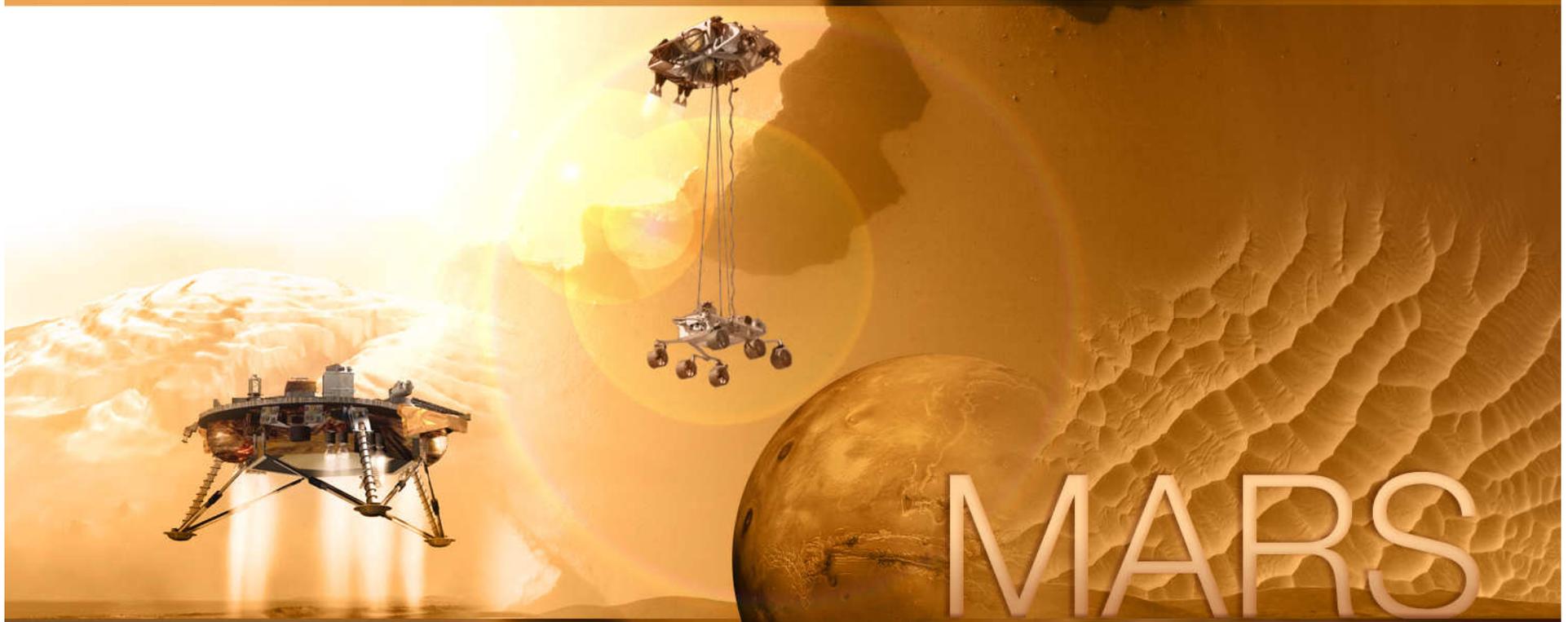


National Aeronautics and Space Administration



Mars Exploration Program

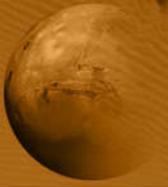
MEPAG 2/2012



—the search for life

Michael Meyer
Lead Scientist

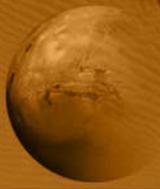
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FY13 President's budget – what happened?

- The President's FY13 budget reflects difficult decisions made in response to economic challenges.
- The President's FY13 budget no longer allows us to participate with ESA in the 2016 and 2018 Mars missions
 - This budget also requires us to skip the 2016 Mars opportunity altogether.
 - Strategy for ramping down on the 2016 and 2018 instrument development
 - The intent is to insure that the high TRL level achieved on TGO instruments is well documented and any flight is hardware controlled.
 - The MOMA development will also be ramped down
 - We plan to continue Electra



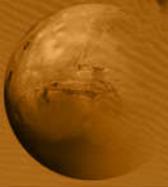


FY13 President's budget

No impact to ongoing missions

- MSL remains the highest priority of this program. MAVEN remains the highest-priority mission in development.
 - MSL and MAVEN funding is not impacted. MSL cruise, landing, and science operations are fully funded, as are MAVEN development, launch and operations.
- Operating missions, Odyssey, MRO, and Opportunity are fully funded, including through the notional run-out.
- Mars R&A funding is not intended to be impacted.
- Mars opportunities in Discovery calls and Planetary Science R&A Programs will continue.





Planetary Science Budget Features

- **What Changed:**

- Initiate a new Mars exploration strategy as an integrated approach by partnering with Human Exploration and the Office of the Chief Technologist:
 - Ending work on 2016 ExoMars Trace Gas Orbiter and Mars 2018 ExoMars rover
 - Looking at a robotic exploration mission
- Reduced Discovery flight rate with Discovery 13 AO release moved to FY15
- Lunar Quest Program phased out after LADEE with remaining activities absorbed into Research Programs and Discovery
- NEO program expanded to improve and increase its detection efforts

- **What's the Same:**

- Continuing 14 operating science missions:
 - MESSENGER, GRAIL, LRO, Deep Impact, MRO, Odyssey, Opportunity, Dawn, Juno, Cassini, New Horizons
 - ESA partnered missions: Venus Express, Mars Express, Rosetta
- LADEE and MAVEN launch in 2013
- Technology and Data Programs: Develop Radioisotope Power Systems (RPS); Planetary instruments; continue to support Planetary missions with navigation and sample curation
- Continue with Research & Analysis awards selections and awards



Mars R&A Programs

Mars Data Analysis (MDAP); Mars Fundamental Research (MFRP)

Selection Rates:

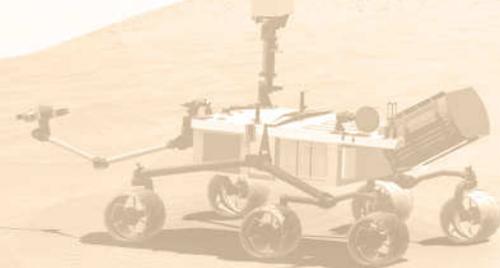
ROSES Yr	MFRP (# submitted)	MDAP (# submitted)
2008	22.3% (94)	35.2% (88)
2009	20.0% (130)	37.1% (105)
2010	20.3% (128)	26.4% (91)
2011	16.5-18.7 % (123)	TBD (98)

Budget:

FY

2009	\$8.962M	\$8.679M
2010	\$7.146M	\$7.737M
2011	\$7.956M	\$9.426M
2012	\$8.767M	\$9.294M

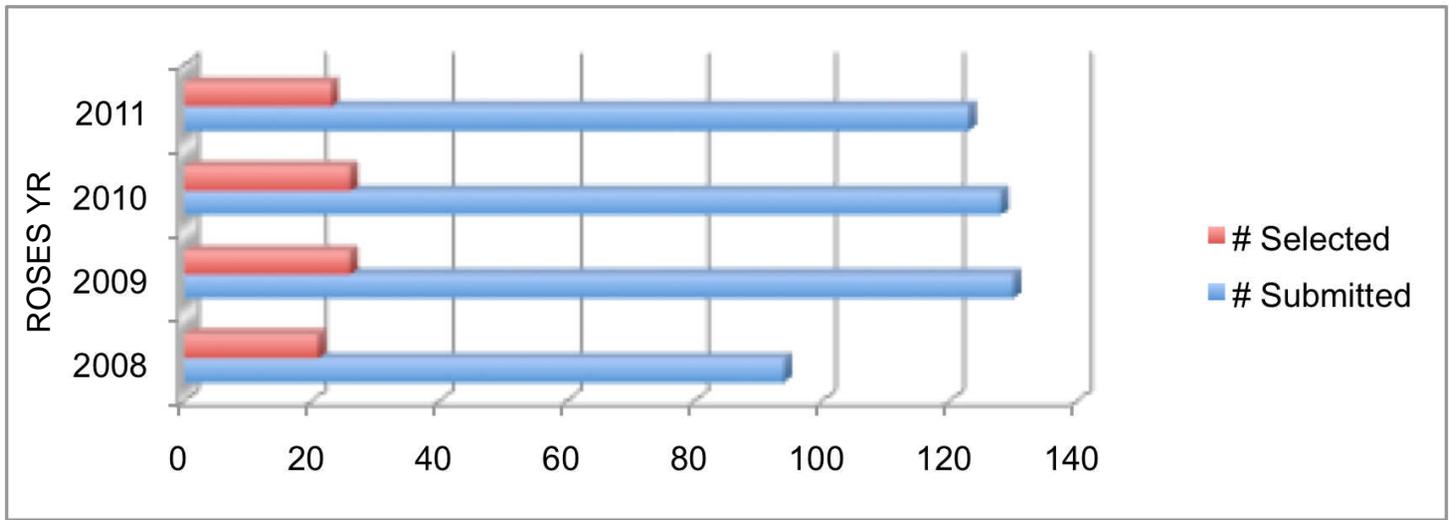
Note: MDAP allows four-year awards.





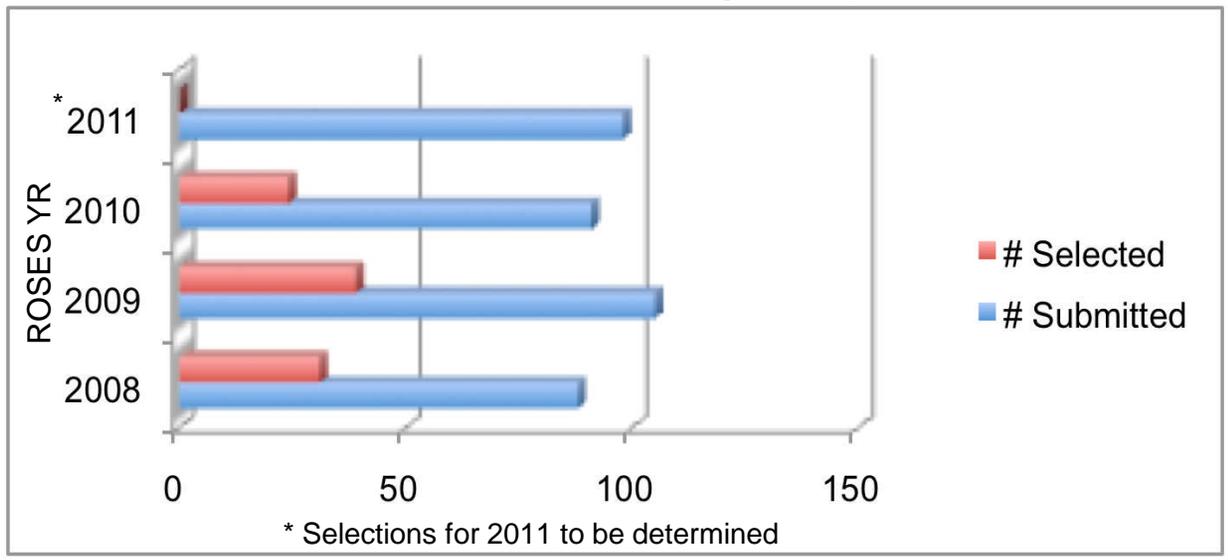
Mars R&A Program

Mars Fundamental Research Program (MFRP)



MFRP Funding
 FY 2009 - \$8.9 M
 FY 2010 - \$7.1 M
 FY 2011 - \$7.9 M
 FY 2012 - \$8.7 M

Mars Data Analysis Program (MDAP)

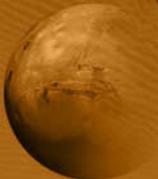


MDAP Funding
 FY 2009 - \$8.7 M
 FY 2010 - \$7.7 M
 FY 2011 - \$9.4 M
 FY 2012 - \$9.3 M

Planetary Science Program Content (cont'd)

	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
				<i>(FY14-17 estimates are notional)</i>			
<u>Mars Exploration</u>	<u>547.4</u>	<u>587.0</u>	<u>360.8</u>	<u>227.7</u>	<u>188.7</u>	<u>266.9</u>	<u>503.1</u>
MAVEN	160.6	245.7	146.4	37.6	17.3	5.3	
<u>Other Missions and Data Analysis</u>	<u>386.8</u>	<u>341.4</u>	<u>214.4</u>	<u>190.1</u>	<u>171.4</u>	<u>261.6</u>	<u>503.1</u>
Mars 2016/2018/MOMA/Future	46.6	43.8	62.0	72.8	72.8	151.7	346.1
2011 Mars Science Lab	242.9	174.0	65.0	38.5			
Mars Reconnaissance Orbiter 2005	30.1	40.4	0.1				
Mars Exploration Rover 2003	13.6	15.0	0.1				
Mars Odyssey 2001	10.1	12.8					
Mars Express	0.9	2.1					
Mars Extended Operations			53.7	40.1	56.3	51.2	51.4
Mars Mission Operations	1.6	1.8	1.8	1.8	1.9	1.9	1.9
Mars Research and Analysis	17.4	19.0	15.2	15.2	15.3	15.3	15.3
Mars Technology	2.5	5.0	3.0	4.0	7.0	23.0	75.0
Mars Program Management	21.0	27.5	13.5	17.6	18.1	18.5	13.4





Proposed Introduction

The Mars Exploration Program Analysis Group (MEPAG) is asked to identify common mission objectives of the Science Mission Directorate and the Human Exploration and Operations Mission Directorate, including potential technology demonstrations for the Office of the Chief Technologist, that could be pursued in a near-term, cost-constrained integrated program of Mars exploration.

Propose: Precursor Science Analysis Group (PSAG)



Proposed Assumptions - PSAG

1. The needs of a human mission to the martian surface are those needed to support the campaign of three missions described by DRA 5.0.
2. Science objectives and priorities are as defined by the MEPAG Goals Document and NRC (2011) Decadal Survey.
3. The budget for near-term activities (spanning launch periods in 2018, 2020 and 2022) is as given in the President's FY13 budget submittal.





Proposed Deliverables - PSAG

1. Begin by preparing a first draft of perceived opportunities and science/exploration measurement priorities that could potentially constitute input to the development of mission concepts for the period 2018-2022.
2. MEPAG recently evaluated the strategic knowledge gaps (SKGs) in required knowledge of Mars to support the first human mission to the martian surface (Goal IVa). The PSAG should reconsider this analysis, based on input from the Human Spaceflight Architecture Team (HAT) Mars destination leads, and update as needed.
 - The output of this task is a list of potential investigations that could be carried out using the Mars flight program that would address these gaps, their temporal phasing, and their priorities.



Proposed Deliverables - PSAG

3. With reference to the MEPAG goals, identify the key science objectives that could be addressed in synergy with each of the potential investigations from #1.
4. As time and expertise permit, identify key technology development/demonstration opportunities necessary to support science and humans-to-Mars objectives.
5. Classify each of the opportunities identified above by implied or potential platform (e.g. orbiter, stationary lander, rover, etc.), and evaluate relative priority. Include an analysis of the pros and cons from the standpoints of both science and human exploration.



From Project-Submit to Appropriation Takes 22+ Months - Change Happens!

