

NASA ADVISORY COUNCIL
National Aeronautics and Space Administration
Washington, DC 20546
Dr. Kenneth M. Ford, Chairman

November 4, 2008

The Honorable Michael D. Griffin
Administrator
National Aeronautics and Space Administration
Washington, DC 20546

Dear Dr. Griffin:

Enclosed are the NASA Advisory Council recommendations as agreed to in a public meeting on October 16, 2008 held at the Hilton Cocoa Beach, FL. Prior to the meeting, members received a tour of the Kennedy Space Center and used the OSBII facility to hold Committee fact-finding meetings. Ms. Janet Petro and her staff should be commended for their hospitality and hard work.

The Council had a very productive day of deliberations with three recommendations and one observation we believe will be of assistance as NASA continues its implementation efforts of the Vision for Space Exploration. We are not expecting a formal response to the observation, but wished to merely emphasize our assurance in this area. The Council will continue to monitor and consider future recommendations that may be of assistance to you.

Ad Hoc Biomedical Committee Recommendation

1. **Convene a workshop to seek broad community input to the crew radiation health risks associated with Constellation missions:** Based on reviews of the radiation risks presented in fact-finding sessions at the July NAC meeting, a recent report from the NRC, and informal input from several sources in the radiation scientific community, the NASA Advisory Council recommends that NASA sponsor a NAC-convened workshop to assess both current knowledge and the research plan to address the health risks associated with human space flight beyond Low Earth Orbit. Such review must be timely in order to inform both vehicle and operational requirements for the preliminary and critical design reviews (i.e., PDR and CDR) for Orion and Altair.

Science Committee Recommendations

1. **Enhancing communication between NASA and the lunar science community in planning for science activities in lunar exploration:** A formal mechanism should be established to enhance communication between the Optimizing Science and Exploration Working Group (OSEWG) and the lunar science community through coordinated interaction with the Lunar Exploration Analysis Group (LEAG).
2. **Obtain Minotaur launch vehicles as a gap-filler:** NASA should work with the Office of Science and Technology Policy and the Department of Defense to obtain Minotaur launch vehicles to launch science missions. This capability would fill the gap until new commercial vehicles are available to provide launch services on a reliable, routine basis.

Exploration Committee Observation

1. **Evaluation of Ares Progress:** Given the quality of NASA's analysis and the project's momentum, it is imperative to maintain stability and continuing progress on execution of the current plan. The Ares project is well underway with an established baseline and provides a solid foundation for the Constellation Program. The current Exploration Program has strong and accelerating international support and participation.

If there are any questions on the proceedings of our meeting, please contact me.

Best Regards,

A handwritten signature in black ink, appearing to read "Ken M. Ford". The signature is written in a cursive style with a large initial "K" and a long horizontal stroke at the end.

Ken M. Ford
Chairman
Enclosures

NASA Advisory Council
Council Recommendation
[Tracking Number B-08-01](#)

Committee Name: Ad Hoc Biomedical Committee

Chair: Dr. David Longnecker

Date of public deliberation: October 16, 2008

Date of transmission: November 4, 2008

Short title of the recommendation

Convene a workshop to seek broad community input to the crew radiation health risks associated with Constellation missions.

Short description of the proposed recommendation

The committee recommends a workshop that would bring together the leaders in space radiation physics, physiological effect of radiation, and countermeasure development, both within NASA and in the wider scientific community. The workshop could be limited in number of participants but representative of the broader scientific community that explores radiation biology, in order to inform NASA's current plans and to further engage this community in protecting crew health (similar strategies are used in other areas such as cardiovascular, musculoskeletal and behavioral health, for example). Overall, the workshop might follow the model of the Lunar Biomedical Workshop (Houston, June 2007) in size and composition. That workshop provided valuable guidance to NASA and energized the scientific community for further research in crew health and safety.

Major reasons for proposing the recommendation

NASA has consistently performed well-respected work and planning in the area of radiation research. However, due to both costs and limited access to radiation technology, this work has involved a relatively small number of investigators. Thus a recent NRC Committee concluded "*The committee finds that lack of knowledge about the biological effects of and responses to space radiation is the single most important factor limiting the prediction of radiation risk associated with human space exploration*" (Managing Space Radiation Risk in the New Era of Space Exploration, National Academies Press 2008). The essence of the scientific method involves hypothesis proposal and testing, followed by broader input, critique and validation by others. The proposed workshop would strengthen and inform NASA's efforts in radiation biology, especially at a time when the engineering and operational requirements are being developed for both the crewed spacecraft and the crew operations associated with the Constellation program.

Consequences of no action on the recommendation

The design reviews for the Constellation crew vehicles, Orion and Altair, and the operations planning for Constellation-class missions, are now scheduled for late 2009 and early 2010. Many consider radiation to be the most critical human health risk in plans for extended or permanent human activities on the Moon. Missing the steps of input, critique and validation in the radiation planning cycle could lead to subsequent increased costs for redesign and/or lost opportunities to enhance countermeasure development that would mitigate radiation hazards, especially those hazards associated with galactic cosmic radiation, and/or to more conservative than necessary restrictions on human activities in space.

NASA Advisory Council
Council Recommendation
[Tracking Number S-08-04](#)

Committee Name: Science Committee

Chair: Dr. Jack Burns

Date of public deliberation: October 16, 2008

Date of transmission: November 4, 2008

Short title of the recommendation

Enhancing communication between NASA and the lunar science community in planning for science activities in lunar exploration.

Short description of the proposed recommendation

A formal mechanism should be established to enhance communication between the Optimizing Science and Exploration Working Group (OSEWG) and the lunar science community through coordinated interaction with the Lunar Exploration Analysis Group (LEAG).

The LEAG and OSEWG should coordinate a workshop in conjunction with a regular meeting of the LEAG or other appropriate conference to review NASA's ongoing implementation of the lunar exploration architecture, including the development of Surface Science Scenarios and implementation of responses to previous recommendations of the Council.

Major reasons for proposing the recommendation

The OSEWG and other elements of lunar exploration planning, including elements of the Constellation Program, are making significant progress in responding to recommendations regarding science activities and priorities within the lunar exploration architecture. One of the keys to a successful exploration program that also optimizes scientific return is continuing feedback between the science community and the Constellation Program. Such interactions will ensure that the lunar exploration architecture enables the potential to address key science questions, as laid out, for example, in the NRC study report on *The Scientific Context for the Exploration of the Moon* and priorities as given in the NAC report of the *Workshop on Science Associated with the Exploration Architecture*. The LEAG is the principal forum for science community planning. The OSEWG should participate at regular intervals in science forums, e.g., at major scientific conferences in lunar and planetary science, heliophysics, astrophysics, and Earth Science to enhance exchange with the scientific community that will constitute the main stakeholders in the lunar exploration program.

Consequences of no action on the recommendation

In the absence of this recommendation, there exists a serious risk that the scientific value of the return to the Moon will be limited by architecture decisions made in isolation from science needs.

NASA Advisory Council
Council Recommendation
[Tracking Number S-08-05](#)

Committee Name: Science Committee

Chair: Dr. Jack Burns

Date of public deliberation: October 16, 2008

Date of transmission: November 4, 2008

Short title of the recommendation

Obtain Minotaur launch vehicles as a gap-filler.

Short description of the proposed recommendation

NASA should work with the Office of Science and Technology Policy and the Department of Defense to obtain Minotaur launch vehicles to launch science missions. This capability would fill the gap until new commercial vehicles are available to provide launch services on a reliable, routine basis.

Major reasons for proposing the recommendation

All four of NASA's science areas face challenges in obtaining reliable launch services for medium-class payloads given the pending retirement of the Delta-II. New commercial vehicles in this class are under development, but it will be several years before they are available for routine purchase and use for NASA science missions. DoD's Minotaur 4/5 launch vehicles could be an important resource to fill the gap until new commercial vehicles are available. NASA has arranged for launch of the Lunar Atmosphere and Dust Environment Explorer (LADEE) mission on a Minotaur vehicle from Wallops Island.

Consequences of no action on the recommendation

NASA will face a lack of viable, cost-effective alternatives to launch medium-class science missions to space until such time as new commercial vehicles are available. Many of NASA's planned missions are in this class.