

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry and Landing Systems (3)

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CONCEPT DESIGN OF HIGH POWER SOLAR ELECTRIC PROPULSION VEHICLES FOR HUMAN
EXPLORATION

Abstract

Human exploration beyond low earth orbit will require the use of enabling capabilities that are efficient, affordable and reliable. Solar electric propulsion has been proposed by NASA's Human Exploration Framework Team as one option to achieve human exploration missions to beyond earth orbit exploration because of its favorable mass efficiency as compared to traditional chemical systems. This paper describes the unique challenges and hurdles associated with developing a large high-power SEP vehicle, and design concepts that have potential to meet those challenges. A subsystem level breakdown of factors contributing to the feasibility of SEP as a platform for future exploration missions is presented. Overall concepts, trip times, design tradeoffs, and pathways to achieve development readiness are discussed.