

Outer Planets Assessment Group February 10-11, 2005 Meeting Report

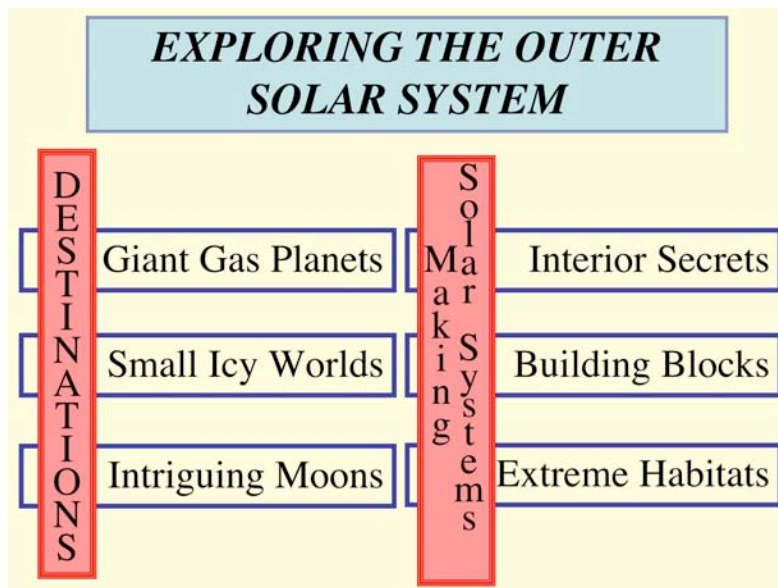
The Outer Planets Assessment Group was established by NASA in late 2004 to identify scientific priorities and pathways for exploration in the outer solar system. The group consists of a 15-person steering committee, which actively solicits input from the scientific community and reports its findings to Dr. Curt Niebur, NASA Headquarters. OPAG provides input to NASA but does not make recommendations. The first OPAG meeting was held February 10-11, 2005 in Bethesda, MD, and was attended by 101 people.

The first day of the meeting was comprised of presentations and their accompanying discussion:

- Objectives of OPAG and the meeting - Fran Bagenal (U of Colorado, OPAG Chair)
- OPAG charter and role – Curt Niebur (NASA HQ)
- State of solar system exploration - Andy Dantzler (Solar System Division Director, NASA HQ)
- Technology studies, mission studies - Jim Robinson (NASA HQ)
- Advanced power systems – Anjay Misra (NASA HQ)
- History of outer solar system exploration – Torrence Johnson (JPL)
- Lessons to be learned from MEPAG - Ron Greeley (MEPAG chair, ex-officio)
- Summary of the Decadal Survey - Andy Ingersoll (Caltech), Bob Pappalardo (U of Colorado)
- Roadmap activities - Bob Pappalardo
- ESA studies - Michel Blanc (ESA)

The second day involved short presentations from individuals promoting science targets and mission concepts. Attendees then participated in breakout groups to discuss science themes; these results were summarized and discussed in an open forum with all attendees.

The first meeting of OPAG produced a draft description of the main broad scientific themes of outer solar system exploration:



The outer solar system community is encouraged to provide both the scientific details and to develop simple ways to communicate these themes to a broad audience. Iterations of graphics and articulations of these themes will be provided via the OPAG website at <http://www.lpi.usra.edu/opag/>.

Based on input voiced at this meeting, the OPAG steering group makes the following findings:

- (1) OPAG largely affirms the science themes and priorities for outer solar system exploration set out by the 2003 NRC report *New Frontiers in the Solar System* (the “Decadal Survey”). With new discoveries and mission selections since the Decadal Survey, small shifts in priorities are inevitable. With community input, OPAG will carefully assess the Decadal Survey’s prioritized science goals to reflect new priorities where necessary.
- (2) The outer solar system has important targets that are critical for understanding the origin and evolution of the solar system and for understanding the origin and evolution of life:
 - Titan: Explore the surface and atmosphere of an exotic Earth-like world
 - Europa: Oceans, organics and habitability
 - Giant planet atmospheres, interiors, and satellites: Keys to the formation of planetary systems
 - KBOs, comets and other primitive bodies: Windows to the past
- (3) Recent and upcoming missions to the outer solar system such as Cassini, Huygens, and New Horizons have captured the imagination of both the public and scientific communities, and it is important that outer solar system exploration build on this enthusiasm while addressing the most important scientific themes.
- (4) Exploration of the outer solar system is challenging because the large distances of the targets from Earth generally imply long mission flight-times and large budgets. However, a substantial and ongoing exploration program is vital for continued growth in our understanding of the outer solar system. OPAG voices concerns that:
 - Cassini-Huygens is the only active outer solar system mission
 - With the long-term deferral of the Jupiter Icy Moons Orbiter (JIMO), New Horizons is the only confirmed outer planet mission in development.
 - There is no planned mission to follow up on the exciting discoveries of the Galileo and Cassini-Huygens.
 - Even with an immediate start, the probable 10-year gap after Cassini-Huygens and before the next flagship mission’s arrival would be the longest gap since the beginning of NASA’s space exploration.
- (5) To achieve the major scientific goals of Decadal Survey for exploration of the outer solar system, a mixed-class mission program is required. Such a program could consist of:
 - Large (Flagship class) - missions every ~10 years
 - Medium (New Frontiers class) - missions every ~3 years, with a significant fraction targeted toward outer solar system priorities
 - Small (Discovery class) - missions addressing outer solar system targets where feasible.
- (6) The goals of the Decadal Survey cannot be accomplished without a vigorous research and analysis program that includes, but is not limited to, data archiving, data analysis, modeling, theory, lab studies, and ground-based astronomy.
- (7) International interest in outer planets exploration may provide significant opportunities for broadening the constituency of outer solar system programs in both scientific and technological ways, as has been demonstrated through the success of the NASA-ESA Cassini-Huygens mission.
- (8) Important near-term steps toward creating a successful Outer Solar System Program include:

- Focused technology development studies targeted for outer planet destinations. Such studies could address technologies such as deep probes, radiogenic power systems, components for extreme radiation and thermal environments, and aerocapture technologies.
- Focused working groups to provide science input to mission designers as they look at potential flagship missions. OPAG has initiated working groups to study missions to Europa (Chair: Ron Greeley) and Titan (Chair: Ralph Lorenz), and additional working groups will be formed as needed.
- Maximization of existing assets with Cassini Data Analysis Program and Cassini extended mission.

Since it is not OPAG's role to make recommendations concerning competed missions, OPAG will neither endorse nor critique the New Horizons 2 mission (an opportunity to build and send a duplicate spacecraft to the Kuiper Belt), which was discussed at the OPAG meeting. We caution that activities involving NH2 not cause further delay of the New Frontiers 2 selection or of progress towards a flagship mission to the outer solar system.

Presentations from the meeting are available from the OPAG website at <http://www.lpi.usra.edu/opag/> .

The next meeting will be held May 18-19, 2005, in Boulder, Colorado. All OPAG meetings are open, and OPAG encourages ongoing input from the community.

The OPAG Steering Committee:

Fran Bagenal, University of Colorado (Chair)
 Sushil Atreya, University of Michigan
 Kevin Baines, Jet Propulsion Laboratory
 Paul Geissler, University of Arizona
 Randy Gladstone, Southwest Research Institute
 Ron Greeley, Arizona State University
 Bill Hubbard, University of Arizona
 Torrence Johnson, Jet Propulsion Laboratory
 Bill Kurth, University of Iowa
 Ralph McNutt, The Johns Hopkins University Applied Physics Laboratory
 Bill Moore, University of California, Los Angeles
 Julie Moses, Lunar and Planetary Institute
 Amy Simon-Miller, Goddard Space Flight Center
 Henry Throop, Southwest Research Institute
 Hal Weaver, The Johns Hopkins University Applied Physics Laboratory