

## **Findings of the Lunar Exploration Analysis Group Annual Meeting October 2013**

### ***LEAG Executive Committee:***

The suggestion was made to add an additional member to the Executive Council to represent the space physics community. Jasper Halekas was asked to join the committee and accepted.

### ***Discovery Missions:***

LEAG and the lunar community are concerned about the fading possibility of a Discovery mission in the near future. The cost of the Mars 2020 mission, and other missions under development (e.g., James Webb Space Telescope), in addition to a declining budget, appear to eliminate the possibility of devoting any resources to a Discovery Mission in the immediate future. The Decadal Survey indicated that Flagship Missions should not consume so large a fraction of the budget so as to preclude Discovery Missions. While one might argue that Mars 2020 is not a "Flagship Mission" but part of the Mars program, the cost of the mission is in the same category and the effect is the same. The question must be asked: Is Mars 2020 the most important mission for the Planetary Science Division to undertake, to exclusion of other planetary missions (including those that are active, e.g., Cassini, MSL, LRO)? We would say not and strongly suggest that balance be maintained in the Planetary Science Division mission portfolio.

### ***Research and Analysis:***

The Lunar Quest program is being canceled at the same time as data continue to be acquired (e.g., LRO) and a new spacecraft has just begun its mission (LADEE). In addition, the Chinese are about to send a lander/rover mission. Cancellation of this program and the concomitant reduction in the potential for lunar science analysis seems surprising and inappropriate.

### ***Resource Prospector Mission (RPM):***

The objectives and rationale for the RPM mission are not well understood by LEAG or the lunar community. The agency apparently plans to spend some \$275M on the mission, with the expectation that the lander and the rover will be provided by sources outside of NASA and at no cost to NASA. It is unclear if this mission is considered a technology demonstration or a science mission (science is used here in the context of a mission whose goals are primarily scientific in which the mission design and payload are tailored to understand specific questions). Given the limited capability of the mission, there is a concern that the results may be out of context and provide no real insight into lunar volatiles, or worse, provide an incorrect picture. There does not appear to have been any interaction with the lunar science community and virtually all of the science-related activity has occurred completely within the Ames Research Center. We believe the mission and NASA would be better served by a broader participation in the definition of the goals and mission design for the RPM mission. LEAG would be happy to create a SAT to assist in such an effort.

***China:***

While LEAG recognizes that NASA is precluded from bilateral activities with the Chinese, the perception within the community is that NASA will take action against anyone who engages with the Chinese. Statements to the effect of "NASA will take away my research grant if I talk to the Chinese." and "NASA will cancel LPI's contract if the Chinese are invited to LEAG" have been made. Clearly the restrictions regarding the use of NASA money must be followed, but individual personal interactions should not be precluded. Clarification on these issues leading up to and following the imminent Chinese mission are requested.

A second issue with respect to China is the impact of the Chang'e 3 mission on the LADEE mission. NASA should explore an exemption from the legislation to allow it to understand the aspects of the Chinese mission that will impact LADEE. An example is the amount, composition, and timing of propellant burns in the lunar environment. Given that the best current estimate of when the landing will occur (December 2013), these communications need to occur immediately.

***Global Exploration Roadmap (GER):***

LEAG has prepared a statement supporting the general outline of the GER document (attached below). We note that the Moon is important in expanding our capabilities of Solar System exploration. We further indicate that understanding the potential for lunar ISRU should be part of the GER. While lunar (and other) science is not discussed in the Roadmap, this appears to be beyond the scope of the current document.

***International Lunar Science Goals Meeting:***

There have been considerable advances in our understanding of lunar science as the result of new data provided by the recent suite of missions. Those data have also raised new questions, particularly with respect to volatiles at the lunar poles and lower latitudes.

The United States developed the Scientific Context for Exploration of the Moon (SCEM) document in 2007. Since that time, our understanding of Moon has significantly changed. We suggest that the goals and objectives outlined in the US National Academy SCEM report be revisited to formally internationalize it and reflect our current understanding. To this end, we propose an international conference of lunar scientists, the objective of which is to examine the outstanding questions of lunar sciences and to formulate a revised set of goals and measurement objectives.

***LEAG Flyer:***

The LEAG Executive Committee prepared a flyer for general distribution illustrating the importance of the Moon in terms of enhancing further exploration of the Solar System and international cooperation. A draft version of the flyer was posted on the LEAG website for community comment. The revised version will also be posted and will be available for download. The target audiences for the flyer include NASA, Congressional members and staff, and the general public.

***Conference Approval and Travel:***

While we understand the constraints that the budgetary sequester has had on NASA and that the agency has had to establish processes to reduce costs, the restrictions on travel are creating unnecessary confusion and wasting time. The primary issue is not that travel restrictions are occurring, although this is detrimental as well, but the seemingly ad hoc nature in which travel is evaluated and meetings are approved. It appears that each potential meeting is a unique event in terms of requirements, timing, and authorization.

The LEAG meeting is an example. Over the course of several months there was repeated interaction with Mike Wargo regarding whether the meeting needed approval, and who the approving official would be. Apparently there was never a formal decision until late in the process. And even after the decision, the Chair of LEAG was not informed and the Jet Propulsion Laboratory continued to insist that it did require approval. It would be extremely helpful if a clear and concise policy and instructions could be published to allow for planning.

Prepared by Jeff Plescia, LEAG Chair

## **LEAG Statement Regarding the Global Exploration Roadmap**

The Lunar Exploration Analysis Group supports the strong and appropriate endorsement of lunar exploration in the Global Exploration Roadmap (GER) prepared by the International Space Exploration Coordination Group in August 2013. The document provides an excellent overview of plans for exploration in the coming decades. But, we believe that the GER should specifically address the importance of understanding the potential of *in situ* lunar resources as a mechanism to expand the opportunities for Solar System Exploration. In particular, we encourage the United States to ensure the continuation of the Lunar Reconnaissance Orbiter mission as well as take specific, near-term steps to systematically address the lunar Strategic Knowledge Gaps through the execution of lunar precursor missions following the recommendations outlined in the GER.