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**Outer Planets Assessment Group  
March 31<sup>st</sup>-April 1st, 2008 Meeting  
Boulder Colorado**

The Outer Planets Assessment Group is a NASA-supported forum for scientists and engineers to discuss exploration of the outer solar system and to enhance communication between community and NASA.

The meeting of OPAG held at the Boulderado Hotel, was attended by ~50 people. We heard presentations as follows:

- Planetary Science Division - Jim Green (NASA HQ)
- Radioactive Power Systems - Len Duzinski (NASA HQ)
- NOSSE report - Reta Beebe (NMSU)
- Outer Planet Flagship mission status/plans - Curt Niebur (NASA HQ)
- International collaboration - Jean-Pierre Lebreton (ESA)
- Joint Titan SDT - Dennis Matson (JPL)
- Joint Jupiter SDT - Ron Greeley (ASU)
- Aerocapture - Len Duzinski (NASA HQ)
- Cassini extended mission(s) - Linda Spilker (JPL)

These presentations are available at the OPAG website:

<http://www.lpi.usra.edu/opag/reports.html>

We also heard science presentations from Alessandro Morbidelli (Obs. Cote d'Azur & SWRI), John Spencer (SWRI) and Ralph Lorenz (JHU/APL).

At the conclusion of the meeting OPAG made the following findings:

1. OPAG lauds the initiation of the **Outer Planets Flagship (OPF)** mission in the Presidents FY 2009 budget, and notes the good progress made in the formation of two joint U.S.-European Joint Science Definition Teams (JSDTs) to the Jupiter and Saturn systems, respectively. OPAG emphatically stresses that the highest priorities for exploration of the outer solar system (as described in the 2006 OPAG report *Scientific Goals and Pathways for Exploration of the Outer Solar System*) are either 1) a mission to the Jupiter system with a focus on in-depth exploration of Europa, or 2) a mission to the Saturn system with a focus on in-depth exploration of Titan. Such a mission will capitalize on the phenomenal discoveries made by *Galileo* at Jupiter and made and being made by *Cassini/Huygens* at Saturn, and greatly advance our knowledge of the Solar System.
2. OPAG applauds the plans, already approved by NASA, for a **Cassini Extended Mission**. The committee noted with great interest the plans for potential follow-on "Extended Extended" mission, in which a Juno-like

exploration of Saturn would be possible. Cassini is a great resource to be utilized in balance with the OPF new start. We support the efforts of NASA and the Cassini team to substantially reduce operations costs during this follow-on phase so its ongoing operations can be balanced with the funding needed to initiate the OPF. OPAG applauds this exploration of creative means to achieve new, first class science results including, but not limited to, seeking new funding to support fundamentally new science goals (as in the EPOXI and Stardust NExT missions).

3. **Discovery and Scout Mission Capability Enhancement - DSMCE** – Five out of the 9 missions recently selected for study involve exploration of the outer solar system. This suggests an exciting potential for use of Discovery missions enabled by ASRGs to address selective, focused scientific objectives in the outer solar system.
4. **New Frontiers program** – OPAG encourages sufficient funds be included in Phase A to allow technology development since NASA has indefinitely postponed most technology development programs other than ASRG and instrument development. OPAG encourages NASA to include radioactive power systems in the NF4 AO since RPSs enables missions to several important scientific objectives, including multi-targeted missions in outer (e.g., flybys of both Uranus and Neptune).
5. OPAG is encouraged that a sufficient supply of **radioisotope fuel** will be available for MMRTG use on OPF, and if selected, for ASRG use on a Discovery mission. Technology development with respect to ASRGs is especially encouraging. OPAG supports NASA's support of DOE plans for restarting Pu processing in the next decade, as radioisotope power is a critical enabling technology for outer planets missions.
6. **Deep Space Network** – OPAG is encouraged to hear that a recent SOMD report recommends maintenance of 70-meter dishes through 2015-2020. OPAG queries whether the restriction on the OPF studies to 34-meter antennas should be revisited.
7. **Next Decadal Survey** – OPAG notes several lessons to be learned from the first NRC Decadal Survey (DS) for solar system exploration and urges the community and NASA to consider how the process should be improved next time. For example, OPAG argues that the emphasis should be on prioritizing science objectives rather than specific implementations and/or missions. As per upcoming Decadal Surveys of Astrophysics and Heliophysics, the next DS for solar system exploration would benefit from studies of potential missions, including budget & mission costing. Less clear is how a Decadal Survey should be updated mid-term as new data

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come in.

8. **Aerocapture** is a key enabling technology for the outer solar system, particularly at Titan, and some gas giant planets. OPAG asks NASA what is the proper path to permit use of aerocapture at Titan and other solar system targets? How much risk will be retired by MSL and CEV flight tests?
9. The new **PI qualification requirements** being implemented by SMD present a special problem for the outer planets community. Given the scarcity of outer planet missions and their extended lifetimes, there are fewer mission opportunities that scientists can utilize to gain the experience necessary to meet the new requirements. Other pathways for scientists to gain the required experience have not been clearly defined by NASA, and it is likely that those pathways will be of limited applicability for scientists studying the outer solar system. Since all missions, not just PI-led missions, rely on teams consisting of the PI, project manager, systems engineer(s), and others, OPAG recommends NASA revisit the qualification requirements and could, for example, apply them to the team as a whole rather than focus them on the PI only. NASA could also better define pathways for these team members to gain the experience NASA desires, such as offering a "PI Boot Camp" and other opportunities.
10. **Technology development** – OPAG applauds approach of using DSMCE for validating technologies for outer solar system exploration using existing flight opportunities and recommends this pathway be expanded to other technologies.

The next OPAG meeting is tentatively set for the first week of November 2008.