

system, LSST, and the mid-decadal review for astronomy and astrophysics that will take place in the middle of this decade. The last day of the CAA's meeting was devoted to closed-session discussion. CAA plans to hold several teleconference-based meetings before its Fall 2013 meeting. More information about CAA is available at <http://sites.nationalacademies.org/BPA/BPA_048755>.

The **Committee on Earth Science and Applications from Space (CESAS)** held its second in-person meeting in Washington, DC, on March 6-8 as part of the NRC's Space Science Week. The second day of the meeting was devoted to discussions on the "continuity" needs for NASA-sustained remote sensing observations of Earth from space. Instruments on NASA research and NOAA "operational" spacecraft measure numerous variables relevant to Earth's biosphere, hydrosphere, atmosphere, and oceans and their interactions on various scales. However, there is a growing tension between the need for measurement continuity of data streams that are critical components of Earth science research programs, including, but not limited, to areas related to climate, and the development of new measurement capabilities. While there is an increasing societal need for information products derived from Earth observations, the federal agencies responsible for providing these measurements face a near-perfect storm of diminished fiscal resources, growth in program costs, and a coming loss of heritage assets. Present throughout the day were representatives from NASA, NOAA, USGS, OSTP, OMB, and congressional staff. The committee was briefed by NASA Earth Science Division Director Michael Freilich, who was present for the entire meeting of CESAS; Bryon Tapley, chair of the NASA Advisory Council's Earth Science Subcommittee; Jim Tucker, NASA GSFC; Tom Karl, Director, NOAA NCDC; and (by teleconference) Kevin Trenberth, NCAR.

CESAS will hold its next in-person meeting in Fall 2013 (date/location TBD), where—among other items—it will begin discussing the structure of and relevant issues for the next decadal survey in Earth science and applications from space. For more information about CESAS and to learn about upcoming meetings, go to <http://sites.nationalacademies.org/SSB/SSB_066587>.

The **Committee on Astrobiology and Planetary Science (CAPS),** a new activity combining the responsibilities formerly exercised by COMPLEX and COEL, held its third face-to-face meeting on March 6-8 as part of the NRC's Space Science Week. The CAPS-only sessions included presentations on the current status of NASA's planetary science, astrobiology, and research and analysis activities. In addition, the committee heard a briefing on planning for the InSight (Interior Exploration using Seismic Investigations, Geodesy and Hear Transport) mission to Mars in 2016 and activities related to NASA's planned 2020 Mars rover. Scientific presentations on the microbiology of Antarctica's Lake Vida and the chemical context of the origin of life rounded out the open sessions. Closed session discussions explored issues relating to the 2020 rover, the concept of habitability, and exoplanets. The committee was asked by NASA Science Mission Directorate/Planetary Science Division officials to draft an outline of a possible task to review the report of the 2020 rover science definition team. Potential study activities on the general topics of habitability and exoplanets are also being explored. The committee's second meeting of 2013 will take place in the late-summer/early autumn. A committee-wide conference call will likely be scheduled as soon as feasible after the release of the president's budget proposal for the 2014 fiscal year. More information about CAPS is available at <http://sites.nationalacademies.org/SSB/SSB_067577>.

Space Science Week. Courtesy of D. Day.

The **Committee on Solar and Space Physics (CSSP),** which stood down while work was underway for the solar and space physics (heliophysics) decadal survey, met in person for the first time on March 6-8, 2013, during the NRC's Space Science Week. The second day of the meeting featured updates on the programs and plans of NSF's upper atmosphere section, NASA's Heliophysics division, and the National Space Weather Program. CSSP was also briefed by the following: NASA and NSF regarding their responses to the decadal survey; the chair of the committee developing the NASA Heliophysics Division Program Roadmap, which will provide the detailed implementation of the survey's recommendations; NSF representatives on the implications for ground-based solar astronomy as a result of the NSF's Division of Astronomical Sciences' (AST's) Portfolio Review of all AST-supported facilities, programs, and other activities. Te committee also received an update on the Advanced Technology Solar Telescope. The committee had

Leaders of the SSB Standing Committees at Space Science Week. Courtesy of D. Day.

SSB ACTIVITIES, CONTINUED

a discussion of mission management options and implications for cost containment, which was prompted in part by the survey recommendation that NASA Solar-Terrestrial Probe mission line be cost-capped and executed in "principal-investigator mode." Finally, CSSP was briefed on the report of the recent SSB-sponsored workshop, *The Effects of Solar Variability on Earth's Climate* (available at <http://www.nap.edu/catalog.php?record_id=13519>). Further information about CSSP, including future meetings, is available at <http://sites.nationalacademies.org/SSB/ssb_052324>. More information about CSSP is available at <http://sites.nationalacademies.org/SSB/ssb_052324>.

STUDY COMMITTEES

Nominations to the organizing committee for the SSB workshop **"The Role of High-Power, High Frequency-Band Transmitters in Advancing Ionospheric/Thermospheric Research"** were approved in February 2013. The workshop, which is planned for May 20-21, 2013, in Washington, DC, will bring together parts of the upper atmosphere research community that heretofore have not had much contact—those engaged in active ionospheric modification and those engaged in more traditional types of upper atmosphere research. Especially in a highly constrained budgetary environment, it is important for these communities to understand and leverage their respective capabilities. A particular focus of the workshop will be on the current capabilities and potential future research uses of the Alaska-based high-power, HF-band transmitter and associated assets of the High Frequency Active Auroral Research Program (HAARP). The workshop is sponsored by the Department of Defense (Air Force) and NSF (GEO/AGS). The product of the workshop will be a summary of the proceedings that will be authored by the organizing committee. As is typical for this type of workshop, the summary will not include findings or recommendations. Further information about the committee and its task is available at <http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_082082>.

Solar and Space Physics: A Science for a Technological Society, the NRC's second decadal survey in solar and space physics from the ad hoc **Committee on A Decadal Strategy for Solar and Space Physics (Heliophysics)**, released on August 15, 2012, is proceeding with the intent to publish the final version by June 2013. A prepublication version is available at <http://www.nap.edu/catalog.php?record_id=13060>, and the final version will also be posted to this site. Information about the survey is available at <http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_056864>.

The **Committee for the Implementation of a Sustained Land Imaging Program** has completed a draft report and is now in the process of review. The prepublication report is expected to be delivered mid-2013. More information is available at <http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_065886>.

The **Human Spaceflight Committee** met on January 8 at Stanford University in closed session to deliberate on the information received previously and to consider future plans. At this meeting, the committee also discussed a preliminary list of technical and operational issues for further investigation by the Technical Panel.

Joint meeting of CAPS and CAA at Space Science Week. Courtesy of D. Day.

The committee also formed two internal working groups, which have been meeting via telecon in preparation for the committee's next meeting on April 22-24 in Washington, D.C.

One of the committee's two panels, the Technical Panel, held its first two meetings in Washington, DC, on February 4-5 and March 27-28 . The panel received extensive briefings from NASA on current human exploration activities as well as long-term technical challenges. The panel also heard from experts in industry and academia regarding their perspectives on current and future human exploration activities by NASA and the private sector. One of these briefings, by representatives of the Keck Institute of Space Studies at Caltech, reviewed their study of a mission to capture a small near-Earth asteroid and move it into a cis-lunar orbit to facilitate human exploration. The President's budget request for FY 2014 includes $100 million for NASA to initiate an asteroid retrieval mission.

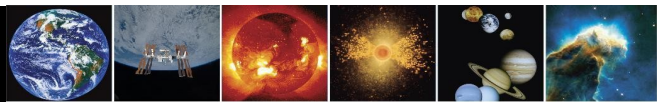
In addition to the Technical Panel, the planned second panel has now been formed to assist and advise the committee. The Public and Stakeholder Opinions Panel, led by Dr. Roger Tourangeau, Westat, Inc., will collect and analyze public and stakeholder inputs regarding the motivations, goals, rationales, and possible evolution of human spaceflight. That panel has begun preliminary work on reviewing the extensive past survey literature and will convene its first meeting on April 5 in Washington, DC.

Dissemination activities continued for the report ***NASA's Strategic Direction and the Need for a National Consensus***, a comprehensive, agency-wide assessment of NASA's strategic direction. Several report-release briefings were held in December, and the final report was printed in early January. The committee vice chair, Ron Sega, presented the report to the National Space Symposium in Colorado Springs, CO, in April.

OTHER ACTIVITIES

The **Committee on Space Research (COSPAR)** will hold its next scientific assembly at the Lomonosov Moscow State University in Moscow, Russia, on August 2-10, 2014. The inaugural COSPAR Symposium will be held in Bangkok, Thailand, on November 11-15, 2013 (see page 7). COSPAR business meetings will be held at COSPAR Headquarters in Paris, France, on March 18-21 , 2013.

The SSB exhibited at the 221st **American Astronomical Society** meeting in Long Beach, CA, on January 6-10, 2013, in partnership with the Board on Physics and Astronomy.



First COSPAR Symposium
Planetary Systems of Our Sun and Other Stars, and the Future of Space Astronomy
Bangkok, Thailand
November 11-15, 2013

The 2013 COSPAR Symposium on "Planetary Systems of our Sun and other Stars, and the Future of Space Astronomy" (http://www.cospar2013.gistda.or.th/) is the first of a new series of events initiated by COSPAR, which aims to promote space research at a regional level in emerging countries. It will be held every two years in a different area of the world.

The Symposium will be multidisciplinary in nature and address topics ranging from astronomy, Earth observation, planetology, and astrobiology, up to citizen science. The Symposium will feature plenary lectures, parallel and poster sessions, as well as training sessions. It is open to participants worldwide, and scientists, young professionals, and students from the Asian region are particularly encouraged to participate.

You are warmly invited to submit an abstract and application by visiting
http://www.cospar2013.gistda.or.th/ab-signin.php

The deadline for submission of abstracts is May 31, 2013.

A selection of refereed papers will be published after the Symposium in *Advances in Space Research*, and authors are encouraged to submit manuscripts after the Symposium for consideration.

Please note that a Capacity Building Workshop entitled "Atmospheric Correction of Earth Observation Data for Environmental Monitoring: Theory and Best Practices" will also take place in Bangkok at GISTDA the week before the Symposium from November 4-8, 2013, for which participants from the Asian region will be selected by application.

Contact cospar2013@gistda.or.th with any questions.

News from the National Academies

News releases can be found at <http://www.nationalacademies.org/newsroom/>.

Academy Honors 18 for Major Contributions to Science

The National Academy of Sciences has selected 18 individuals to receive awards in recognition of their outstanding scientific achievements in a wide range of fields spanning the physical, biological, and social sciences. The recipients will be honored in a ceremony on April 28, during the Academy's 150th annual meeting. One of the recipients for 2013 has served on a Space Studies Board committee:

John T. Gosling, senior research associate in the Laboratory for Atmospheric and Space Physics at the University of Colorado, Boulder, and retired laboratory fellow at Los Alamos National Laboratory, will receive the **Arctowski Medal.** Gosling was selected because of a long series of insights into the generation of energetic solar events, especially distinguishing solar flares and Coronal Mass Ejections, and how they impact the heliosphere and Earth. The medal is given every two years for studies in solar physics and solar terrestrial relationships and carries an award of $20,000, plus $60,000 to support research in solar physics and solar-terrestrial relations. *Gosling chaired the Panel on the Sun and Heliospheric Physics of the 2003 decadal survey on solar and space physics.*

National Academy of Engineering Elects 69 Members and 11 Foreign Associates

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education." One newly elected NAE member for 2013 has served on a Space Studies Board committee:

Vijay Kumar, UPS Foundation Professor, School of Engineering and Applied Sciences, University of Pennsylvania, Philadelphia. For contributions in cooperative robotics, networked vehicles, and unmanned aerial vehicles, and for leadership in robotics research and education. *Kumar served on the Committee on Assessment of Options for Extending the Life of the Hubble Space Telescope.*

150th Anniversary of the National Academy of Sciences

Since 1863, the National Academy of Sciences has provided independent, expert advice on some of the most pressing challenges facing the nation and the world. Founded by a congressional charter signed by Abraham Lincoln, the National Academy of Sciences eventually expanded to include the National Research Council, National Academy of Engineering, and Institute of Medicine. This year we celebrate our 150th year of service to the nation and our continuing commitment to excellence in science, engineering, and medicine.

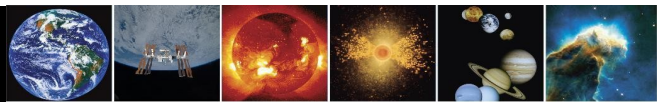
NATIONAL ACADEMY OF SCIENCES
1863–2013
Celebrating 150 Years of Service to the Nation

The National Academies Committee Process from Beginning to End

A video of the study committee process can be found on YouTube .It's a good primer on how our process works. Go to http://www.youtube.com/user/nationalacademies?feature=watch.

Distinctive Voices

This series of videos highlights innovations, discoveries, and emerging issues in an exciting and engaging public forum. Do you wonder how things work? What the future holds? If you are curious about the science and technology behind today's hot topics, Distinctive Voices is for you! Spend an evening gaining insights on significant advances in medicine, biotechnology, energy, the environment, space exploration, and more. Learn from some of the best minds in the world—including members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine—in presentations geared to the general public. Events are held in Irvine, California and Woods Hole, Massachusetts, with videos of past Distinctive Voices events available on the YouTube channel http://www.youtube.com/DistinctiveVoicesBC.



STAFF NEWS

SSB research associate **Lewis Groswald** was selected as a delegate and panelist to the 2013 Space Generation Advisory Council's Fusion Forum. The Fusion Forum is "a U.S. space event highlighting international thinking geared towards university students and young professionals. This event, held in conjunction with the National Space Symposium, aims to gather a selected group of up to 50 top young adults from various areas of space—government, industry, and academia. These intense, interactive panel discussions, moderated by today's international space sector leaders, gather the perspectives of tomorrow's space leaders on today's key space issues." Mr. Groswald served on the "Regional Space Programmes" panel and subsequently won—by vote of his peers—the Fusion Forum MVP Award for his overall participation in the 2-day event. As a result, he will be flown by the AIAA to its Space 2013 conference this September in San Diego to report out on the proceedings of the Fusion Forum. More information on the Fusion Forum and the Space Generation Advisory Council can be found at <http://spacegeneration.org/index.php/component/content/article/724>.

Rodney Howard, a senior program assistant with the SSB since January 2002, left SSB in March. Rodney's committee assignments included the Committee on Astrobiology and Planetary Science (and former standing committees, the Committee on Planetary and Lunar Exploration and the Committee on the Origins and Evolution of Life), as well as the ad hoc committee's that authored the recent reports *Vision and Voyages for Planetary Science in the Decade 2013-2022* and *Assessment of Planetary Protection Requirements for Spacecraft Missions to Icy Solar System Bodies*, among many others. Rodney was particularly popular with committee members and always willing to assist them in any way he could. Rodney, an enthusiastic amateur geologist, was frequently found discussing his interests in rocks, minerals, meteorites, and fossils with committee members and guests. We will miss him and wish him much success in his future endeavors.

Christine Mirzayan Science and Technology Policy Graduate Fellowship Program

Over the years, the SSB has participated in in the Christine Mirzayan Science and Technology Policy Graduate Fellowship Program. For Winter/Spring 2013, however, this program of the Policy and Global Affairs Division of the National Academies is not currently active. More information can be found at <http://sites.nationalacademies.org/PGA/policyfellows/index.htm>.

Lloyd V. Berkner Space Policy Internship

The goal of the Lloyd V. Berkner Space Policy Internship Program is to provide promising students with the opportunity to work in the area of civil space-research policy in the nation's capital, under the aegis of the SSB. We are currently accepting applications for internships for the Autumn 2013 program (see page 3). Information can be found on at <http://sites.nationalacademies.org/SSB/ssb_052239>. Our Summer 2013 Lloyd V. Berkner Space Policy Intern will be Frederick Harrison Dreves, a senior at Vanderbilt University.

Harrison Dreves is currently completing his senior year at Vanderbilt University, where he will receive a B.A. degree with concentrations in the communication of science and technology and Earth and environmental sciences. His academic interests at Vanderbilt have included science policy, climate science, and science communication through video. At Vanderbilt, he served as a senior video producer for student media. Mr. Dreves hopes to pursue a career in science journalism or science policy, working to translate between the scientific community and the public. He is interested in combining his lifelong passion for space exploration (attending Space Camp in Huntsville at age 11) with his interest in science policy at the Space Studies Board this summer, especially to gain insight into the political and economic structures behind space science programs. As a future space science communicator, Mr. Dreves would like to explain how research is funded, how a research target is selected, and, most importantly, why space science research funding matters.

*ASEB staff member **Alan Angleman** welcomed three granddaughters into the family on February 11.*

Space Science Week. Courtesy of D. Day.

SSB STAFF

MICHAEL H. MOLONEY
Director

JOSEPH K. ALEXANDER
Senior Program Officer

ARTHUR A. CHARO
Senior Program Officer

SANDRA J. GRAHAM
Senior Program Officer

IAN W. PRYKE
Senior Program Officer

DAVID H. SMITH
Senior Program Officer

DWAYNE A. DAY*
Senior Program Officer

DAVID LANG*
Program Officer

ABIGAIL SHEFFER
Associate Program Officer

LEWIS GROSWALD
Research Associate

ANDREA REBHOLZ*
Program Associate

DIONNA WILLIAMS
Program Associate

RODNEY N. HOWARD†
Senior Program Assistant

LINDA WALKER
Senior Program Assistant

TANJA E. PILZAK
Manager, Program Operations

CHRISTINA O. SHIPMAN
Financial Officer

CARMELA J. CHAMBERLAIN
Administrative Coordinator

CATHERINE A. GRUBER
Editor

CELESTE A. NAYLOR
Information Management Associate

SANDRA WILSON
Senior Financial Assistant

* Staff of other NRC boards who are shared with the SSB.
† Through March 8, 2013.

CONGRESSIONAL HEARINGS OF INTEREST

The following is provided for information only, as there was no testimony provided on behalf of the National Research Council.

A Review of the Space Leadership Preservation Act
U.S. House of Representatives
Committee on Science, Space, and Technology
Subcommittee on Space Hearing
February 27, 2013

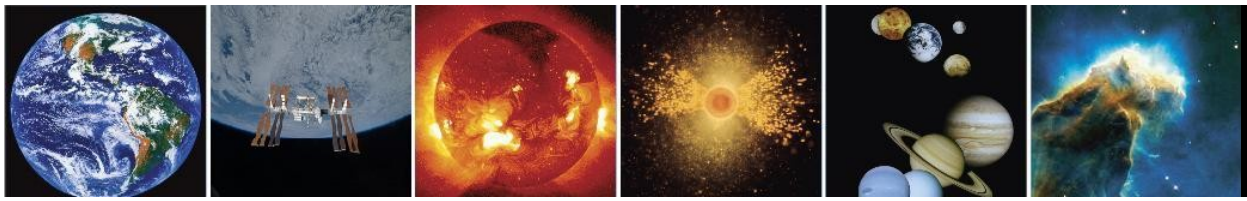
Hearing charter, opening statements, and testimony available at <http://science.house.gov/legislation?type=hearing>

Witnesses: Panel 1—The Honorable Frank R. Wolf, The Honorable John Culberson; Panel 2— Mr. A. Thomas Young, Executive Vice President (Ret.) Lockheed Martin Corporation; Mr. Elliot Pulham, Chief Executive Officer, The Space Foundation

Assessing the Risks, Impacts, and Solutions for Space Threats
U.S. Senate
Committee on Commerce, Science, and Transportation
Subcommittee on Science and Space Hearing
March 20, 2013

Webcast and testimony available at <http://commerce.senate.gov/public/index.cfm?p=Hearings >

Witnesses: Dr. James Green, Director, Planetary Science Division, Science Mission Directorate, NASA; Dr. Ed Lu, Chairman and Chief Executive Officer, B612 Foundation; Mr. Richard DalBello, Vice President, Legal and Government Affairs, Intelsat General; Dr. Joan Johnson-Freese, Professor, National Security Affairs, U.S. Naval War College .



SSB Calendar

APRIL

S	M	T	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY

S	M	T	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE

S	M	T	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/31	24	25	26	27	28	29

April 4-5	Space Studies Board (with ASEB on April 4)	Washington, DC
April 5	Committee on Human Spaceflight (ASEB-led): Public and Stakeholder Opinions Panel	Washington, DC
April 22-24	Committee on Human Spaceflight (ASEB-led)	Washington, DC
May 20-21	Workshop on the Role of High-Power, High Frequency-Band Transmitters in Advancing Ionospheric/Thermospheric Research	Washington, DC
June 19-21	Committee on Human Spaceflight (ASEB-led): Technical Panel	Irvine, CA

Future SSB Meetings

August 8-9, 2013, SSB Executive Committee

November 7-8, 2013, SSB, Washington, DC

April 3-4, 2014, SSB, Washington, DC

November 5-7, 2014, SSB, Irvine, CA

Visit <http://www.nas.edu/ssb> to stay up to date on board, workshop, and committee meetings and developments.

Our meeting facilities

National Academy of Sciences Building
2101 Constitution Ave NW
Washington, DC

Keck Center of the National Academies
500 Fifth St NW,
Washington, DC

Arnold and Mabel Beckman Center of the National Academies
100 Academy Drive
Irvine, CA

J. Erik Jonsson Conference Center
314 Quissett Ave
Woods Hole, MA

SELECTED REPORTS AVAILABLE FROM THE SPACE STUDIES BOARD

For a complete list of titles visit our website at <http://sites.nationalacademies.org/SSB/ssb_051650>

Free PDF versions of all SSB reports
are available online at <http://www.nap.edu>
and on the DVD (listed below)

Hardcopy versions of all SSB reports are available
free of charge from the SSB while supplies last.
To request a hardcopy of a report, send an email to ssb@nas.edu
and include your name, affiliation, mailing address, and
the name and quantity of each report that you are requesting.

- ☐ Space Studies Board Annual Report 2012 (2013)
- ☐ The Space Studies Board 1958-2012: Compilation of Reports (2013) DVD
- ☐ NASA's Strategic Direction and the Need for a National Consensus (2012)
- ☐ The Effects of Solar Variability on Earth's Climate: A Workshop Report (2012)
- ☐ Vision an Voyages for Planetary Science (2012) Booklet
- ☐ Solar and Space Physics: A Science for a Technological Society [prepublication] (2012)
- ☐ The Role of Life and Physical Sciences (2012) Booklet
- ☐ Earth Science and Applications from Space: A Midterm Assessment of NASA's Implementation of the Decadal Survey (2012)
- ☐ Assessment of Planetary Protection Requirements for Spacecraft Missions to Icy Solar System Bodies (2012)
- ☐ Assessment of a Plan for U.S. Participation in Euclid
- ☐ Technical Evaluation of the NASA Model for Cancer Risk to Astronauts Due to Space Radiation
- ☐ Space Studies Board Annual Report 2011 (2012)
- ☐ Report of the Panel on Implementing Recommendations from the New Worlds, New Horizons Decadal Survey (2012)
- ☐ Sharing the Adventure with the Public—The Value of Excitement: Summary of a Workshop (2011)
- ☐ Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era (2011) Book and CD
- ☐ Visions and Voyages for Planetary Science in the Decade 2013-2022 (2011) Book and CD
- ☐ Space Studies Board Annual Report 2010 (2011)
- ☐ Assessment of Impediments to Interagency Collaboration on Space and Earth Science Missions (2011)
- ☐ Forging the Future of Space Science: The Next 50 Years (2010)
- ☐ Panel Reports—New Worlds, New Horizons in Astronomy and Astrophysics (2011)
- ☐ New Worlds, New Horizons in Astronomy and Astrophysics (2010)
- ☐ Controlling Cost Growth of NASA Earth and Space Science Missions (2010) CD Only
- ☐ Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research (2010)
- ☐ Revitalizing NASA's Suborbital Program: Advancing Science, Driving Innovation, and Developing a Workforce (2010)
- ☐ Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies (2010) CD Only
- ☐ An Enabling Foundation for NASA's Space and Earth Science Missions (2010)
- ☐ America's Future in Space: Aligning the Civil Space Program with National Needs (2009)
- ☐ Approaches to Future Space Cooperation and Competition in a Globalizing World: Summary of a Workshop (2009)
- ☐ Radioisotope Power Systems: An Imperative for Maintaining U.S. Leadership in Space Exploration (2009) CD Only
- ☐ Assessment of Planetary Protection Requirements for Mars Sample Return Missions (2009)
- ☐ A Performance Assessment of NASA's Heliophysics Program (2009)
- ☐ Severe Space Weather Events—Understanding Societal and Economic Impacts: A Workshop Report (2008)
- ☐ Launching Science: Science Opportunities Provided by NASA's Constellation System (2008)
- ☐ Satellite Observations to Benefit Science and Society: Recommended Missions for the Next Decade (2008) Booklet

If you are unable to email your request, please send a copy of this form to the address or fax number below. Remember to enter the number of reports you wish to receive in the space to the left of each report.

Space Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
or fax a copy to: 202-334-3701

Name _____ **E-mail** _____

Affiliation _____

Address _____ **City/State/Zip** _____