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TESTING STANDARD FOR LEAN SATELLITE CONSTELLATIONS

Abstract

ISO-19683, “Space systems – Design qualification and acceptance tests of small spacecraft and units” was published in July 2017. It was the product of an international joint endeavor by the lean satellite (a.k.a. small/micro/nano/pico satellite) community since 2011. The standard describes the minimum test requirements and test methods for lean satellite and their units. The standard has served as a guideline for lean satellite testing for the past five years. The document, however, was made based on the state-of-art knowledge in early 2010s. In the past 10 years, much wider and deeper knowledge regarding the lean satellite testing has been gained. Also, in early 2010s, most of lean satellites was still one of a kind, dealing with a single satellite only. But, nowadays, we see many constellation programs especially in the area of CubeSats. As a standard should be a living document, the testing standard has to be revised to reflect those changes surrounding lean satellites. In the systematic review voting conducted in December 2022, it was decided to revise ISO-19683 reflecting those points by December 2025. In the revision, we consider the two points; (1) reflecting the state-of-art knowledge based on the experience of the past 10 years, (2) adding a chapter regarding testing of constellation satellite programs. For the second points, we do basic research on how to improve the efficiency of testing multiple satellites simultaneously and how to formulate a logic of skipping some tests for satellites of identical design. In the conference, we will present the research results such as the effect of procedure documents on workmanship error, a short-cut method to measure the structure natural frequencies, identification of the most time-consuming test items, necessity of battery screening process, thermal vacuum test methods of multiple satellites, etc. The draft revised standard will be also presented.