

PRESELECTION OF THE REFERENCE ORBIT FOR AN EARTH REMOTE SENSING SATELLITE

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Low near-circular orbits of Earth remote sensing (ERS) satellites are considered. The objective is to select the orbits most suitable for a particular satellite mission. In particular, the problem of an approximate determination of the orbit parameters that allow a satisfactory satellite survey of the target surface of the Earth is considered. The main desires of observation system developers regarding the conditions of the Earth's surface survey are considered. To reconcile these desires with the regularities of satellite motion in low Earth orbits, use may be made of simple models that describe these regularities. In doing so, it is desirable to visualize viewing swaths on the Earth's surface. A compromise between the desires of observation system developers and the satellite motion regularities is the selection of orbits that best meet the characteristics of a particular satellite and its observation system. This article presents a simple model and algorithm that make it possible to preselect ERS satellite orbits. The proposed model is based on familiar relationships, and the novelty of the article lies in a compact and generalized presentation of the model for ERS satellite orbit preselection. The article presents models that make it possible to estimate the satellite swath width and choose the orbit inclination angle, a stable orbit shape, the orbit altitude, and the orbital period. The advantages and disadvantages of solar synchronous orbits are considered. Analytical expressions are constructed to fairly simply estimate the excursion of a satellite from its operational orbit under the action of the aerodynamic drag, estimate the rate of recovery of the orbit parameters under the action of a constant transversal control acceleration, and determine allowable time intervals between engine starts and engine operation intervals. The advantages of repeat ground track orbits are shown. The simplest model for calculating and visualizing satellite viewing swaths of the Earth's surface is constructed. Thus, the article proposes a simple algorithm for the preselection of low Earth orbits for ERS satellites with a satisfactory observation of the target surface of the Earth.

Keywords: *Earth remote sensing satellite, reference orbit, viewing swath width, inclination angle, orbit shape.*

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