Planetary Science Division Update

Presentation to the
Outer Planets Assessment Group

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(on detail from GSFC)

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Outline

- Administrative Changes
- New Mission Selections
- PSD mission status & calendar
- OPAG/PSS/NAC Recommendations
- Issues in the R&A Program

Administrative Changes

- Current civil servant positions to be filled:
  - Discovery Program Executive (to be posted soon)
  - A Discovery Program Scientist (to be posted soon)
- Other staff changes and positions filled:
  - Alan Harmon/DoE detailee
  - Reports November 15th
  - Responsible for the Radioisotope Power System program
    - Develop a new RPS program plan taking into account a variety of factors including PSD RPS requirements for future missions and projected budget

Discovery Selections

- 3 full missions and 3 Missions of Opportunity announced October 31st
- New missions will receive $1.2M to conduct concept studies (Phase-A) over the next 7 months
- NASA may choose one or more missions to continue
  - If selected for continuation each is cost capped at $425M.
- MOO will receive $250K to conduct concept studies.
  - If selected for continuation, each MOO is capped at $35M.

Discovery Phase-A Missions

- Michael Drake,University of Arizona, Tucson
  - Origins Spectral Interpretation, Resource Identification and Security (OSIRIS) mission
  - Survey an asteroid and provide the first return of asteroid surface material samples to Earth
- Gordon Chin, Goddard Space Flight Center
  - Vesper mission
  - A Venus chemistry and dynamics orbiter that would advance our knowledge of the planet's atmospheric composition and dynamics
- Maria Zuber, Massachusetts Institute of Technology, Cambridge, Mass
  - The Gravity Recovery and Interior Laboratory (GRAIL) mission
  - Uses high-quality gravity field mapping of the moon to determine the moon's interior structure

Discovery MOOs

- Michael A'Hearn, University of Maryland
  - The Deep Impact eXtended Investigation of Comets (DIXI) mission
  - Use the existing *Deep Impact* spacecraft for an extended flyby mission to a second comet to take pictures of its nucleus to increase our understanding of the diversity of comets
- L. Drake Deming, Goddard Space Flight Center
  - The Extrasolar Planet Observations and Characterization (EPOCh)
  - Use the high-resolution camera on the *Deep Impact* spacecraft to search for the first Earth-sized planets detected around other stars

Discovery MOOs

- Joseph Veverka, Cornell University, Ithaca, NY
  - Stardust NExT mission
  - Uses the existing *Stardust* spacecraft to flyby comet Tempel-1 and observe changes since the *Deep Impact* mission visited it in 2005
  - In 2005, Tempel-1 made its closest approach to the sun, possibly changing the surface of the comet

Mars Scout Selections

- More than 20 full missions with several MOOs
- In the peer review process
- Current schedule on track for announcement by the end of the calendar year or before MEPAG
- Phase-A increased to 9 months and $2 M

Current Mission Status

- Mars: MRO, MGS, MER-1, MER-2, Mars Odyssey
  - *New Launches*: MSL and Phoenix
- Discovery: Messenger, Deep Impact, Stardust
  - *New Launches*: Dawn
- New Frontiers: New Horizons
  - *New Launches*: Juno
- Flagships: Cassini/Huygens at Saturn, Mars Science Laboratory (MSL)
- International: Mars Express, Venus Express, Rosetta, Hayabusa
  - *New Launches*: Moon Mineralogy Mapper-Chandrayan

Stardust Science Workshop

- Stardust (4th Discovery mission)
  - PI: Don Brownlee; Co-PI: Peter Tsou
  - Launched on Feb. 7, 1999
  - Encountered Comet Wild 2 on Jan. 2, 2004
  - Earth return of aerogel with comet material on Jan. 15, 2006
  - Flown as proposed! (on budget and on schedule)
- About 200 attended with ~40% foreign (Europe & Japan)
  - Teams working on the bulk composition, organics, mineralogy, isotopes, spectroscopy and craters in the aluminum holding frame.
- Major advances in material analysis partially funded by Sample Return Lab Instruments R&A
- If you thought we knew everything about comets, your wrong!
  - See their papers in *Science*, Dec. 15th

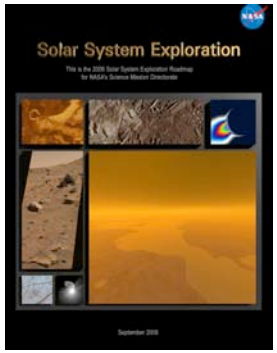
Planetary Mission Event Schedule

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NH/Pluto Oct. 24 Messenger @ Venus	Feb 28, NH @ Jupiter June 5, Messenger @ Venus Phoenix Dawn	Jan. 14 Messenger @ Mercury Chandraayn Oct. 6 Messenger @ Mercury	MSL Sept. 29 Messenger @ Mercury		March 3 Messenger @ Mercury Juno Mar Scout2	Disc-12	Disc-13 MSO	NewFront3	Disc-14 July NH @ Pluto/Charon

- Planetary Division launches (green)
- Planetary mission events (red)

Planetary Science Division Roadmap

- Roadmap has been issued & posted at a number of locations



Finding and Recommendations

OPAG -> PSS -> NAC

PSS Flagship Recommendations

- *Flagship missions will be required to address many of the most fundamental scientific objectives of solar system exploration and must be accommodated… The New Frontiers Program, too, is critical to the accomplishment of solar system exploration objectives. The New Frontiers Program should therefore not be expanded in an attempt to accommodate the goals and objectives of flagship-class missions.*
- *The PSS recommends that in-depth studies to evaluate mission concepts and technologies for potential outer solar system missions should be completed as soon as feasible.*

Outer Planets Flagship Missions: Concept Studies

- In response to OPAG/PSS recommendation and other discussions, PSD plans to conduct detailed studies for several flagship-class missions
  - Europa
  - Titan
  - Enceladus
  - Ganymede (with additional focus on other Jovian system science)
- Science community participation via Science Definition Teams and reports to OPAG
- Study results will undergo independent external review
- Study results will be used as input to near term NASA strategic planning for a Flagship mission

ISSUES in the R&A Program

"The President's FY07 Budget includes reductions in R&A (15%) and Astrobiology (50%)"

PSS R&A Recommendation

The R&A cuts … undercut NASA's return on investment in missions, threaten the viability of entire research fields, and jeopardize the continued recruitment of young space scientists and engineers… the restoration of those cuts should be the top priority in the reallocation of funds within the PSD. ***The maintenance of healthy and stable R&A programs beyond 2007 should be achieved even if doing so requires the delay of a future small, medium, or large mission.***

- NAC is currently deciding on how this recommendation will move forward to NASA

PSD R&A Program for FY07

- Cosmochemistry
- Planetary Geology And Geophysics
- Mars Data Analysis
- Sample Return Laboratory Instruments And Data Analysis
- → **Stardust Sample Analysis**
- Discovery Data Analysis
- → **New Horizons at Jupiter Data Analysis**
- Planetary Astronomy
- Near Earth Object Observations --- Funded by ESMD
- Planetary Atmospheres
- Outer Planets Research
- Cassini Data Analysis
- → **Cassini Participating Scientist**
- Astrobiology: Exobiology And Evolutionary Biology
- Planetary Protection Research
- Planetary Instrument Definition And Development
- Planetary Major Equipment
- Astrobiology Science & Technology Instrument Development & Mission Concept Studies
- Astrobiology Science And Technology For Exploring Planets
- Mars Fundamental Research
- Mars Instrument Development
- In-Space Propulsion
- Early Career Fellowships
- → **Lunar Science and Exploration Research**

Current Efforts within PSD

- Evaluate the Health of our R&A program
  - "Yard-stick" metrics
- Collect statistical information to present results to the PSS & Community (FY03-FY06)
  - Should be ready by next PSS meeting (Feb. 2007)
- Develop arguments for funding enhancements
  - Which R&A elements need new funds the most
- Develop strategies for improvements in the R&A evaluation and award process
- Our input includes:
  - DPS Survey 2005
  - Planetary Science Inst. Survey - Apr. 2006

Attributes of a Competitive R&A Program

- All "Excellent" rated proposals are funded
- Fund/total ratio ranges between
  - Minimum: 1 in 3 (~30%)
  - Upper limit: 2 in 5 (~40%)

Attributes of A Healthy R&A program

- Types of metrics that will be looked at include:
  - Grant size
  - Award duration
- Funding a *High risk - High payoff* proposal or two
- Looking for the right metrics
  - Will require more community discussion and input perhaps through a survey

Process Improvements

- Notification process needs to be shorted
- Determining members for review panels needs to be easier
- Time for issuing grants needs to be shorten
- Finding the best way to let the community know the status of their proposal at any time

Summary

- Discovery selections completed and Mars Scout selections will soon follow
- With the support of OPAG, PSD is developing plans for our next outer planets flagship
  - Radioisotope Power Systems efforts will be reorganized to better support our outer planets flagship and other missions
- PSD is analyzing past R&A program and will provide information on its health over a several year period
  - Identifying what elements of the program need the most help