



Bureau International des Poids et Mesures (BIPM) - Time Section

web: www.bipm.fr

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Development and Functions

Since 1 January 1988 the Bureau International des Poids et Mesures (BIPM) is fully responsible for the maintenance of International Atomic Time (TAI) and of Coordinated Universal Time (UTC).

The BIPM is in charge of:

- Establishing TAI and UTC (except for the UTC leap second occurrence and announcement, in charge of IERS).
- Providing the data making TAI and UTC available in the standard laboratories.
- Participating to the worldwide coordination for time comparisons.

Activities and Services

- Time scales

TAI is established on the basis of atomic clock data and atomic frequency standards from some two hundred atomic clocks in nearly 60 laboratories or national centers.

TAI and UTC are made available by the dissemination of corrections to be applied to the readings of the master clocks of the participating laboratories. Since January 1998 TAI has been calculated using one-month blocks of data, instead of two as used previously.

The stability of TAI is about 3×10^{-15} for averaging times of 1 to 2 months. The TAI scale unit differs from the SI second on the rotating geoid, in values in the range -5×10^{-15} s to $+5 \times 10^{-15}$ s during 1999 with an uncertainty of 4×10^{-15} s.

In addition to TAI, the BIPM establishes a scientific time scale TT(BIPM) for applications requiring ultimate long-term stability. A new version of this time scale, based on data reprocessing, is available every year and covers several past years.

- Time comparisons

The activities of the BIPM Time Section are based on accurate time comparisons between remote clocks, which are mostly based on the tracking of GPS

satellites. The BIPM organizes these time comparisons by providing international GPS common-view tracking schedules and by checking differential calibration of GPS time receivers. The BIPM treats raw GPS data according to a unified procedure:

- Only strict GPS common views are used to minimize Selective Availability effects.
- The international network figures local stars on continental distances added to two long-distance links between the NIST (Boulder, Colorado, USA), the CRL (Tokyo, Japan) and the OP (Paris, France).

Since July 1999 long-distance links are corrected for measured ionospheric delays obtained from IGS ionospheric maps and for precise satellite ephemerides. The ultimate uncertainty is of a few nanoseconds for a tracking duration of 13 minutes.

Publications

- Circular T (monthly): Corrections to the readings of laboratory clocks to get TAI and UTC. Data on time comparisons Informations.
- Annual Report of Time Section of BIPM: Methods of evaluation of TAI. Data on the clocks and time comparisons. Data from the primary frequency standards, BIPM results on time scales.
- Schedules for GPS and GLONASS satellite tracking (for participating laboratories), issued about twice a year.

Point of Contact

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