Experimental determination of photometric characteristics of the BLITS-M satellite and its range correction

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The BLITS-M satellite with a submillimeter target error will be launched into the orbit of 1,500 km in altitude with the inclination angle of 82.5°. The launch is scheduled for the end of 2018.
The paper presents the results of measurements of the time periods that laser pulses take to propagate inside the optical glass sphere in order to calculate the range correction, to evaluate the variations of the correction values and to measure the satellite star magnitude due to the Sun radiation. Upon calculating the range correction, the group refractive index of glass is taken into account.
To detect the BLITS-M satellite by optical instruments, it is necessary to estimate its photometric parameters (star magnitude) for different values of the phase angle, considering the rotation of the device around its spin axis with the frequency of 10 rpm.
The outer glass layer of the BLITS-M satellite consists of two meniscus; one of them has an interferential mirror coating and the other one is transparent. Thus, the scattered solar radiation depends on the position of the sphere relative to an observer, taking into consideration the mirror reflectivity and diffuse reflection due to rays passing through the transparent meniscus. We have obtained the graphs of the star magnitude variation of the satellite during its rotation, depending on the phase angle.
It is shown that the star magnitude is reducing, i.e. the brightness is increasing in case of the light reflection from the satellite mirror coating.