QUAVER - Simple quasi-static verification test approach

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Spacecraft structures are designed to support the maximum quasi-static loads they will be subjected to during their lifetime. It is a normal practice in these space projects to perform a test to qualify this structural design. The standard testing approach is achieved by subjecting the structure or satellite to those loads using a wiffle tree, a centrifuge machine or an electrodynamic shaker. Each one of these testing options has its own weak points: Wiffle tree is not able to test actual flight spacecrafts; centrifuge tests require a very expensive facility and can only be used to test low mass spacecrafts and the current electrodynamic shaker tests have maximum mass and minimum frequency limitations. Because of these limitations, a simple and efficient alternative that can fulfill almost any mass, frequency and load requirement is herein proposed. This non-conventional approach is based in the simplest way to generate a quasi-static acceleration wave using the spring-mass-damper concept. Due to its simplicity, this system does not require high technology components helping to obtain a very low cost quasi-static testing machine. Then, the main objective of this presentation is to show the key characteristics of this solution including a detailed table comparing its performance versus the standard ones, finally it must be highlighted that in spite the design to be presented is able to test spacecrafts from 100 to 4000 kg this concept has no limitations for testing lighter or heavier satellites.

Biography

Edgardo Roggero obtained Post-graduate degree in Aerospace Technology from Universidad Tecnologica Nacional, Argentina. He is a Professor and Director of Master’s Degree in Satellite Technologies and Director of the Aerospace Technology Group and Argentine Space Agency (CONAE). Currently, he is Deputy Project Manager of SABIA-Mar Satellite International Project.

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