

Implementation Options For the Solar System Exploration Survey's "Jupiter Polar Orbiter with Probes" Mission

Thomas R. Spilker, JPL/Caltech

In July of this year the National Academy of Science released a draft of its report, "New Frontiers in the Solar System: An Integrated Exploration Strategy," briefly describing the current state of solar system planetary science and the most important science objectives for the next decade (2003-2013). It includes a prioritized list of five mission concepts that might be flown as part of NASA's fledgling New Frontiers Program; each "concept" is more a list of science or measurement objectives than a full mission concept, since it does not specify implementation details in most cases. Number three on that list is the "Jupiter Polar Orbiter with Probes" ("JPOP") mission. This mission concept combines the strengths of previously described or proposed Jupiter missions into a single mission, and gains from the synergies of some of the newly-combined investigations. The primary science objectives are:

1. Determine if Jupiter has a central core
2. Determine the deep abundance of water (and other volatiles)
3. Measure Jupiter's deep winds
4. Determine the structure of Jupiter's dynamo magnetic field
5. Sample in situ Jupiter's polar magnetosphere

This paper examines some of the implementation options for a JPOP mission, and gives relative advantages and disadvantages. Given the New Frontier Program's constraints, implementing the full range of JPOP science objectives in a single New Frontiers mission may be challenging.

This work was performed at the Jet Propulsion Laboratory / California Institute of Technology, under contract with the National Aeronautics and Space Administration.