Planetary Science Division Update

Presentation at the 38th Lunar and Planetary Science Conference

James L. Green
Director, Planetary Science Division

March 12, 2007

Administrative Changes

• Key Civil Servant positions have been filled:
  – James L. Green, Director
  – James Adams, Deputy Director
• Civil servant positions to be filled (were on hold but are now active again!)
  – Discovery Program Executive
  – A Discovery Program Scientist
• Other staff changes and positions filled:
  – Alan Harmon, Detailed from DOE new Program Executive for Radio-isotope Power Systems
  – Kelly Snook, Lunar Science Liaison with ESMD
  – Tom Morgan detailed to GSFC as Senior Scientist for Lunar Exploration
Division Activities

• Current Academy reviews:
  – PSD- based on the NASA Authorization 2005
    • Planetary Performance Assessment Committee formed (meetings: Feb. 22, 2007…)
    • How well is PSD addressing the strategies, goals, and priorities outlined in Academy reports
  – COMPLEX - providing guidelines for the selection of candidate missions for the next NF
  – Evaluate NAI’s success leading to reshaping the future of astrobiology activity

FY07 Budget Implications

What Stayed the Same:
• Discovery 2006 and Mars Scout AO’s on track
  – Selected 3 Discovery full-class and 3 Mission of Opportunity (MoO) missions concept studies
  – Selected 2 Mars Scout full-class and 1MoO and 2 MoOs for technology development
• One Mars mission per opportunity
  – Phoenix scheduled for launch in August 2007 and MSL in 2009
• New Frontiers AO #3 no later than 2008
• Moon Mineralogy Mapper (M3), selected as a Discovery MoO, on schedule to launch on the ISRO Chandrayaan-1 spacecraft
• Continues operations of Mars Rovers (Spirit, Opportunity), Odyssey, Mars Express, Mars Reconnaissance Orbiter (MRO), MESSENGER, ASPERA-3, New Horizons, Cassini, and Rosetta
FY07 Budget Implications (cont.)

What’s Changed:

• Funds Dawn for a launch in June 2007
• Funds Juno for a launch in August 2011
• Confirms and provides additional funding for Mars Science Laboratory (MSL) to reduce schedule risk for 2009 launch
• Adds a new Lunar Science Research project to enhance opportunity for lunar scientific discovery
• Funds Outer Planets mission concept studies
• Planetary Research and Analysis (R&A) changes:
  – Provides partial restoration (~$5.8M) of the 15% cut
• Funds Mars rovers through FY07
• Transfers Deep Space Network to the Space Operations Missions Directorate (SOMD) but kept the navigation tools & systems
• Transfers Near Earth Objects (NEO) to Exploration Systems Mission Directorate (ESMD)

Planetary Science Division

FY08 Budget, Total $1320M (included “Simplified” Full Cost)
Current Mission Status

- Mars: MRO, MER-1, MER-2, Mars Odyssey
  - *Upcoming Launches*: MSL and Phoenix
- Discovery: MESSENGER, Deep Impact, Stardust
  - *Upcoming Launch*: Dawn
- Lunar Science Research Project
  - *Upcoming Launch & Extended Mission*: LRO
- New Frontiers: New Horizons
  - *Upcoming Launch*: Juno
- Flagships: Cassini/Huygens at Saturn
  - *Upcoming Launch*: Mars Science Laboratory (MSL)
- International: Mars Express, Venus Express, Rosetta, Hayabusa, and ExoMars
  - *Upcoming Launch*: Moon Mineralogy Mapper - Chandrayan

Planetary Mission Future Events

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<tbody>
<tr>
<td>Feb 28, NH @ Jupiter</td>
<td>Jan. 14 MESSENGER @ Mercury</td>
<td>LRO Science Mission</td>
<td>March 3 MESSENGER @ Mercury</td>
<td>Discovery</td>
<td>Discovery</td>
<td>New Frontiers 3</td>
<td>Discovery</td>
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<tr>
<td>June 5, MESSENGER @ Venus</td>
<td>Chandrayan</td>
<td>MSL</td>
<td>Juno</td>
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<tr>
<td>Dawn</td>
<td>Oct. 6 MESSENGER @ Mercury</td>
<td>Sept. 29 MESSENGER @ Mercury</td>
<td>Mars Scout 2</td>
<td>Fall Dawn @ Vesta</td>
<td>MSO</td>
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<tr>
<td>Phoenix</td>
<td>LRO-LCROSS</td>
<td>Phoenix Lands</td>
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- Planetary Division launches (*green*)
- Planetary mission events (*red*)
- Exploration Systems Mission Directorate (*blue*)
Discovery Selections

• Selected 3 full missions and 3 Missions of Opportunity on October 31st
• Missions received $1.2M to conduct concept studies (Phase-A) over a 7 month period
• NASA may choose one or more missions to continue
  – If selected to continue: cost cap is $425M.
• MOO will receive $250K to refine concept
  – If selected to continue: cost cap at $35M.

Selected Phase-A Full Missions

• GRAIL: Gravity Recovery and Interior Laboratory - Maria Zuber (PI), MIT — Produce a uniform, global, high-quality gravity field mapping of the Moon that will allow for unprecedented modeling of its internal structure and thermal history.


• Vesper: Venus Chemistry and Dynamics Orbiter - Gordon Chin (PI), NASA GFSC — Advance our understanding of the atmospheric composition and dynamics of Venus, especially its photochemistry.
Mission of Opportunity

• **DIXI: Deep Impact eXtended Investigation of Comets - Michael A’Hearn (PI), University of Maryland** — Uses the existing *Deep Impact* spacecraft for an extended flyby mission to a second comet, Boethin, that will return data advancing our understanding of the nature of comet nuclei.

• **EPOCh: Extrasolar Planet Observations and Characterization - L. Drake Deming (PI), NASA GSFC** — Observations using *Deep Impact’s* High Resolution Imager will either lead to the discovery of additional low mass (down to one Earth-mass) planets or will set limits on the existence of such planets that will be useful for constraining theories of planet formation.

• **Stardust NExT: A Mission of Opportunity to complete the exploration of Tempel 1 - Joseph Veverka (PI), Cornell University** — Uses the *Stardust* spacecraft to perform an extended flyby mission to comet Tempel 1 which will provide the first look at the changes to a comet nucleus after a perihelion passage.

Ices, Oceans, and Fire: Satellites of the Outer Solar System

• Purpose is to bring together researchers to share their work in the broader context of common processes and unique properties shaping the satellites of the outer solar system

• The goal of the conference is to promote cross fertilization of research among small communities focused on specific satellites

• Papers in special issue of JGR-Planets

• August 13-15 in Boulder, CO

Discovery at 15: Looking Backward Looking Forward

- Open to the scientific community
- All former Discovery Principal Investigators, Project Managers, and Education/Public Outreach Leads
- Session include:
  - Invited talks
  - Contributed posters on mission concepts and new technologies
- September 19-20, 2007 in Huntsville, AL

Congratulations to the New Horizons Team!

Jupiter Encounter Observations
PSD R&A Program

ROSES 2007 Released on February 16, 2007

New PSD R&A Policy

• Issued February 20, 2007 - effective immediately
  – Applies to all PSD R&A elements in ROSES

• Rapid notification and funding procedure
  – Within four weeks of the review panel I expect to sign an “initial Selection Decision Document” or SDD - within 2 weeks goal!
  – Proposals are in “Selected, Selectable, Not Selected” categories
    • Selectable proposals are those in competitive range that may have a chance to be selected pending identification of funds
  – Letters issued to all with Selected proposals funded
  – As funding becomes available/identified a new addendum is added to the SDD and signed then those proposals in the Selectable range are funded
  – With final budget authority, letters sent to the selectable but deferred category are notified of their non-selection
## PSD R&A Program for ROSES 2006

<table>
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<tr>
<th>ROSES 2006 Program Element</th>
<th>Due</th>
<th>Selection Date</th>
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<tbody>
<tr>
<td>C.09 Cassini Data Analysis</td>
<td>4/25/06</td>
<td>12/15/06</td>
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<tr>
<td>C.08 Outer Planets Research</td>
<td>4/28/06</td>
<td>1/31/07</td>
</tr>
<tr>
<td>C.10 Discovery Data Analysis</td>
<td>4/28/06</td>
<td>11/22/06</td>
</tr>
<tr>
<td>C.04 Planetary Geology and Geophysics</td>
<td>5/5/06</td>
<td>3/6/07</td>
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<tr>
<td>C.02 Cosmochemistry</td>
<td>5/19/06</td>
<td>1/9/07</td>
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<tr>
<td>C.12 Mars Fundamental Research</td>
<td>5/24/06</td>
<td>Next Week</td>
</tr>
<tr>
<td>C.05 Planetary Astronomy</td>
<td>6/2/06</td>
<td>3/9/07</td>
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<tr>
<td>E.03 Origins of Solar Systems</td>
<td>6/2/06</td>
<td>1/17/07</td>
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<tr>
<td>C.06 Near Earth Object Observations</td>
<td>6/9/06</td>
<td>Next Week</td>
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<tr>
<td>C.07 Planetary Atmospheres</td>
<td>6/16/06</td>
<td>10/24/04</td>
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<tr>
<td>C.03 Sample Return Laboratory Instruments and Data Analysis</td>
<td>6/30/06</td>
<td>2/20/07</td>
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<tr>
<td>C.15 Mars Reconnaissance Orbiter Participating Scientists</td>
<td>6/30/06</td>
<td>12/1/06</td>
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<tr>
<td>C.16 MESSENGER Mission Participating Scientists</td>
<td>7/7/06</td>
<td>3/6/07</td>
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<tr>
<td>C.19 Planetary Protection Research</td>
<td>8/4/06</td>
<td>2/20/07</td>
</tr>
<tr>
<td>C.11 Mars Data Analysis</td>
<td>8/11/06</td>
<td>April</td>
</tr>
<tr>
<td>C.17 Planetary Instrument Definition and Development</td>
<td>8/18/06</td>
<td>Next Week</td>
</tr>
<tr>
<td>C.25 Stardust Sample Analysis</td>
<td>1/19/07</td>
<td>April</td>
</tr>
<tr>
<td>C.18 Astrobiology: Exobiology and Evolutionary Biology</td>
<td>3/15/07</td>
<td>July</td>
</tr>
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## Recent Signed off Selections

- **Planetary Geology & Geophysics** - Normal Selection
  - Proposals due May 5, 2006
  - Peer Review Panel in July 30 - August 4, 2006
  - Decision Document signed March 6, 2007
  - 49 selected; 52 declined (49% selection rate)
  - Average grant size: $67K/year

- **MESSENGER Participating Scientist Program** - New Rules
  - Proposals due July 7, 2006
  - Peer Review Panel in November 7-9, 2006
  - Decision Document signed March 6, 2007
  - 20 selected; 6 selectable; 26 declined (38-50% selection rate)
  - Average grant size: $78K/year
Grant Processing Status

- Check the NASA Shared Services Center (NSSC) website for grant status

http://www.nssc.nasa.gov/grantstatus
Overview of R&A Awards

- Success rate = Awarded / Total number of proposals
- FY07 Provides partial restoration of the 15% cut (~$5.8M)

Top Priority R&A Programs for Additional Funding

- Astrobiology: Exobiology & Evol. Biology
- Mars Data Analysis
- Mars Fundamental Research
- Outer Planets Research
- Planetary Instrument Definition & Development
- Planetary Protection Research

- Augmentation rules:
  - Astrobiology will have special consideration
  - Intent will be to fund all “Excellent Proposals”
### Early Career Fellows in Planetary Science

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Title</th>
<th>Sponsoring Program</th>
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</thead>
<tbody>
<tr>
<td>David O’Brien</td>
<td>Planetary Science Institute</td>
<td>Exploring the Collisional and Dynamical Implications of Current Outer Planet Migration Models</td>
<td>PG&amp;G</td>
</tr>
<tr>
<td>Chris Okubo</td>
<td>University of Arizona</td>
<td>Numerical Analysis and Mapping of Volatile Migration Pathways In Equatorial Layered Sedimentary Deposits On Mars</td>
<td>MDAP</td>
</tr>
<tr>
<td>Lori Fenton</td>
<td>Arizona State University</td>
<td>Recent Climate Shifts, Circulation Patterns, and Climate-driven Erosion Recorded in the Morphology of Southern Hemisphere Sand Dunes</td>
<td>MDAP</td>
</tr>
<tr>
<td>Rebecca Williams</td>
<td>Smithsonian Institution</td>
<td>Assessing the Preservation of Fluvial Pathways in the Terrestrial Geologic Record: Analog for the Investigation of Martian Raised Channels</td>
<td>MFRP</td>
</tr>
<tr>
<td>Michelle Minitti</td>
<td>Arizona State University</td>
<td>Making Mars: Experimental investigation of linkages between Martian mantle and Martian crustal lithologies</td>
<td>MFRP</td>
</tr>
<tr>
<td>Justin Haggerty</td>
<td>Los Alamos National Laboratory</td>
<td>Investigating Thorium Enhancements and Pyroclastic Deposits on the Moon: Implications for the Abundance and Distribution of Thorium in the Lunar Crust and Mantle</td>
<td>DDAP</td>
</tr>
<tr>
<td>Olivier Barnouin-Jha</td>
<td>Johns Hopkins University Applied Physics Lab</td>
<td>Crater shape and surface roughness on 433 Eros from improvements in topography</td>
<td>DDAP</td>
</tr>
<tr>
<td>David Brain</td>
<td>University of California Berkeley</td>
<td>Atmospheric Energy Deposition at Mars, Venus, and Extrasolar Planets from Solar Energetic Particle Events</td>
<td>PATM</td>
</tr>
<tr>
<td>Lynn Carter</td>
<td>Smithsonian Institution</td>
<td>Searching for Regolith on Asteroids Using Radar Polarimetry</td>
<td>PAST</td>
</tr>
<tr>
<td>Ken (KC) Hansen</td>
<td>University of Michigan</td>
<td>Balancing Solar Wind Control, Internal Plasma Sources and Rotational Effects: Structure and Dynamics of the Jovian Magnetosphere</td>
<td>OPRP</td>
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<tr>
<td>Jonathan Forney</td>
<td>NASA Ames Research Center</td>
<td>A Consistent Evolutionary History for Jupiter and Saturn</td>
<td>OPRP</td>
</tr>
<tr>
<td>Andrew Dombard</td>
<td>Johns Hopkins University Applied Physics Lab</td>
<td>Investigating the Effect of Remnant Impact Heat on Icy Crater Topography</td>
<td>OPRP</td>
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**Selections from ROSES 2006 call**

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### R&A Meet and Greet

- For proposers who are just starting out
- **Where:** Habor Club
- **When:** Tuesday, Noon - 1pm
- **Why:** R&A Program Scientists will be available to answer your questions and address your concerns.
PSD R&A Program for ROSES 2007

- Astrobiology: Exobiology And Evolutionary Biology (pending)
- Astrobiology Science & Technology Instrument Development & Mission Concept (pending)
- Astrobiology Science And Technology For Exploring Planets
- Cassini Data Analysis
- Cosmochemistry
- Discovery Data Analysis
- Early Career Fellowships
- In-Space Propulsion (pending)
- Lunar Advanced Science and Exploration Research *
  - [Near Earth Object Observations --- Funded by ESMD -- to be release in ROSES 2007]
- New Horizons at Jupiter Data Analysis *
- Origins of the Solar System
- Outer Planets Research
- Participating Scientist Program * [Not posted yet]
  - Planetary Astronomy
  - Planetary Atmospheres
  - Planetary Geology And Geophysics
  - Planetary Instrument Definition And Development
  - Planetary Major Equipment
  - Planetary Protection Research
  - Mars Data Analysis
  - Mars Fundamental Research
  - Mars Instrument Development
  - Mars Technology Project (pending)
  - Sample Return Laboratory Instruments & Data Analysis

* New PSD R&A elements