

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems (4)

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EVOLVING VISION OF JAPANESE PRIMARY LAUNCH SYSTEM

Abstract

This paper presents our current upgrade plan for the next primary launch system succeeding to H-IIA.

As Japanese primary launcher, H-IIA has been continuing successful launches for the 9th times in a row. In addition, a maiden flight of a heavier launcher, H-IIB, planned this autumn will show that Japan has launch capability comparable to space leading nations, such as U.S.A., Russia and Europe. In the field of national space policy, the Japanese basic law on space was established in the last year. Japanese space activities are now on the turning point from technology development phase to true space utilization phase. While we will keep operating H-IIA/B family, we have started to prepare advanced solution for future transportation as Japanese primary launch system to boost space activities much more than today.

We are considering a block upgrade (step-by-step) approach to avoid superfluous risk and cost for its development because primary launch system has to operate steadily responding to national launch demand. First, we will improve a 2nd stage to meet various launch demands including lunar/planetary exploration as well as GTO, LEO, and SSO. And then, we will develop a new 1st stage for more efficient operation and higher reliability.

The target of the second stage is to improve performance and functional capability to meet more various demands. Long coasting and multiple burning techniques are crucial to cover geographical disadvantage of our launch site, i.e. latitude of 30 degrees north. In addition, lighter structure is expected to be applied to compensate mass penalty to attain the long coasting. We are studying the change of tank material with higher-specific strength.

1st stage is closely related to efficient operation including short lead-time, stable production and cost reduction. We are pursuing simple configuration concept of the 1st stage. Our current solutions for the simple configuration are standard type only with a core (without boosters on the core's sides), commoditizing among launch family and access-less operation in launch site. A tentative standard type of the next launcher can lift off only with two newly developed LE-X engines. As for commoditizing, we are considering common core booster concept to accommodate wider launch demands. Access-less operation can be realized by minimizing interface between a vehicle and launch pad, and automatic checkout.