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LARES 2: STATUS OF THE MISSION

Abstract

LARES 2 is a satellite of the Italian Space Agency that is scheduled for launch next autumn on ESA's VEGA C, an empowered version of the VEGA launcher. Taking advantage of the increased performance of this vehicle, it is possible to launch LARES 2 to a much higher orbit (ca. 5900 km!) than LARES thus allowing to insert the satellite into a suitable orbit i.e., supplementary to the one of LAGEOS. This particular orbit will allow to combine the data of LAGEOS and LARES 2 in such a way to eliminate the effects on the nodes (intersection of the orbit with the equatorial plane of Earth) of all the Earth's even zonal harmonics, in effect realizing the LAGEOS 3 experiment proposed in the '80s. Thus, LARES 2 will allow to measure frame-dragging, an effect predicted by the General Relativity theory, with accuracy improved by one order of magnitude with respect to the present most accurate tests. The satellite is in its final qualification phase and its mass is almost 300 kg. The satellite is designed to have the best ranging accuracy ever reached and has a diameter which is between the one of LARES and LAGEOS. The paper will review the scientific objectives that range from general relativity to Earth science. Besides frame dragging, the weak equivalence principle can also be verified with better accuracy by including in the orbital analysis the LARES 2 satellite laser ranging data. Other contributions of LARES and LARES 2 are in the field of space geodesy that in turn can be used to study the effect of climate change. The paper will describe the details of the mission and the scientific goals as well as report on the status of the project, including qualification tests of the flight unit.