

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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OPTIMIZING 3-COMPONENT FORCE SENSOR INSTALLATION FOR SATELLITE FORCE
LIMITED VIBRATION TESTING

Abstract

Due to the high cost, long development times, and uniqueness of satellites, it has become imperative to implement techniques that ensure the safety during vibration qualification testing. Force Limited Vibration limiting the reaction force between the shaker and unit under test. The use of piezoelectric, 3-component force sensors facilitates easy and accurate measurement of the input force. This force relates directly, using Newton's Second Law, $F=ma$, to the "quasi-static" acceleration of the structure's center-of-gravity.

Payloads are often fitted with piezoelectric force sensors using flight hardware which presents the problem of proper installation and preload required for a successful test. Preloading selection criteria is reviewed in detail along with its effects on gage sensitivity and bolt material effects. A case study is presented showing single gages at each mounting point using flight hardware.