Investigations of the evolution of optical characteristics and dynamics of proper rotation of uncontrolled geostationary artificial satellites.

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The contribution is devoted to the analysis of results of research of the dynamic phenomena during rotation uncontrolled geostationary satellites. The opportunity of research of the spacecrafts technical condition and its launching facility is considered. Researches are based on comparison of observable and simulated light curves for SC with a known design. The studies are focuses on the analysis of the light curves of the spacecrafts (S/C) after the termination of the active operation. The data result from the long period of the observation in the Sayan mountain observatory of ISTP SB RAS. A classification of the periods of the SC rotation changes on the basis of an available observational data (20 GEO satellites) is carried out. The description of methods and instruments used for acquisition of light curves as well as the review of the material observed will be considered. The evidence demonstrates that the light curves of all uncontrolled S/C have the periodical structure and the features specific for every satellite. The analysis of rotation period change of uncontrolled S/C has pointed to the peculiarities of their behavior, connected both to their interaction with outer environment and inner processes in S/C. Selected S/C's demonstrates fluctuations of the periods in the range from a few seconds to a few minutes. The results of the temporal-frequency analysis of light curves, which has been carried out in order to identify the proper periods of a satellite rotation and the dynamics of their change with time. Physical mechanisms of changes are discussed. The reasons of the period of rotation changes can be the internal processes changing of the SC the momentum of inertia, and interaction with space environment. Mechanism of secular decreasing of the period rotations cause by the space environment interactions is proposed.