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SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (1) (1)

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TECHNOLOGICAL DEMONSTRATION TESTS OF MAIN ENGINE FOR REUSABLE SOUNDING ROCKET

Abstract

A fully reusable sounding rocket is proposed in ISAS/JAXA to provide opportunities for atmospheric observation mission with lower cost and short turnaround time, and also to improve technology readiness levels for reusable space transportation systems. This rocket will take off vertically, reach to the high altitude more than 100 km, land on the launch site vertically, and be launched again within 24 hours. The main propulsion system of this rocket is clustered LOX/LH2 engines with full –time abort capability in spite of the one engine fail. In order to realize the reusable sounding rocket, the main propulsion system should have advanced features of high reliability, reusability, maintainability, and survivability. To fulfill those requirements, followings have been considered and reflected in the engine system design, i.e., optimization of design margines among components for high reliability and reusability, deep throttling capability for vertical landing, and health monitoring capability for abort operation, easy inspection and maintenance for short turnaround time operations. The engine performance and related advanced features are going to be verified and demonstrated through ground engineering tests. The facility for OTP and/or FTP demonstration tests and fully equipped engine system demonstration tests has been completed at the beginning of 2013. In this paper, demonstration tests plan is presented, including the details of the results of the demonstration tests for the oxygen turbopump.