

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures) (2)

Author: Dr. Claudio Paris

Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Italy, claudio.paris@centrofermi.it

Dr. Giampiero Sindoni

Sapienza University of Rome, Italy, giampiero.sindoni@uniroma1.it

Prof. Cristian Vendittozzi

Universidade de Brasília, Brazil, vendittozzi@aerospace.unb.br

Prof.Dr. Chantal Cappelletti

University of Brasilia, Brazil, chantal@aerospace.unb.br

Prof. Filippo Graziani

G.A.U.S.S. Srl, Italy, filgraziani@gmail.com

FBG OPTICAL SENSORS FOR ENVIRONMENTAL TESTS OF MICROSATELLITES

Abstract

The use of Fiber Bragg grating sensors is growing in many fields thanks to their properties such as the immunity to electric and magnetic fields and the capability to realize a distributed network of sensors exploiting the multiplexing capabilities.. In this paper the use of FBG sensors during the environmental tests performed on a specimen in the thermo-vacuum chamber of the LARES-LAB will be presented. The test chamber has been realized for the optical tests of the LARES satellite, launched in 2012 and now, thanks to the small size of the test chamber, the facility can be proficiently used for testing small satellites as cubesats and nanosats. The chamber has been upgraded adding an optical feed-through suitable for the use of FBG sensors that will let the real-time monitoring of the conditions of the test. A test campaign will be described and a specimen will be monitored using both optical strain gauges and standard sensors, thermal and mechanical stress will be applied in order to perform a comparison of the behavior of the two types of sensors. The validation of the performances of the FBG sensors could open the road for a new methodology for testing satellites with a cheaper and more accurate stress monitoring system.