“The Space Studies Board hasn’t even completed the last decadal survey of the present round, and you’re already worrying about how to do the next round?”

—Charles Kennel, Chair, SSB

From the Chair 2
Director’s Corner 3
SSB Membership 3
Space Studies Board and Chinese Academy of Sciences Meeting 4
Lloyd V. Berkner Space Policy Internships 5
The Planetary Science Decadal Survey: Preliminary Outcomes 6
SSB Activities 8
SSB Member News 10
Report News 10
Seeking Nominees for COSPAR Awards and Medals 11
Staff News 12
SSB Staff 12
SSB Calendar 13
Selected Reports Available from the SSB 14
FROM THE CHAIR

Time to Reflect on the Surveys

The Space Studies Board hasn’t even completed the last decadal survey of the present round, and you’re already worrying about how to do the next round? Haven’t we enough problems just getting through the present decade? Why, we haven’t even achieved top priorities from ten years ago!

The Space Studies Board will devote an entire workshop in November 2012 to the lessons learned from the present round of decadal surveys while our memories are still fresh. I can already predict some of the issues people will want to discuss.

The recent astronomy and astrophysics decadal survey, *New Worlds New Horizons in Astronomy and Astrophysics*, pioneered the use of an independent cost assessment and technical evaluation (CATE) as an additional criterion for evaluation of scientific missions. Subsequently, the decadal survey for planetary science, *Visions and Voyages for Planetary Science in the Decade 2013-2022*, adapted the CATE process to its needs, and the ongoing survey of solar and space physics has done likewise. By November, it will be time to review how well the CATE process worked in these different contexts.

Did CATE promote greater credibility with Congress? With NASA? Did it take up too much time? Are there more efficient ways to generate and manage CATE information? How did using CATE support the decadal survey committee’s main responsibility to identify the best science? Did we overlook emerging opportunities whose cost cannot yet be estimated? In the effort to produce financially credible program architectures, fewer missions could be given high priority—Were the budgetary scenarios used to down-select mission recommendations realistic? Haven’t budget predictions already proven unrealistic? How can the surveys’ decision rules deal with such major alterations in budget outlook? How should the SSB and its committees steward the decadal surveys in the off-years?

A related issue: Is it time to reconsider how we treat flagship missions? Their cost, schedule, and technical risks are high, by definition, and overruns and delays can compromise entire disciplinary programs. Should we advocate that flagship missions have significantly larger contingency budgets? NASA has had to make the James Webb Space Telescope an agency-wide priority—Does this mean that in the future not every discipline can expect a flagship mission in its decade, that all flagships should be managed at the agency level? If so, how should SSB choose priorities among the flagships recommended by its decadal surveys?

International collaboration is becoming a necessity in more and more areas. In many cases, we seek international collaborators when we find we cannot afford a mission we would love to have. We may not have planned the missions with the special capabilities of potential partners in mind—Would we get a scientifically stronger result if we plan certain missions and programs at the international level from the beginning? If so, should decadal surveys identify international mission opportunities separately? Should decadal surveys review the plans of other nations and inquire about collaboration opportunities? Should survey committees include international members as a matter of policy?

One final thought: Dwight Eisenhower once said, “plans are worthless, but planning is everything.” By that I suppose he meant that even in the fog of battle, everyone still knows what he should be trying to do. It is that way with the decadal surveys, too? Certainly, our workshop in the fall of 2012 will be an interesting dialogue on these topical and important questions.
A look across the success stories of NASA’s science missions in recent years clearly results in an easy conclusion. International collaboration has been a key element to our nation’s success in space science. Indeed this has been a topic of discussion in several NRC-related studies, including our recent decadal surveys, meetings of the SSB, our collaboration with the European Space Sciences Committee and COSPAR, and discussions held with colleagues at JAXA, ESA, and the Chinese Academy of Sciences (see p. 4).

The role of international collaborations has been highlighted as key to the future of U.S. space science in all three of the recently completed decadal surveys. But the other elements of international collaboration, in addition to the successful science story of the past, are the challenges and opportunities the future holds. For example, the New Worlds New Horizons report commented that:

For much of the 20th century, research in astronomy was dominated by the United States. Today, the globalization that has influenced so many facets of our society is transforming astronomy as well.…… Over the past 50 years astronomy has expanded dramatically in Europe, which has achieved parity with the United States in many areas, as well as in Australia. A similar, more recent expansion in Asia—Japan and China in particular—is likely to influence the future of our subject for decades to come.…… South America also continues to increase its impact on the field, and South Africa is becoming a presence. In this new era it is imperative that planning for the U.S. research enterprise be done in an international context. We all share one sky and similar science agendas, and there are significant gains to be made by increasing international coordination and cooperation. This is a challenging task, because our early leadership means that many U.S. researchers, institutions, funding agencies, and policy makers are unaccustomed to long-range scientific planning with an international perspective.

It is clear that as a community a considerable effort is needed to find approaches for overcoming challenges in international collaboration such as:

- Aligning the science-priority-setting processes within and between national communities of space scientists,
- Aligning the diverse decision-making processes undertaken by individual agencies at the national and international level,
- Coordinating programs in space science rather than collaborating solely on a mission-by-mission basis,
- Planning modes of collaboration that go beyond the cost-sharing on construction, launch, and operations and cover strategic allocation of observing time and data sharing, and
- Minimizing the cost of collaboration.

These are just some of the questions facing us as a community, and the challenges are made only more evident by the certainty of continued fiscal restraint being endured across the globe. But they are challenges worth meeting. Specific examples of how some of these challenges impacted the conduct of the recently completed planetary science decadal survey can be found in the article by David H. Smith on page 6 of this newsletter.

If as a global community we are to realize the promise of building on the success of major missions such as the Hubble Space Telescope and Cassini, we will need to collaborate on missions that will cost on the order of $5 billion. But success is imperative so that we can continue to expand our scientific understanding of our solar system, galaxy, and the expanding cosmos that surrounds us.
Space Studies Board and Chinese Academy of Sciences Meeting

Representatives of the Chinese Academy of Sciences (CAS) met with Space Studies Board (SSB) Chair Charles Kennel and SSB staff to initiate a dialogue between the two organizations on matters related to space science. The two groups met at the National Academies’ Keck Center on October 12, 2011. The Chinese delegation was led by CAS Vice President Yin Hejun and included Wu Ji (Director General, National Center for Space Science Research and Application), Yu Yingjie, (Director General, Bureau of High Tech Research and Development), Jinghua Cao (Deputy Director General, Bureau of International Cooperation), and Feng Kai (Bureau of International Cooperation).

On arrival the CAS delegation was welcomed to the National Research Council (NRC) by National Academy of Sciences (NAS) President Ralph Cicerone and NAS Foreign Secretary John Bohright. Following introductory remarks from SSB Director Michael Moloney and Charles Kennel, CAS Vice President Yin gave a historical overview of the Academy and its role in Chinese scientific and technological research and policymaking. One interesting difference between CAS and NAS/NRC is that the former plays two roles: one similar to the advisory role that the NAS/NRC has with the U.S. government, and another role as an innovator and implementer of basic and applied research activities. In essence, CAS is almost an equivalent to the NAS/NRC, combined with the National Science Foundation, the National Institute of Standards and Technology, and elements of NASA.

Following the introductory comments, Wu Ji outlined China’s plans for space science activities through 2020. China’s goals in space science over the next decade or two has two themes: How did matter originate (universe and life) and how does it evolve and move? and What is the relationship between the solar system and human beings? To accomplish this, the Chinese have outlined an ambitious program of space-based platforms for conducting science.

China’s current 5-Year Plan includes the following spacecraft:

- **Hard X-ray Modulation Telescope (HXMT)**—The scientific objective will be to conduct a hard X-ray full-sky survey that will diffuse background and cosmic variance and discover highly obscured supermassive black holes.
- **Recoverable Satellite for Space Microgravity and Space Life Science (SJ-10)**—This satellite will have nine experiments onboard the orbiting capsule and 11 aboard the reentry capsule. Experiments will be conducted in biotechnology, biological effects of gravity, biological effects of space radiation, fundamental physics, materials science, microgravity combustion, and microgravity fluid physics.
- **Quantum Experiments at Space Scale (QUESS)**—The scientific objectives include accomplishing the first satellite-to-ground secure communication with the core of quantum, conduct the first satellite-to-ground quantum entanglement distribution and test Bell’s inequality, investigate the possibility of achieving satellite-to-ground quantum teleportation experiment, and establish a wide-area quantum communication network.
- **Dark Matter Particle Detection Satellite**—This satellite will find and study dark matter particles, the origin of cosmic rays, and the propagation and acceleration mechanism of cosmic rays.

(Continued on page 5)
• **KUAFU**—This constellation of three spacecraft will observe the complete chain of disturbance from the solar atmosphere to geo-space. Right now, the Chinese are looking for partners to commit to building the second and third spacecraft in the constellation. Once those deals are secured, they will be construction of their own KUAFU-A.

Beyond these approved missions, the Chinese have a number of proposed activities they hope to initiate through 2020. These include exploration of magnetosphere-ionosphere-thermosphere coupling, a solar polar orbit radio telescope (similar to a Ulysses-type solar polar orbit), and a space millimeter-wave VLBI experiment. They are also involved in the Phobos-Grunt mission led by Russia, where China will piggy-back their “Ying Huo-1” (YH-1) microsatellite with the Phobos-Grunt payload. China’s Mars exploration plans begin with YH-1 and expand to include an as-yet-undefined orbiter, lander, and rover missions.

SSB Senior Program Officer David H. Smith gave the CAS representatives an historical overview of the NAS and NRC, explaining how the organization came into existence and the services it provides to the U.S. government, as well as how the NRC study process works. Dr. Smith and other study directors present, including Sandra Graham and Arthur Charo, also gave overviews of past and current studies that the SSB is conducting, which proved to be of great interest to the CAS representatives.

The differences and similarities between the NAS/NRC and CAS were illuminating, and Vice President Yin made it clear that China is interested in greater international cooperation and mentioned plans for joint space projects with France, Germany, Brazil, Russia, and others. He also emphasized the necessity of strategic analysis and consulting performed at the international level, rather than just the national level, as is the current practice.

Vice President Yin also stressed his organization’s desire for greater dialogue between CAS and the SSB. Both parties agreed that increased communication would benefit both sides and would provide a foundation of understanding for future SSB studies.

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**LLOYD V. BERKNER SPACE POLICY INTERNSHIPS**

**WE ARE CURRENTLY ACCEPTING APPLICATIONS FOR INTERNSHIPS FOR THE SUMMER 2012 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 undergraduates for its summer 2012 program. The deadline for applications is February 3, 2012. Successful candidates will be contacted no later than March 2, 2012.

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 physics, astronomy, chemistry, biology, or geology (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, world wide web and basic research techniques (familiarity with Microsoft Word and 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](http://sites.nationalacademies.org/SSB/ssb_052239) to learn more about the internship program and to get application information.
The Planetary Science Decadal Survey: Preliminary Outcomes

David H. Smith
Study Director, Planetary Science Decadal Survey

The planetary science decadal survey report, Vision and Voyages for Planetary Science in the Decade 2013-2022, was released to the planetary science community and the general public on March 7 during a special session at the 42nd Lunar and Planetary Science Conference. Since then, the survey report has met a generally favorable reception from its principal audience—i.e., NASA, the National Science Foundation, the Office of Management and Budget (OMB), the Office of Science Technology Policy, congressional committees, and the scientific community. However, the true influence and effectiveness of this survey, and all the others, will only be able to be judged in hindsight. A time span of just 6 months is too short to make any profound statements. Three specific items do, however, stand out as being potentially important indications of the report success to date. These include the following:

- The NASA-European Space Agency (ESA) deliberation on future Mars exploration activities,
- The rescoping of plans for the Jupiter Europa Orbiter (JEO), and
- The adoption of the Aerospace Corporation’s cost and technical evaluation (CATE) methodology by NASA.

Mars Exploration Program

Several weeks prior to the release of Vision and Voyages, President Obama had sent his proposed budget for fiscal year (FY) 2012 to Congress. The out-year budget projections showed a significant decline in the funds likely to be available for space science activities relative to the notion budget the decadal survey committee had been given by NASA in 2009. The budget decrease was not unexpected, and so the committee had included decision rules to accommodate just this eventuality. These rules provided a decision tree to guide NASA’s implementation of the survey’s recommendations concerning large, medium, and small missions and related research and technology development activities in the event that actual budgets deviated significantly from those assumed.

On July 29, NASA’s formal response to the decadal survey report was sent to the SSB. The cover letter commented that the survey report’s “innovative decision tree provisions for future flagship missions have already made a central contribution to decision making in our Mars Exploration Program” —the context being that the budgetary situation was no longer consistent with the existing plans for NASA-ESA cooperation on the 2016 Mars Trace Gas Orbiter and the 2018 MAX-C/ExoMars missions. Instead of having some $2.5 billion to contribute to the 2018 mission, NASA estimated that it had at most ~$1 billion.

Meanwhile, ESA learned that the estimated cost of its contributions to the 2016 and 2018 Mars missions was likely to exceed their €1 billion cost cap. Something had to give, and it was the plan to deliver two rovers to Mars in 2018. By combining resources, the two agencies might have enough to send a single NASA-ESA rover to Mars in 2018 and still have funds left for the Mars Trace Gas Orbiter in 2016.

But, it turned out that NASA was still short on its contribution to the joint program. Having followed the first of the decadal survey’s decision rules—descope or delay flagship—NASA needed to look elsewhere for the funds to fill the shortfall. The second decision rule said that changes to the New Frontiers or Discovery programs should be made only if adjustments to flagship missions cannot solve the problem. Enough funds could be found if NASA slightly delayed the anticipated schedule for the release of the Announcements of Opportunity for the next Discovery and/or New Frontiers missions.

Since then additional threats have arisen to the joint NASA-ESA Mars program. These include growing concern in the United States about the ballooning federal deficit and the seeming inevitability of draconian cuts to federal spending, the euro crisis in Europe, the cost overruns incurred by the James Webb Space Telescope, and the apparent reluctance of OMB to commit to even the first phase of a multibillion dollar Mars sample return campaign.

Jupiter Europa Orbiter

The large gap between the project-team’s $3.4 billion (FY2015) estimate of the cost of JEO and the CATE estimate of $4.7 billion (FY2015) was a revelation. The JEO mission had been studied extensively prior to the initiation of the decadal survey. Nevertheless, there was no way NASA’s budget could accommodate a mission of this cost. Following the release of Vision and Voyages, NASA instructed the JEO team to “examine descoped, lower-cost missions focused only on Europa science objectives.” Current efforts focus on splitting the large and complex JEO into two smaller and significantly less costly spacecraft. One spacecraft would be a minimal orbiter capable of addressing those science goals that can only be achieved by placing a spacecraft in orbit about Europa. These goals would include, for example, observing the tidal deformation of Europa’s surface via laser altimetry. Other science
goals would be performed by a second spacecraft that is in orbit about Jupiter. Frequent flybys of Europa by such a Jupiter orbiter are thought to be sufficient to address science goals requiring high-resolution imaging and spectroscopic studies.

NASA plans to release the preliminary results of the descope options to the Outer Planets Assessment Group and the NASA Advisory Council’s Planetary Science Subcommittee in October 2011. Additional studies of these or other concepts are currently scheduled for 2012. If NASA’s Mars exploration ambitions do not come to fruition, then a reborn Europa mission may be waiting in the wings.

Adoption of the CATE Methodology by NASA

The CATE methodology has now been employed by two decadal surveys: for planetary science and for astronomy and astrophysics. Moreover, the Aerospace Corporation’s CATE team is currently supporting the ongoing solar and space physics (helio-physics) survey.

Since the release of Vision and Voyages in March 2011, NASA headquarters has commissioned the Aerospace Corporation to perform additional CATE analyses on the Wide Field Infrared Survey Telescope—the first priority flagship mission in the most recent astronomy and astrophysics survey—and on 2018 Mars sample-caching rover concepts. In addition, the Jet Propulsion Laboratory has engaged the Aerospace Corporation to undertake CATE analyses of various JEO descope options.

The detailed discussion of the CATE approach in Vision and Voyages, combined with the use of robust, CATE-triggered decision points, appears to have been well-received by NASA and has caused changes in their approach to mission planning.

Preliminary Lessons Learned

Work on the planetary science decadal survey began in the summer of 2008, and approximately 6 months of additional effort are needed to conclude all of its various aspects. The final glossy, printed version of Vision and Voyages should be available in November 2011. NASA also requested that the survey draft and publish a lavishly engaging, full-color, illustrated summary version of Vision and Voyages for a general audience. Work on this project is ongoing and the summary report should be available early in 2012. Remaining efforts focus on dissemination of the results of the study.

Lessons learned concerning the organization and activities of the planetary science decadal survey have already been passed on to the ongoing survey in solar and space physics. Three specific lessons cannot be implemented in the short term but should be foremost in the minds of the organizers of future decadal surveys.

First, the timing of the decadal survey relative to mission-selection exercises on both sides of the Atlantic was not optimal. NASA was in the process of procuring the third New Frontiers mission when the committee was at work. The selection of OSIRIS-REx asteroid sample return mission came after the public release Vision and Voyages in March 2011. The survey committee was handicapped by its ignorance of the identity of a major planetary science mission to be conducted during the decade under study. Similarly, the survey’s activities related to future New Frontiers activities were somewhat constrained so as to avoid the impression that the committee was trying to influence the ongoing selection. Similarly, the committee’s activities would have been somewhat easier to manage if it had known that the Jupiter Ganymede Orbiter (also known as Laplace or the Jupiter Icy Moon Explorer) was or was not to be ESA’s first L-class mission.

Second, the mission studies conducted at the committee’s request by JPL, APL, GSFC and other design centers represented a significant step in efforts to enhance the technical realism of the decadal survey process. But conducting these studies in the middle of the survey significantly contributed to the time it took to undertake the study. In addition, the time committee members devoted to the conduct of the studies themselves might, arguably, have been better spent in other ways. A better process might be for NASA to hold an open competition for opportunities to conduct mission studies 12 to 18 months prior to the initiation of the survey. The results of these studies would then be assessed by the survey committee. Such an approach would give the scientific community a more direct role in defining concepts for the survey to assess.

Third, the planetary science community is broadly international in composition. NASA no longer has a monopoly on solar system exploration activities. NASA and ESA’s future mission plans are already closely entangled and this trend is not likely to be reversed. The inclusion of international participants on the steering committee, the panels, and the peer-review team added greatly to the survey. But much, much more could be done. The addition of a Canadian here or a European there on future survey committees will not be sufficient. Thoroughly international teams of scientists and engineers commissioned by multiple agencies to advise on the creation of international programs will almost certainly be required.

Notes and References

4 Personal communication, Russell R. Persinger, the Aerospace Corporation, August 18, 2011.
SSB ACTIVITIES

THE BOARD AND ITS STANDING COMMITTEES

The Space Studies Board (SSB) did not meet during this quarter; however, the SSB executive committee (XCOM) did meet on August 18-19 at the Birch Aquarium at the Scripps Oceanographic Institute in La Jolla, CA, for its annual strategic planning session. The XCOM met with Carl Wieman (OSTP), Marc Allen (NASA), and Jeff Bingham (Senate Staff) to get views from their stakeholders. This session included a discussion on the impacts of recent reports, future areas of study for the board, and the role of the board and standing committees. The members also discussed lessons learned and impacts from the decadal surveys, the midterm assessments of the decadal survey process, and the cost and technical risk assessments that have been done for the recent decadal surveys in the context of a workshop to be held in 2012. The XCOM was briefed by Wendy Kohrt, co-chair for the Decadal Survey on Biological and Physical Sciences in Space, on the impacts of the report Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era and by Ann Karagozian on the USAF Scientific Advisory Board report The Future of Launch Vehicles for the U.S. Air Force. XCOM members were also briefed by SSB staff member Sandra Graham on the plans for a generational study on the human spaceflight program, which will be done with the Aeronautics and Space Engineering Board.

The SSB will meet next on November 8-9, 2011, at the National Academies’ Arnold and Mabel Beckman Center, in Irvine, CA.

The Committee on Astronomy and Astrophysics (CAA) is currently on hiatus following the astronomy and astrophysics decadal survey. The NRC is preparing to stand up the committee in the months ahead.

The Committee on Earth Studies (CES) did not meet during this quarter; however, several members of the committee are serving on an ad hoc committee that is assessing Earth science programs at NASA at the mid-point of the decadal survey cycle (the first NRC decadal survey in Earth science, Earth Science and Applications from Space, was published in 2007). The Committee on Earth Studies has been renamed the Committee on Earth Sciences and Applications from Space. The NRC is preparing to stand up this new committee in the months ahead.

The Committee on Planetary and Lunar Exploration (COMPLEX) was disestablished on September 18, 2011. Responsibility for planetary science activities will be transferred to the SSB’s proposed new Committee on Astrobiology and Planetary Science.

The Committee on the Origins and Evolution of Life (COEL) was disestablished on September 18, 2011. Responsibility for astrobiology will be transferred to the SSB’s proposed new Committee on Astrobiology and Planetary Science.

The Committee on Astrobiology and Planetary Science (CAPS) is a new activity combining the responsibilities formerly exercised by COMPLEX and COEL. Pending NRC approval, the co-chairs and members of CAPS will be identified and appointed in the final quarter of 2011. It is anticipated that the committee’s first meeting will occur during the first or second quarter of 2012.

The Committee on Solar and Space Physics (CSSP) is on hiatus until the completion of the solar and space physics (heliophysics) decadal survey. The committee will be stood up again in the spring of 2012.

STUDY COMMITTEES

An edited and final version of the prepublication report issued late last year from the ad hoc Committee on the Assessment of Impediments to Interagency Cooperation on Space and Earth Science Missions was completed. On June 7 the committee co-chairs, Daniel Baker, University of Colorado, and D. James Baker, William J. Clinton Foundation, gave a second briefing of the findings of the report to staff of the White House Office of Science and Technology Policy and the Office of Management and Budget. The final report is available at http://www8.nationalacademies.org/catalog.php?record_id=13042.

The ad hoc Committee on the Assessment of NASA’s Earth Science Program was formed to review the alignment of the NASA Earth Science Division’s program with previous NRC advice, primarily the 2007 NRC decadal survey report, Earth Science and Applications from Space. In carrying out this study, the committee is directed to neither revisit nor alter the scientific priorities or mission recommendations provided in the decadal survey and related NRC reports; however, the committee may provide guidance about implementing the recommended mission portfolio in preparation for the next decadal survey. The committee began work in March 2011 and held meetings on April 27-29 in Washington, DC; on July 6-8 in Seattle, WA; and on September 21-23 in Irvine, CA. No further in-person meetings are to be held, but the committee is continuing its discussion, deliberation, and report development. Delivery of a prepublication version of the committee’s report is scheduled for January 31, 2012. For more information, go to http://www8.nationalacademies.org/cp/projectview.aspx?key=49354.

(Continued on page 9)
The report of the Committee for the Decadal Survey on Biological and Physical Sciences in Space, Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era, completed primary editing during this period and entered publication formatting and review. Final publication of the report is anticipated in the fourth quarter.

Many activities occurred this quarter in connection with the second Decadal Strategy for Solar and Space Physics (Heliophysics), including the penultimate meeting of the survey steering committee in Irvine, CA on August 29-31, 2011. Among the highlights of the meeting were briefings by the Aerospace Corporation, which is operating under contract to the NRC, on the final results of a cost and technical analysis of survey-developed mission concepts. During this quarter, the survey’s three study committees and five informal working groups also continued their work. In addition, the steering committee created several splinter study groups to address particular subjects of interest. In response to a request from NASA, the survey also broadened its workplan to include explicit consideration of “decision rules” relevant to the Solar Probe Plus (SPP) mission, which is currently planned for a 2018 launch. On August 11, 2011, the survey’s study group on SPP met in Washington, DC, and received briefings from agency officials; SPP project and program scientists, many of whom are working at Johns Hopkins Applied Physics Laboratory; and all of the SPP instrument principal investigators. As the quarter ended, the three study panels were finalizing their submissions to the steering committee, as were the working groups and study groups. Preparations were also underway for the steering committee’s sixth and final meeting, which will take place in Irvine, CA, on November 16-18, 2011. The survey remains on schedule to deliver a prepublication version of its report by March 31, 2012; however, work on the additional tasks associated with the SPP mission could result in a short delay. More information about the survey is available at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_056864.

The ad hoc Committee on Planetary Protection Standards for Icy Bodies in the Solar System is developing recommendations for planetary protection standards for future spacecraft missions, including orbiters, landers, and subsurface probes, to the icy bodies in the outer solar system. The committee has completed all of its scheduled meetings. A complete draft of the report was assembled during the summer months. The draft was iterated by the committee in the late-summer/early-autumn and will be sent to external reviewers in mid-October. Delivery of a final NRC-approved document to NASA is scheduled for February 2012.

The Planetary Science Decadal Survey issued a prepublication draft of its report, Vision and Voyages for Planetary Science in the Decade 2013-2022, completed its initial dissemination activities, and is currently focused on the preparation of the text for publication, which is scheduled for November 2011. Papers on the survey’s origin, organization, and outcome and on the survey’s public outreach activities were delivered by NRC staff at the International Astronautical Congress (Cape Town, South Africa) and at the Division for Planetary Sciences of the American Astronomical Society (Nantes, France), respectively. An illustrated version of the survey report intended for a popular audience is currently in preparation and is currently scheduled for publication early in 2012.

The Committee for Evaluation of Space Radiation Cancer Risk Model met twice during this period, and both meetings were held in Washington, DC. On August 3-5 the committee met to discuss and assess component modules in the NASA risk model for radiation-induced cancer in astronauts and to draft and revise sections of the committee report. One open session was held on the second day of the meeting, in which committee members closely questioned NASA radiation scientist Francis Cucinotta regarding aspects of the proposed model and saw a demonstration of the integrated model’s desktop graphical user interface. At the close of the meeting the committee submitted additional questions of clarification to NASA and set writing assignments and schedules. The committee held its final planned meeting on September 12-14, at which time it reviewed the recently published final version of the NASA model, along with a number of resource materials it had requested from NASA. During the meeting the committee reviewed and extensively revised the integrated draft of the report and worked to develop its final conclusions and recommendations. Following the meeting, committee members continued to refine sections of the report and develop summary materials in preparation for external review.

Workshop details for Sharing the Adventure with the Public: The Value and Excitement of "Grand Questions" of Space Science and Exploration can be found on the SSB Web site at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_057195, along with videos of each session. A workshop summary is expected in November.

The workshop for The Effects of Solar Variability on Earth’s Climate was held on September 8-9 in Boulder, CO. About 50 scientists attended the event each day. Sessions included The Sun—Past and Present and The Sun-Climate Connection, parts 1 and 2. The committee is currently drafting the workshop summary, which will be available in Spring 2012. The workshop agenda and abstract booklet is available at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_061983.

OTHER ACTIVITIES

The next scientific assembly of the Committee on Space Research (COSPAR) will be held in Mysore, India, on July 14-22, 2012. The 2014 assembly will be held in Moscow, Russia. COSPAR is seeking nominees for COSPAR awards and Medals (see page 11 of this newsletter).

On behalf of the Space Studies Board and the Aeronautics and Space Engineering Board, Michael Moloney attended DARPA’s 100 Year Starship conference on September 30-
October 1; Abigail Sheffer attended the European Planetary Science Congress-Division for Planetary Science of the American Astronomical Society (EPSC-DPS) Joint Meeting in Nantes, France, on October 2-7; and David Smith presented at the 62nd International Astronautical Congress in Cape Town, South Africa, October 3-7.

In partnership with other boards, SSB will exhibit at several upcoming conferences this fall.

Look for our booth at
- American Geophysical Union Fall Meeting, San Francisco, CA, December 5-9, 2011
- American Astronomical Society, Austin, TX, January 8-12, 2012
- AIAA, Nashville, TN, January 9-12, 2012

Selected staff will attend the American Meteorological Society meeting in New Orleans, LA, January 22-26, 2012.

SSB MEMBER NEWS

Space Studies Board member Yvonne C. Brill, RCA Astro Electronics (retired), received the 2010 National Medal of Technology and Innovation—the highest honor bestowed by the United States government on scientists, engineers, and inventors—from President Obama on October 21, 2011. Dr. Brill was honored for innovation in rocket propulsion systems for geosynchronous and low Earth orbit communication satellites, which greatly improved the effectiveness of space propulsion systems.

Credit: Ryan K Morris, National Science and Technology Medals Foundation.

REPORT NEWS

From the Board on Physics and Astronomy and the Space Studies Board—

A richly-illustrated 30-page booklet, titled 2020 Vision: An Overview of New Worlds, New Horizons in Astronomy and Astrophysics, is now available at http://sites.nationalacademies.org/BPA/BPA_064932. The booklet describes the science and the high-priority projects discussed in the 2010 astronomy and astrophysics decadal survey, New Worlds, New Horizons in Astronomy and Astrophysics. Survey chair Roger Blandford, executive officer Lynne Hillenbrand, and members Michael Turner and Debbie Elmegreen worked closely with NRC staff and consultants Hugh van Horn, Michael Specian, and Shannon Thomas to produce the booklet. The booklet is intended for policymakers, the general public, the media, and young students interested in science, and astronomy, in particular. It will be distributed to high schools across the country and made available for free. To order a booklet, please contact the Board on Physics and Astronomy.
Seeking Nominees for COSPAR Awards and Medals

COSPAR, the Committee on Space Research of the International Council for Science, is seeking candidates to be nominated for COSPAR awards and medals, which recognize the outstanding achievements of space scientists throughout the world. The awards will be presented at the 39th COSPAR Scientific Assembly, to be held in Mysore, India, on July 14-22, 2012.

It is important to honor the contributions of your colleagues. Please take a moment to consider nominees for the following awards and medals:


**COSPAR International Cooperation Medal** is awarded to a scientist (or group of scientists) who has made distinguished contributions to space science and whose work has contributed significantly to the promotion of international scientific cooperation. Recent recipients include: L.-L. Fu and Y. Mérand (2010), M.A. Geller (2008), R. A. Greenwald (2006), S.S. Holt (2004), A. Brack (2002) and J.H. Carver (2000).


**COSPAR Distinguished Service Medal** serves to honor extraordinary services rendered to COSPAR over many years. Recent recipients include: M.A. Shea (2010), I. Révah (2008) and S. Grzedzielski (2001).


**Jeoujang Jaw Award** is bestowed by the Chinese Academy of Sciences and is intended to recognize scientists who have made distinguished pioneering contributions to promoting space research, establishing new space science research branches, and founding new exploration programs. Past recipients are C.T. Swift (2010) and J.L. Burch (2008).

**Zeldovich Medal** is conferred by the Russian Academy of Sciences to scientists, under 36 years of age on the last day of 2011, for excellence and achievements. Medals are presented to a scientist in each of COSPAR’s Scientific Commissions. Recipients of the 2010 Zeldovich Medals are: P.I. Palmer (Scientific Commission A); A.A. Fedorova (Scientific Commission B); J. Lei (Scientific Commission C); Y. Narita (Scientific Commission D); V. Sguera (Scientific Commission E); O.A. Gusev (Scientific Commission F); J. Shiomi (Scientific Commission G) and J.W. Conklin (Scientific Commission H).

Additional details concerning the awards, together with instructions and nomination forms, can be found at [http://cosparhq.cnes.fr/Awards/awards.htm](http://cosparhq.cnes.fr/Awards/awards.htm). Completed nominations forms must be received by the COSPAR Secretariat in Paris no later than November 30, 2011. Questions can be addressed to David H. Smith, executive secretary of the U.S. National Committee for COSPAR, at dhsmith@nas.edu.
STAFF NEWS

Lloyd V. Berkner Space Policy Internship

During this quarter the Lloyd V. Berkner Space Policy Internship Program welcomed Danielle Piskorz (Massachusetts Institute of Technology) as a participant in its 2011 autumn program and said good-bye to our 2011 summer interns Rachael Alexandroff and Katie Daud.

The goal of the 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. Additional information on the program can be found in this newsletter and at http://sites.nationalacademies.org/SSB/ssb_052239.

Christine Mirzayan Science and Technology Policy Graduate Fellowship Program

We are happy to welcome Anna Williams as the SSB’s Fall 2011 Mirzayan Fellow. The Christine Mirzayan Science and Technology Policy Graduate Fellowship Program within the Policy and Global Affairs Division of the National Academies is designed to engage its fellows in the analytical process that informs U.S. science and technology policy. Fellows develop basic skills essential to working or participating in science policy at the federal, state, or local levels. More information about the fellows program can be found at http://sites.nationalacademies.org/PGA/policyfellows/index.htm.

Anna Williams received her Ph.D. in organic chemistry from Northeastern University. Dr. Williams’s doctoral work focused on the inhibition of protein-protein interactions between nuclear receptors and coactivator proteins, which are known to play a key role in a number of pathologies including hormone responsive cancers. Another aspect of her work was in the development of synthetic methodology towards the efficient radiolabelling of compounds of known biological activity for use as radioactive tracers. Prior to her graduate work, Dr. Williams received her bachelor’s degree in chemistry with a minor in philosophy from Dickinson College, where she became particularly interested by the interface that science shares with the public sphere.

Division on Engineering and Physical Sciences

10th Annual Staff Achievement Awards

SSB staff members were honored at the 10th Annual DEPS Staff Achievement Awards on July 12. David H. Smith received the Sustained Excellence Award and Chris Shipman and Sandra Wilson were honored as part of the Project Integrate–PeopleSoft Transition Team that received the Special Project Award.

National Academies

2011 Staff Awards & Staff Appreciation Day

On October 10 SSB staff member Tanja Pilzak received an Individual Distinguished Service Award for her role as manager of program operations for the Aeronautics and Space Engineering Board and the Space Studies Board, where she is an outstanding behind-the-scenes leader who has repeatedly demonstrated her dedication, attention to detail, diplomacy, and unfailingly cheerful disposition. Unflappable during crises, she is always willing to help resolve urgent matters and volunteer for projects with tight deadlines.

Christine Mirzayan Fellow

ANNA WILLIAMS

*Staff of other NRC boards who are shared with the SSB
SSB MEETINGS

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November 7  
*Space Studies Board and Board on Physics and Astronomy Joint Meeting—Irvine, CA*

November 8-9  
*Space Studies Board—Irvine, CA*

November 16-18  
*Decadal Survey on Solar and Space Physics (Heliophysics): Steering Committee—TBD*

FUTURE SSB MEETINGS

April 4-5, 2012, in Washington, DC (April 4 joint with ASEB)  
August 7-8, 2012, Woods Hole, MA (Executive Committee)  
November 12-14, 2012, Irvine, CA  
April 4-5, 2013, Washington, DC  
November 7-8, 2013, Irvine, CA
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 <www.nap.edu>.
(Search for available titles then click the blue “Sign in” button to download a free PDF version of the report.)

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

☐ Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era (2011, prepublication)
☐ Visions and Voyages for Planetary Science in the Decade 2013-2022 (2011, prepublication)
☐ The Space Studies Board 1958-2011: Compilation of Reports (2011) DVD Only
☐ 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)
☐ 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)
☐ Assessment of Planetary Protection Requirements for Mars Sample Return Missions (2009)
☐ A Performance Assessment of NASA’s Heliophysics Program (2009)
☐ Launching Science: Science Opportunities Provided by NASA’s Constellation System (2008)
☐ Ensuring the Climate Record from the NPOESS and GOES-R Spacecraft: Elements of a Strategy to Recover Measurement Capabilities Lost in Program Restructuring (2008)
☐ Assessment of the NASA Astrobiology Institute (2008)

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

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WWW.NATIONALACADEMIES.ORG/SSB/ VOLUME 22, ISSUE 3