Planetary Science and Mars Program

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Director, Planetary Science NASA
May 20, 2014
Outline

• Planetary Recent Events
• Budget Overview:
  – Passed FY14 budget
  – President’s FY15 budget
• Status of the next Discovery Opportunity
• Planetary Missions Overview
• Education and Public Outreach status
• Research & Analysis status
Planetary Science Missions and Outreach Events

2013
May – November – Mars As Art Exhibit at Dulles Airport Gallery
July 19 – Wave at Saturn and MESSENGER’s Earth image from Mercury
July 31 – Curiosity Day on the Hill
August 6 – One Year Anniversary of Curiosity Landing on Mars
September 6 – LADEE launch from Wallops Flight Facility, VA
October 1 – Close approach of Comet ISON to Mars – Campaign Science
October 9 – Juno flyby of Earth
November 27 – VESPER rocket launch observing Venus
November 18 - Launch of MAVEN from Cape Canaveral, FL
November 28 – Comet ISON Perihelion. Brightest view from Earth of Comet ISON

2014
January – EXCEED-HST observations of Io – Campaign Science
Late Summer - Curiosity arrives at Mt. Sharp
August 6 – 2nd Year Anniversary of Curiosity Landing on Mars
August – ESA’s Rosetta mission arrives at Comet Churyumov–Gerasimenko
September 21 - MAVEN inserted in Mars orbit
October 19 – Comet Siding Spring encounters Mars
June/July – Mars2020 instrument selection announcement

* Completed
Planetary Budget Overview for FY14

• Congress passed a budget for Planetary Science of $1.345B
• Budget elements include:
  – Research and Analysis: $130M
  – Near Earth Object Observation: up to $40.5M
  – Discovery: $285M
  – New Frontiers: $258M
  – Mars Exploration: $288M ($65M for Mars Rover 2020)
  – Outer Planets: $159M ($80M Europa)
  – Technology: $146M (including Pu-238 production)
• Instructions included:
  – Pre-formulation and/or formulation activities on the Europa mission including an AO for instrument development supporting the scientific goals of the mission outlined in the Decadal
  – Release the next Discovery AO – next AO Sept 2014
Planetary Science Budget FY15

- President’s proposed FY15 budget includes an additional SMD funding:
  - $15M for competed EPO activities
  - $50M in the Opportunity, Growth, and Security Initiative
- House Appropriations Committee approved the FY2015 Commerce-Justice-Science (CJS) appropriations bill
  - Planetary $1.45B ($302M for MEP; 24 month Discovery cadence)
Discovery AO
Schedule Overview

• Anticipated Schedule:
  – Technology day to discuss tech options - end of March
  – Release of draft AO – May 2014
  – Release of final AO – September 2014
  – Pre-proposal conference – AO + 3 weeks
  – Proposals due – AO + 90 days
  – Selection of 2 - 3 $3M (RY) Phase A studies – May 2015
  – Concept Study Reports due – April 2016
  – Down selection of mission – October 2016
  – Launch Readiness Date – NLT December 2021

• Questions or input should be directed to: Dr. Michael New, michael.h.new@nasa.gov

• Full announcement:
Planetary Missions
Extended Missions Senior Review

• Guidelines issued Jan 31, 2014 with comment period
• Final guidelines & budget targets issued Feb 21, 2014
• Proposals due: April 11, 2014
• Review Panel date: ~May 2014
• Results announced: ~June 2014
• 2014 Senior Review missions:
  – Cassini, LRO, Opportunity, Mars Express, Mars Odyssey, MRO and Curiosity
Mars Missions this Decade

Operational 2001-2013
- Odyssey
- Mars Reconnaissance Orbiter
- MAVEN Aeronomy Orbiter

2016
- ESA Trace Gas Orbiter (Electra)

2018
- InSight

2020
- Curiosity – Mars Science Laboratory
- ExoMars Rover (MOMA)

2022
- Opportunity
- 2020 Science Rover

Follow the Water
Habitable Environments
Seeking Signs of Life
Future
Seeking signs of life: Mars 2020 Rover

Conduct rigorous in situ science

Geologically diverse site of ancient habitability

Coordinated, nested context and fine-scale measurements

Enable the future

Critical ISRU and technology demonstrations required for future Mars exploration

Returnable cache of samples

MSL heritage rover and moderate instrument suite stays within the resource constraints
How NASA Space Assets Will Observe Comet Siding Spring

Closest Approach to Mars on October 19, 2014

(Items in yellow successfully observed the comet so far)

For more information, visit: http://mars.nasa.gov/comets/sidingspring

Hubble observed Siding Spring in October 2013, and Jan/Mar 2014

NeoWISE observed the comet in January and will again in July 2014

Mars Reconnaissance Orbiter will attempt observations beginning in October 2014

Swift observed the comet three times between Nov 2013 and February 2014

ESA’s Mars Express may attempt observations in October 2014

Spitzer observed the comet March 2014

Mars Odyssey will attempt observations beginning in October 2014

Opportunity will attempt observations in October 2014

Curiosity will attempt observations in October 2014
Europa and the Decadal Survey

- The Decadal Survey provided 5 science goals for Europa exploration
  1. Characterize the ocean
  2. Characterize the ice shell and the surface-ice-ocean exchange
  3. Determine global composition and chemistry, especially with regard to habitability
  4. Understand the surface features and geology (and locate landing sites for future exploration)
  5. Understand the space environment

- The Decadal Survey considered a comprehensive mission concept called the Jupiter Europa Orbiter (JEO)
  - NRC’s independent Cost And Technical Estimate (CATE) for JEO deemed it unaffordable at $4.7B, and therefore it was the “second highest priority Flagship mission” based on “pragmatic reasons associated with the spending profiles”

“NASA should immediately undertake an effort to find major cost reduction for JEO”
Options for Reduced Cost Europa Missions

- The year following the Decadal Survey was spent executing the recommendation to find major cost reductions
  - The highly capable but complex JEO concept was split into three far simpler elements
  - These three mission concepts were independent, stand alone missions each with its own meritorious science
- The purpose of this effort was to define and validate a set of minimum concepts that demonstrate missions exist at the lower end of the cost spectrum (~$2B) that still provide significant science return
Path Forward

• Continue Europa mission concept pre-formulation activities looking at several potential options:
  – Refine the Europa Clipper concept taking into account the recent potential Europa plume discovery
  – Release a Request for Information (RFI) soliciting brief descriptions of mission concepts that address Decadal Survey science objectives for Europa via missions costing less than $1B (FY15 dollars, phases A-E, excluding launch vehicle)
  – Study various launch vehicle options including SLS

• As directed by Congress: Release competitive instrument AO for Phase A risk reduction
  – This would address the long standing and long lead risk identified by all previous Europa mission studies and independent reviews
Education and Public Outreach (EPO)
EPO Background

• Recent events require a new PSD strategy on EPO
  – In FY14 and beyond, $5.6M/year removed from PSD budgets associated with EPO (in addition to EPOESS & Forum budgets)
  – FY14 Appropriation language guidance has informed PSD approach:

  “Education and Public Outreach (EPO).--Consistent with longstanding NASA practice, the agreement maintains EPO funding within the Science Mission Directorate (SMD). The current method of distributing EPO funds within SMD, however, may not produce the most efficient allocation of limited resources. For fiscal year 2015 and future years, NASA shall consider consolidating EPO funding within each SMD division and allocating funds to individual activities based on an assessment of division-wide priorities and program effectiveness.”
PSD EPO Approach

• FY14 will be a transition year:
  – PSD plans to work with the community to transition EPO
  – At a minimum and consistent with the 2013 Decadal Survey, PSD efforts will: Contribute to Increased US Scientific Literacy for the General Public

• FY15 President’s budget request provides $15M to SMD for EPO
  – A new plan is under construction and will be released before October 1st
  – PSD will restructure consistent with guidance from: 2013 Decadal Survey, CoSTEM, OMB, Congress, and other NRC report recommendations

• Our value to add towards this goal is from our knowledge experts and our exciting planetary content
Research & Analysis Program
Reorganization at a glance

- ROSES13 has 20 calls; ROSES14 has 19 calls with 7 that remain the same
- ROSES14 will be funded out of FY15 funding
- All calls address division science goals supporting NASA’s strategic plan

<table>
<thead>
<tr>
<th>Core Research</th>
<th>Strategic</th>
<th>Focused</th>
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</thead>
<tbody>
<tr>
<td>Emerging Worlds</td>
<td>PDART (data archiving, tools)</td>
<td>ETIPS (emerging topics)</td>
</tr>
<tr>
<td>Solar System Workings</td>
<td>PSTAR (analogues)</td>
<td>LDAP (lunar data analysis)</td>
</tr>
<tr>
<td>Habitable Worlds</td>
<td>Exoplanets (joint with Astro)</td>
<td>CDAPS</td>
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<tr>
<td>Exobiology</td>
<td>DDAP</td>
<td>DFRAP</td>
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<tr>
<td>Solar System Observations</td>
<td>LARS</td>
<td></td>
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<tr>
<td>Core Technology</td>
<td>MDAP</td>
<td>New program</td>
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<tr>
<td>MatISSE</td>
<td>Planetary Protection</td>
<td>Not solicited in ROSES 2014</td>
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<tr>
<td>PICASSO</td>
<td>NAI (not solicited in ROSES)</td>
<td>Unchanged</td>
</tr>
<tr>
<td>Planetary Major Equipment</td>
<td>SSERVI (not solicited in ROSES)</td>
<td></td>
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## ROSES 2014 Planetary Due Dates

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Step-1 Proposal Due Date</th>
<th>Step-2 Proposal Due Date</th>
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<tbody>
<tr>
<td>Exoplanets</td>
<td>March 31, 2014</td>
<td>May 23, 2014</td>
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<tr>
<td>Emerging Worlds</td>
<td>March 31, 2014</td>
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<td>PPR</td>
<td>April 7, 2014</td>
<td>June 6, 2014</td>
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<tr>
<td>Solar System Observations</td>
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<td>Exobiology</td>
<td>April 14, 2014</td>
<td>June 3, 2014</td>
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<td>MatISSE</td>
<td>April 21, 2014</td>
<td>June 20, 2014</td>
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<tr>
<td>LARS</td>
<td>April 28, 2014</td>
<td>June 27, 2014</td>
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<tr>
<td>Hayabusa 2 PSP</td>
<td>May 19, 2014</td>
<td>July 18, 2014</td>
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<td><strong>PDART</strong></td>
<td>July 14, 2014</td>
<td><strong>September 12, 2014</strong></td>
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<td>DDAP</td>
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<td>September 19, 2014</td>
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<td>PSTAR</td>
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<td>CDAP</td>
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<td>MDAP</td>
<td>August 4, 2014</td>
<td>October 3, 2014</td>
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<td><strong>DFRAP</strong></td>
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<tr>
<td>PICASSO</td>
<td>September 15, 2014</td>
<td>November 14, 2014</td>
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Currently under review (Red)
NASA’s

Planetary Science

Advance scientific knowledge of the origin and history of the solar system, the potential for life elsewhere, and the hazards and resources present as humans explore space.