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FEATURES OF THE DEVELOPMENT OF SPACE-BASED SHADING AND LIGHTING SYSTEMS FOR THE EARTH'S SURFACE

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The problem of ensuring favorable climatic conditions in a particular territory is global for mankind. In the context of the global climate change, its resolution may be crucial for national economy management in many countries. By now, a number of engineering solutions have been proposed to develop means that may allow one to achieve the goal of global climate control. These solutions include an Earth orbit change concept, aerosol marine and stratospheric technologies, and a "sunshade" concept. One of the promising conceptual developments is a space-based "sunshade" technology. Taking into account the significant scientific background and a similar principle of operation of lighting (illuminative) systems, they were suggested to be used simultaneously with "sunshade" systems.

The goal of this work is the development of a structure for a mathematical model of the ballistics and navigation of a space-based shading and lighting system (SBSLS). To do this, SBSLS structural modules were identified: a space-based industrial platform for SBSLS module production, passive and active shading and lighting modules, and service spacecraft. Generalized construction arrangements of the shading and lighting module were decided on. Based on the features of the SBSLS structural modules, a structure for a mathematical model of SBSLS ballistic and navigational support was developed. The structure comprises five components: an orbit estimator, an attitude motion estimator, an attitude and orbit control system, an optical estimator, and a geodetic estimator. A number of specific problems involving the choice of SBSLS design parameters at the conceptual design stage were identified and justified for further investigation. The combined use of the above modules may allow one to solve them.

Keywords: *space-based shading and lighting system, ballistics and navigation support, structure of mathematical model, conceptual design, space-based sunshade system.*

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