

National Aeronautics and Space Administration
Office of the Administrator
Washington, DC 20546-0001



July 15, 2013

Dr. Steven W. Squyres
Chairman
NASA Advisory Council
Washington, DC 20546


Dear Dr. Squyres:

Enclosed are NASA's responses to the nine recommendations from the NASA Advisory Council meeting held April 24-25, 2013, at NASA Headquarters. Please do not hesitate to contact me if the Council would like further background on the responses. I appreciate the Council's thoughtful consideration leading to the recommendations and welcome its continued findings, recommendations, and advice concerning the U.S. civil space program.

I look forward to working closely with you and members of the Council in the future.

Sincerely,



Charles F. Bolden, Jr.
Administrator

Enclosures:

- 2013-01-01 (HEOC-01) Demonstrate and Articulate the Justification and Strategy for NASA's New Asteroid Initiative
- 2013-01-02 (AC-01) Unmanned Aircraft Systems in the National Airspace System Project Demonstration Mission
- 2013-01-03 (SC-01) Recovering the Planetary Exploration Program
- 2013-01-04 (SC-02) Augmented Search for Small Asteroids
- 2013-01-05 (CSC-01) Space Act Agreement Internal Coordination
- 2013-01-06 (CSC-02) Explore Expanded Use of Cooperative Research Development Agreements
- 2013-01-07 (EPOC-01) Separation of Vision and Mission
- 2013-01-08 (EPOC-02) Transitional Year for Education and Public Outreach
- 2013-01-09 (EPOC-03) Remove Restrictions on NASA Center Education and Public Outreach Spending

NASA Advisory Council Recommendation

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

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 Response:

NASA concurs with the recommendation of the NASA Advisory Council.

NASA's FY 2014 budget proposes an innovative asteroid initiative which leverages on-going investments in space technology, science and space exploration in order to make simultaneous progress toward a range of goals, including:

- Advancing technologies and capabilities applicable to future exploration, as well as science, commercial and other U.S. Government space activities;
- Integrating these efforts to lead to the first-ever human mission to an asteroid; and
- Accelerating efforts to improve detection, characterization, and mitigation of potentially hazardous asteroids to help plan for the defense of our planet against the threat of catastrophic collisions.

Enclosure

Each of the leveraged activities individually provides technology advancements or new capabilities for human exploration, science and commercial applications, and include:

- Asteroid identification and characterization efforts for potential hazardous asteroids;
- Advanced high power solar electric propulsion for future robotic missions, human space exploration, and commercial applications;
- Autonomous guidance and control for deep space proximity operations and capture;
- Exercising Space Launch System and Orion crew vehicle initial capabilities; and
- Technologies for deep space astronaut extra vehicular activity (EVA).

The initiative enables both the Grand Challenge, to “find all asteroid threats to human populations and know what to do about them” and an integrated asteroid mission, composed of three separate and independently compelling elements: the detection and characterization of candidate near-Earth asteroids; the robotic rendezvous and redirection of a target asteroid to the Earth-Moon system; and crewed exploration and sampling of the captured asteroid using the Space Launch System (SLS) and the Orion crew vehicle. This mission represents an unprecedented technological challenge — raising the bar for human exploration and discovery, while helping protect our home planet and bringing us closer to a human mission to Mars in the 2030’s.

The necessary search for a suitable target asteroid will provide a significant increase in the discovery rate of NEOs along with an associated increase in the characterization of this population. Our greater understanding of small bodies in Earth’s vicinity would benefit planetary defense activities; which aligns perfectly with the goals of the Grand Challenge. Those near Earth objects that are most easily reached by spacecraft are the same objects that represent the greatest likelihood of striking Earth. A better understanding of this population would benefit both planetary science and planetary defense.

Through the Grand Challenge, NASA will expand upon current efforts to enhance capabilities to detect, track and characterize hazardous near Earth asteroids and plan mitigation responses. Central to the Grand Challenge is the use of innovative methods like crowd sourcing, prizes and challenges, citizen science, and public/private partnerships to leverage NASA’s planned investments and meaningfully engage the public.

The asteroid redirect mission utilizes human space flight capabilities currently under development in important ways during early operations in the early 2020’s. Astrodynamically stable regions in the lunar vicinity offer locales for early operations in deep space environments. Interactions with an asteroid in this region will allow NASA to test and gain operational experience in proximity operations and rendezvous with a non-cooperative target, astronaut experience in complex EVA, and sample collection, handling and return.

In addition, these locales offer an ideal venue for initial crewed operations in regions in which returns to Earth are impossible for many days. This will stretch our human space flight capabilities in a safer approach than very long journeys of many months to a year. This allows NASA to gain experience in practicing aborts and contingency procedures, and handling maintenance and repair, including with EVA.

These activities will keep the U.S. in the forefront of peaceful uses of outer space, complement scientific investigations and technology demonstrations on the International Space Station, and provide valuable experience in mission planning and operations to prepare and reduce risk for future crewed deep-space missions, such as a future human mission to Mars. We are currently working on an analysis of the technologies and capabilities planned for and operational experience gained in this mission, albeit in early planning stages, and how they would be a stepping stone to NASA's goal of a human mission to Mars.

Continued progress on the mission is conditional upon identification of a technically and programmatically feasible concept. NASA anticipates completing this summer (2013) an internal review of the asteroid redirect mission to assess technical and programmatic aspects of the mission. Budgetary findings of this review will be integrated into budget planning for FY 2015 with other priorities. Based on the results of this summer's review and the further maturation of this mission concept, NASA will continue to evolve the story of this asteroid mission, the broader asteroid strategy, and how these build toward our future in deep space exploration.

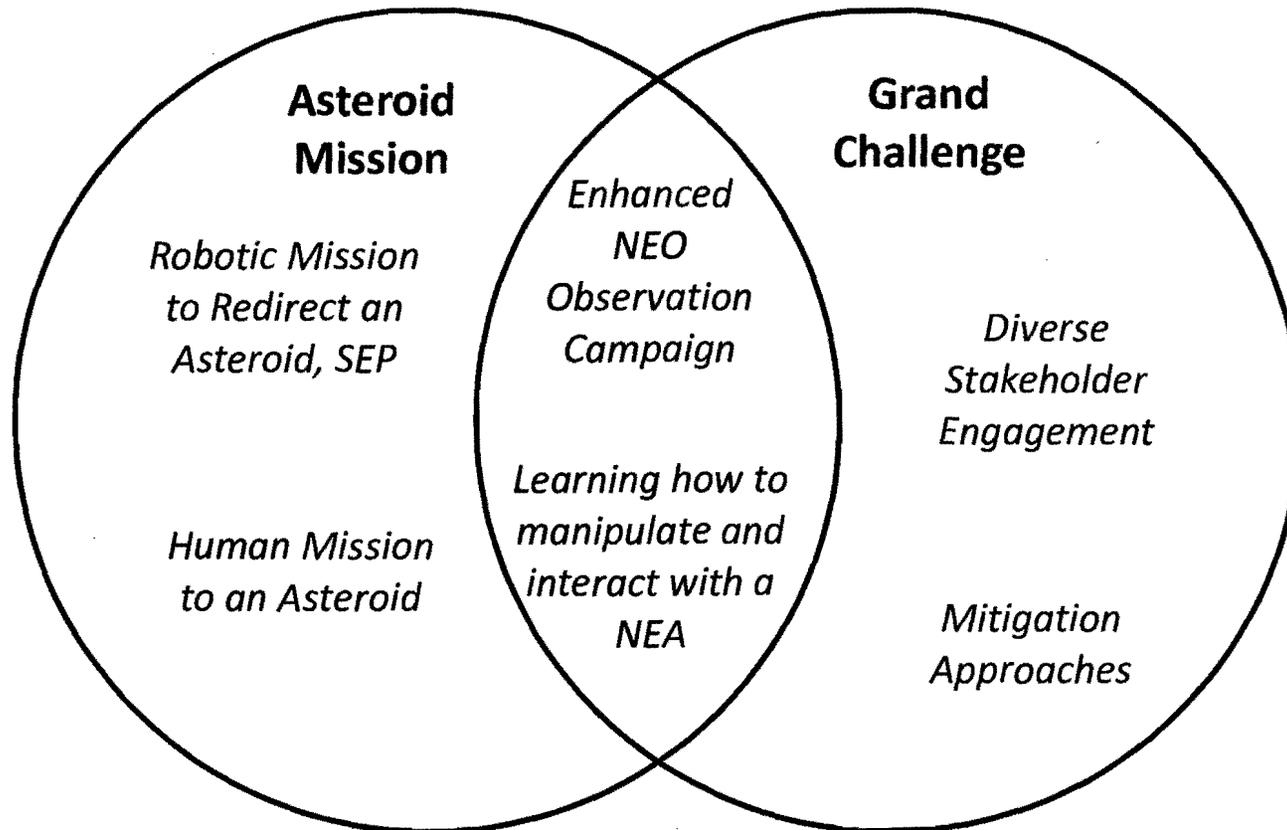
Announcement of the Grand Challenge has already engaged members of the public looking to participate in the exciting work of NASA. A fall workshop will bring together those with great ideas to assist in the development of an implementation plan for the Grand Challenge. Nominally, a Grand Challenge has a 10-15 year time horizon, so in the near-term the planning budget will be baselined at FY 2014 levels.

We would like to offer a briefing on the Asteroid Initiative to the NASA Advisory Council at its next meeting.

FY14 Asteroid Initiative

- **NASA has a broad asteroid strategy which aligns relevant portions of NASA's science, space technology, and human exploration capabilities for a human mission, advanced technology development, efforts to protect the planet, and engages new industrial capability and partnerships**
- **The FY14 Asteroid Initiative consists of two mutually supporting activities, both leveraging on-going activities to:**
 - **Redirect a small asteroid to a stable orbit in trans-lunar space, followed by sampling by astronauts in early operations of Orion and SLS.**
 - **Lead an effort to find all asteroid threats to human populations and know what to about them.**
- **This initiative includes a parallel, forward-looking mission development approach, partnership opportunities (nationally and internationally), open innovation, and participatory engagement.**

FY14 Asteroid Initiative: What and How



Both sets of activities leverage existing NASA work while amplifying participatory engagement to accomplish their individual objectives and synergize for a greater collective purpose.

NASA Advisory Council Recommendation

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

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 Response:

NASA concurs with the recommendation. The UAS Integration in the NAS Project is in the process of designing the Capstone Demonstration to be flown during Phase 2 of the project. This will most likely occur during FY16. The project presented a summary of progress to date to the NAC Aeronautics Committee’s UAS Subcommittee during a briefing at NASA Headquarters on May 21, 2013. The briefing included specific objectives, success criteria, and resource requirements. In addition, the project presented three candidate Capstone Demonstration scenarios and an assessment of the three candidates against specific phases of flight. An important topic during the Capstone Demonstration discussion was related to whether the Demonstration should be flown in restricted airspace or in the National Airspace System. This is a key question to be answered that affects the pathway forward to get approval to actually fly the Demonstration and will be addressed as we continue to evaluate each of the various scenarios. The project will look at a variety of pros and cons for each scenario, including high-level evaluation of objective satisfaction, cost, benefit, and risk. The project will follow up with a briefing to the Subcommittee currently scheduled for mid-July 2013 with a definitive proposal to the Subcommittee.

Enclosure

NASA Advisory Council Recommendation

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

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 Response:

The FY 2014 budget request reflects difficult budget decisions in a very difficult budget environment that are consistent with the Administration's priorities. The FY 2013 budget process concluded very late this year, and the referenced changes in the FY 2013 budget were not signed into law until March 26, 2013, after the FY 2014 budget request had been finalized and nearly six months into FY 2013. The FY 2013 enacted appropriation was also subject to a rescission and a reduction due to sequestration. These changes are reflected in the operations plan that was delivered to Congress in May 2013. NASA will use the approved FY 2013 funding for Planetary Science and the outcome of the FY 2014 appropriations process to inform its future planning with respect to the formulation of the FY 2015 budget request.

NASA Advisory Council Recommendation

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

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 Response:

NASA concurs. NASA's plans for implementing the enhanced asteroid detection and characterization activities called for in the President's FY 2014 budget request are being formulated with this broader goal in mind. In addition to finding asteroids of appropriate size in support of NASA's Asteroid Retrieval Mission, NASA will also be discovering near-Earth asteroids of much larger size, thereby increasing the overall rate of discovery.

NASA Advisory Council Recommendation

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

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 Response:

NASA agrees that these issues need to be addressed. The NASA Office of General Counsel has recently briefed this NASA Advisory Council (NAC) recommendation to the senior team leads in the Office of the NASA Administrator responsible for working this issue. This team reports to NASA Deputy Administrator Garver and Associate Administrator Lightfoot to address NASA Headquarters guidance, governance, and the process for partnership activities. The team is implementing a strategic approach to partnering, following a briefing Deputy Administrator Garver gave to the NASA Strategic Management Council (SMC) in January 2013. The NASA Executive Council (EC) is currently scheduled to review and approve some aspects of the team's recommendations early July 2013, with the remainder to be briefed to the SMC in late July 2013.

Because this activity is still being worked and has not yet been approved by the EC nor the SMC, NASA is currently not in a position to communicate its final response concerning this NAC recommendation at this time. NASA would be pleased to brief the NAC on this recommendation after July 2013.

Enclosure

NASA Advisory Council Recommendation

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

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 Response:

NASA concurs with the recommendation as noted below:

- The Council recommends that NASA explore expanded use of CRADAs with its commercial partners.

NASA concurs. The Agency has already begun steps to put in place expanded use of CRADAs. In October 2011, the Mission Support Council approved the request of the Office of Chief Technologist (OCT) and Office of General Counsel (OGC) to delegate the authority to negotiate, execute, amend, and terminate CRADAs with domestic entities to the Center Directors. This was recommended with the consensus of the Center Directors to increase technology transfer and commercialization at NASA consistent with the NASA Strategic Plan and Presidential guidance (See October 2011 Presidential Memo, "Accelerating Technology Transfer and Commercialization of Federal Research in Support of High Growth Businesses.") OGC and OCT issued a draft NASA Policy Directive (NPD) and is completing a Program Information Package that will be released this summer/early fall, coincident with the NPD delegation policy explaining to Centers how to implement CRADA processes to ensure efficiency and consistency across the Agency. Training will also be provided to the Centers with the goal of having wider use of CRADAs to encourage economic growth and stimulate innovation while meeting Agency mission needs.

- The Council recommends identification of 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.

NASA concurs. The appropriate office for that role is within OCT, which currently administers the Agency's technology transfer program in conjunction with OGC. This recommendation will supplement OCT's existing analyses of technology transfer and commercialization activities, including an annual report on technology transfer-related partnerships that is provided to the Office of Management and Budget and published by the National Institute of Standards and Technology. In addition, the NASA Technology Transfer System (NTTS), a workflow tool for managing all of NASA's technology transfer and intellectual property management activities, will be updated to include CRADA tracking, and metrics will be posted online quarterly at <http://technology.nasa.gov>. In addition to these tools, NASA's Technology Transfer Program Executive will be responsible also for specifically addressing on a semiannual basis for provision to the NAC: the elements included in the NAC recommendation related to the number of active CRADAs, their success, and the overall benefits of promoting CRADAs.

NASA Advisory Council Recommendation

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

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 Response:

NASA is in the process of re-evaluating the vision and mission statements contained in the 2011 Strategic Plan. To this end, NASA has set up a cross-Agency Team, including representation from mission directorates and offices at HQ as well as Centers. The Team has performed an in-depth assessment of the 2011 vision and mission statements in light of external subject matter expert input, benchmarking with other institutions, and best practices. The Team has formulated several options. One option for the mission statement is to add the words “space” and “aeronautics.” For the vision, the Team has crafted several different options according to guidelines received by the Agency leadership:

- Maintain the current 2011 vision statement and add a memorable motto/slogan;
- Maintain key elements of the 2011 vision statement, but add a preamble to make it specific to NASA; and
- Focus less on the existing vision statement and more on developing a motto/slogan.

NASA will consult each of its Centers to ask for their input for the options. Then, the Team will work with the NASA Communications Coordination Council, chaired by the Associate Administrator for Communications, to incorporate the Center inputs into specific wording proposals and better integrate them into the overall Strategic Plan narrative. Final decisions on the options will be made by the Agency senior leadership before the final submission of the Strategic Plan in the fall of 2013.

Enclosure

NASA Advisory Council Recommendation

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

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 Response:

NASA's Office of Education appreciates the support and insight of the NASA Advisory Council; however, NASA non-concurs with the recommendation. Consistent with the Administration's plan, NASA's Office of Education will lead the Agency's coordination with other Federal agencies in pursuit of the Administration's Science, Technology, Engineering and Mathematics (STEM) education goals. NASA will strive to maintain the best of these activities, which provide unique NASA experiences and resources to students and faculty.

NASA's education portfolio will focus on four priorities, which will contribute toward the Administration's goals for STEM education: STEM Engagement, NASA Internships, Fellowships and Scholarships, Educator Professional Development, and Institutional Engagement. In a new approach, NASA will consolidate the education functions, assets, and efforts of the Mission Directorates, Offices, and Centers into a single coordinated STEM Education and Accountability Project.

Enclosure

As part of NASA's STEM interagency coordination effort, NASA will ensure that the Agency's assets are put to use effectively in support of the STEM activities that will be directed by the National Science Foundation, the Smithsonian Institution, and the Department of Education. NASA will make its rich content knowledge and other assets available to these agencies as they facilitate Federal STEM education activities through the Administration's Committee on STEM Education (CoSTEM) process for agency coordination, bringing NASA's inspirational activities to a broader audience. This includes the infrastructure necessary to support the rigorous collection, evaluation, and dissemination of evidence of NASA's contributions towards the achievement of the wider STEM goals.

Representatives from the 13 Federal agencies are meeting to ensure that the Federal assets entrusted to each agency are coordinated and put to best use in support of the Nation's educators and learners. NASA is committed to close collaboration with other STEM agencies and to inspiring future generations to seek careers in aerospace.

NASA Advisory Council Recommendation

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

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 Response:

NASA’s Office of Education appreciates the support and insight of the NASA Advisory Council; however, non-concurs with the recommendation. Consistent with the Administration’s plan, NASA’s Office of Education will lead the Agency’s coordination with other Federal agencies in pursuit of the Administration’s Science, Technology, Engineering and Mathematics (STEM) education goals. NASA will consolidate the education functions, assets, and efforts of the Mission Directorates, Offices, and Centers into a single coordinated STEM Education and Accountability Project. NASA will strive to maintain the best of these activities, which provide unique NASA experiences and resources to students and faculty.

Through the Education Coordinating Council, NASA will coordinate activities, and ensure that NASA focuses on its two key strengths: 1) engaging undergraduate and graduate students in internships and fellowships; and 2) providing opportunities for participatory and experiential learning activities that connect learners, educators, and communities to NASA-unique resources. In addition to the activities directly funded by NASA, the Agency will ensure that its people, facilities, and assets are available for use in the STEM consolidation effort.

Enclosure