SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Space Transportation Solutions for Deep Space Missions (8-A5.4)

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THE ANALYSIS OF TRANSPORTATION AND PROPULSION DEMAND FOR DEEP SPACE EXPLORATION MISSION

Abstract

According to the flight modes and flight phases, deep space exploration missions are generally divided into following modes: earth escape flight, target orbit capture, exploration orbit maintenance, orbit rendezvous and solar escape flight. The above flights all need large velocity increment, and the different orbit demands require different propulsion. Some missions need to achieve larger velocity increment in a short time, such as exploration target orbit capture. While the others have enough time to accelerate, such as earth phasing orbit escape acceleration. Deep space exploration missions should reduce the size of probes and launch weight as much as possible under the premise of meeting the scientific needs, in order to reduce the difficulty of research and development costs. Deep space exploration missions require efficient transport and propulsion. For mission design, selection and optimization of transport and propulsion have a significant impact on reducing the difficulty of the probes. For different mission, this paper analyses the demand on deep space exploration transportation, multi-stage propulsion, solid propulsion, electric propulsion. Analysis results can be used as the reference for deep space mission program and probes design.