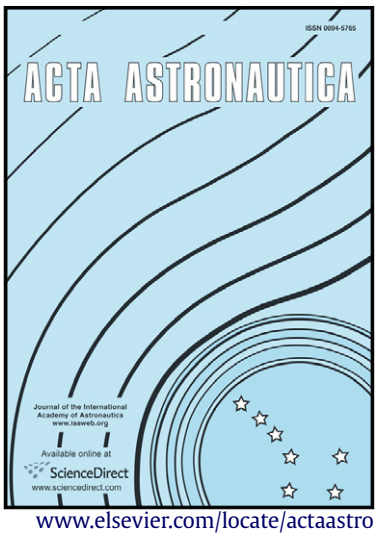

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LARGE-SCALE SHIELDING STRUCTURES IN LOW EARTH ORBITS

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Abstract: The problems involved in the design-engineering digital simulation of large-size transformable-screen constructions for protecting spacecraft and equipment from space debris and meteoroids were considered. The engineering principles used to improve the design and efficiency of protective screens are presented. The use of embedded matrix transducers located all over the composite material used for armor tiles is proposed for the construction of protective clad screens; this approach enables efficient detection of damaged areas of the protective screen, the assessment of the level of damage, and the prediction of damage to spacecraft and equipment structures.

Keywords: spacecraft, space debris, meteoroids, protective screen, digital models,

1 Introduction

The problems of using digital simulations to improve the design of the production and deployment processes of large-size transformable modular units for shields used to protect spacecraft from collisions with debris and meteoroids must urgently be addressed. The growth of debris and meteoroid threats to space programs [1-4] places these activities at the top of the list of research and production needs.

Techniques for transforming graphic information models into digital production models of large-size transformable protective screen modular (TPSM) units for spacecraft involve a complex of complicated problems. Digital models describe the steps in the process of transforming blocks and raw materials into components and components into assembly units, standard protective screen modular

units and packaged units ready to be assembled, installed and anchored. Experience indicates

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