



Exploration Strategy Workshop

Introduction and Overview

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The Process



- **Information Gathering**

- This week's workshop
- NASA's Exploration Strategy Request for Information (RFI)
- Participating Agency Inputs
- Studies (Participants are encouraged to share copies of material they have generated in the past)

- **Strategy Development and Refinement**

- Accurately capture and integrate the inputs received into an initial product
- Seek involvement from participating Agencies through upcoming meetings and conferences (US and International)
- Interim products will be developed at regular intervals
- Opportunity provided for review by stakeholders community
- Participating agencies can use these opportunities to internally review the draft strategy within their agency

- **Final Product**

- The final product will be an Integrated Global Lunar Exploration Strategy describing:
 - Themes; Major focal areas of lunar exploration
 - Objectives; Specific achievable task areas that support defined themes
 - Strategy; Time phased strategy for accomplishing defined objectives with key milestones and decision points

Workshop Overview



- **Participants Invited**
 - ~60 International guests representing 12 countries
 - ~ 15 Non-NASA Federal Employees
 - ~ 45 Private Sector guests
 - ~ 16 Academic participants from universities throughout the United States
 - ~ 25 NASA Civil Servants
- **Your input is important**
- **Commercial, International, and Science representation**
- **This is the beginning; The process will continue, ideas will mature**
- **Expect many objectives**
- **For Exploration of the Moon to be sustainable, the end state will not be defined by NASA, but by the commitment and participation of many entities, commercial, international, etc.**

Workshop Goals and Objectives



- **Develop a List of Compelling Ideas / Objectives**
 - Identify what might be possible
 - Inputs from all participants are valued
- **Develop scenarios of how objectives may play out**
 - Understand synergies and interdependencies between Ideas / Objectives
 - Leading to representative surface reference missions (to be developed outside the workshop)
- **Guidelines**
 - Think strategically
 - Focus on “what” needs to be done, rather than “how” to achieve it
 - Work across disciplines to identify synergies and potential conflicts between various lunar objectives
 - Get to know colleagues and their views across differing perspectives

Key Elements of the Final Strategy



The workshop will initiate the development of a global Space Exploration Strategy for future robotic and human missions. The objective is to integrate common interests and objectives of the participants into a comprehensive plan for exploration on the Moon, Mars, and beyond

- **Ensure the Moon is an integral part of a broader exploration strategy that encompasses Mars and other destinations**
- **Provide a strategy for lunar robotic missions to collect key strategic information and develop key capabilities to enable and enhance human exploration**
- **Provide a strategy for human missions that will enable us to live and work productively on other planetary surfaces**
- **Enable opportunities for international collaboration through merging of common interests in our respective strategic plans for exploration**
- **Characterize opportunities for science investigations**
- **Enable opportunities for lunar commerce**

NASA's Strategy



Vision

A Bold Vision for Space Exploration

The Fundamental Goal of This Vision is to Advance U.S. Scientific, Security, and Economic Interest Through a Robust Space Exploration Program

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond
- Extend human presence across the solar system, starting with a Human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- Develop the innovative technologies, knowledge, and infrastructure both to explore and to support decisions about the destinations for human exploration; and
- Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.

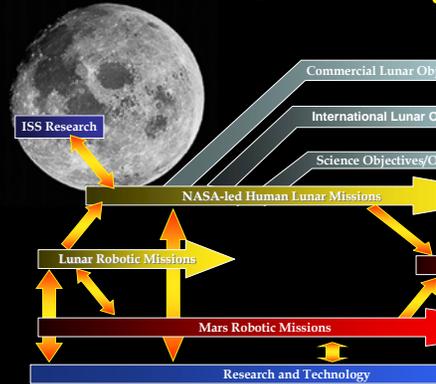


NASA Authority

The Administrator shall develop a sustained program including a robust program of exploration, science, and technology, and shall ensure the preeminence of space exploration in the future exploration of the solar system and beyond.

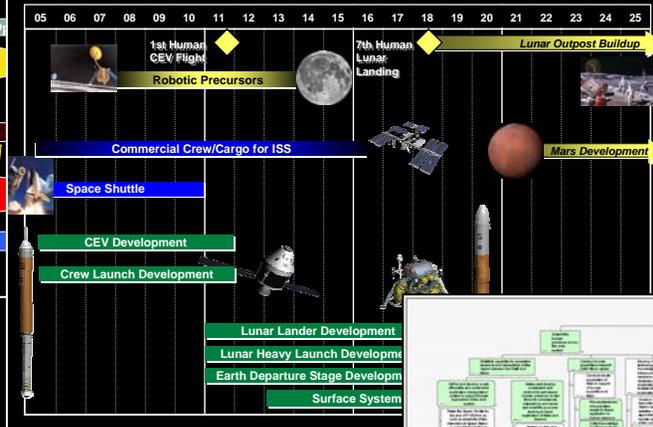
Strategy

Vision Leads to Strategy

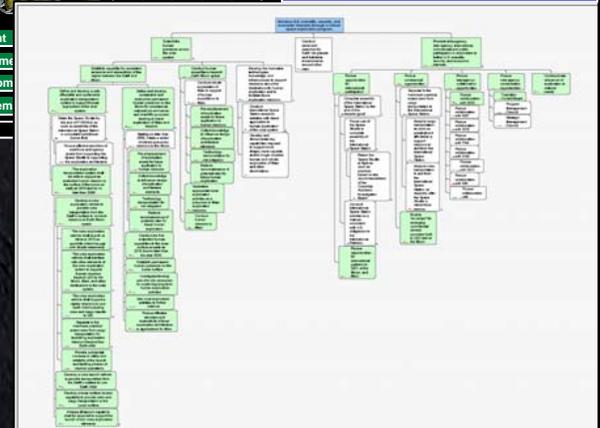


Architecture

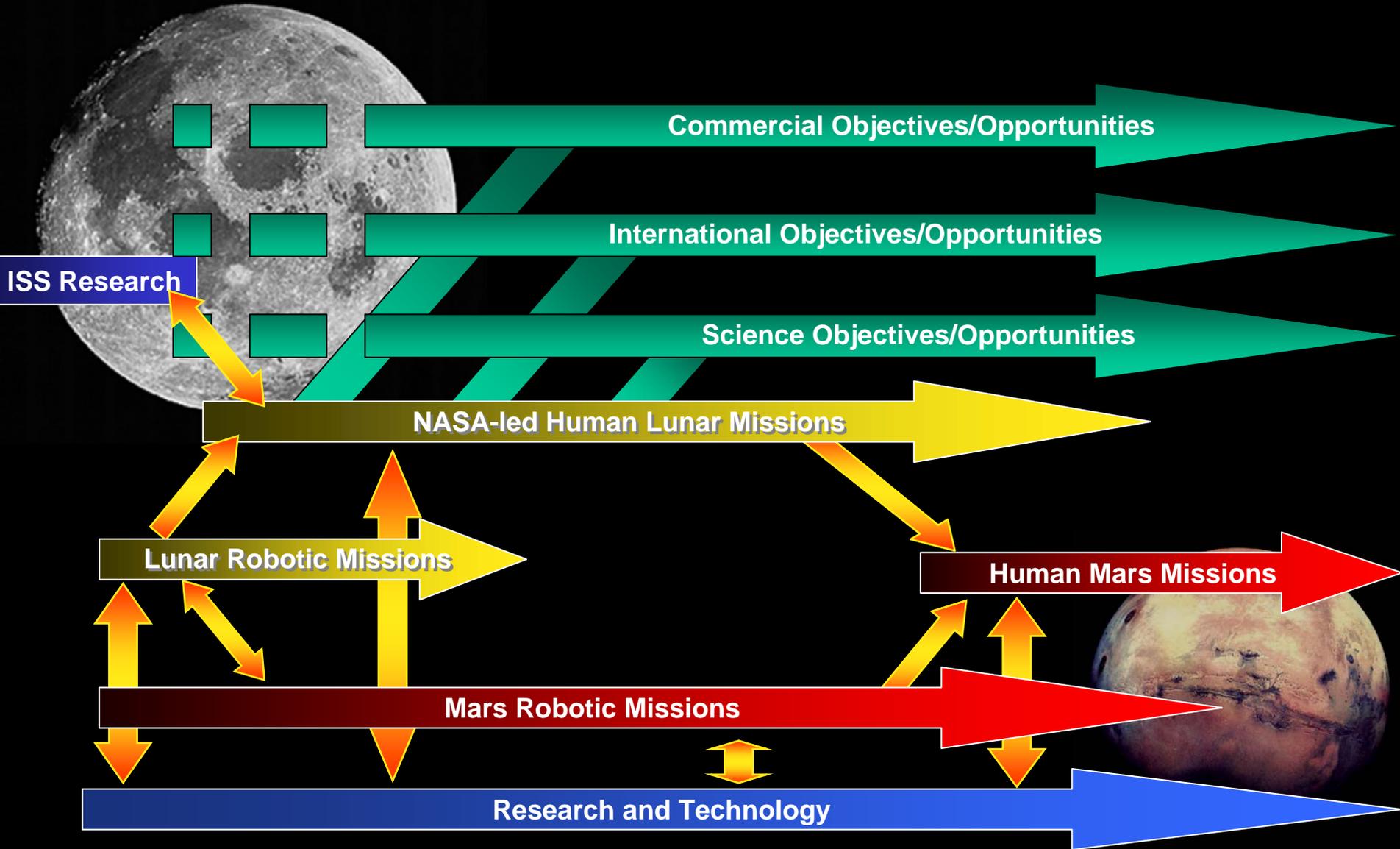
The Exploration Roadmap



Requirements



Vision Leads to Strategy



US Role in Exploration - Derived from the Vision

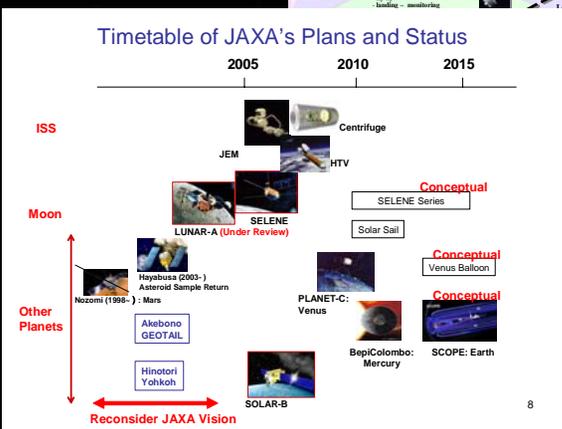
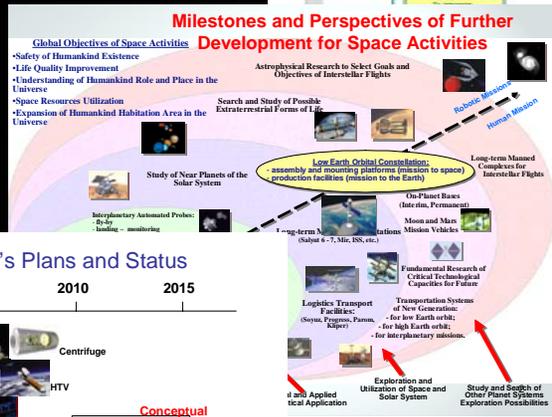
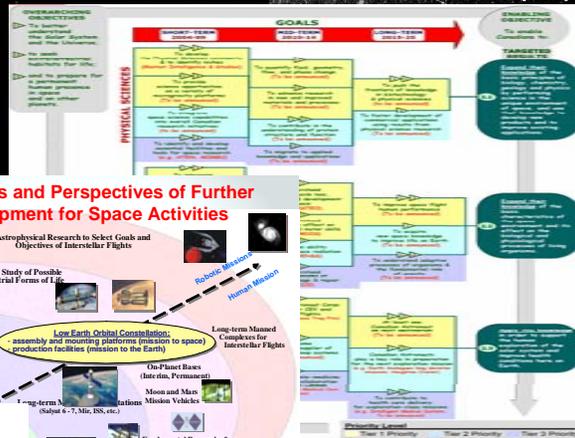
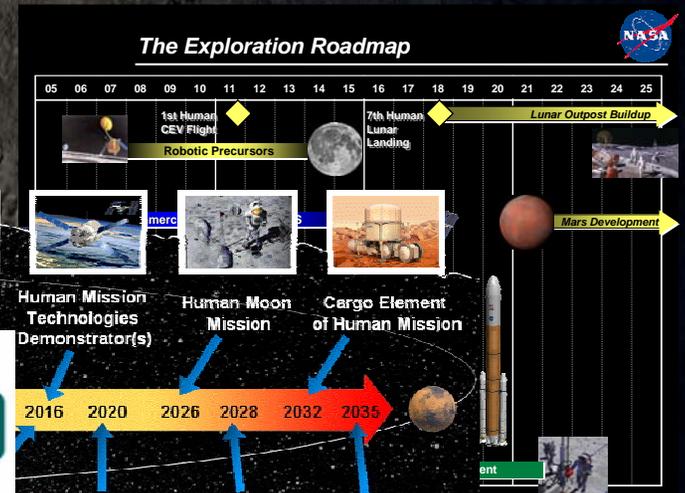


- **Leadership in US Exploration Strategy and Architecture Development-**
 - A collaborative effort
 - Identifying common interests with others
- **Provide the US Transportation and basic exploration infrastructure for long term exploration**
- **Extend operational experience in a hostile planetary environment**
- **Early US Robotic and Human mission definition**
- **Prepare for Human exploration of Mars**
- **Early experiments and demos to characterize the planetary environment and test feasibility of planned operations (ISRU for example)**
- **Provide Educational Benefits**
- **Provide and facilitate opportunities for :**
 - Science
 - Economic development
 - International participation



Maturing an Overall Strategy

Will work with International Entities to understand complementary interests and develop an overall strategy



Agenda for Today



Theme: Background and Perspectives

- **Plenary briefings will discuss recent exploration studies and activities**
- **Not intended to prescribe an answer**

• **Morning Session**

- Dr. Scott Horowitz - Current state of the NASA Exploration Architecture
- Questions for Morning Speakers – (time permitting)

• **Lunch**

• **Afternoon Session**

- Additional information on the state of lunar knowledge
- Examples of recent lunar and Mars strategies and planning studies
- Questions for Afternoon Speakers – (time permitting)

• **Evening Reception**

- Opportunity to dialogue with other workshop participants
- View the IMAX movie “Volcanoes of the Deep Sea”
- Discussion with Dr. Richard Lutz, the films chief scientist

Agenda for Days 2 - 3



Theme: Gather Information through breakout sessions

- **Goals of Breakout Sessions:**

- Collect ideas from participants
 - lunar exploration objectives
 - lunar exploration time-phased strategy
 - lunar exploration themes
 - lunar exploration enablers, issues, and constraints
- Identify key enabling objectives
- Identify synergies and interactions between ideas / objectives
- Take a multidisciplinary approach to lunar exploration

- **Workshop participants will divide into “Breakout Teams”**

- 20-25 individuals per team
- Team assignments were made in advance to provide a multidisciplinary makeup
- Badges are color-coded to identify teams
- Workshop Program defines where each group meets

- **Each Team will be facilitated by a Lead**

- Ensure all participants are able to provide input
- Ensure the group remains on track
- Supported by a team assistant



Breakout Team Leads

Green Team (Classroom A/B)	Dave Beaty
Gray Team (Classroom C/D)	Kate Maliga
Pink Team (Oceanic A)	Frank Schowengerdt
Purple Team (Oceanic B)	Laurie Leshin
Orange Team (Continental B)	Brent Sherwood
Brown Team (Continental C)	Marc Allen
Blue Team (Hemisphere B)	Wendell Mendell

Note: Breakout room assignments are also printed in your program and badges are color coded

Breakout Session Products



Each team will be chartered with the same task

1. Identify the breadth of objectives that could be accomplished as part of a lunar exploration strategy
2. Discuss the interactions and dependencies among these objectives to look at the drivers for phasing the execution of these objectives over time
3. Discuss the logical grouping of these objectives into high-level lunar exploration themes
4. Develop a list of the policy, technical, legal and other issues, enablers and constraints that they believe require further research as part of the development of a lunar exploration strategy

Breakout Session Process



- **Teams will be left to work on all products without interruption**
 - Breakfast and lunch will be available in breakout rooms
 - No interim products need to be generated
- **Participants are asked to stay with the team to which they have been assigned**
- **Workshop staff will float from team to team to assist in answering questions**

Agenda for Day 4



Theme: Workshop Summary and the Path Ahead

- **Closing Remarks**
 - The Honorable Shana L. Dale; Deputy Administrator, NASA
- **Breakout Group Briefings**
 - Each breakout team lead will be provided with an opportunity to brief all workshop participants on the ideas generated during their breakout activities
- **Forward Plan**
 - Mr. Doug Cooke; Deputy Associate Administrator for Exploration Systems, NASA
- **Adjourn**

Note: Workshop materials will be compiled on a CD and distributed to all participants in the weeks following the workshop

Summary



- **For Exploration of the Moon to be sustainable, the end state will not be defined by NASA, but by the commitment and participation of many entities**
- **Individual nations and commercial organizations will each choose to pursue programs of lunar exploration that reflect their specific interests and priorities**
- **Through gatherings such as this workshop, we may find that we have much in common with each other – and through these interactions, the seeds of future collaborative efforts may be born**

Workshop materials will be compiled on a CD and distributed to all participants in the weeks following the workshop