



Planetary Protection Subcommittee – Mars Brief

May 1, 2012



Doug McCuiston
Director, Mars Exploration Program

Mars Exploration Program

An Integrated, Strategic Program

2001



Odyssey

2003



Mars Express
Collaboration

2005



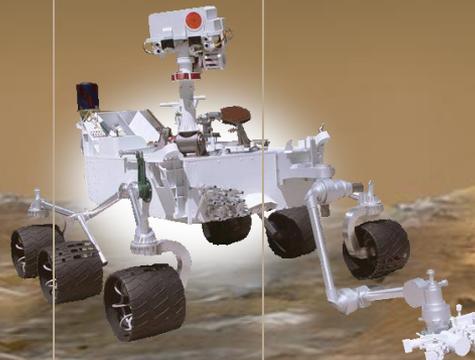
MRO

2007



Phoenix
(completed)

2009



MSL/Curiosity

2011



MAVEN

2013

2016 & Beyond

*Mars future
planning
underway!*

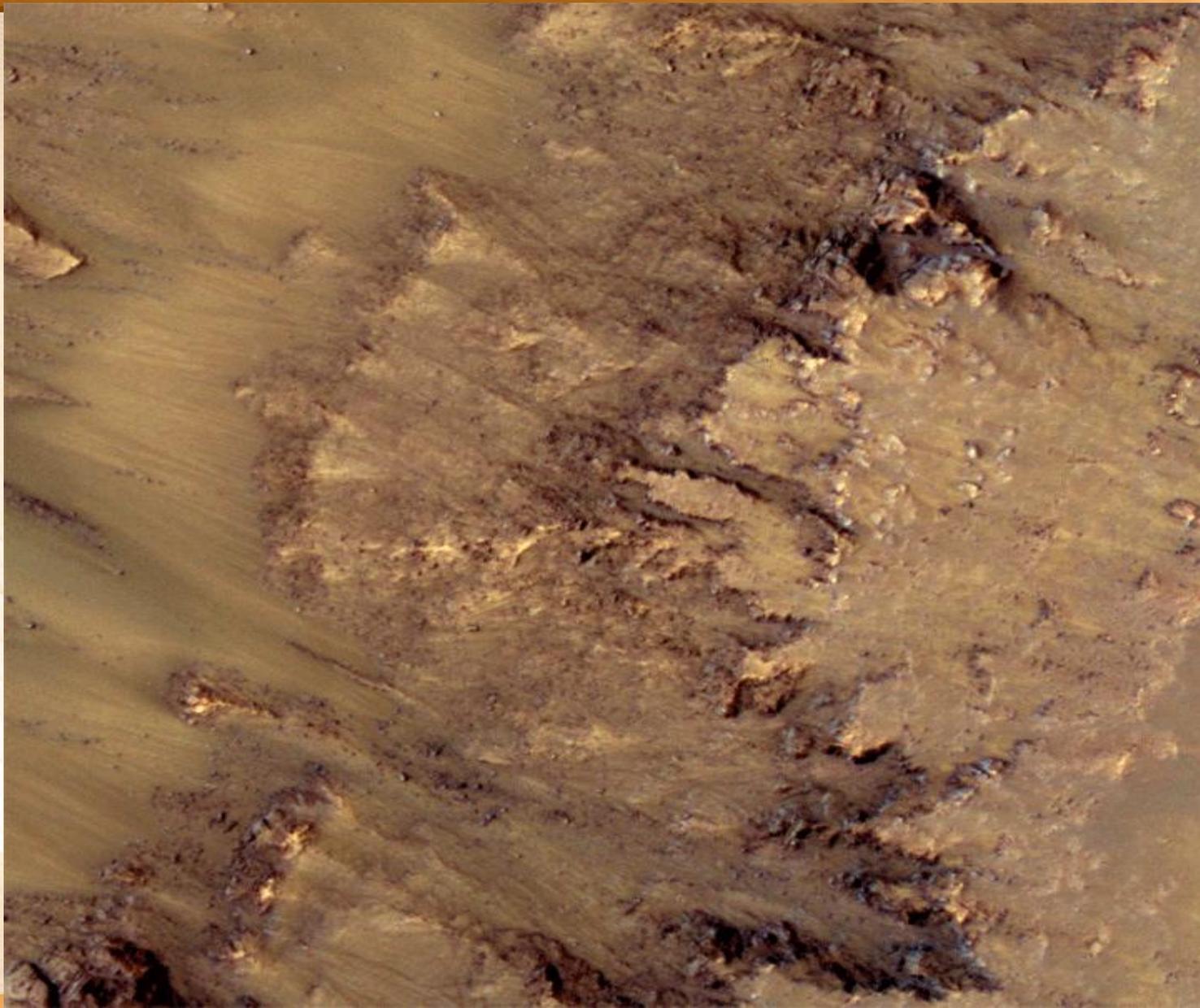
Spirit &
Opportunity





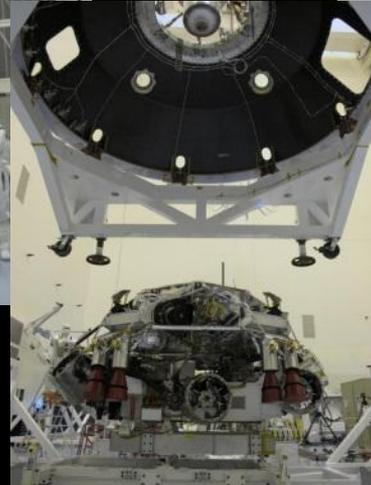
Martian Seasonal Flows

from MRO's HiRISE Imager



Curiosity





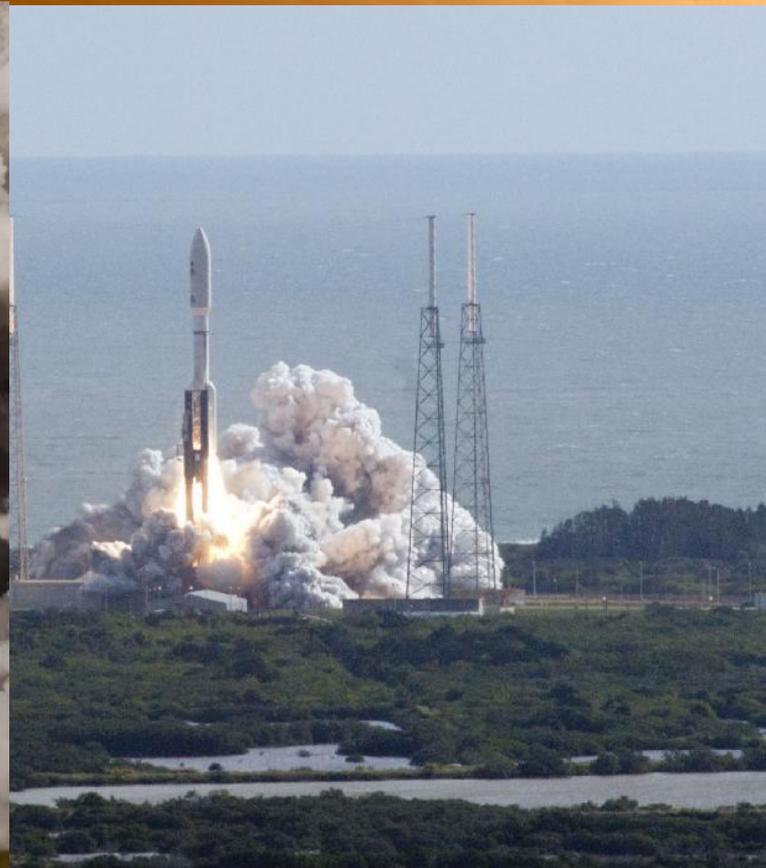
MSL/Curiosity



Final Stack

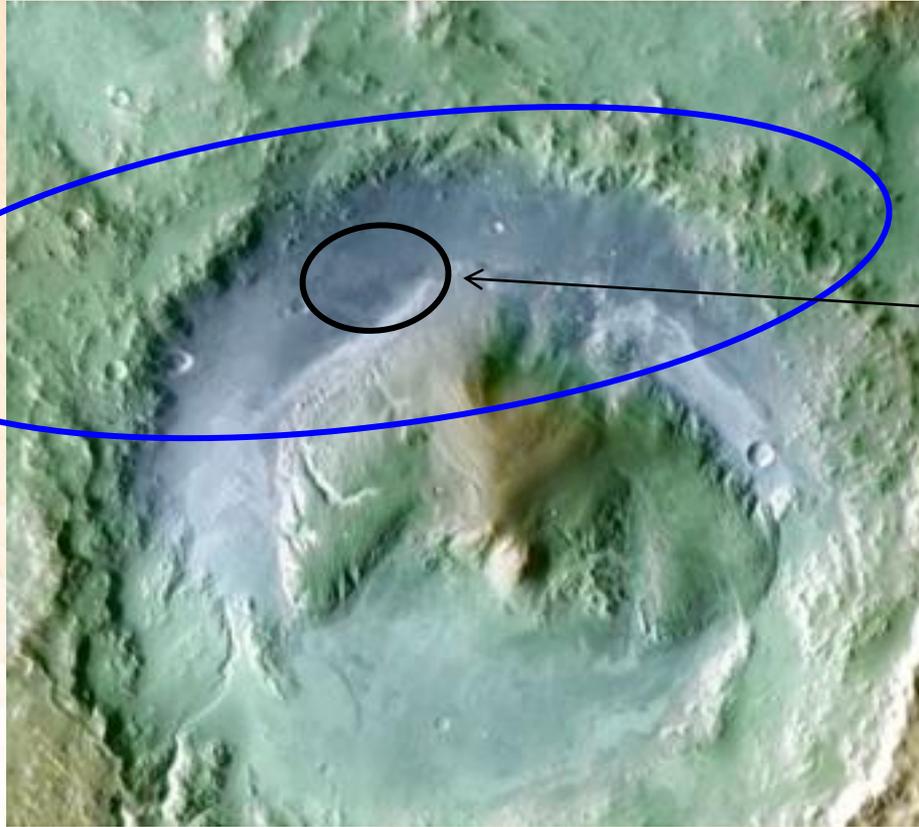


MSL/Curiosity Launch and Separation



The Advantage of Guided Entry (MSL and MER)

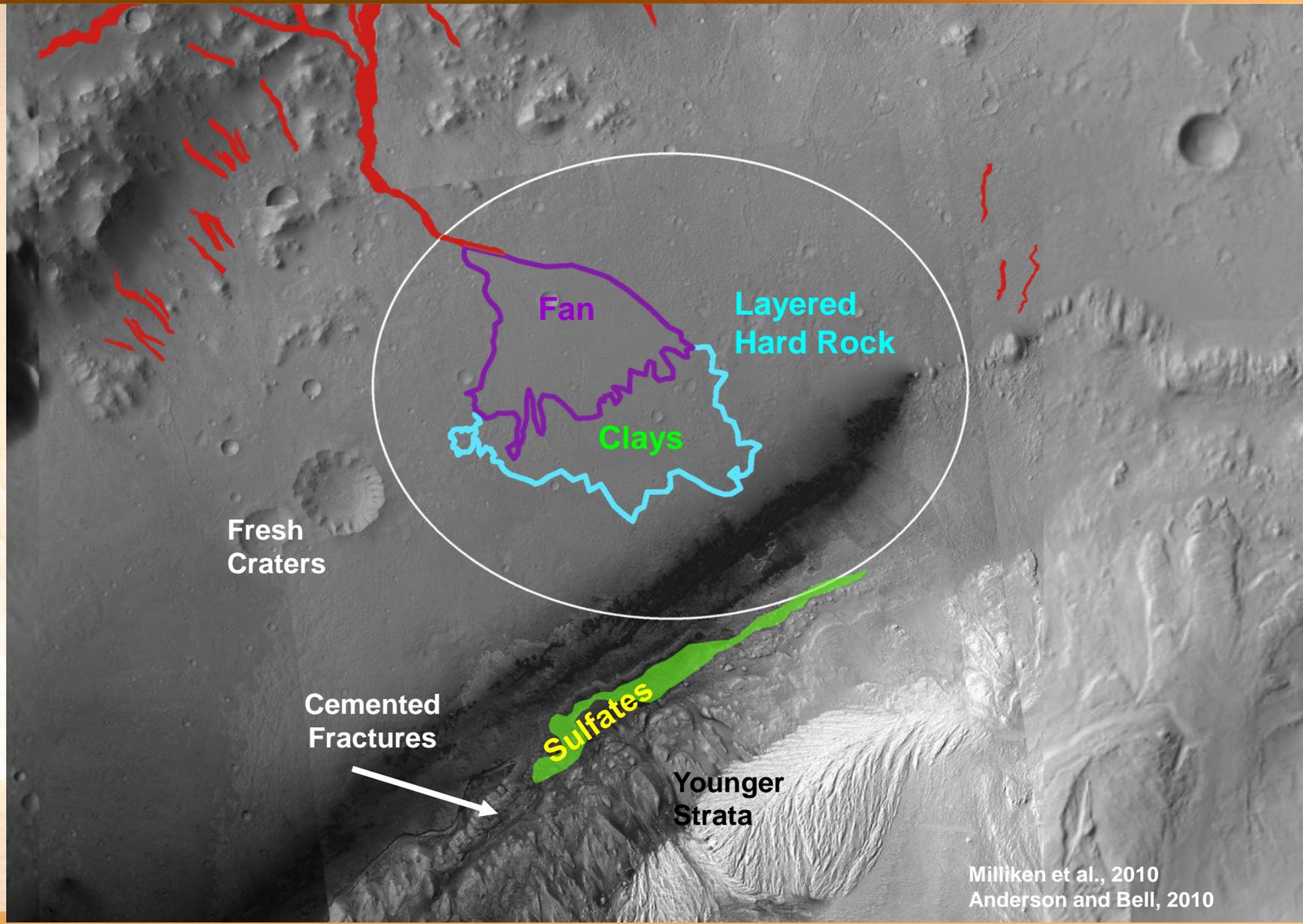
Approximate
MER Landing
Ellipse



**MSL
Landing
Ellipse**



Gale Crater



Fresh
Craters

Fan

Layered
Hard Rock

Clays

Cemented
Fractures

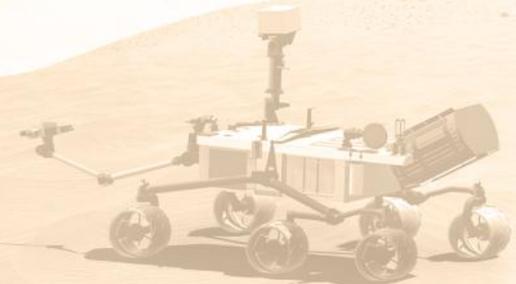
Sulfates

Younger
Strata

Moving into the Next Decade

Overview of MEP Reformulation Effort

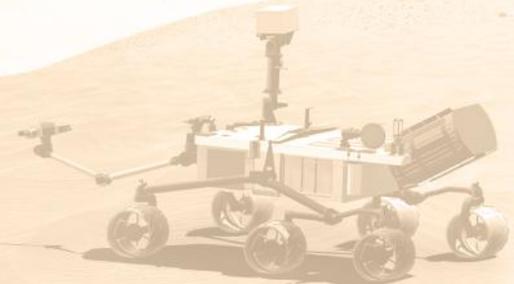
- NASA is committed to develop an integrated strategy to ensure that the next steps for the robotic Mars Exploration Program will support science, as well as longer-term human exploration and technology goals.
- In this context, NASA is developing a plan for a reformulated medium-class robotic Mars mission, within available resources
 - Taking advantage of the favorable location of Mars and Earth in the 2018 and/or 2020 launch opportunities.
- NASA's decisions on missions and sequence will be consistent with science and exploration program-level needs and requirements agreed upon between SMD/HEOMD/OCT.
 - Opportunities for technology infusion consistent with the long term goals of science and exploration
 - Technical, programmatic, and scientific risk reduction
 - Opportunities for collaboration, including international partners



Moving into the Next Decade

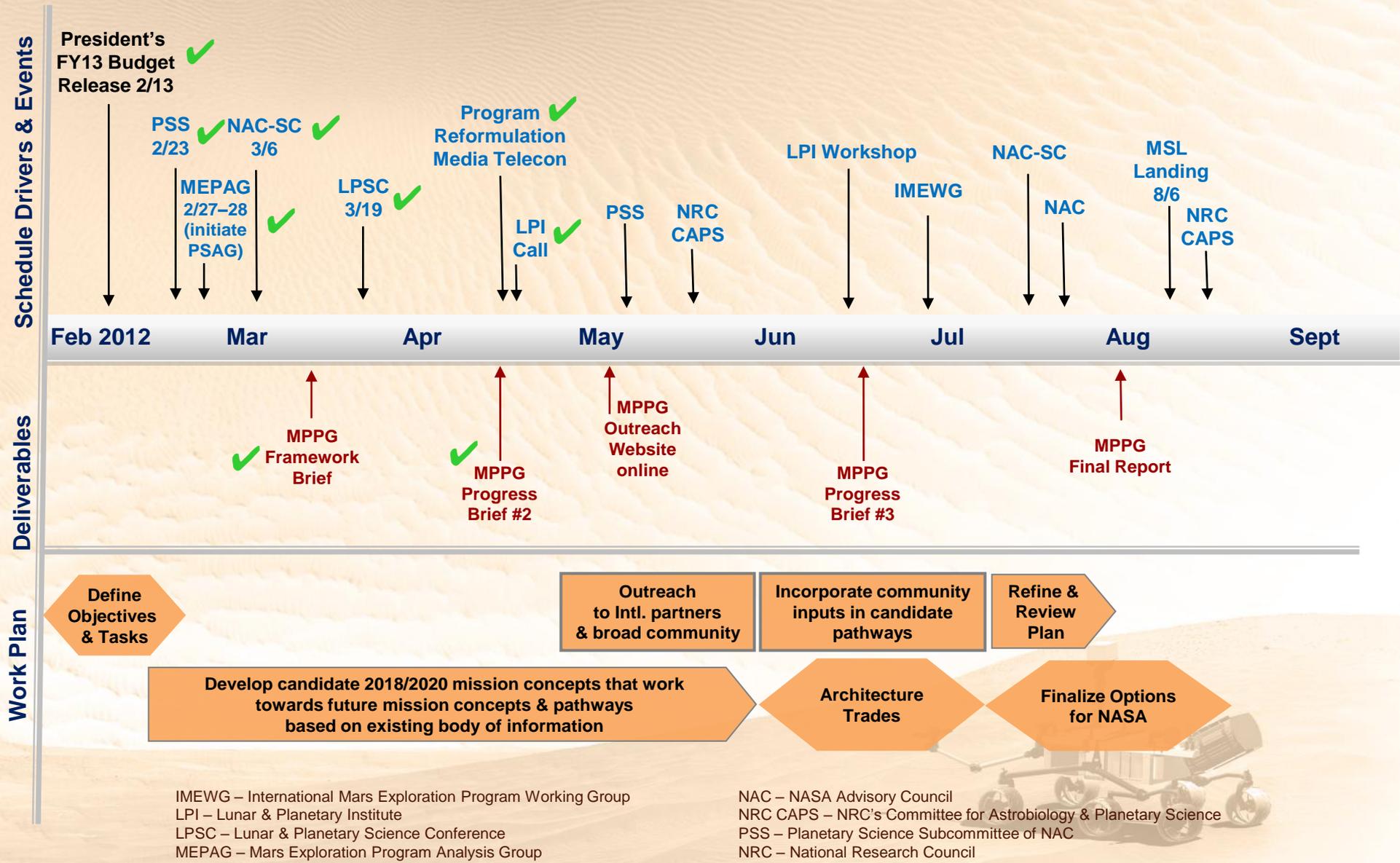
Overview of MEP Reformulation Effort

- To facilitate this reformulation, NASA has established the Mars Program Planning Group (MPPG)
 - Identify potential investigations and options in sufficient detail for NASA to be able to select and initiate a high pay-off mission aiming at the 2018/2020 timeframe consistent within available resources
 - Orbiters (e.g. morphology, mineralogy, shallow surface interrogation, and/or combination)
 - Landers (surface and subsurface sample access and analysis)
 - Develop options for a program-level architecture for future robotic exploration of Mars
 - Consistent with the President's challenge of sending humans to orbit Mars in the decade of the 2030s
 - Fully engage HEO and OCT to coordinate requirements to meet the Agency's goals
 - Respond to the primary scientific goals of the 2011 NRC Decadal Survey for Planetary Science
 - Remain consistent with the President's FY 2013 budget request.
 - Inform NASA's development of its FY 2014 budget submission.
- The MPPG will provide NASA with progress reports in April and June, culminating in a final presentation of options in August 2012



Mars Exploration Program Reformulation

FY12 Timeline & Milestones (dates are approximate; as of 4/30/12)



Mars Concepts & Approaches Workshop

Hosted by Lunar & Planetary Institute (LPI), June 12-14, 2012

<http://www.lpi.usra.edu/meetings/marsconcepts2012/>

WHAT

- Workshop forum organized by LPI for the community to discuss ideas and approaches for Mars exploration
- Includes both near-term (2018-2024) and mid- to longer-term (2024-2030s) timeframes
- Results will inform architecture trades by MPPG/MEP in June/July timeframe

WHY

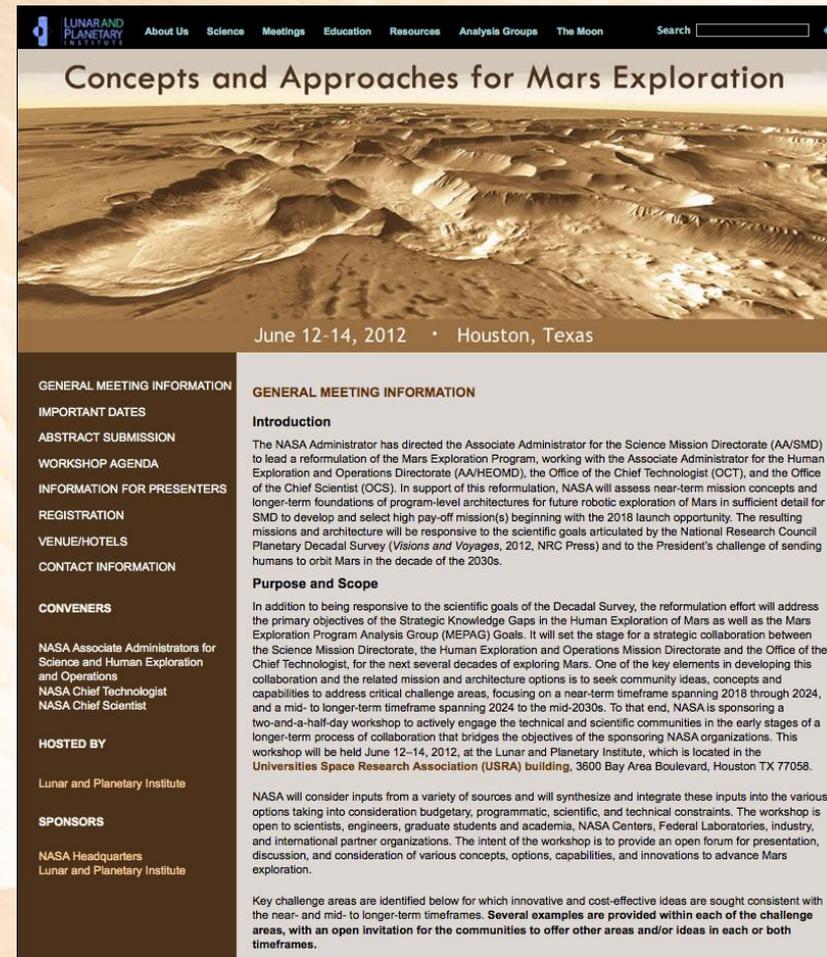
- To seek science, technical, industry, & international partner community ideas, concepts, and capabilities to address key challenges areas in Mars exploration that bridge the objectives of SMD, HEOMD, and OCT.

WHEN

- Call for Abstracts: April 13
- Deadline for submission: May 10
- Workshop at LPI: June 12-14
- LPI summary reports due to NASA: June 18

WHO

- Targeted to professional community, but open to all
 - Plenary sessions Livestreamed; breakout sessions on Webex
- Public & Community are Excited! as of 1:00pm 17 April:
 - 16,258 unique IP addresses have visited the workshop site
 - 13 ideas from the public via email
 - 16 formal submissions to workshop website



The screenshot shows the website for the "Concepts and Approaches for Mars Exploration" workshop. At the top, there is a navigation bar with links for "About Us", "Science", "Meetings", "Education", "Resources", "Analysis Groups", and "The Moon", along with a search box. The main header features the title "Concepts and Approaches for Mars Exploration" and the date "June 12-14, 2012" and location "Houston, Texas". Below this is a large image of the Martian surface. The page is divided into two columns. The left column lists various sections: "GENERAL MEETING INFORMATION", "IMPORTANT DATES", "ABSTRACT SUBMISSION", "WORKSHOP AGENDA", "INFORMATION FOR PRESENTERS", "REGISTRATION", "VENUE/HOTELS", "CONTACT INFORMATION", "CONVENERS", "HOSTED BY", and "SPONSORS". The right column contains the "GENERAL MEETING INFORMATION" section, which includes an "Introduction" and a "Purpose and Scope" section. The introduction states that the NASA Administrator has directed the Associate Administrator for the Science Mission Directorate (AA/SMD) to lead a reformulation of the Mars Exploration Program. The purpose and scope section explains that the reformulation effort will address the primary objectives of the Strategic Knowledge Gaps in the Human Exploration of Mars as well as the Mars Exploration Program Analysis Group (MEPAG) Goals. It will set the stage for a strategic collaboration between the Science Mission Directorate, the Human Exploration and Operations Mission Directorate and the Office of the Chief Technologist, for the next several decades of exploring Mars. One of the key elements in developing this collaboration and the related mission and architecture options is to seek community ideas, concepts and capabilities to address critical challenge areas, focusing on a near-term timeframe spanning 2018 through 2024, and a mid- to longer-term timeframe spanning 2024 to the mid-2030s. To that end, NASA is sponsoring a two-and-a-half-day workshop to actively engage the technical and scientific communities in the early stages of a longer-term process of collaboration that bridges the objectives of the sponsoring NASA organizations. This workshop will be held June 12-14, 2012, at the Lunar and Planetary Institute, which is located in the Universities Space Research Association (USRA) building, 3600 Bay Area Boulevard, Houston TX 77058. The introduction also mentions that NASA will consider inputs from a variety of sources and will synthesize and integrate these inputs into the various options taking into consideration budgetary, programmatic, scientific, and technical constraints. The workshop is open to scientists, engineers, graduate students and academia, NASA Centers, Federal Laboratories, industry, and international partner organizations. The intent of the workshop is to provide an open forum for presentation, discussion, and consideration of various concepts, options, capabilities, and innovations to advance Mars exploration. At the bottom of the page, there is a small image of a Mars rover.