

SPACE SYSTEMS SYMPOSIUM (D1)
Enabling Technologies for Space Systems (2)

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HITOS: A HIGH-TEMPERATURE OPTICAL FIBER-BASED SENSOR SYSTEM FOR SPACE
STRUCTURES

Abstract

Temperature and strain sensors based in optical fiber, such as Fiber Bragg Gratings (FBG), present important advantages over the traditional technologies, like thermocouples, in terms of mass/weight, EMI immunity, chemical compatibility, multiplexing capabilities, (i.e. simplification of harness), etc.

Nevertheless, standard FBG technology is intrinsically not suitable for temperature ranges above 500°C, which limits its use on high-temperature applications like Thermal Protection Systems (TPS) or propulsion elements.

The HiTOS project consists in the development of a High-Temperature ($>1000^{\circ}\text{C}$) sensor system based on a new generation of Bragg gratings called regenerative Bragg Gratings (rFBG). This manufacturing technique enables the FBG technology to a higher range of operation temperatures, opening an entirely new scope of applications in Space Vehicles.

In this contribution, the HiTOS project is described as well as its main results and conclusions, obtained after the final characterization tests performed over the prototype implemented, which included all the elements of a future Space qualified version of the sensor system.