IAF SPACE PROPULSION SYMPOSIUM (C4)
Liquid Propulsion (1) (1)

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DEVELOPMENT OF SMALL ROCKET ENGINE FOR ROCKET VENTURES

Abstract

JAXA has a space business support program called J-SPARC (JAXA Space Innovation through Partnership and Co-creation), in which a private company and JAXA co-create in a multifaceted way, including technology development and business concept studies, to support the commercialization of a private company's space business. This paper describes the development of a small rocket engine (the Reference Engine), which is being conducted jointly by Interstellar Technologies Inc., a Japanese rocket venture, and JAXA at J-SPARC.

The Reference Engine is a rocket engine that uses liquid methane and liquid oxygen as propellants and has a thrust of about 4 tons. The engine is designed to be low-cost and easy to handle for use by rocket ventures aiming to commercialize small rocket systems. For this purpose, we are devising cost reduction measures in the design and manufacturing of major components such as the combustion chamber, injector, and turbo pump, and are conducting performance tests of each component at the JAXA Kakuta Space Center from 2019 to confirm the applicable technology. From 2023, system tests will be conducted on these major components plus necessary functions such as the control system, aiming for completion of the prototype engine.