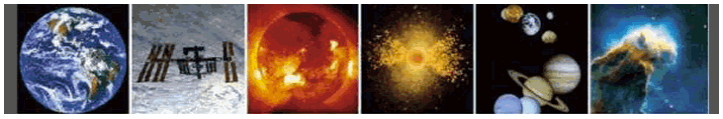


Briefing on Space Studies Board and Aeronautics and Space Engineering Board Activity

Michael H. Moloney, Ph.D.

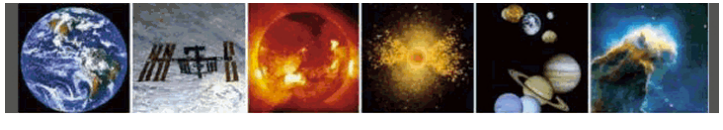
March 2015

Director for Space and Aeronautics

Space Studies Board

Aeronautics and Space Engineering Board

National Research Council



- The National Academy of Science (NAS) was established on March 3 1863 by Act of Congress, signed into law by President Lincoln in the midst of the Civil War.

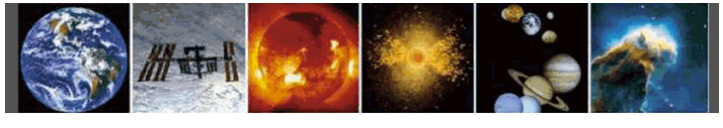
- NAS was established to "investigate, examine, experiment, and report upon any subject of science or art" whenever called upon to do so by any department of the government. The National Academy of Engineering (NAE) was established in 1964 and the Institute of Medicine in 1970.

- The National Research Council serves as the principal operating arm of the NAS and NAE in providing services to the government, the public, & the scientific & engineering communities.

- Together these are the National Academies.

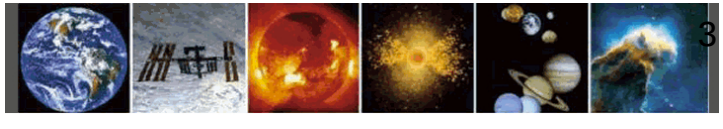
NAS, NAE, and IOM Membership
as of December 31, 2013

- **NAS:**
  - 2,152 members (72 emeritus)
  - 425 foreign associates
  - 31 sections in 6 classes
- **NAE**
  - 1,977 members (218 emeritus)
  - 203 foreign members
  - 12 sections
- **IOM**
  - 1,743 members (89 emeritus)
  - 120 foreign associates
  - 12 sections

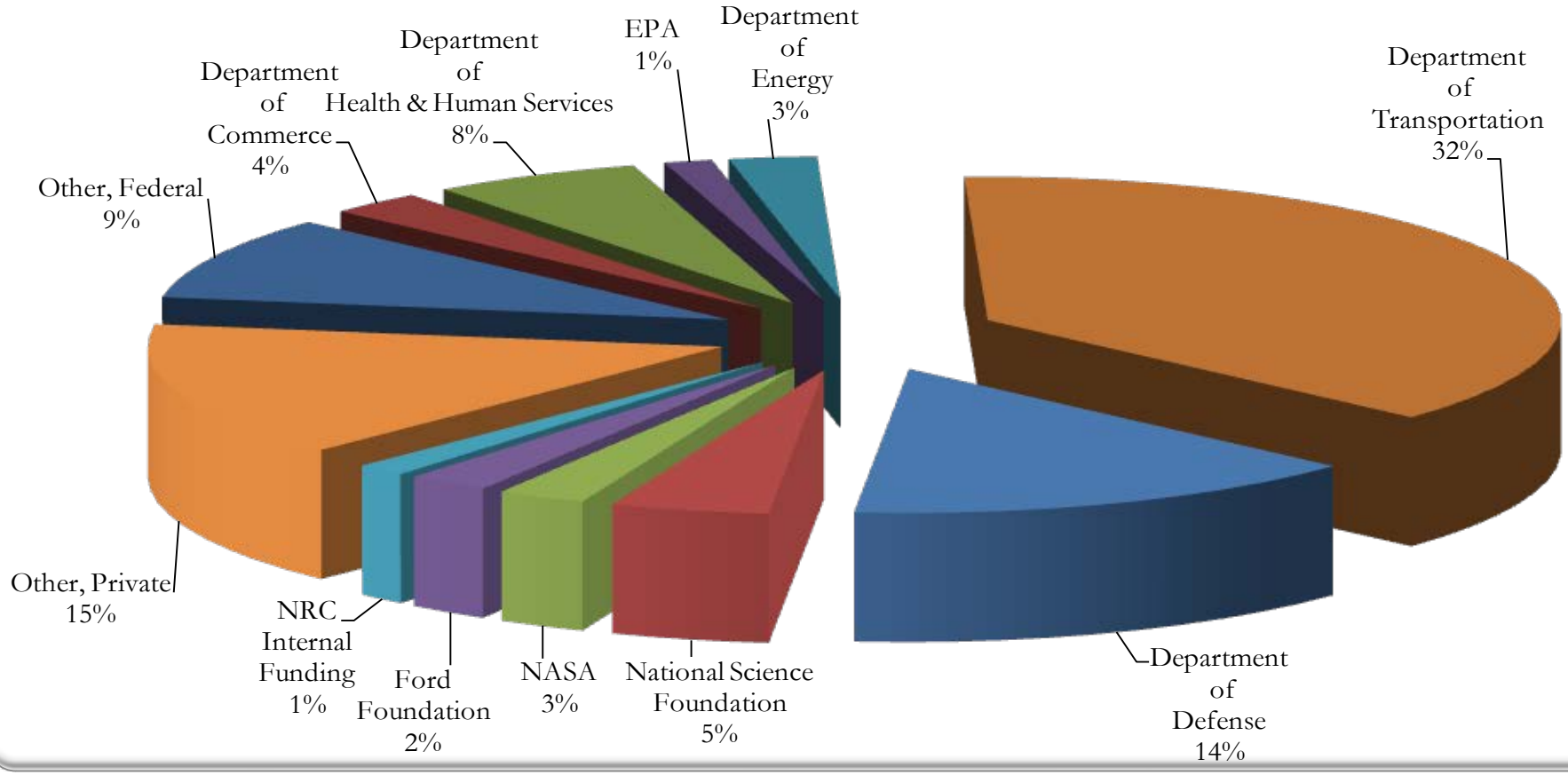


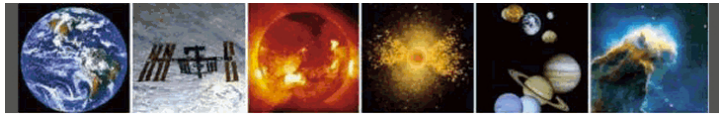
NRC Level of Activity

- **500 – 600 committees in operation, involving ~6,000 volunteers.**
- **~200 – 250 reports produced per year.**
- **~1100 NA staff with around 63% working on NRC activities, 13% on NAS/NAE/IOM.**
- **~80-85% of operational budget comes from contracts and grants from Federal Government.**



PROGRAM SUPPORT BY SOURCE FOR FY 2013
Total Actual Revenue of $294M



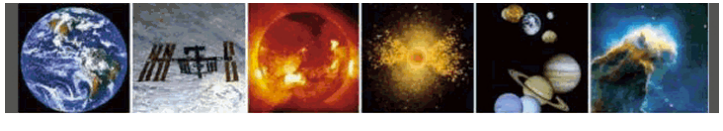


Space and Aeronautics at the NRC

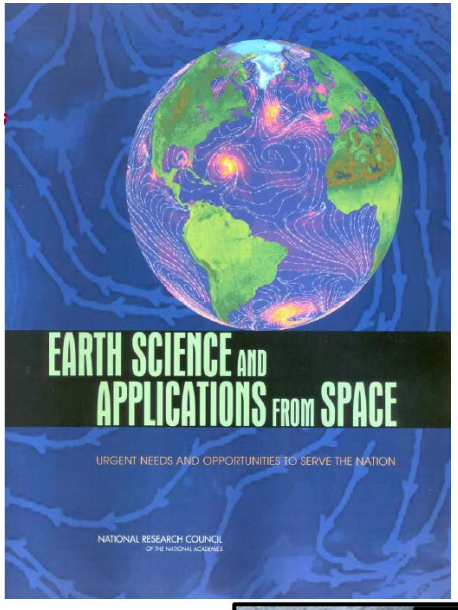
Space Studies Board
and the
Aeronautics and Space Engineering Board

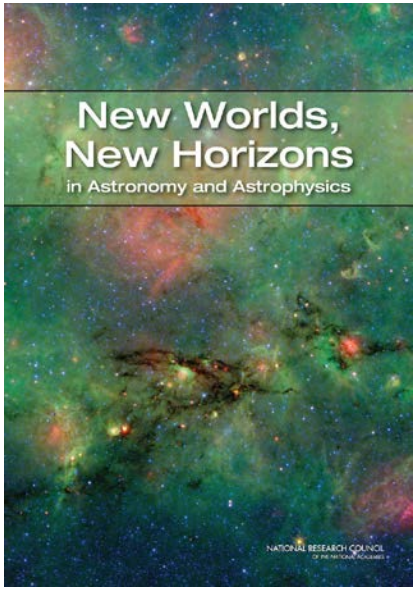
- One of the larger units in the NRC.
- Conduct studies for NASA, USGS, USAF, NOAA, etc.
- Encompasses all of Space Science, Space Engineering, and Aeronautics.

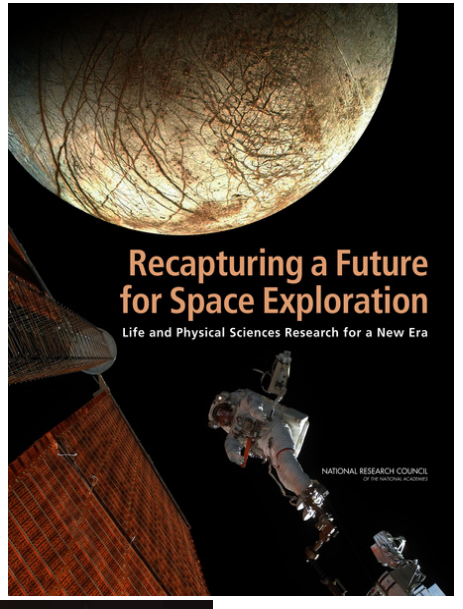
- SSB's Signature product are the decadal surveys in space science.
- ASEB prioritizes space technology development and gives advice on NASA aeronautics.
- SSB and ASEB provide guidance on human spaceflight

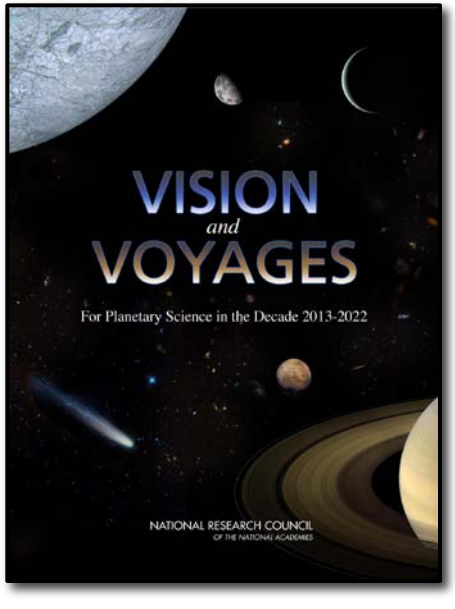


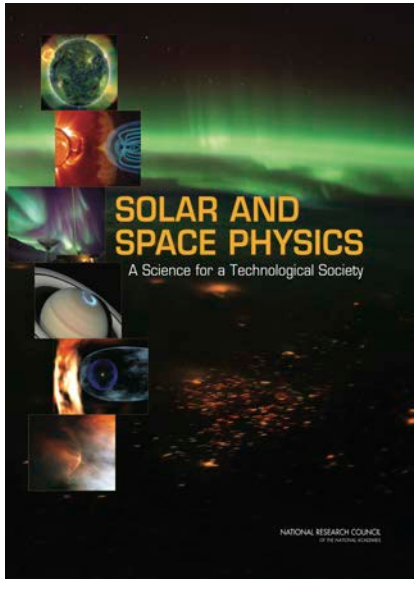
The Space Science Decadal Surveys

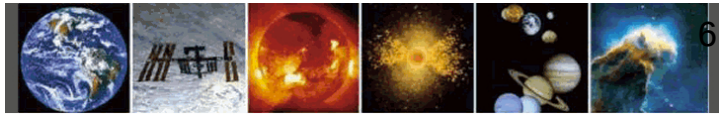






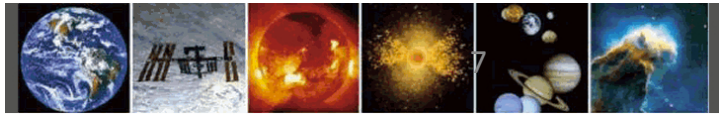


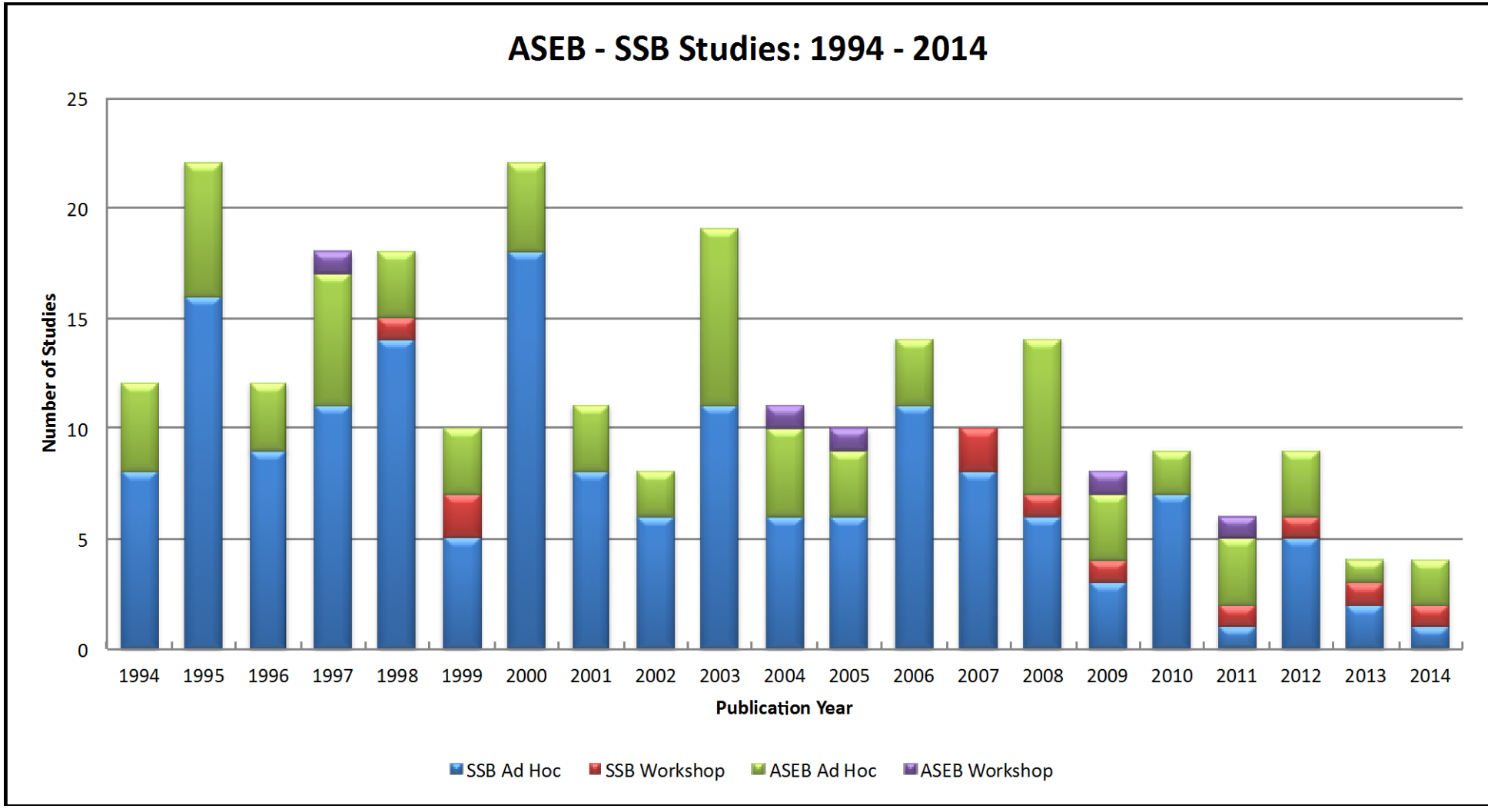


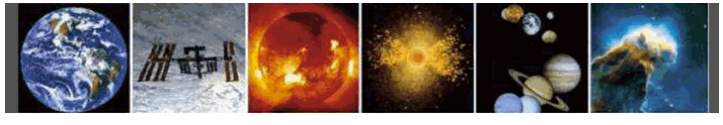


Some Recent ASEB / SSB Publications

- 3D Printing in Space (ASEB)
- Autonomy Research for Civil Aviation: Toward a New Era of Flight (ASEB)
- Pathways to Exploration—Rationales and Approaches for a U.S. Program of Human Space Exploration (ASEB with SSB)
- Evaluation of the Implementation of WFIRST/AFTA in the Context of New Worlds, New Horizons in Astronomy and Astrophysics (SSB with BPA)
- Landsat and Beyond: Sustaining and Enhancing the Nation's Land Imaging Program (SSB)
- Review of the Draft 2014 Science Mission Directorate Science Plan (SSB)
- The Role of High-Power, High Frequency-Band Transmitters in Advancing Ionospheric/Thermospheric Research: A Workshop (SSB)
- NASA's Strategic Direction and the Need for a National Consensus (DEPS)
- Planetary Protection Standards for Icy Bodies in the Outer Solar System (SSB)
- Reusable Booster System: Review and Assessment (ASEB)
- Recapturing NASA's Aeronautics Flight Research Capabilities (ASEB)
- NASA Space Technology Roadmaps and Priorities: Restoring NASA's Technological Edge and Paving the Way for a New Era in Space (ASEB)
- Technical Evaluation of the NASA Model for Cancer Risk to Astronauts Due to Space Radiation (SSB)

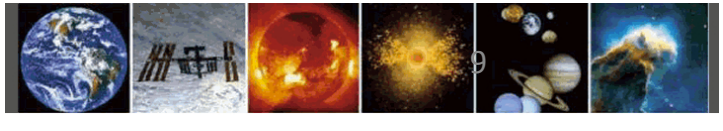



ASEB - SSB Studies: 1994 - 2014
Number of Studies
25
20
15
10
5
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Publication Year
SSB Ad Hoc
SSB Workshop
ASEB Ad Hoc
ASEB Workshop



Ongoing ASEB/SSB Activities

- Science Potential of CubeSats (SSB)
  - Committee in formulation
- Research Agenda for Low Carbon Aviation (ASEB)
  - Committee in formulation
- Forum for New Leaders in Space Science (SSB)
  - First and Second forums held in Beijing and Irvine in May and November
- A Framework for Analyzing the Needs for Continuity of NASA-Sustained Remote Sensing Observations of the Earth from Space (SSB)
  - Committee preparing review of its report.
- Sharing the Adventure with the Student – A Workshop (SSB)
  - Workshop took place Dec 2/3 and the report is close to exiting review.
- Survey of Surveys: Lessons Learned from Decadal Planning – A Study (SSB)
  - Committee has completed its meetings and the report is in review
- Review of MEPAG Special Regions Report (SSB)
  - First study in cooperation with ESF since 1998 – report in preparation
- A Strategy to Optimize the U.S. Optical and Infrared System in the Era of the Large Synoptic Survey Telescope (BPA)
  - Led by the NRC's Board on Physics and Astronomy



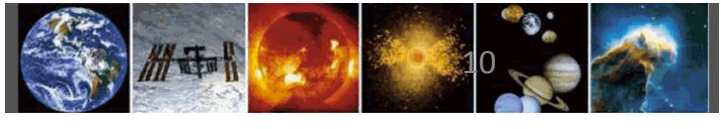
Snapshot of Some Potential New Activities

Ongoing Discussions with NASA and others on:

- **Earth Science Decadal – ESAS-2017**
  (SSB – NASA/SMD, USGS, NOAA)
- **Value of large strategic missions** (SSB – NASA/SMD)
- **Value of extended missions**
  (SSB – NASA/SMD)
- **Search for life in the solar system**
  (SSB – NASA/SMD)
- **Planetary Protection – Review of Process**
  (SSB - NASA & ESSC – ESA?)
- **Astro Midterm Review**
  (SSB/BPA – NASA/NSF/DOE)
- **Planetary Science Midterm Review**
  (SSB - NASA-SMD)
- **Review of Geospace Portfolio Review**
  (SSB - NSF)
- **Review of Planetary R&A Program**
  (SSB – NASA-SMD)
- **Space Law Activity**
  (ASEB/SSB/CSTL – Foundation and ?)
- **Review of NASA Technology Roadmaps**
  (ASEB – NASA-OCT)

Potential Congressional Requests:

- **Planetary Protection for Human Exploration Missions**
- **Extrasolar Planet Exploration Strategy**
- **Astrobiology Strategy**
- **Assessment of Mars Architecture**
- **Space Weather Review**
- **Review of National Space Grant College and Fellowship Program**
- **Barriers Impeding Enhanced Utilization of the ISS's National Laboratory By Commercial Companies**
- **Value of PI-led suborbital and small satellite missions**



More Information

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www.nationalacademies.org/ssb

www.nationalacademies.org/aseb

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