

Abstract

A low-Cost Power Subsystem for the Pluto Fast Flyby Mission

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The technical challenges of designing a low cost power subsystem for an extended far outer planets mission are staggering. Lifetime and reliability as well as cost are primary concerns. This paper will address the evolution of the power subsystem and the techniques and decisions used to determine the subsystem conceptual design. The Pluto Power Subsystem is a scald derivative of the Cassini Power Subsystem. The paper will discuss how heritage can save costs if used properly.

The paper will also focus on the various power source options; RTGs, special purpose small RTG designs, AMTEC, and Thermo-Photovoltaic (TPV). The paper will discuss the status of these sources as well as the development plans for the future. These new and existing designs will be compared and a trade space for the decision presented.

Particular attention will be focused on the AMTEC, TPV, and small RTG options. A number of new isotope designs have been investigated over the past few years. A mini-RTG called the "Power Stick" will be discussed in some detail and compared to the AMTEC and TPV and solar options. This aspect of the Pluto Power Subsystem is the most costly and impacts overall project cost tremendously. Thus, low cost approaches to far outer planet power must be found.

The paper will close with a discussion of the development and test plans for the power subsystem. In low-cost missions it is important to limit these costs while not adding additional risk to the project.



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The Jet Propulsion Laboratory is pleased to submit abstracts to the IAA Low-Cost Planetary Missions Conference. We submit one abstract on the Pluto Fast Flyby Power Subsystem and one on the Mars μ Rover power subsystem design. Both of these designs are large departures from the standard flagship development with risk and cost being prime considerations.

Thank you for your consideration.

John W. Klein