Planetary Science Division Update

Presentation to the
VEXAG

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(on detail from GSFC)

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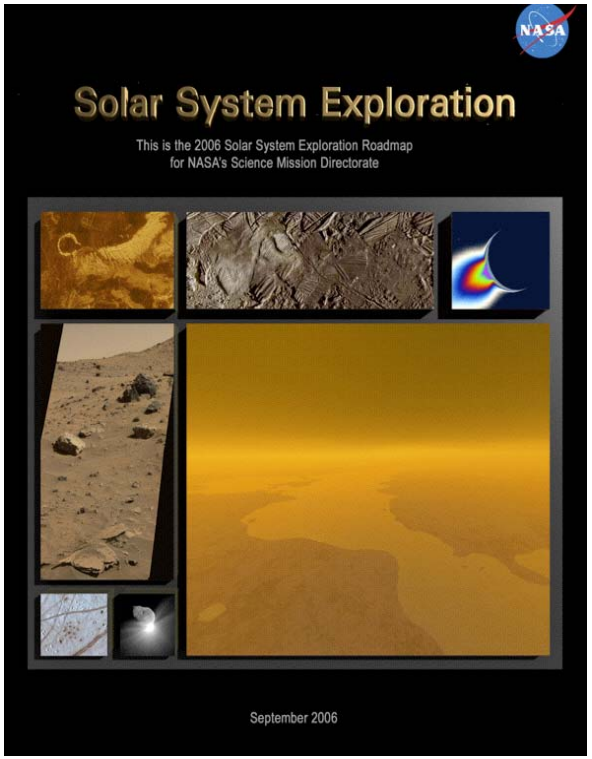
Outline

- Planetary Division Update
- Response to NAC recommendations
- VEXAG concerns

Planetary Science Division Roadmap

- Planetary Science Roadmap has been issued & posted
- Hardcopies available!



Discovery Selections

- Selected 3 full missions and 3 Missions of Opportunity on October 31st
- 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 to continue: cost cap is $425M.
- MOO will receive $250K to refine concept
  - If selected to continue: cost cap at $35M.

Selected 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.

- **OSIRIS: Origins Spectral Interpretation, Resource Identification, and Security - Michael Drake (PI), University of Arizona** — Survey asteroid 1999 RQ36 and provide return of uncontaminated surface sample to Earth.

- **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.

Mars Scout Selections

- Selections announced January 8, 2007
- **MAVEN: Mars Atmosphere and Volatile EvolutioN** - Bruce Jakosky (Univ. of Colorado) - Mars climate and habitability and improve understanding of dynamic processes in the upper atmosphere and ionosphere.
- **TGE - The Great Escape** - Alan Stern (SWRI) - Determine basic processes in Martian atmospheric evolution by measuring the structure and dynamics of the upper atmosphere.
- Two proposals for technology development studies
  - Mars Organic and Oxidant Detector - Jeffrey Bada (UC at San Diego)
  - Mars Organic Molecule Analyzer - Luann Becker (UC at Santa Barbara)
- Phase-A studies for 9 months with $2 M

Planetary Science Division mission status & calendar

Current Mission Status

- Mars: MRO, MER-1, MER-2, Mars Odyssey
  - *New Launches*: MSL and Phoenix
  - *Recently lost:* MGS
- 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

☐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 **Chandrayan** Oct. 6 Messenger @ Mercury (LRO-LCROSS) Phoenix Lands	**MSL** Sept. 29 Messenger @ Mercury		March 3 Messenger @ Mercury **Juno** **Mar Scout2** Fall Dawn @ Vesta	**Disc-12**	**Disc-13** **MSO**	**NewFront3**	**Disc-14** July NH @ Pluto/Charon Summer Dawn @ Ceres

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

Planning for the Next Flagship

Flagship Studies Underway

- PSD detailed studies for flagship-class missions
  - Europa - Jet Propulsion Laboratory
  - Titan - Applied Physics Laboratory
  - Enceladus - Goddard Space Flight Center
  - Ganymede (with additional focus on Jovian system science) - Jet Propulsion Laboratory
- Science community participation via Science Definition Teams (SDT) and reports to OPAG
  - Teams have been selected and will be announced Jan. 12th
- Studies start in Jan 2007 and will be completed fall 2007
- Study results will undergo independent external review
- Study results will be used as input to near term NASA strategic planning for a Flagship mission

NAC Recommendations

NAC Recommendation - 1

- *NASA should conduct planetary mission concept and technology costing studies to determine whether future Europa Orbiter, Enceladus Explorer, and Titan Explorer missions can fit into the New Frontier class or if they instead require flagship-class missions.*

Response:

- On October 1, 2006 the Science Mission Directorate's Planetary Science Division initiated mission studies for Enceladus and Titan. These studies were designed to determine the technical feasibility of conducting separate missions to these moons and to characterize the potential science return within a New Frontiers cost cap. The results from these studies will be completed by March 15, 2007 and released to the community. An Europa mission has been studied many times and will clearly require a flagship-class mission.

NAC Recommendation - 2

- *NASA should develop a process to expand and reassess the field of solicited mission candidates for the New Frontiers mission line prior to each New Frontiers solicitation. NASA should engage the science community in this reassessment of targets/missions prior to the creation of each AO for New Frontiers.*

Response:

- The Planetary Science Division (PSD) agrees that a revised candidate list is necessary for the next New Frontiers Announcement of Opportunity. Our current plan is to release that list before the end of FY07 to enable the community to formulate and develop competitive mission proposals. The list of candidate missions will follow the recommendations from the National Academies decadal report, *New Frontiers in Solar System Exploration* (2003). The Science Mission Directorate will formally request a study from the National Academies Committee on Planetary and Lunar Exploration (COMPLEX) that provides criteria and guiding principles that would enable the PSD to narrow the list of candidate missions to 5. COMPLEX will be asked to consider recent scientific results from current missions as it considers the relevant range of science objectives and concepts in the *New Frontiers* report.

VEXAG Concerns:

- How will NASA cooperate in ESA's Cosmic Vision plan, and how we should introduce that (usefully) into our VEXAG analysis?
- NASA plans for continuing or additional VEX-related data analysis funds and for Venus-mission-related Technology Development
- Updates on New Frontiers mission planning
  - See response to NAC recommendations
- Political impacts of NASA's plans for the VSE or of Mary Cleave's departure or of any other changes in HQ

Backup

ISSUES in the R&A Program

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

Lunar Advanced Science and Exploration Research (LASER)

Supports:

a) Basic Lunar Science

b) Exploration Lunar Science (Applied)

c) Data Analysis

d) Lunar Data Restoration

✓ *No selection quotas for (a)-(d)*

✓ *Proposals that span the Basic(a)-Exploration(b) science continuum encouraged*

First Year Funding ~ $1.5M (Co-Funded: SMD-ESMD)