

NASA Advisory Council Subcommittee Recommendation

Subcommittee Name: Planetary Science

Chair: Sean Solomon

Date of Public Deliberation: 7 October 2007

Date of Transmission to Science Committee: 15 October 2007

Short title of the proposed Recommendation:

Maintaining focus on the priorities of the Vision for Space Exploration

Short description of the proposed Recommendation

The PSS recommends that the NAC take steps to ensure that in planning for the return to the Moon, NASA keep its highest-priority goals in sharp focus. These top-priority goals should include science as well as technology and operations development relevant to the ultimate goal of a crewed mission to Mars. To this end, the PSS recommends that:

- science should be considered a high priority in the site selection decision for a lunar outpost,
- NASA should review the Lunar Precursor Robotic Program after LRO with the aim of devising innovative routes (e.g., international or commercial participation, individual state involvement) to undertake robotic exploration missions needed to initiate the next era of lunar and solar system exploration, including ISRU demonstrations, and
- the LEAG should be directed to prepare a “Lunar Goals Roadmap,” which will include not only science goals for lunar exploration but will also highlight needed technology developments, “on-ramps” for commercial and international participation, and a “feed forward” focus on the exploration of Mars as beyond.

Major reasons for proposing the Recommendation

LEAG expressed the concern that the original Vision for Space Exploration may have become blurred during the lunar exploration architecture planning process. This impression was conveyed in several ways at the LEAG meeting. In presentations on the latest report of the Lunar Architecture Team (LAT), it was unclear how the lunar outpost would become sustainable to allow for extended stays on the lunar surface (instead it appeared as though everything for life support would have to be taken from Earth for every trip to the Moon). The lunar lander was described as having a much reduced cargo capacity (700 kg to the lunar surface was the worst-case scenario) compared with earlier descriptions. The role of international participation was unclear (this perception was voiced by international representatives on the first morning of the meeting; there is a desire to collaborate but NASA has been sending mixed signals as to when agreements might be discussed). There seemed to be no “feed forward” to Mars in the latest LAT report (LAT-2), a situation highlighted by the fact that LAT-2 does not include in situ

resource utilization (ISRU) in the critical path, despite the fact that a consensus at the LEAG meeting was that ISRU is essential for outpost sustainability and for feed-forward to Mars.

Moreover, not all potential outpost sites will yield a comparable variety of compelling science, as documented in the LAT and National Research Council reports on lunar exploration. Because science is expected to be the dominant activity of outpost astronauts, according to LAT estimates, science must be included in lunar outpost site selection.

Consequences of no action on the proposed Recommendation

Without the robust participation of the science community, the implementation of the Vision for Space Exploration could suffer a major loss of broad support; the lunar exploration program would certainly be much less valuable to the current and future science and exploration communities.