

# Session 1 Summary: Update to Flexible Path Vision

William Gerstenmaier (NASA AA, HEOMD): *Asteroid Redirect Mission and Human Exploration*

Michael Moloney (Director, SSB/NRC): *NRC Study on Human Spaceflight*

Kathy Laurini (NASA HEOMD): *The ISECG Global Exploration Roadmap*

Session chairs: Doug Stetson (Independent) and Cheryl Reed (APL)

# Session 1 Summary

## Key points from presentations and Q & A:

### William Gerstenmaier:

- An overview of ARM was provided. An exciting technology demonstration concept, it is intended to be capability driven towards an ultimate Mars destination. Use of existing technology investments will be leveraged. 2016 final target selection, goal for 2017 launch to enable Mars mission in 2030's. Will likely need to build the spacecraft prior to a target selection. This would likely drive a spacecraft overdesign to support multiple mission scenarios. The differences of the missions are so extreme (free-space target, boulder on a rubble-pile), it is acknowledged that a decision needs to be made "soon" as to which mission scenario will be pursued.
- **Q&A:** Potential for higher costs, including a need for a larger, more costly LV given the inability to optimize to a point design. Needs to be clear how the capability story applies to future human interplanetary flight missions (and mission to Mars). How to balance risk/cost in such an environment? What is process by which these mission and spacecraft requirements will be developed? Note of extreme caution: Well-known that a lack of clear and specified requirements is the top culprit for driving-up (uncontrollable) mission cost. Need to define mission success criteria. Doubtful that not bringing an asteroid back would be seen as an acceptable success criteria. Need to define a realistic cost cap (which establishes a cost uncertainty range) and schedule.

# Session 1 Summary (Continued)

## Michael Moloney:

- An overview of studies undertaken by NRC/NAS to assess human exploration of space and its science and exploration contribution possibilities over last few decades was provided. The current study focuses on future relevance and focus of human space (what it should and should not be).
- **Q&A:** A report card on the progress of the program against the study's expectations is not done (vs. what is done for missions in SMD).

## Kathy Laurini:

- An overview of the Global Exploration Roadmap (GER) update was provided, and how ARM could fit into this architecture in an international cooperation construct. Been noted that international collaboration and contribution is key to a robust and sustained human exploration program. A human asteroid mission is not currently included in any other international partner's strategic roadmap as a destination. However, international partners do agree that the ultimate destination is to send humans to the surface of the Mars and ISECG notes the contribution that an ARM mission would make towards Mars.
- **Q&A:** Discussion of specific international cooperation on ARM has not yet occurred, however, it is likely that any contribution would come from existing partner efforts due to the highly compressed ARM implementation schedule.