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HIGH RELIABILITY DESIGN FOR TEST LAUNCH CONTROL SYSTEM IN LONG MARCH 5

Abstract

Long March 5 is a Chinese heavy lift launch system developed by China Academy of Launch Vehicle Technology (CALT). The main objective for the LM-5 rocket was to fulfill China's requirement for the large payload to LEO and GEO missions for the next 20–30 years. The LM-5's maiden launch successfully occurred on 3 November 2016, from the Wenchang Spacecraft Launch Center on Hainan Island. Its second launch on 2 July 2017 failed due to an engine problem in the first stage. On the basis of comprehensively implementing fault improvement measures, the Long March-5 Y3 will be launched in July this year, then the Long March-5 Y4 rocket will be used to launch the Chang'e-5 lunar probe, which is expected to bring lunar samples back to Earth. It will launch major lunar missions and the country's first independent interplanetary mission - to Mars - in 2020, and a variant will be used to construct the Chinese Space Station, launching 20-tonne modules to low Earth orbit. In order to fulfill these significant tasks which are lifted by the Long March 5 heavy carrier rocket, it requires high reliability to control system. The architecture of the test launch control system and its redundant design is reported in this paper.