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Feasibility Studies on Single Stage to Orbit Spaceplane

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Abstract

For the promotion of extended and diversified space activities in Japan, it is required to build immediately the technology bases capable of supporting such space activities.

Especially, the development of the space transportation system to and from lower Earth orbit, as driven by the clear need for affordability and operational flexibility, would be the key issue.

For such advanced systems, the spaceplane integrated by hypersonic airbreathing propulsion system, optimally configured as single stage, horizontal take-off and landing system, should be potentially promising option.

In Japan, the National Aerospace Laboratory of Science and Technology Agency (NAL) has initiated to study the spaceplane concept and develop the required technology bases since 1987.

The primary purpose of the spaceplane program is to provide technology as well as to provide a base of research and technology capabilities in critical disciplines for the future development of manned space transportation system.

The NAL's spaceplane research is a long-range, technology maturation program, which would identify, develop and transfer technology to increase future spaceplane's mission safety, reliability and performance, to reduce program development and operations cost.

The paper presents current studies on SSTO Spaceplane initiated by National Aerospace Laboratory, with an emphasis on a system feasibility on the vehicle powered by SCRAM/LACE hypersonic airbreathing propulsion system.

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