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COMPOSITE STRUCTURE OF A CUBESAT SATELLITE WITH EMBEDDED SENSORS FOR STRUCTURAL MONITORING EXPERIMENT

Abstract

The structure of a cubesat satellite, manufactured in laminated composite material is provided of piezoelectric sensors embedded into the stacking sequence to monitor his structural behavior and transmit it via wireless radio connection. The aim of this experiment is to sense permanently the state of stress and/or deformation to which a generic space structure is subjected at launch or during its operative life. This capability is achieved by mean of a network of piezoelectric transducers, wired to a processing unit. Such unit is linked to a remote control station via wireless radio connection to transmit the acquired data and collect it. A shaker device simulates the vibrational environment at launch. A numerical model of the structure obtained with a finite element approach in order to evaluate the optimal placement of the piezo sensors is built. This manuscript describes both the design and the production phase of the sensorized composite structure and the structural monitoring experiment via wireless transmission of vibrational parameters.