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LARES IS IN ORBIT! SOME ASPECTS OF THE MISSION

Abstract

LARES (LAsER Relativity Satellite) has been accurately injected in the nominal orbit by the Vega launcher during the qualification launch on the 13th of February 2012. The European Space Agency (ESA) supported LARES satellite by accepting it on the Vega first flight and consequently a strong cooperation was required in order to meet the scientific requirements of the LARES experiment with the qualification objectives of the VEGA development program. The program started on February 2008 when the Italian Space Agency (ASI) awarded a contract to the prime contractor CGS (former Carlo Gavazzi Space). A Peculiarity of the LARES program was the major involvement of universities in many aspects such as the technical design of the satellite and the innovative separation system. The launch trajectory has been chosen as a compromise between the science requirements of the satellite and the Vega qualification objectives in terms of launch vehicle performance and trajectory constraints. The initial orbit was a typical sun-synchronous orbit at about 750 km. However that was not acceptable for the science objective of an accurate measurement of the frame-dragging phenomenon, an Einstein's General Relativity prediction. Therefore ESA and the launch vehicle authority, ELV (European Launch Vehicle), Prime Contractor of the VEGA development program, submitted a new orbit at 1200 km that later was changed to 1450 km along with the value of the inclination to improve the overall safety of the mission. LARES satellite with its separation and support systems were taking about 95% of the overall launch capability of Vega. A description of those systems will be briefly addressed along with some basic information on the autonomous telemetry of the LARES System. Interesting were also the VEGA upper-stage (AVUM) maneuvers, namely neutral axis maneuver, the barbeque, sun pointing, and spin axis maneuver. The ground segment description will conclude the paper.