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Fully Integrated Miniature Multi-Point Fiber Bragg Grating Sensor Interrogator (FBG-Transceiver™) System for Applications where Size, Weight, and Power are Critical for Operation

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Redondo Optics Inc. (ROI), is in the process of developing a miniature fiber Bragg grating sensor interrogator (FBG-Transceiver™) system based on ROI's proprietary multi-channel integrated optic sensor microchip technology for applications where size, weight, and power are critical for operation. The FBG-Transceiver technology is based on the integration of all of the functionalities, both passive and active, of conventional bench top FBG sensor interrogators systems, packaged in a miniaturized, low power operation, 2-cm x 5-cm small form factor (SFF) package suitable for the long-term structural health monitoring of current and future NAVY tactical solid fuel rocket motors. The FBG-Transceiver system uses active chip-on-submount (CoS) optoelectronic components monolithically integrated to the integrated optic microchip, a microprocessor controlled CMOS-PC signal processing electronics board capable of processing the FBG sensors signals related to stress-strain and temperature as well as acoustics and ultrasound. ROI is in the process of developing a family of FBG-Transceiver systems for single channel and multichannel FBG sensor interrogation at 20-kHz sampling rates per sensing channel.

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Ключевые слова:

Integrated Optics, hybrid PLC, fiber sensors, structural health monitoring, nondestructive inspection, aerospace, military, miniature

Содержание.

Abstract

Introduction

The FBG-Transceiver™ system

Monolithic integrated optic sensor microchip technology

Demonstration of operating principle of miniature multichannel FBG-Transceiver™ system

Summary

Acknowledgments