Calculation of illumination conditions during putting the spacecraft into geostationary orbit using low thrusters

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This article assesses conditions of spacecraft illumination and the possibility of its falling into the shadow of the Earth during the flight from the parking orbit to geostationary orbit using low thrusters. The obtained results are used for simulating the temperature state of the antenna reflector to determine the thermal load during an orbital flight. In the course of simulation it was found that during the trip, the orbit plane tilt angle is continuously changing from the initial value to zero by the time of entering into a geostationary orbit, and the entrance angles of the antenna directed along the radius of the orbit were determined. It is shown that the flight trajectory is a spiral with a pitch increasing in orbit radius magnitude and the spacecraft shadow-sunlight time for each subsequent orbit pass increases, and the maximum shadow-sunlight time is of the order of 1.12 hours.

Keywords: *illumination, geostationary orbit, spacecraft, low thruster, antenna*

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