

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

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

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OPERATIONAL MODAL ANALYSIS VIA IMAGE BASED TECHNIQUE OF VERY FLEXIBLE
SPACE STRUCTURES**Abstract**

Vibrations represent one of the most important topic of engineering design relevant to the flexible structures. The importance of this problem increases when a very flexible system is considered and the effects must be taken into account especially when a space structure is under concern. In order to identify the modal characteristics, in terms of natural frequencies and relevant modal parameters, ground tests are performed. The so identified parameters could vary due to the operative conditions of the system. In order to continuously monitor the modal characteristics during the operating life an operational modal analysis is mandatory. This kind of analysis is usually performed by using classical accelerometers or strain gauges and by properly analyzing the acquired outputs. In this paper a novel approach for the vibrations data acquisition will be performed via image-based technique. A web-cam placed on the vibrating structure, in this case an aluminum thin plate simulating a deployable solar panel, will be used to identify the eigenfrequencies and relevant damping ratios. In a second phase the vibrating panel will be installed on a free-flyer to simulate the solar array wing in a deployed configuration. By giving a act of rotary motion to the free-flyer, the modal parameters will be identified. The results of the experimental campaign will be investigated and compared with respect to the numerical simulation obtained via a FEM software and the relevant results will be proposed and discussed.