

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Vehicles in Service or in Development (1)

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CURRENT STATUS AND EVOLVING PLAN OF JAPANESE FLAGSHIP LAUNCH SYSTEM,
H-IIA/H-IIB**Abstract**

Current status and an evolving plan of Japanese flagship launch system, H-IIA and H-IIB family, will be presented. Status of H-IIA upgrade development and the concept study of a next flagship launch system will be shown.

As the current flagship launcher of Japan, H-IIA has been continuing successful launches for the 14 times and marked success rate of 95% by the Flight No.20 in last December. Although this success rate proves that H-IIA has high reliability and has caught up with world leading launchers from the technological point of view, our launcher still has some issues for improvement in order to boost space activities in Japan and also to increase commercial competitiveness in spacecraft launch market.

Mitsubishi Heavy Industries (MHI) and Japan Aerospace Exploration Agency (JAXA) have a step-by-step evolving plan of the flagship launch system. The first step is to upgrade the second stage of H-IIA. The second step is the development of the next flagship launch system with a new stage configuration.

H-IIA upgrade will adopt a long coasting flight sequence to reduce the delta-V of spacecraft to Geostationary Orbit (GSO). H-IIA upgrade is now in critical design and development tests phase. In order to extend the mission time, reduction of unusable propellant plays a crucial role to achieve the target launch performance. Engineering and qualification tests are being conducted, such as, thermal radiation insulating coating (white paint) on propellant tank, in-flight chill-down sequence improvement, propellant settling using vented GH2, and so on. Furthermore, 60% throttling capability of 2nd stage engine, LE-5B, will be employed to conduct 3rd burn with small delta-V.

Along with H-IIA upgrade, totally redesigned next flagship launch system is now in conceptual study phase. The major purpose of the next flagship launcher is to accommodate wide range of spacecraft through SSO (for institutional) to GTO (for commercial) with higher cost competitiveness to world-

standard launchers. The vehicle configuration study and feasibility tests of key technologies are now on going. A fully liquid propellant vehicle is selected as a baseline configuration to realize high reliability with cost-effectiveness. Although this configuration requires higher first stage thrust than current LE-7A, our solution is to apply engine clustering obtained through H-IIB development and next generation robust engine with expander bleed cycle same as LE-5B, dubbed LE-X. LE-X is under research phase as safe, reliable and cost effective engine.