Paper ID: 79072
student

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Smart Materials and Adaptive Structures (9)

Author: Ms. Hasel Ramírez Cortés
Instituto Politécnico Nacional, Mexico

Mrs. Atzin Fernanda Constantino Gomez
Samara National Research University (Samara University), Russian Federation
Mr. Angel Vázquez
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico

USE OF SMART MATERIALS FOR STRUCTURAL HEALTH MONITORING IN AEROSPACE STRUCTURES

Abstract

Science of materials is continuously evolving to innovate the structures used in aerospace components, in recent years a new generation of materials has been proposed: smart materials, which have the capability to respond to stimuli and environmental changes to activate their functions according to these changes in a controllable way. These materials are usually embedded in systems to impart smartness and they require sensors, actuators and controllers to execute a cycle of inpunt, recognition, discrimination and reaction.

One of the applications of smart materials is Structural health monitoring (SHM), which facilitates the detection and characterization of damage in a structure or component that may result in its ability to fully and safely perform its intended function. The main purpose of SHM is to identify these changes at the earliest possible opportunity so that corrective action can be taken to minimize downtime, operational and maintenance costs, and most important, to reduce the risk of catastrophic failure.

The implementation of SHM in aerospace structures could enhance safety and reliability, because it is an advanced method to conduct the analysis of structural damage and degradation which impact on safety and performance of aerospace vehicles. This article is aimed to discuss the fundamentals, design methods and measurements analysis, including advantages and limitations of smart materials to determine the current state of health in space launch vehicle structures.