

October 2013

Aeronautics and Space Engineering Board News



Welcome to the latest installment of the ASEB News! This newsletter will update you on ASEB events and activities, as well as policy items of interest to the aerospace community.

Inside this issue

Committee News	1
From the Chair	2
Calendar	3
Committee News	3
IAA Conference	4
Staff News	4

Committee News

Human Spaceflight Study. The Human Spaceflight Committee met in Washington, DC, on April 22-24 and in Woods Hole, MA, on July 24-26. The committee discussed issues related to human spaceflight in low Earth orbit and beyond with experts from the White House, NASA, the Federal Aviation Administration, academia, the European Space Agency, and Roscosmos. The scope of these discussions included the supporting roles played by robotic space missions and commercial space endeavors. The committee also heard progress reports from the Technical Panel and the Public and Stakeholder Opinions Panel, which are supporting the committee, and it deliberated on rationales for human spaceflight and the outline for the committee's final report. During June and July, the committee also solicited input papers from any interested parties. The purpose of these papers was to broaden the scope of the committee's information-gathering process, particularly with regard to the benefits and challenges of human spaceflight and the domestic and global ramifications if the United States terminated NASA's human spaceflight program. Papers submitted to the committee can be downloaded from <http://www8.nationalacademies.org/aseboutreach/publicviewhumanspaceflight.aspx>. During the period, several members of the committee also conducted scheduled site visits to Johnson Space Center, the Kennedy Space Center and the Marshall Space Flight Center. The committee's next meeting will take place on October 21-23 in Washington, D.C. The Technical Panel held its third meeting on June 19-21 in Irvine, CA, and it will hold its final meeting on October 15-16 in Washington, DC. At the June meeting, the panel heard from experts on both near-

and far-term prospects for human space exploration. The balance of that meeting and the entirety of the October meeting will be dedicated to preparing a written summary of the panel's work, which will be delivered to the committee at its meeting on October 21-23. The committee's second panel, the Public and Stakeholder Opinions Panel, held its first two meetings on April 5 and June 19 in Washington, DC, and two additional meetings are planned on October 4 and December 12, also in Washington, DC. The Opinions Panel has reviewed past polls of public attitudes towards space exploration, and it is making plans for a survey to ascertain the views of stakeholders in human spaceflight. Additional information on this study, including committee and panel meetings, is available at <http://www.nationalacademies.org/humanspaceflight>.

Study on Autonomy Research for Civil Aviation. The Committee on Autonomy Research for Civil Aviation is developing a prioritized set of technical goals and objectives of importance to the civil aeronautics community and the nation. These goals and objectives will be based on scientific and technological requirements to advance the state of the art, potential user needs, and technical research plans, programs, and activities. The committee will also identify technical and policy barriers to implementing advances in autonomy. The committee has held two meetings: July 10-12 and August 27-29. Both meetings were dedicated to discussions with experts from government, industry, and academia who have experience with autonomous technologies and systems for aerospace, aeronautical, ground, and maritime

(Continued on page 3)

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From the Chair



As we collectively look forward to our Fall ASEB meeting, we are conscious of the considerable anxiety in the Federal Government and among the communities it serves as a result of the budget uncertainties, and the impacts of sequestration. Nevertheless, I am pleased to see so much continuing interest in the future of science, technology, engineering, and mathematics within the federal community. As an example, recently I participated in an NRC workshop on enhancing prototyping for the U.S. Air Force and the Department of Defense, organized by the Air Force Studies Board. One of the subject matter experts, and proponents of the value of prototyping, was Dr. Jaiwan Shin, the Associate Administrator of NASA's Aeronautics Research Mission Directorate. Dr. Shin, as we have heard at previous ASEB meetings, has consistently discussed the need for "X-Planes" if the country hopes to continue (or return to) being a world leader in aeronautics and aviation. Indeed, NASA sponsored a study on revitalizing the Agency's flight research program that resulted in the 2012 report *Recapturing NASA's Aeronautics Flight Research Capabilities*, available by visiting the ASEB website. Though the recent workshop was initially focused on Air Force/DOD issues, it was obvious after Dr. Shin's briefing that there is great commonality between the agencies when it comes to recognizing the value of having prototypes as an integral tool in the research and development area. The candidates for prototyping included subsystems, major systems, integrated capabilities, and operational systems in both air and space. The other participants in this workshop included major aerospace contractors, university research organizations, and federal laboratories.

Simultaneous with holding of the NRC Workshop was the release of the Defense Science Board's year-long study on *Technology and Innovation Enablers to Achieve (Continued) Military Superiority in 2030*. The study, in which I participated, focused on new, game-changing technologies and innovations to support national security needs for the future military. However, the technologies and innovations in most cases have potential applications to commercial needs, and/or the needs of other agencies such as NASA. The DSB study report, available on the DSB website, portends future investments by the DOD in these cutting edge technologies. Also, the ASEB has begun a study for NASA's ARMD on the important research topic of autonomy in the civil aerospace system. This study is sponsored by NASA, but its results will have impacts on systems for DOD operating in air, land, and sea.

The encouraging aspect of these various studies and focus areas is the common theme that our future technical successes, our future economy, and our future security are highly dependent on a robust support for science, technology, and engineering. Regardless of the budget challenges today and tomorrow, we cannot overlook any of these research areas, and it is critical for our nation's future that we continue to fund them. Likewise, all of the studies mentioned above emphasize the criticality of having the technologically savvy workforce to develop and operate the technologically sophisticated systems we can expect in the future. It is a reminder that the human dimension of the systems we discuss in the ASEB is equally as important for success in the future as the hardware and software.

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The views expressed here do not necessarily reflect those of the ASEB or the National Research Council.

Committee News, continued

(Continued from page 1)

vehicles. The committee will hold two more meetings, on November 13-14 and December 16-18. These meetings will focus on deliberations and report preparation; the only open session will take place on November 13.

Space-Based Additive Manufacturing of Space Hardware. The committee held its first meeting in Washington on August 20-22. At the meeting the committee heard from the study sponsors: NASA Office of the Chief Technologist, Air Force Space Command, and the Air Force Research Laboratory. The committee also heard from DARPA and from leading experts in the field of additive manufacturing (also known as 3D printing). The Air Force Space Command and NASA have asked the National Research Council to undertake a study of the implications of space-based additive manufacturing technologies. The study is investigating the opportunities that this new technology presents for such activities as manufacturing spare parts and tools on the International Space Station and long-duration human spaceflight missions, in-space construction,

and the production of entire satellites in space. Although the technology is relatively new, it is advancing rapidly and may have significant impact in some aspects of spaceflight. The committee chair is Bob Latiff. The committee's second meeting is Scheduled for November 12-14 in Irvine, and the final report is due to be delivered in the late spring or early summer of 2014.

The Aeronautics Research and Technology Roundtable (ARTR). The Roundtable held two meetings this past summer, on June 18 and August 23. The latter meeting involved a subset of the roundtable along with experts in the field of composites. The meeting focused on NASA's new Advanced Composites Program, providing input to NASA's formulation and development of this new effort that will begin operations in 2014. The ARTR is chaired by John Tracy. The ARTR contract expires in early 2014 and the NRC will be working with NASA to renegotiate and extend the ARTR.

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ASEB Calendar—Fall 2013 and Winter 2014

October 10-11, 2013	ASEB Meeting: Washington, DC
October 15-16, 2013	Human Spaceflight Technical Panel Meeting: Washington, DC.
October 21-23, 2013	Human Spaceflight Meeting: Washington, DC.
November 12-14, 2013	Space-Based Additive Manufacturing Meeting: Irvine, CA.
November 13-14, 2013	Autonomy Meeting #3: Washington, DC.
December 12, 2013	Human Spaceflight Public and Stakeholder Opinions Panel: Washington, DC.
December 16-18, 2013	Autonomy Meeting #4: location TBD.
January 13-15, 2014	Human Spaceflight Meeting: Irvine, CA.
April 2-3, 2014	ASEB Meeting: Washington, DC.

For updates to the ASEB calendar, please see <http://www.national-academies.org/aseb>.



Antares Launch

On September 18, SSB and ASEB staff went up to the Keck building's tenth floor balcony and looked in the southeast, in the direction of the U.S. Capitol building. There they observed a small smoke trail, resulting from the launch of an Orbital Sciences Antares rocket over 100 miles away at Wallops Island. The Antares was carrying cargo to the International Space Station inside its Cygnus spacecraft as part of NASA's Commercial Orbital Transportation Services program. Cygnus was docked with the ISS on September 30, and the astronauts began unloading cargo a day later. [PHOTOS: left, courtesy of NASA; right, courtesy of NRC staff Dwayne Day]



International Academy of Astronautics Conference

The International Academy of Astronautics (IAA) is holding Space Exploration Conference on January 9, 2014 in Washington, DC. This conference is the day before the IAA Heads of Space Agencies Summit on Exploration. The IAA is accepting abstracts for the pre-Summit conference through November 15. Please visit <http://www.iaaconferences.org/iaasummit2014/> for more information on abstract submission and conference registration.



Staff News

Cathy Gruber, editor for the SSB and the ASEB, has moved to the NRC's Division on Engineering and Physical Sciences (DEPS) as Managing Editor. **Susan Maurizi** is retiring from her post as Senior Managing Editor for DEPS on July 13 after more than 25 years.

On June 28, former SSB Director **Joseph K. Alexander** marked his full, formal retirement from the SSB and NRC. His career included 36 years in the government followed by 15 years at the Academies.

Paul Jackson left the ASEB on July 1. Paul, who joined the NRC in 2006, was a co-study director for the 2011 report *Defending Planet Earth: Near-*

Earth Object Surveys and Hazard Mitigation Strategies of the SSB and the ASEB.

John F. Wendt retired on June 28 after 11 years at the Academies. His first retirement was from the von Karman Institute for Fluid Dynamics in 1999. John was the study director for the 2010 report *Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research* of the Laboratory Assessments Board, the SSB, and the ASEB.

Former ASEB Director **George M. Levin** passed away June 17. After a 35-year career at NASA, he joined the NRC in 1997 and retired in 2007.

THE NATIONAL ACADEMIES

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The ASEB's sister Board, the Space Studies Board (SSB), also publishes a newsletter; visit http://sites.nationalacademies.org/SSB/ssb_052298 to subscribe or to view past SSB newsletters. The ASEB's division, the Division on Engineering and Physical Sciences (DEPS), also publishes a newsletter; visit http://sites.nationalacademies.org/DEPS/DEPS_059299 to subscribe.

About the ASEB...

The Aeronautics and Space Engineering Board (ASEB) was established in 1967 "to focus talents and energies of the engineering community on significant aerospace policies and programs." In undertaking its responsibility, the ASEB oversees ad hoc committees that recommend priorities and procedures for achieving aerospace engineering objectives and offers a way to bring engineering and other related expertise to bear on aerospace issues of national importance.

The majority of ASEB studies originate with the National Aeronautics and Space Administration (NASA), particularly the Aeronautics Research Mission Directorate and the Human Exploration and Operations Mission Directorate. Some of these studies are requested by Congress in related legislation. ASEB also conducts proposal reviews for the State of Ohio's Third Millennium Program through the Ohio Department of Development and identifies experts to assist the Government Accountability Office in conducting its studies. The ASEB also has performed technical and policy studies for the Nuclear Regulatory Commission, the Defense Nuclear Agency, the Federal Aviation Administration, the National Science Foundation, the Defense Threat Reduction Agency, Air Force Space Command, the Air Force Office of Scientific Research, the National Oceanic and Atmospheric Administration, and others.

On October 15, 2013 the National Academy of Sciences' Committee on Human Spaceflight is asking all Twitter users to share their thoughts on:

What are your best ideas for creating a NASA human spaceflight program that is sustainable over the next several decades?

For more information please visit the Committee on Human Spaceflight's website at http://sites.nationalacademies.org/DEPS/ASEB/DEPS_069080

