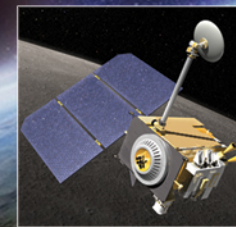
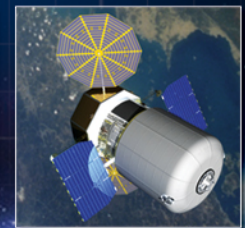




International Collaboration for Space Exploration

**Presentation to LEAG
Annual Meeting
Sept 14, 2010**

ESMD/J. Olson, K. Laurini,
C. Culbert





- ESMD International Engagement Overview
- Multilateral Initiatives
 - Global Exploration Strategy and the International Space Exploration Coordination Group (ISECG)
 - ISECG accomplishments and near term priorities
 - Maximizing use of the International Space Station
 - Opportunity provided with ISS extension
 - Seeking coordination between 5 ISS Partners and 14 ISECG members
 - Explore NOW Workshop
- Overview of Bilateral Initiatives
- Look Ahead

ESMD International Engagement Overview



- International engagement has remained a priority during the past year
 - Communication, advancing strategies that prepare for international cooperation in space exploration
- **Multilateral Engagement**
 - Communicating human and robotic mission plans to enable coordination and potential partnerships
 - Developing a common long term vision: The Global Exploration Roadmap
 - Leveraging technology investments
 - Maximize use of ISS as an exploration test-bed for exploration
 - Includes establishing functional mechanisms between ISS and exploration entities
 - Leveraging investments in capability developments in ways that are coordinated and interdependent, as appropriate
 - Creating opportunities for new partnerships
 - Continued involvement in human research forums such as International Life Sciences Working Group
- **Bilateral Engagement**
 - Ongoing exploration dialog with ISS partners: ESA, JAXA, CSA
 - Initiating dialog with Russia on certain topics
 - Pursuing opportunities with other partners

A Common Vision: The Global Exploration Strategy



- *The Global Exploration Strategy: A Framework for Coordination*
 - Documented in 2007 by 14 space agencies
- GES Vision
 - A globally coordinated human and robotic space exploration effort to destinations that humans will someday live and work
 - Delivers benefits in 5 thematic areas:
 - Science and Technology
 - Sustained Presence in the Solar System
 - Economic Expansion
 - Global Partnerships
 - Inspiration and Education
 - An evolutionary effort to enable extending human presence, benefiting from knowledge gained from human and robotic missions at the ISS, moon, asteroids and Mars
 - A coordination mechanism to promote the GES vision
 - International Space Exploration Coordination Group (ISECG)



To learn more: http://www.nasa.gov/pdf/178109main_ges_framework.pdf



- ISECG is a multi-lateral forum established to advance coordination of space exploration activities
- ISECG is committed to the development of products that enable participating agencies to take concrete steps towards multilateral or bilateral partnerships
 - Agencies participate in ISECG activities based on interest
- Principles
 - Non-binding
 - Open and Inclusive
 - Flexible and Evolutionary
 - Effective
 - Mutual Interest
- Open to any agency interested in working cooperatively to advance the Global Exploration Strategy





- Technical coordination in operation since end 2007
 - Workshops, telecons, as necessary for product development
 - Meetings at technical level roughly annually
- Agency management coordination
 - First meeting of Directors of exploration/human spaceflight in Washington, DC, June 23, 2010
 - Next meeting, June 2011 in Japan
 - Telecons as needed

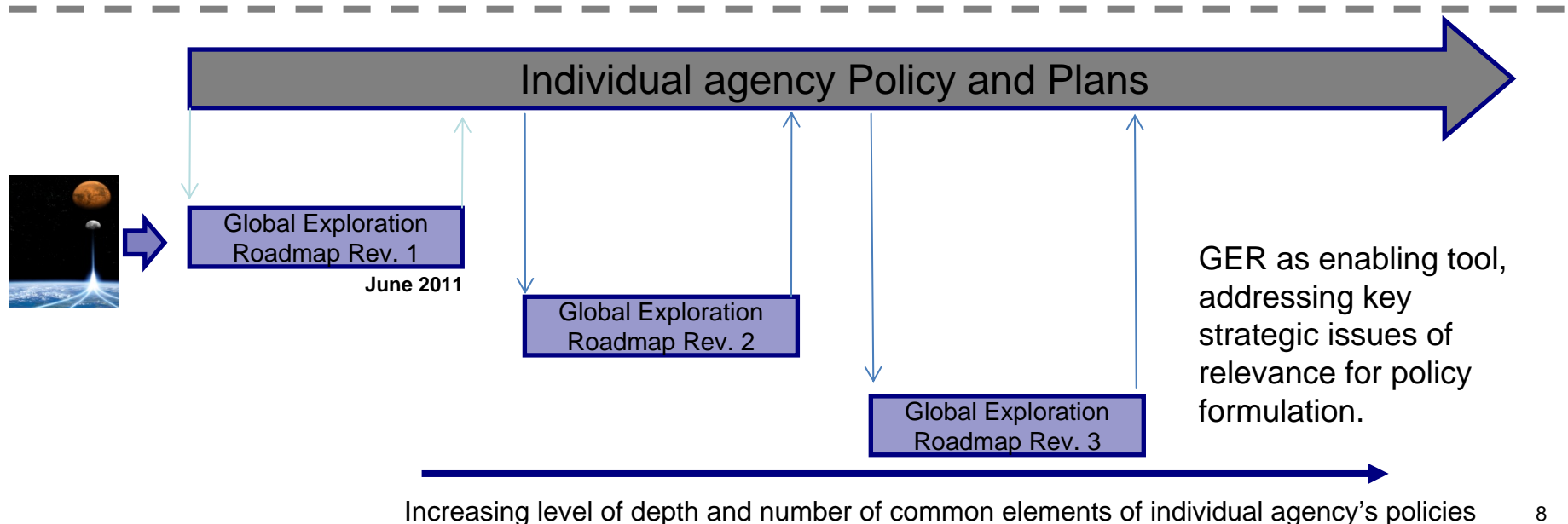


- ISECG Reference Architecture for Human Lunar Exploration
 - A conceptual architecture describing an international approach to human lunar exploration which includes a robotic precursor phase
 - Major findings:
 - Important to involve space agencies up front, allowing input to concept formulation
 - Demonstrate role of ISECG in informing partnerships/governance structures
 - Common reference to guide individual agency investments
- Common Goals for Human Lunar Exploration
 - Derived from individual agency objectives
 - Cross-cutting and compelling; linked to GES themes
- Enhancement of Public Engagement Working Group
 - Forum for sharing information on how to best reach all stakeholders
 - Strong interest in ensuring space exploration delivers value to all stakeholders
 - Developed ISECG Informational Brochure for distribution at IAC Prague

The ISECG Global Exploration Roadmap



- Key tool for advancing common global strategy, enabling alignment of agency policy and plans
- Illustrative, high-level plan of missions towards exploration destinations
 - Reflecting firm agency plans, as well as strategic consensus on next steps
- Merges capability and mission based approach to exploration
- Demonstrates how near term activities prepare future human mission scenarios



Maximizing Use of International Space Station

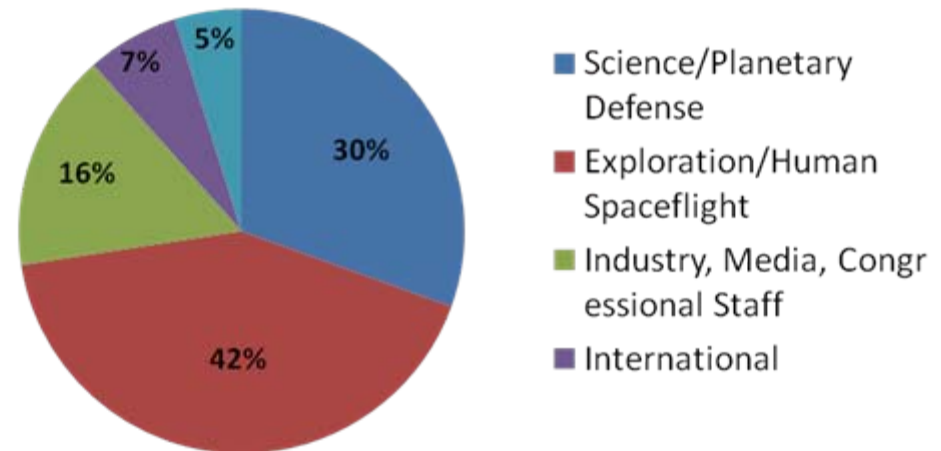


- Opportunities created with impending decision to extend ISS lifetime to 2020 and beyond
 - Human research informing exploration risk reduction
 - Technology development and demonstration
 - Operations concept demonstration
- Near term priority for ISS Partnership and ISECG
 - MCB action
 - ISECG Senior Agency Management key message
- Working to establish mechanisms to coordinate efforts to
 - Demonstrate role ISS is currently playing and will play in enabling exploration beyond LEO
 - Identify additional ISS activities to contribute to exploration risk reduction, close technology gaps
 - Identify technology demonstration opportunities for non-partner participants
- ISECG Global Exploration Roadmap likely to play a role

Explore NOW Workshop



- High level of interest and participation
- 175 on-site participants from Academia, Industry, International, other Federal Agencies and NASA
 - International attendees from CSA, DLR, ESA, JAXA and KARI



Web stream: Approximately 1700 hits

- 103 concurrent viewers
- 10 countries with most connections - USA, Russian Federation, China, United Kingdom, Czech Republic, Germany, Netherlands, Ukraine, Canada and Japan

Bilateral Engagement



- Terrestrial analog activity cooperation with CSA, DLR, ESA
- Technology development information exchanges with DLR, CNES, ESA, JAXA
- Regular bilateral dialog with partners
 - Technology demonstration cooperation
 - Robotic precursor cooperation



- IAC Prague
 - “Advancing the Global Exploration Strategy” Plenary Session at IAC Prague
 - Cooke (NASA), Leclerc (CSA), DiPippo (ESA), Hasegawa (JAXA), Parker (UKSA), Lee (KARI)
 - Communicating the role/importance of GES and ISECG
 - Sharing importance of ISECG Lunar Reference Architecture
 - Introducing the Global Exploration Roadmap
 - Multiple papers on ISECG Reference Architecture for Human Lunar Exploration to be presented by international team members
 - www.iac2010.cz
- HEFT and agency decision making on future programs/technology priorities will inform international engagement priorities
- Continue multilateral and bilateral engagement to advance partnerships in the near term and in the future