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H3 LAUNCH VEHICLE LAUNCH RESULT AND LE-9 TYPE2 ENGINE DEVELOPMENT STATUS

Abstract

JAXA is developing H3 rocket with the concepts of high flexibility, high reliability, and high cost performance. Although the maiden flight of H3 rocket was unsuccessful, subsequent launches from the second to the fifth vehicle were all successful. H3 rocket allows for the selection of the number of first-stage engines and solid rocket boosters according to the mission requirements. The five H3 rockets launched so far have all used a configuration with two first-stage engines and two solid rocket boosters (referred to as the "22 configuration"). In the future, a flight is planned that will be the first in Japan to lift off using only three first-stage engines without solid rocket boosters (the "30 configuration"). JAXA has developed LE-9 engine as the first-stage engine for H3 rocket. To achieve H3 rocket's concept, LE-9 engine adopts a high-thrust (150 tonf), expander bleed cycle and electrically driven valves. H3 rockets launched so far were equipped with Type1 and Type1A versions of LE-9 engine, which operated successfully during flight. Currently, the development of Type2 version of LE-9 engine is underway to further improve performance and reduce costs. Type2 development plans include modifications to the turbine design of the liquid hydrogen turbopump and the application of 3D printing technology to the injector. This paper describes H3 rocket launch results and the development status of LE-9 Type 2 engine.