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LOW-ORBIT SPACECRAFT SERVICE PLANNING

Abstract

A methodical approach to the planning of the flyby of low-orbit spacecraft (passive SC) that require maintenance is presented. The servicing system is a set of base stations intended for servicing passive SC by means of detachable returnable and non-returnable modules (active SC) located at base stations. The serviced system can be either a classical satellite system in which altitudes of all spacecraft orbits are the same, or may consist of spacecraft located in orbits of different altitude, that greatly complicates the task. Servicing is understood as the implementation of maneuvers for the transfer of active SC in the vicinity of passive SC. The task of service planning is to determine which of the active SC should fly to the passive SC that required maintenance in order to minimize the total energy cost of all flights. It is assumed that each flight is carried out within a time interval specified for maintenance and with minimum total characteristic velocity. Service planning is performed on the basis of the analysis of the deviation portrait for the longitude of the ascending node (LAN) of each passive and active SC from the averaged LAN value of all serviced and servicing SC.