

THE LASER STATION SYNCHRONIZATION AND REFERENCE FREQUENCY SYSTEM AND ITS METROLOGICAL SUPPORT

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The uniformity of measurements and metrological traceability of the units of length, time, frequency and the national time scale UTC(SU) transfer in the Russian Federation provided by calibration (verification) in accordance with the "chain of metrological traceability", based on a standard of time and frequency hierarchy, and on the relevant state verification schemes. It is noted, that creation of synchronization and complex metrological provision system of laser station, performed by the FSUE "VNIIFTRI", will contribute to providing metrological traceability of measurements in the submillimeter laser ranging system, forming the measuring data in the interests of the complex of means for fundamental support of the GLONASS system.

The uniformity of measurements and metrological traceability of the units of length, time, frequency and the national time scale UTC(SU) transfer in the Russian Federation provided by calibration (verification) in accordance with the "chain of metrological traceability", based on units, length, time and frequency standards hierarchy, and on the relevant state verification schemes.

The aim of the work performed by the FSUE "VNIIFTRI" is the creation of a system of synchronization and complex of metrological provision of laser station for the submillimeter satellite laser ranging. The station, in turn, forms the measuring data in the interests of the complex of means for fundamental support of the GLONASS system. The goal of the station is to provide high-precision measurements of the distance to navigation and geodesic spacecrafts, as well as to clarify fundamental astronomic-geodesic and geodynamic parameters. In the result of the work, the necessary level of accuracy of binding state geocentric coordinate system to the center of mass of the Earth, high-precision determination of GGSC communication parameters with International worldwide coordinate systems, and to reconcile GLONASS time scale with the State primary standard of time, frequency and the national time scale, is achieved.

The report provides a brief description of methods and means of the units of time, frequency and the national time scale UTC(SU) transfer, included in the synchronization system and metrological provision complex of laser station.

There are estimates of measurements uncertainty at the decision of the transfer of the units of length, time, frequency and the national time scale UTC(SU) tasks and calibration (verification) of measuring means of laser station tasks.

Signals of time and frequency are transferred from the standard to the laser station through fiber-optic line and go back to ensure the work of the witness compensating system, excluding the impact of signal delays in fiber optics, lasers and photodetectors too. Temperature control of the transmitting, receiving elements, and the tracking system elements, is used in conjunction with active corrections, produced by results of measurement of the instantaneous values of the temperature of these elements. As a result, the phase of the signal frequency and the time stamp on laser station coincide with the phase of the signal and the time stamp on the standard output with high accuracy.

Creation of synchronization and complex metrological provision system of laser station of FSUE "VNIIFTRI", will contribute to providing metrological traceability of measurements in the submillimeter laser ranging system, forming the measuring data in the interests of the means complex for fundamental support of the GLONASS system.