

*NASA Advisory Council*  
National Aeronautics and Space Administration  
Washington, DC 20546

Dr. Steven W. Squyres, Chair

May 2, 2013

Mr. Charles F. Bolden, Jr.  
Administrator  
National Aeronautics and Space Administration  
Washington, DC 20546

Dear Administrator Bolden:

The NASA Advisory Council held a very productive public meeting at NASA Headquarters, Washington, DC, April 24-25, 2013.

As a result of its deliberations, the Council approved nine recommendations and seven findings. They are enclosed for your consideration. If you have any questions or wish to discuss further, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'S. Squyres', with a long horizontal line extending to the right.

Steven W. Squyres  
Chairman

Enclosures

## NASA Advisory Council Recommendation

### Demonstrate and Articulate the Justification and Strategy for NASA's New Asteroid Initiative 2013-01-01 (HEOC-01)

**Name of Committee:** Human Exploration and Operations Committee

**Chair of Committee:** Mr. Richard Kohrs

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Recommendation:** Demonstrate and Articulate the Justification and Strategy for NASA's New Asteroid Initiative

**Recommendation:** NASA should clearly demonstrate and articulate a strategy for the Agency's new Asteroid Initiative that highlights the benefits that will be gained, making progress toward NASA goals while furthering science and technology and benefiting humankind. The Agency should clearly demonstrate how the Initiative will serve as a stepping stone to NASA's ultimate goal of a human mission to Mars. Potential benefits include involving operations that could apply to future missions, including life support and deep space habitability, advanced propulsion, complex ground and space operations, rendezvous in new gravitational environments, and sampling of small objects.

The Agency should also demonstrate and articulate other potential benefits:

- Benefit the United States by forging new industrial capabilities and international partnerships.
- Benefit humankind by advancing technologies and operations that might someday assist in the development of a defense strategy for Earth-bound asteroids.

**Major Reasons for Proposing the Recommendation:** Current budget constraints result in Federal agencies having to justify and fight for annual budgets. It is in NASA's best interests to demonstrate and clearly articulate the benefits of the Asteroid Initiative to the public and Congress in a way that accurately represents its merits. Asteroid impact is in the public mind after the recent event in Chelyabinsk, Russia. As part of the new Initiative, NASA can take action to identify asteroids that might impact the Earth.

**Consequences of No Action on the Proposed Recommendation:** In the absence of a clearly demonstrated and accurately articulated justification, the new Asteroid Initiative might miss external interest, leading to loss of public and Congressional support.

## NASA Advisory Council Recommendation

### Unmanned Aircraft Systems in the National Airspace System Project Demonstration Mission 2013-01-02 (AC-01)

**Name of Committee:** Aeronautics Committee

**Chair of Committee:** Ms. Marion Blakey

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Recommendation:** Unmanned Aircraft Systems in the National Airspace System Project Demonstration Mission

**Recommendation:** The NASA Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Project plans as part of their next phase of research a variety of flight tests to validate concepts developed as part of their research. The Council recommends that in addition to these flight tests, one or more “capstone” demonstrations be incorporated into the program plan. These “graduation exercises” should serve to pull together and focus multiple research threads, and provide a compelling test or demonstration that the program’s various stakeholder will find compelling and convincing. The Council encourages NASA to continue working with the UAS Subcommittee in the development of such a capstone demonstration.

**Major Reasons for Proposing the Recommendation:** The Council is concerned that sufficient impact is made as a result of the project’s research. These capstone demonstrations would find their way onto the integrated master plan, and would ideally involve both NASA and outside participants, demonstrating the access barriers broken down as a result of the NASA research.

**Consequences of No Action on the Proposed Recommendation:** Absent compelling capstone events, the various research elements may never achieve the desired synergy.

## NASA Advisory Council Recommendation

### Recovering the Planetary Exploration Program 2013-01-03 (SC-01)

**Name of Committee:** Science Committee

**Chair of Committee:** Dr. Wesley Huntress

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Recommendation:** Recovering the Planetary Exploration Program

**Recommendation:** The Council recommends that in formulating its FY 2015 budget proposal, NASA seek restoration of the Planetary Science budget to a level consistent with Congressional action on the FY 2013 budget.

**Major Reasons for Proposing the Recommendation:** The cuts to NASA's Planetary Science program in the Administration's proposed FY 2013 and FY 2014 budgets are disproportionately large, and Congressional action restored \$223M of the \$309M cut proposed in FY 2013. The intent of Congressional action has not been included in formulating the FY 2014 budget, and the Planetary Science Division budget again faces a large \$284M cut relative to FY 2012.

**Consequences of No Action on the Proposed Recommendation:** The funds restored by Congress in the passed FY 2013 budget allowed continuation of the Outer Planets program, including studies of a Europa mission, continuation of the Division's fleet of missions currently in operation, and maintenance of the launch rate of small- and medium-class missions. The proposed FY 2014 funding profile will result in effective termination of the Outer Planets program, early termination of missions currently in operation, and a serious decline in new mission launches over the decade – threatening NASA's world leadership in planetary exploration.

## NASA Advisory Council Recommendation

### Augmented Search for Small Asteroids 2013-01-04 (SC-02)

**Name of Committee:** Science Committee

**Chair of Committee:** Dr. Wesley Huntress

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Recommendation:** Augmented Search for Small Asteroids

**Recommendation:** The augmented ground-based search for a small asteroid meeting the requirements of NASA's Asteroid Initiative should be formulated broadly to increase the rate of discovery of small asteroids that could threaten Earth.

**Major Reasons for Proposing the Recommendation:** While prioritizing the search for a target asteroid, any effort expended on a wider search would increase the Initiative's contribution to Planetary Defense.

**Consequences of No Action on the Proposed Recommendation:** Loss of an excellent opportunity for the Initiative to make a larger contribution to national priorities regarding Planetary Defense.

## NASA Advisory Council Recommendation

### Space Act Agreement Internal Coordination 2013-01-05 (CSC-01)

**Name of Committee:** Commercial Space Committee

**Chair of Committee:** Ms. Patti Grace Smith

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Recommendation:** Space Act Agreement Internal Coordination

**Recommendation:** The Council recommends that NASA update its Space Act Agreement (SAA) process to be more transparent and efficient for those SAAs involving new policy issues between NASA and commercial partners which require broader coordination between Headquarters and a Center. The Council recommends: (1) designating a person responsible at Headquarters and the Center for resolving the issues; (2) establishing a timeline for a Headquarters decision; and (3) identifying to the potential commercial partner a person with sufficient authority to move the process toward resolution.

**Major Reasons for Proposing the Recommendation:** Most ordinary SAAs are dispatched in a reasonable amount of time. However, SAAs presenting new policy issues require a broader coordination between a Center and Headquarters that can result in unusual delays without providing the commercial partner insight on when a decision will be made. The Council discovered that possible reasons for the delay included not identifying NASA personnel at Headquarters and the Center who are responsible for the decision, and not having an internal timeline to make a decision. Commercial partners seeking an SAA often do not have a point of contact from whom they can get actionable information.

**Consequences of No Action on the Proposed Recommendation:** SAAs involving new policy issues will continue to face unnecessary delay and commercial partners will be frustrated when dealing with NASA.

## NASA Advisory Council Recommendation

### Explore Expanded Use of Cooperative Research and Development Agreements 2013-01-06 (CSC-02)

**Name of Committee:** Commercial Space Committee

**Chair of Committee:** Ms. Patti Grace Smith

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Recommendation:** Explore Expanded Use of Cooperative Research and Development Agreements

**Recommendation:** The Council recommends that NASA explore expanded use of Cooperative Research and Development Agreements (CRADAs) with its commercial partners. Initially, NASA should identify an office (or a person) at Headquarters that would: (1) identify the current number of active CRADAs between (a) a party and Headquarters and (b) a party and each of the Centers; (2) assess the success of each of these CRADAs; and (3) evaluate the benefits of promoting use of CRADAs.

**Major Reasons for Proposing the Recommendation:** CRADAs were designed to promote technology transfer in a way that protects the intellectual property that the partner brings to the project and advances the commercial application of such technology. NASA should ensure that its commercial partners are aware of the CRADA option and use this tool to the maximum extent appropriate to encourage relationships with commercial partners.

**Consequences of No Action on the Proposed Recommendation:** NASA and its commercial partners may miss an opportunity to work together if the parties do not realize that CRADAs are available.

## NASA Advisory Council Recommendation

### Separation of Vision and Mission 2013-01-07 (EPOC-01)

**Name of Committee:** Education and Public Outreach Committee

**Chair of Committee:** Mr. Lars Perkins

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Recommendation:** Separation of Vision and Mission

**Recommendation:** NASA should, as part of its strategic planning process, create a short inspirational “vision statement” that embodies NASA’s aspirational goals. In addition, NASA should rewrite the current vision statement to be clearer, more focused, more NASA-specific and reposition it to replace the agency’s current “mission statement.”

**Major Reasons for Proposing the Recommendation:** The current vision statement is long, unmemorable, generic, and does not resonate with or inspire the public. Even as such a longer articulation of NASA’s goals may be appropriate for internal dissemination, but a shorter, inspiring vision statement will be more effective in increasing awareness of NASA.

**Consequences of No Action on the Proposed Recommendation:** Continuing public confusion about the overarching theme which binds all NASA programs together.

## NASA Advisory Council Recommendation

### FY 2014 Transitional Year for Education and Public Outreach 2013-01-08 (EPOC-02)

**Name of Committee:** Education and Public Outreach Committee

**Chair of Committee:** Mr. Lars Perkins

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Recommendation:** FY 2014 Transitional Year for Education and Public Outreach

**Recommendation:** Rather than halting nearly all NASA Education and Public Outreach (EPO) programs immediately, fund and recast FY 2014 as a transitional year where existing programs can be evaluated, and slated for shutdown, transfer to other agencies, or continuance in an orderly fashion. In particular, the Agency should fight for continuance of EPO activities that are enabled by capabilities that are uniquely NASA's.

**Major Reasons for Proposing the Recommendation:** NASA EPO programs are arguably the most inspirational and successful infusion of science into the public consciousness. In a time of austerity we recognize it is important to consolidate education efforts and eliminate redundancies. NASA programs built around missions such as Hubble and Curiosity are, however, unique and NASA-specific, as they are built around dynamic missions, not textbook knowledge. We feel that thoughtful deliberation is necessary to develop a transition plan which preserves NASA's unique capabilities, eliminates redundancies, and best serves the interests and strategic vision of our nation.

**Consequences of No Action on the Proposed Recommendation:** Immediate shutdown will prematurely terminate programs in progress, cause loss of NASA's educational institutional knowledge, and dramatically disrupt the continuity of public messaging at a time when NASA's popularity and inspirational impact are at a decades-high level. We also feel cutting NASA's educational programs will significantly degrade the nation's Science, Technology, Engineering and Mathematics (STEM) education capability during this critical time.

## NASA Advisory Council Recommendation

### Remove Restrictions on NASA Center Education and Public Outreach Spending 2013-01-09 (EPOC-03)

**Name of Committee:** Education and Public Outreach Committee

**Chair of Committee:** Mr. Lars Perkins

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Recommendation:** Remove Restriction on NASA Center  
Education and Public Outreach Spending

**Recommendation:** If a mission team, along with the NASA Office of Education, determine that an educational initiative is in the best interests of the mission, and can identify funding from non-educational budget funds, they should have the authority to spend those funds for that purpose.

**Major Reasons for Proposing the Recommendation:** Citizen science, participatory exploration, “crowdsourcing,” and public engagement are often critical components of a mission, potentially including making contributions to the mission’s science return.

**Consequences of No Action on the Recommendation:** Prohibition on the use of available non-education budget funds for public outreach activities unnecessarily further cripples the ability of NASA to engage the public in the way that it uniquely can.

## NASA Advisory Council Finding

### Strategic Direction to Inform Future Aeronautics Research Portfolio Decisions

**Name of Committee:** Aeronautics Committee

**Chair of Committee:** Ms. Marion Blakey

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Finding:** Strategic Direction to Inform Future Aeronautics Research Portfolio Decisions

**Finding:** The Council endorses the approach that the NASA Aeronautics Research Mission Directorate (ARMD) is taking to establish a strategic direction to inform future research portfolio decisions. The Council feels that the underlying process of utilizing strategic trends analysis, systems and portfolio analysis, and community/stakeholder engagement will enable ARMD to respond more effectively to new needs and new approaches to plan future research. The Council notes that ARMD has made significant progress in an area which the Council had commented on in a previous observation (regarding the use of systems analysis and trade studies to inform prioritization and advocacy of ARMD research – August 2011). The Council looks forward to engaging with ARMD as their efforts mature and helping to inform the plan.

## NASA Advisory Council Finding

### Unmanned Aircraft Systems – Systems Analysis

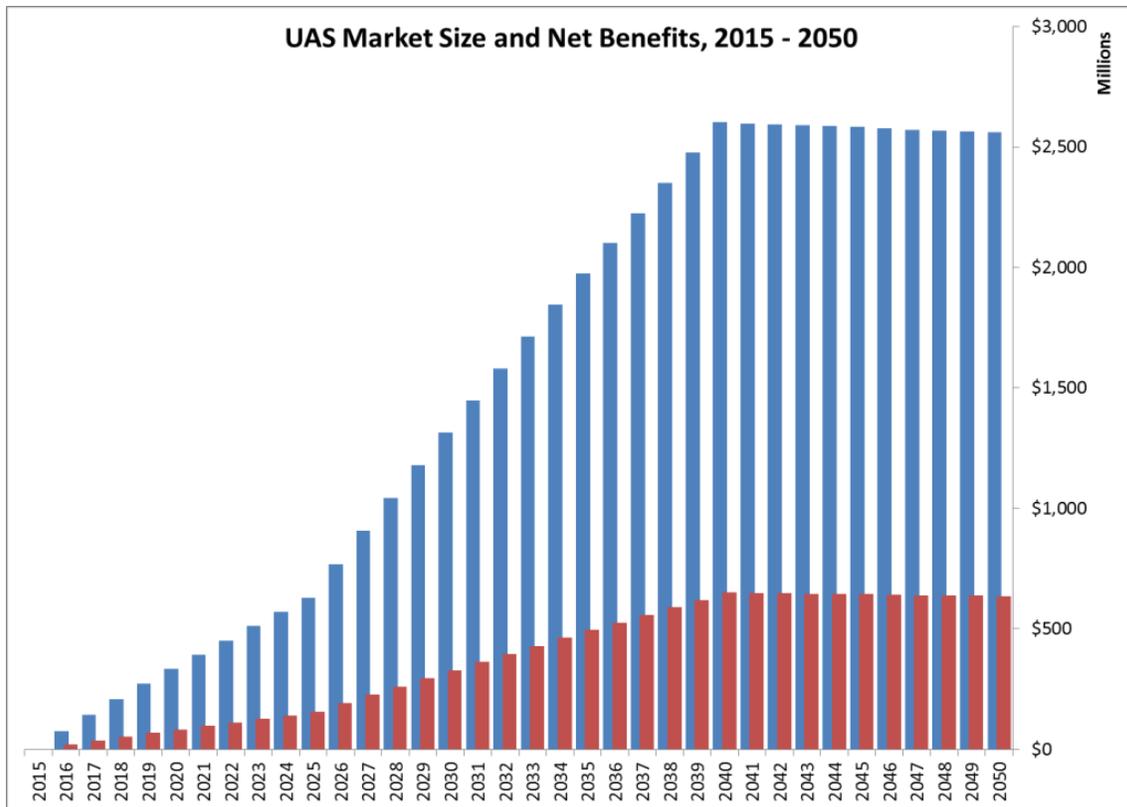
**Name of Committee:** Aeronautics Committee

**Chair of Committee:** Ms. Marion Blakey

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Finding:** Unmanned Aircraft Systems – Systems Analysis

**Finding:** The Council would like to commend the Unmanned Aircraft Systems (UAS) Systems Analysis work that NASA is supporting through the Joint Program and Development Office (JPDO). The business analysis and future flight data modeling is highly necessary work and of great benefit to the community. While the analysis is preliminary, it is a good starting point and clearly illustrates UAS will have a significant impact on the National Airspace System as indicated by the graph below. The Council strongly encourages NASA and the UAS Project to continue supporting and expanding this important effort throughout the next phase which starts in October 2013. This work should also be fed back directly into project planning efforts to focus and enlighten the planning of the next phase research elements.



## **NASA Advisory Council Finding**

### **Earth and Space Science Research and Analysis Grants Program Under Stress**

**Name of Committee:** Science Committee

**Chair of Committee:** Dr. Wesley Huntress

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Finding:** Earth and Space Science Research and Analysis  
Grants Program Under Stress

**Finding:** The proposals selection rate for high quality proposals has fallen to levels sufficiently low to cause an unstable feedback loop where the Earth and space science community writes a much larger number of proposals, resulting in a significant non-productive burden on the community and NASA staff.

## NASA Advisory Council Finding

### Pu238 Production

**Name of Committee:** Science Committee

**Chair of Committee:** Dr. Wesley Huntress

**Date of Council Public Deliberation:** April 24, 2013

**Short Title of Finding:** Pu238 Production

**Finding:** Pu238 is vital to the future of NASA's planetary science program. There is a long, complex history of negotiations concerning its production. Rather than simply purchasing Pu238, the NASA Planetary Science Division has now been tasked with managing and funding Department of Energy (DOE) facilities involved in the production of this material. NASA is a customer for Pu238, however, it has no expertise in the management of engineering of its production. The Agency will need to apply their best efforts to get up on the learning curve and apply its management expertise to insuring the most effective and efficient production of Pu238 at DOE.

## NASA Advisory Council Finding

### NASA Asteroid Initiative Capture and Exploration Mission

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Wesley Huntress
<b>Date of Council Public Deliberation:</b>	April 24, 2013
<b>Short Title of Finding:</b>	NASA Asteroid Initiative: Capture and Exploration Mission

**Finding:** The Agency's Asteroid Initiative is an innovative approach to a human spaceflight mission to an asteroid. It would develop capabilities required for human exploration to the Moon and beyond.

The Science Mission Directorate (SMD) can support this human spaceflight mission in several ways. First, by finding and characterizing asteroids in the size, mass, rotation rate, orbital characteristics and velocity range required for transfer to lunar orbit. Second, by providing expertise and advice on the space weather environment that astronauts may encounter beyond low-Earth orbit. While not a science-driven mission, there may be an opportunity for doing some science.

There are challenging technical requirements as well as schedule and cost issues that require further investigation. SMD should provide support to the Human Exploration and Operations Mission Directorate (HEOMD) and the Space Technology Mission Directorate (STMD) in the 2013 summer feasibility study.

## NASA Advisory Council Finding

### NASA Technology Program

**Name of Committee:** Technology and Innovation Committee

**Chair of Committee:** Dr. William Ballhaus

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Finding:** NASA Technology Program

**Finding:** There is significant lag time between deciding to support a technology and flying it in a mission. Hence, the missions we are flying today have been enabled by technology investments made years ago. The NASA technology shelf has been depleted over the last decade due to a lack of investment. NASA has begun to correct this over the last three years with the formation of the Office of Chief Technologist (OCT) and the Space Technology Mission Directorate (STMD). This has been supported by senior government decision-makers in the Agency and within the Administration.

The Council commends Dr. Gazarik, Dr. Peck, and their teams for rebuilding a program that effectively fosters technology development and innovation, especially in a challenging budget environment. We need to sustain and grow STMD's technology program (in accordance with the Strategic Space Technology Investment Plan – SSTIP) to continue to enable future NASA missions.

## NASA Advisory Council Finding

### Collaboration of Center for the Advancement of Science in Space and National Space Biomedical Research Institute

**Name of Committee:** Commercial Space Committee

**Chair of Committee:** Ms. Patti Grace Smith

**Date of Council Public Deliberation:** April 25, 2013

**Short Title of Finding:** Collaboration of Center for the Advancement of Science in Space and National Space Biomedical Research Institute

**Finding:** The Council finds that the Center for the Advancement of Science in Space (CASIS) does not currently have a Memorandum of Understanding (MOU) for collaboration with the National Space Biomedical Research Institute (NSBRI). The results from NSBRI's support of human research which addresses future exploration risks could be assessed by CASIS for their potential to expand non-NASA-sponsored utilization of the International Space Station (ISS).

There is synergy between the missions of CASIS and NSBRI, whose responsibilities are to enhance the non-exploration related research uses of the ISS and lead a national effort to conduct the integrated, critical path, biomedical research necessary to support long-term human presence, development and exploration of space and enhance life on Earth by applying the resulting advances in human knowledge and technology respectively. They should be aware of each other's programs and work together to ensure the successful, sustainable, scientific research and technical output of the ISS. There is potential for these two organizations to miss opportunities to collaborate in areas of common interest without an MOU.