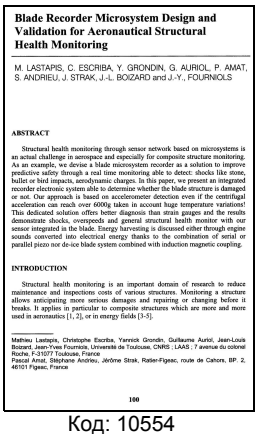
Blade Recorder Microsystem Design and Validation for Aeronautical Structural Health Monitoring

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ABSTRACT

Structural health monitoring through sensor network based on microsystems is an actual challenge in aerospace and especially for composite structure monitoring. As an example, we devise a blade microsystem recorder as a solution to improve predictive safety through a real time monitoring able to detect: shocks like stone, bullet or bird impacts, aerodynamic charges. In this paper, we present an integrated recorder electronic system able to determine whether the blade structure is damaged or not. Our approach is based on accelerometer detection even if the centrifugal acceleration can reach over 6000g taken in account huge temperature variations! This dedicated solution offers better diagnosis than strain gauges and the results demonstrate shocks, overspeeds and general structural health monitor with our sensor integrated in the blade. Energy harvesting is discussed either through engine sounds converted into electrical energy thanks to the combination of serial or parallel piezo nor de-ice blade system combined with induction magnetic coupling.

INTRODUCTION

Structural health monitoring is an important domain of research to reduce maintenance and inspections costs of various structures. Monitoring a structure allowes anticipating more serious damages and repairing or changing before it breaks. It applies in particular to composite structures which are more and more used in aeronautics [1, 2], or in energy fields [3-5].

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Ключевые слова:

Содержание.