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SPACECRAFT SURFACE SENSING FOR IMPACT DETECTION

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Keywords: spacecraft surface sensing, fiber bragg grating, impact detection, acoustic emission

This study reviews problem of spacecraft impact with micrometeoroids and dust particles and its consequences. Those impact could lead to spacecraft hull degradation, holes, subsystems malfunction. Impact with massive particle could cause the spacecraft to go off course and inflict collateral damage to it, which could lead to its total destruction.

The purpose of this study is to review existing methods of impact detection and to propose a system based on one of those methods which could be a potential solution to this problem.

Nowadays there are 8 methods of impact detection applicable to the spacecraft. Two of those methods were inspected closely - acoustic emission method and fiber optic usage. After careful studying of those methods the decision was made to create a hybrid system, which consists of fiber optic sensors based on bragg gratings, but the detection principle itself based on acoustic emission phenomena. This system consists of several fiber bragg grating sensors, half of which is supposed to be mounted on the inner side of the spacecraft hull and supposed to detect acoustic emission waves, and the other half serves as reference ones. Moreover, system includes temperature stabilization for the gratings in order to maintain a constant temperature for the gratings.

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THE PROBLEM OF HEAT LOSS IN SOLAR PANELS

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Key words: hyperbolic thermal emitter, renewable energy, photovoltaic cell, p-n junction

The article gives an overview of such a promising device as a hyperbolic thermal emitter (HTE). This devise consists of highly aligned carbon nanotubes. Due to the properties of nanotubes, the emitter can

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