24

This says it all!

EARTH

HALF-TIME
SCORE:

MARS

16

24
...well, almost!
Mars Exploration Program
More Than a Decade of Integrated, Strategic Program Planning

<table>
<thead>
<tr>
<th>Year</th>
<th>Mission</th>
<th>Year</th>
<th>Mission</th>
<th>Year</th>
<th>Mission</th>
<th>Year</th>
<th>Mission</th>
<th>Year</th>
<th>Mission</th>
<th>2016 &amp; Beyond</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spirit &amp; Opportunity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mars future planning underway!</td>
</tr>
</tbody>
</table>

**Future Planning Underway!**
## “State of the Program” 1/2

<table>
<thead>
<tr>
<th>Project</th>
<th>TECH</th>
<th>COST</th>
<th>SCHD</th>
<th>PROG</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odyssey (ODY)</td>
<td>Y</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>Returning to nominal spacecraft/instrument extended mission operations after Curiosity landing and initial ops support. Working to develop operational solutions for reaction wheel and IMU issues.</td>
</tr>
<tr>
<td>Mars Exploration Rovers (MER)</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>Opportunity has exceeded 35 km on Mars and is in good health with ample energy production as spring and summer approach. Currently exploring Cape York at the rim of Endeavour Crater.</td>
</tr>
<tr>
<td>ESA/Mars Express (MEx)</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>Nominal extended operations; provided MSL/Curiosity landing support</td>
</tr>
<tr>
<td>Mars Reconnaissance Orbiter (MRO)</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>Returning to nominal spacecraft/instrument extended mission operations after Curiosity landing and initial ops support. Continuing MER and Curiosity ops UHF relay support</td>
</tr>
<tr>
<td>Mars Science Laboratory (MSL)/Curiosity</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>Arrived August 5, 2012 PDT! All systems are healthy and rover is proceeding to first science destination - Glenelg</td>
</tr>
<tr>
<td>Mars Atmosphere and Volatile Evolution Mission (MAVEN)</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>MAVEN passed KDP-D and started ATLO early - August 2012</td>
</tr>
</tbody>
</table>

- **TECH**: Yellow = Area of concern; Problem can be resolved within reporting organization; Needs attention
- **COST**: Green = Progress according to plan; All commitments can be met
- **SCHD**: Green = Progress according to plan; All commitments can be met
- **PROG**: Green = Progress according to plan; All commitments can be met
- **COMMENTS**: Textual comments on the status of the project.
“State of the Program” 2/2

• MSL/Curiosity remains the highest priority of MEP.
  – Entry, Descent and Landing (EDL) Reconstruction initiated

• MAVEN remains the highest-priority mission in development.

• Operating missions, Odyssey, MRO, and Opportunity are fully funded, including through the notional run-out.
  – Senior Review did not take programmatic infrastructure requirements into account (telecom, site certification, etc.)

• MPPG is complete
  – Next steps are in NASA’s hands under PPBE14 process

• InSight
  – Managed by the Discovery Program Office
  – MEP Program Exec (Ramon DePaula) and Program Scientist (Mitch Schulte) will oversee the Project for HQ/PSD
Fantastic Comm Support to Curiosity

- Through Sol 48, over 23 Gb of Curiosity data have been returned via ODY and MRO
  - Average data return per sol exceeds 480 Mb/sol
  - Some days <1Gb!
- Electra’s Adapative Data Rate (ADR) is now being used routinely for MRO passes
Mars Exploration Program Reformulation
FY12 Timeline & Milestones (dates are approximate)

Schedule Drivers & Events
- President’s FY13 Budget Release 2/13
  - PSS 2/23
  - NAC-SC 3/6
  - MEPAG 2/27–28 (initiate PSAG)
  - LPSC 3/19
  - Program Reformulation Media Telecon
  - LPI Call
  - PSS
  - NRC CAPS
  - LPI Workshop
  - IMEWG
  - NAC-SC
  - MSL Landing 8/6

Feb 2012
Mar
Apr
May
Jun
Jul
Aug
Sept

Deliverables
- MPPG Framework Brief
- MPPG Progress Brief #2
- MPPG Outreach Website online
- MPPG Progress Brief #3
- CAPS
- MPPG Final Report

Work Plan Overview
- Define Objectives & Tasks
- Develop candidate 2018/2020 mission concepts that work towards future mission concepts & pathways based on existing body of information
- Outreach to Intl. partners & broad community
- Incorporate community inputs in candidate pathways
- Refine & Review Plan
- Architecture Trades
- Finalize Options for NASA

IMEWG – International Mars Exploration Working Group
LPI – Lunar & Planetary Institute
LPSC – Lunar & Planetary Science Conference
MEPAG – Mars Exploration Program Analysis Group

NAC-SC – NASA Advisory Council/Science Committee
NRC CAPS – NRC’s Committee on Astrobiology & Planetary Science
PSS – Planetary Science Subcommittee of NAC
NRC – National Research Council
Mars Program Planning Group (MPPG) results briefed to SMD at the end of August.
- Established by the SMD as one component of planning the next step in Mars Exploration
- MEP/PSD now develops a recommended architecture integrating MPPG study with other drivers

MPPG stakeholder briefings completed in September, and rolled-out publicly
- CAPS briefing 9/25
- Press telecon and release of MPPG summary report also on 9/25
  - Downloadable at: www.nasa.gov/marsplanning

A Mars Exploration Program architecture will be recommended to NASA and OMB during the FY14 PPBE process
- Focus on 2018/2020/2022
- If possible, establish SDTs, draft AO’s, etc. in Oct/Nov to enable a 2018
  - 2018 mission is funding and program architecture dependent
(*) actual based on last Op Plan of each Fiscal Year
Mars Exploration Program – Plan Forward 2/2

• Next Steps:
  – Sept/Oct: NASA integrates MPPG results with other drivers and generates architecture for the reformulated Mars Exploration Program
  – Mid-Oct: Brief OMB on reformulated Mars Exploration Program
  – Late Nov: OMB Passback
  – Oct/Nov: If possible, establish SDTs, draft AO’s, etc., to enable 2018
  – NLT Feb 2013: Roll-out revised Mars Exploration program in FY14 President’s Budget Request
  – Feb/Mar: Engage Community on reformulated MEP (PSS, NRC, MEPAG, etc.)

• Note that NASA’s plan for reformulating Mars exploration is embargoed under the PPBE-14 budget process
  – Release prior to President’s FY14 Budget Request (Feb ‘13) is TBD
Candidate Future Landing Sites on Mars:

- Multiple calls for new sites have resulted in 59 candidates total
- Includes a wide range of future mission scenarios
  - Many candidate ellipses are 10 km X 15 km, but others specified by proposer
- Call for Critical Data Products V, VI, and VII (CDP V, VI, and VII) yielded additional candidates (and some funding!).
- New sites queued for imaging by MRO and other orbital assets
- Mars Steering Committee formalized represents international interest and broad scientific topics (Astrobiology to SR and others).
  - Steering Committee includes John Grant, Matt Golombek, and Nicolas Mangold (co-chairs), Steve Ruff, Dave Des Marais, Scott McLennan, Brad Jolliff, Jack Mustard, Ken Tanaka, Barb Sherwood-Lollar, Gian Ori, Ernst Hauber, John Bridges, Mark Sephton, David Fernandez Remolar, Francois Poulet
Future Mars Landing Sites
As of September 4, 2012
2018 (“Joint Rover”) Sites
As of September 4, 2012

Not all of these were presented at first workshop
I’m Curiosity...

...and I know it!

Credit: YouTube/Satire