

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

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DESIGN AND DEMONSTRATION TESTS OF LOX/LH2 ENGINE FOR REUSABLE SOUNDING
ROCKET**Abstract**

A Reusable Sounding Rocket (RSR) is being developed in JAXA and MHI to provide low-cost and frequent atmospheric observation missions. RSR will take off vertically, reach to 100km and land vertically on the launch site. This rocket is powered by four LOX/LH2 engines of 40kN thrust each and required to have not only high performance but also advanced features, i.e., high reliability, reusability for 100 flights, deep throttling capability for vertical landing, health monitoring capability for abort operation and maintainability. To fulfill these requirements, the engine is designed to reach good balance of performance, reliability, reusability and throttling capability. For example, a pneumatically actuated face seal is adopted for Fuel Turbopump (FTP) to realize high performance, high reliability, and reusability. Engine structure is designed to be easy to overhaul. Borescope inspection ports are adopted for easy inspection. In order to demonstrate these advanced features, demonstrator engine has been manufactured by MHI and demonstration tests have been conducted at Kakuda Space Center, JAXA. Oxidizer Turbopump (OTP) and FTP were tested in 2013 - 2014. These test results show that both turbopumps operate stably and

repeatedly and cover the required wide range of operation without any serious trouble. Following these successful tests, engine test is planned to be conducted in 2014. This paper presents the design and test results of the RSR demonstrator engine and its turbopumps with focus on these advanced features.