

April 2015

Welcome to the latest installment of the ASEB News! This newsletter will update you on ASEB events and activities.

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# Aeronautics and Space Engineering Board News



## From the Chair

The year of 2015 seems to be going by very quickly. It is already time for our Spring 2015 ASEB meeting. As always, the agenda for this meeting is exciting, informative, and timely.

The world of aeronautics seems to be in the headlines more and more—and the most recent attention is increasingly focused on autonomous systems.

Whether the headlines talk about “a drone landing on the White House grounds” or Amazon’s strong interest in developing the capability to deliver their products by “delivery drones,” this topic has increasing public visibility. Couple this with the growing general interest in autonomous systems for applications not only in the air but in the ocean and on the ground, and you have engineering and policy challenges that are the topics “de jour”! Against this backdrop, it is challenging for the FAA’s regulatory processes to keep up with a very fast developing sector.

Our meeting will allow the ASEB to examine these and other issues with presentations and updates from Dr. Jaiwon Shin of NASA; Maj Gen [ret.] Ed Bolton, the head of the FAA’s Next Gen program; and Ms. Pam Melroy of DARPA’s Tactical Technology Office, each of whom will address various aspects of the robust set of aeronautics activities.

We expect that among the areas that NASA/ARMD will also cover is its strategic thrust on innovation in commercial supersonic aircraft. In addition, Dr. Shin has been putting greater focus on cross-agency aviation opportunities, a strategically imperative area that the ASEB has emphasized in past meetings.

Another agency deeply involved in aeronautics development and technology is the U.S. Air Force.

The ASEB will get an update on how the Air Force’s latest mandate for a science and technology emphasis impacts how the service’s Aeronautics and Space investments will be made. We expect this discussion to be part of a broader overview of the Air Force space programs from Major General Roger Teague, the Air Force Director of Space Programs. A major item of interest will be the Air Force/U.S. strategy for dealing with the Russian RD-180 dilemma. Like the subject of drones in the aeronautics community, the question of how, or even whether, to develop an indigenous U.S. rocket engine to replace dependence on use of the Russian RD-180 has various constituents and is still unresolved.



The ASEB will also hear from NASA’s space-oriented mission directorates. These discussions will include a joint session with the Space Studies Board, where the boards and Bill Gerstenmaier from NASA’s Human Exploration and Operations Mission Directorate will discuss reactions and responses to the NRC’s 2014 human spaceflight study *Pathways to Exploration: Rationales and Approaches for a U.S. Program of Human Space Exploration*. In addition, at the joint meeting there will be a roundtable discussion between the boards and the NASA Chiefs of Technology, Engineering, and Science. A separate update will be provided by NASA’s Space Technology Mission Directorate to the ASEB.

In some respects, this is a pivotal time for NASA and the current administration to forge strategies and programs that can be sustainable for the remainder of the Obama administration and beyond. This will be an important context for the ASEB Spring meeting.

## Board Members

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*Johns Hopkins Applied Physics Lab*

## ASEB Calendar—Spring 2015

April 21-22  
*ASEB Spring Meeting,, National Academy of Sciences Building, Washington, D.C.*

May/June  
*Release of the report by the Committee to Review the FAA Research Plan*

June (tentative)  
*Low Carbon Aviation Committee First Meeting, Washington, D.C.*

July 17  
*Aeronautics Research and Technology Roundtable, Keck Center, Washington, D.C.*

August (tentative)  
*Low Carbon Aviation Committee Second Meeting, Location TBD*

September 24  
*Space Technology Industry-Government-University Roundtable Meeting, Keck Center, Washington, D.C.*

October 21-23  
*ASEB Fall Meeting, Beckman Center, Irvine, Calif.*

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

## ASEB Aeronautics Research and Technology Roundtable (ARTR)

The Aeronautics Research and Technology Roundtable held no meetings during the first quarter of 2015. The Roundtable's next meeting is now scheduled for July 17 in Washington, D.C., at the Keck Center. At that meeting, the Roundtable will discuss NASA's new plans for flight research.

## ASEB Staff

|  |   |
|--|---|
| Michael H. Moloney<br><i>Director</i>                      | Tanja Pilzak*<br><i>Manager, Program Operations</i> |
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| Carmela Chamberlain*<br><i>Administrative Coordinator</i>  | Abigail Sheffer*<br><i>Program Officer</i>          |
| Katie Daud*<br><i>Research Associate</i>                   | Dionna Williams*<br><i>Program Associate</i>        |
| Dwayne Day<br><i>Senior Program Officer</i>                | Anesia Wilks*<br><i>Senior Project Assistant</i>    |
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## ARTR Members

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*MIT*

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*American Aerospace Advisors, Inc.*

## ASEB Space Technology Industry-Government-University Roundtable

The NRC Space Technology-Industry-Government-University Roundtable was established to engage senior representatives from industry, universities, NASA, and other government agencies in discussions of critical issues related to NASA's space technology research agenda that are of shared interest.

The Roundtable held its second meeting in February, led by Chair Ray Johnson, formerly the chief technology officer of Lockheed Martin, and Michael Gazarik, NASA's associate administrator for the Space Technology Mission Directorate (STMD), who was also a member of the Roundtable. The February meeting featured panels of officials from the Department of Defense (DOD) and from aerospace companies both large and small. The Roundtable's discussion with the panelists focused on the following questions:

- What opportunities exist for new, coordinated research and technology by NASA and the DOD? That is, what space technology challenges relevant to DOD could be addressed by STMD research and technology development, and what research by DOD may address NASA's needs for space technology?
- What research and technology development challenges could STMD address to support industry priorities in space as they relate to NASA mission priorities and/or industry applications apart from NASA missions?

The next meeting of the Roundtable will take at the Keck Center in Washington, D.C., on September 24, 2015, and it will likely continue the discussions of the February meeting with individuals academia and federally funded research and development centers.

Subsequent to the February meeting, Michael Gazarik resigned from NASA, and Stephen Jurczyk, the new head of the STMD, has been appointed to the Roundtable in his place. As with all National Academies roundtables, the ASEB produced no written products as a result of the meeting; it is left to participants to make note of the key points relevant to them and their organizations.

### STIGUR Members

Ray Johnson, Chair  
*Lockheed Martin*

Robert Braun  
*Georgia Tech*

Claude Canizares  
*MIT*

Carissa Christensen  
*Tauri Group Room*

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*Consultant*

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*Cooke Concepts and Solutions*

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*IDA*

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*Aerojet Rocketdyne*

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*JHUAPL (retired)*

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*Space Systems/Loral*

Laurence R. Young  
*MIT*

Photo courtesy of  
Dwayne Day, ASEB  
staff.





## Committee to Review the FAA Research Plan Members

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*I Power Energy Systems*

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*Ga Tech*

Agam N. Sinha  
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*Indiana General Assembly*

Raymond Valeika  
*Independent Consultant*

Edward L. Wright  
*UCLA*

## ASEB / Transportation Research Board Committee to Review the FAA Research Plan

The FAA Modernization and Reform Act of 2012 required the Federal Aviation Administration to develop a research plan for the certification of new technologies into the National Airspace System and to have the National Research Council review that plan. The NRC's Committee to Review the FAA Research Plan has held three meetings, the last one in early March in Washington during a snowstorm that shut down part of the city but did not prevent the committee from hearing from important government and industry speakers and working on finalizing its report. As directed by Congress the FAA created a new research plan, and the committee learned how this plan relates to the FAA's existing research, program, and policy documents. The committee's report entered review on March 25 and should be delivered to the FAA and Congress in May or June.



The circus was outside, but serious work was going on inside the NRC. [PHOTO courtesy of Dwayne Day, ASEB staff.]

## ASEB Low Carbon Aviation Committee

The NRC has recently embarked on a new study to develop a national research agenda with the objective of reducing life-cycle carbon emissions from commercial aviation globally even if air traffic grows as expected. The recommended research agenda will consist of a prioritized set of research projects of importance to the national and international commercial aeronautics community, and it will focus on advances in technologies and capabilities that can only be achieved through substantial research and technology development. Specifically, the committee will focus on new or more highly efficient propulsion (such as hybrid-electric) and energy systems (such as biofuels, batteries, and fuel cells). This includes consideration of the opportunities and challenges that changes in propulsion and energy technologies have for aircraft configurations, airline operational models, and infrastructure integration. Other key considerations include economic, regulatory and other policy opportunities and challenges that would be associated with a potential major change in propulsion and/or energy systems. This study is focused on propulsion and energy systems research; it will not develop recommendations for research in other areas such as airframe designs or air traffic management systems. In addition, the scope of this study excludes non-technology, policy approaches such as the imposition of carbon taxes, the use of carbon offsets, or legislative limits on carbon emissions.

The membership of the committee will be announced in late April or May, and the committee's first meeting is planned for June 2015.



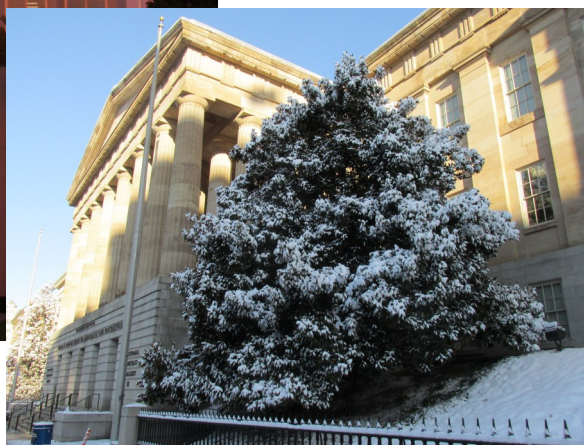
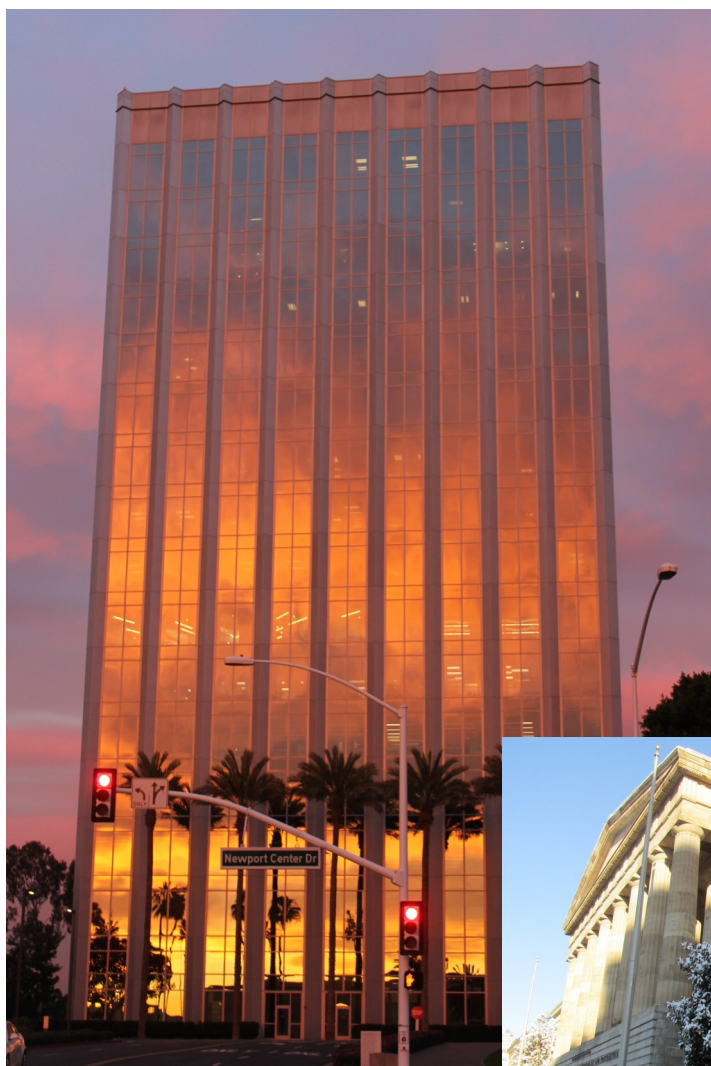
## Space Studies Board/ASEB Standing Committee on Biological and Physical Sciences in Space

Following its October 2014 organizational meeting, where several issues of near-term importance to NASA microgravity research progress were identified, the committee worked with NASA to select the related topics of Open Science and GeneLab Platform development as the focus of a 1-day symposium. Planning and organizing this event was the primary focus of the committee's work for several months, and the resulting symposium was held on April 1, 2015 as part of the committee's scheduled March 31- April 2, 2015 meeting during the NRC's Space Science Week. The symposium brought together experts from a range of government, academic, and private database groups to discuss common development challenges. The discussion focused on challenges relevant to NASA Open Science approaches in general, and potential design input for NASA GeneLab in particular. Included in the symposium were two panels with 10 experts representing diverse database efforts and platforms in the very rapidly growing field of 'omics' research. During the non-symposium portion of the meeting, the

committee also heard a presentation on the role of CASIS in supporting microgravity research on the International Space Station and a status update on NASA's Space Life and Physical Sciences Research and Applications program. The committee also met in plenary with the other standing committees of the Space Studies Board on March 31.

Why are meetings at the Beckman Center always a good choice for committee meetings in the winter? At left, a January sunset in Irvine, Calif. Below, another fluffy day in Washington.

[Photos courtesy of Dwayne Day, ASEB staff.]



### Committee on Biological and Physical Sciences in Space Members

Elizabeth Cantwell, Co-chair  
*Arizona State University*

Robert J. Ferl, Co-chair  
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Kenneth M. Baldwin  
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## 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.

