SLR STATION OF THE NEW GENERATION FOR TIME TRANSFER WITH SUBNANOSECOND ACCURACY AND RANGING WITH SUBMILLIMETER ACCURACY IN NIGHT AND DAYTIME.

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The concept of the new generation SLR station constructing, designed to address the fundamental problems of geodesy, navigation and time transfer at the sub-millimeter and sub-nanosecond level of accuracy is considered. The structure and technical characteristics of the station's measuring systems, which perform laser measurements of range to geodetic and navigation satellites, and also laser and radio-frequency measurements of pseudorange to navigation satellites are presented. The principle of mutual synchronization of the station's measuring systems and correspondence of the station time scale to the national standard of frequency and time.

The main challenges of achieving the sub-millimeter accuracy of measurements are considered. The description of a differential method of the measurements applied in laser station to achieve the sub-millimeter accuracy of range measurements is given. Methods for correcting the systematic errors of normal points formation, caused by fluctuations of a number of photoelectrons in the received laser pulses, diffusion phenomena in single photon detectors and influence of the solar background are presented.

In accordance with the results of the research, recommendations on what photo detectors for precision laser ranging should be selected, as well as on algorithm of normal points formation at the sub-millimeter level of accuracy are given.