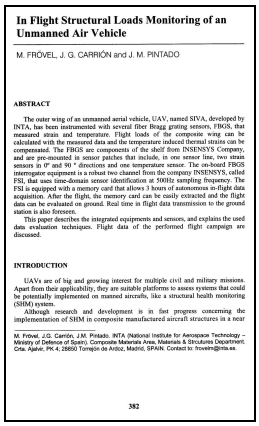

In Flight Structural Loads Monitoring of an Unmanned Air Vehicle

M. FRÖVEL, J. G. CARRIÓN and J. M. PINTADO

ABSTRACT

The outer wing of an unmanned aerial vehicle, UAV, named SIVA, developed by INTA, has been instrumented with several fiber Bragg grating sensors, FBGS, that measured strains and temperature. Flight loads of the composite wing can be calculated with the measured data and the temperature induced thermal strains can be compensated. The FBGS are components of the shelf from INSENSYS Company, and are pre-mounted in sensor patches that include, in one sensor line, two strain sensors in 0° and 90 ° directions and one temperature sensor. The on-board FBGS interrogator equipment is a robust two channel from the company INSENSYS, called FSI, that uses time-domain sensor identification at 500Hz sampling frequency. The FSI is equipped with a memory card that allows 3 hours of autonomous in-flight data acquisition. After the flight, the memory card can be easily extracted and the flight data can be evaluated on ground. Real time in flight data transmission to the ground station is also foreseen.

This paper describes the integrated equipments and sensors, and explains the used data evaluation techniques. Flight data of the performed flight campaign are discussed.

INTRODUCTION

UAVs are of big and growing interest for multiple civil and military missions. Apart from their applicability, they are suitable platforms to assess systems that could be potentially implemented on manned aircrafts, like a structural health monitoring (SHM) system.

Although research and development is in fast progress concerning the implementation of SHM in composite manufactured aircraft structures in a near

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Код: 10598

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In Flight Structural Loads Monitoring of an Unmanned Air Vehicle

Издательство DEStech Publications, Lancaster, 2010 год

6 стр; формат: 23,5 x 16 см; библиографический список: 7 единиц
ISBN: 978-1-60595-024-2

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Ключевые слова:

Содержание.