

ANALYSIS OF USE OF AERODYNAMIC SYSTEMS TO DEORBIT MODULAR LARGE-SIZED SPACE OBJECTS FROM LOW NEAR- EARTH ORBITS

This paper deals with the analysis of the feasibility of aerodynamic deorbiting systems (ADS) to deorbit modular large-sized space objects (MLSO) from low earth orbit. The objective of this paper is to study the feasibility ADS to deorbit MLSOs from low earth orbit. The feasibility of aerodynamic deorbiting systems in the form of a single spherical shell for deorbiting modular large-sized space objects from low earth orbit is analyzed. It is shown that this is unsuitable for use. The method for deorbiting modular large-sized space objects from low earth orbits is presented. The method for deorbiting MLSOs is examined where each module is preliminarily equipped by an autonomous ADS and all modules are separated from the reference module before deorbiting. Criteria for estimation of the feasibility of ADS are selected. Studies of the feasibility of ADS for deorbiting the Mir Space Station from low earth orbit are conducted using selected criteria. The parameters of aerodynamic deorbiting systems for each module of the Mir Space Station are calculated considering the damaging effects of space on the ADS shell. The efficiency of the method proposed is estimated.

Keywords: space debris, aerodynamic removal system, large-sized modular space structure.

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