OUTER PLANETS ASSESSMENT GROUP

Presentation to the
Planetary Science Subcommittee

William B. McKinnon
Washington University in St. Louis
Chair

December 3, 2009

OPAG

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

Bill McKinnon, Washington University (Chair - incoming)
Kevin Baines, Jet Propulsion Laboratory
Sushil Atreya, University of Michigan
Henry Throop, Southwest Research Institute
Pat Beauchamp, Jet Propulsion Laboratory
Ralph Lorenz, APL The Johns Hopkins University
Heidi Hammell, Space Sciences Institute
David Williams, Arizona State University
Jani Radebaugh, Brigham Young University
Jack Connerney, Goddard Space Flight Center
John Clarke, Boston University
EX OFFICIOS
Torrence Johnson, Jet Propulsion Laboratory
Michael Blanc, ESA
Masaki Fujimoto, JAXA

Most recent OPAG meeting was held 14 July 2009 in Columbia, MD

Presentations available: http://www.lpi.usra.edu/opag/reports.html

Primary focus was preparation of OPAG Outer Planets Strategy Paper for Decadal Survey. This involved a number of presentations of Outer Planets white papers in progress, plus discussion of outline of top-level OPAG WPs on 1) OP exploration strategy for 2013-2022 and 2) technology priorities (P. Beauchamp, JPL, lead).

Secondary focus on feedback to OPF SDT (Ron Greeley, chair), and discussion of OPF Instrument Workshop at APL 15-17 July 2009.

OPAG and OP community Decadal Survey white papers written and posted on LPI website: http://www.lpi.usra.edu/decadal/opag/index.html

Presentation to DS Giant Planets and Satellites panels (W. McKinnon), 24 Aug 2009
http://www.lpi.usra.edu/decadal/opag/mcKinnonDecadal.pdf

Presentation to DS Giant Planets panel (P. Beauchamp), 26 Oct 2009
http://www.spacepolicyonline.com/pages/images/stories/PSDS%20GP2%20Beauchamp.pdf

Next OPAG meeting will be held 8-9 February 2010 in Washington, DC

Exploration Strategy for the Outer Planets 2013-2022: Goals and Priorities

Outer Planets Assessment Group White Paper

Executive Summary:

Important scientific discoveries continue to be made in the outer Solar System through NASA missions and research programs, such as the ongoing Cassini mission at Saturn and Titan, the New Horizons encounter with Jupiter in 2007, and Earth-based studies of Uranus and Neptune. The Outer Planets Assessment Group (OPAG) was established by NASA in 2004 to identify scientific priorities and pathways for outer solar system exploration, because the outer solar system provides critical clues to unraveling the mysteries of how solar systems form and evolve, and through the study of bodies like Europa, how planetary systems become habitable and how life has evolved in our solar system. Addressing such scientific questions requires a balanced strategy of outer solar system exploration that includes steady support for vigorous programs of basic research, data analysis, and technology development. Fundamental new discoveries are best made with a mixture of mission sizes that includes large (flagship) missions, along with medium-sized and smaller-sized missions. Such a strategy is most efficiently implemented as a coherent Outer Planets Exploration Program.

Missions to the outer solar system are major undertakings:

1) **OPAG recommends that the Decadal Survey explore the possibilities for a program structure/categorization that could allow 'small flagship' class missions to be considered,** providing a greater range of choice and capabilities in the mix to balance the size of program elements and science return. With the Galileo mission concluded, the Cassini Equinox Mission in progress, and Juno in development,

2) **OPAG strongly endorses the prioritization by NASA of the Jupiter Europa Orbiter (JEO) as the next Outer Planets Flagship and as part of the Europa Jupiter System Mission (EJSM) with ESA**. This collaboration includes a Ganymede orbiter and an increased focus on Jupiter system science; OPAG strongly recommends support of JEO and EJSM in the Decadal Survey.

3) **In addition, OPAG strongly endorses approval by NASA of the Cassini Solstice Mission**, including the Juno-like end-of-mission scenario, given the likely phenomenal return on investment.

4) **OPAG also advocates the need for a focused technology program for the next Outer Planet Flagship Mission, which should be to Titan and Enceladus, in order to be ready for a launch in the mid-2020s.** Technologies that require long-term investment for missions beyond the next decade should also be considered.

5) **New Frontiers class missions that should be considered in the interim include (but *not* in priority order) *a)* a shallow Saturn probe, *b)* an Io observer, *c)* a Titan *in-situ* explorer or probe, *d)* a Neptune/Triton/KBO flyby, and *e)* a Uranus orbiter.** OPAG recommends that these be studied, costed, and if deemed feasible, added to the approved New Frontiers mission set.

Outer Solar System Missions proceed over long time scales