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HOT-FIRING TEST UNDER HIGH ALTITUDE SIMULATED CONDITIONS AND SEA LEVEL CONDITIONS OF THE 7-TONF-CLASS ENGINE FOR KSLV-II

Abstract

The result of hot-firing tests of the 7-tonf-class engine for the third stage of Korea Space Launch Vehicle II(KSLV-II) is presented. Hot-firing tests performed with full nozzle engines were carried out at high altitude simulated conditions using a vacuum chamber, and engines with short nozzle were carried out hot-firing tests at sea level conditions. The combustion time per each test was decided according to the test purpose from a short time of less than 10 seconds to a long time of 530 seconds. The operability of the engine was verified through design and off-design point tests, and the result of hot-firing tests performed at high altitude simulated conditions showed vacuum specific impulse of more than 330 seconds. In the long duration test among hot-firing tests, the target combustion pressure and mixing ratio were reached by feedback control using control valves after the combustion stabilization period. After 30 seconds of feedback control, change in engine performance due to soot stacking of turbine nozzles was observed, but it was confirmed that there was no problem in performing the mission. Through these tests, it was confirmed that the 7-tonf-class engine developed by Korea Aerospace Research Institute fulfilled all the engine requirements to be equipped as the third stage engine of KSLV-II.