

SPACE PROPULSION SYMPOSIUM (C4)
Hypersonic and Combined Cycle Propulsion (9)

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STATUS OF JAXA COMBINED-CYCLE ENGINE RESEARCH FOR FUTURE SPACE
TRANSPORTATION VEHICLE

Abstract

Feasibility study on future transportation vehicle (termed as reference system) is undergoing at Japan Aerospace Exploration Agency, setting the target on reusable, manned launch vehicles. Two staged vehicle configuration to low earth orbit is the final target of the current study, while point-to-point high-speed transportation using the same vehicles is also under consideration for near-term application. For long-range point-to-point transportation, system study on a RBCC (Rocket Based Combined Cycle) engine powered vehicle is undergoing, because a very high specific impulse is necessary to make dry-weight to take-off weight ratio reasonable. This vehicle will be used for first stage (termed as booster) of the TSTO-RLV. Performance prediction on the RBCC engine was conducted to find that higher Isp including airframe drag than that of rocket engines in vacuum was attained. Engine system thermal balance analysis as well as structure / weight analysis were also conducted.