

## **New level of advancement of a national time scale UTC(SU)**

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The report provides information on the composition and main characteristics of the formation complex of the national time scale UTC (SU) and represents the prospects of its development.

The national time scale of the Russian Federation is reproduced and maintained based on the State standard of time and frequency operated at a facility located in Mendeleevo, Moscow Region. The UTC(SU) time scale is a representation of UTC; it is maintained in accordance with the BIPM requirements, based on the results of comparisons by GPS with the time scales of PTB, USNO, NIST with other time laboratories, and with time scales of Eu-Asian TWSTFT workgroup, including laboratories of Germany, China, Korea, India, Japan and Taiwan.

The UTC(SU) time scale is currently transmitted to the GLONASS Ground Control Segment using signal receivers.

The national atomic time scale TA(SU) is computed in accordance with the definition of the SI second and the values of the units of time and frequency realized by primary cesium standards of the CSFO fountain, with an error of  $5 \times 10^{-16}$  or below. Since 2014 CSFO2 is officially included in calculations TAI.

The units of time and frequency are maintained independently during periods between the last official publication of UTC data and the next, by an upgraded ensemble of hydrogen frequency and time standards of type CH1-75A with a daily frequency instability of  $5 \times 10^{-16}$ .

UTC(SU) is computed based on TA(SU), monitored and corrected against UTC as soon as the next BIPM publication becomes available.

According to the BIPM Circular T, the UTC(SU) time offset from UTC has not exceeded 10 ns in the current year.

The following are the future plans on improving the means which reproduce, maintain, and transmit the units of time and frequency, aimed at assuring the prescribed characteristics of the GLONASS system by the year 2020:

- upgrading the set of means for generating and maintaining the national time scale;
- developing means for maintaining the units of time and frequency based on a rubidium fountain;
- creating an optical frequency standard;
- developing means enabling high-precision comparison of UTC(SU) with the GLONASS system time scale, as well as with time scales of other time laboratories, in particular USNO;
- creating high-precision channels for transmitting the standard frequency and time signals over fiber-optic communication lines.