Mission Concepts Enabled by Solar Electric Propulsion and Advanced Modular Power Systems

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Introduction:

The Boeing Company has been active in the field of propulsion and power systems for many years. The company is known for its work in developing advanced technologies for space exploration, including solar electric propulsion (SEP) and advanced modular power systems. This paper presents three mission concepts enabled by solar electric propulsion and advanced modular power systems.

Mission Concepts:

1. NEO Precursor Mission: This mission concept involves a two spacecraft mission with a small body lander (SBL) and a mother ship (MS). The MS carries the SBL to the target NEO, and the SBL performs a high resolution map of the surface. The MS is then used to identify coordinates of interest and rendezvous with the SBL. This mission concept is feasible with SEP propulsion.

2. Mars Exploration Mission: This mission concept involves a two spacecraft mission with SEP propulsion. The first spacecraft, the mother ship, carries the small body lander (SBL) to Mars. The SBL then performs a high resolution map of the surface of Mars, which is used to identify coordinates of interest. The mother ship then returns to Earth to begin the mission cycle again.

3. Saturn Exploration Mission: This mission concept involves a two spacecraft mission with SEP propulsion. The mother ship carries the small body lander (SBL) to Saturn. The SBL then performs a high resolution map of the surface of Saturn, which is used to identify coordinates of interest. The mother ship then returns to Earth to begin the mission cycle again.

Conclusion:

Solar electric propulsion and advanced modular power systems provide significant benefits for space exploration missions. SEP propulsion is particularly attractive for deep space missions due to its high efficiency and low propellant consumption. Advanced modular power systems enable the design of highly versatile and customized power systems for specific mission requirements. Future work will focus on further developing and refining these mission concepts to make them more feasible and cost-effective.