

ABSTRACT

X2000 Flight Missions Utilizing Common Modular Components

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X2000 is the nickname for NASA's Advanced Deep Space System Development Program (ADSSDP). Several flight missions between 2002 and 2006 are planning on using the multimission spacecraft bus being developed for the X2000 First Delivery. There are many challenges in trying to satisfy the requirements of a diverse mission set with modular elements that can be purchased in block buys at recurring cost.

This paper describes the mission set for the X2000 First Delivery and the requirements for a highly capable, low mass, long life, and reliable system that can process large science data sets. Strategies will be presented for developing common modular elements such as the avionics bus, ~~software~~, operations and ~~ground~~ systems, propulsion modules, probe support subsystems, and ~~power sources~~. A matrix of top level requirements, possible ~~spacecraft configurations~~, and a description of common elements will be presented.

Some of the specific challenges to be addressed include science payload accommodation, avionics scalability, temperature control, power constraints, propulsive capability, and spacecraft autonomy. Environmental constraints such as radiation and comet dust present additional challenges. ~~Cost benefits~~ will be addressed along with the penalties of commonality such as increased mass and non-optimum performance capabilities.

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