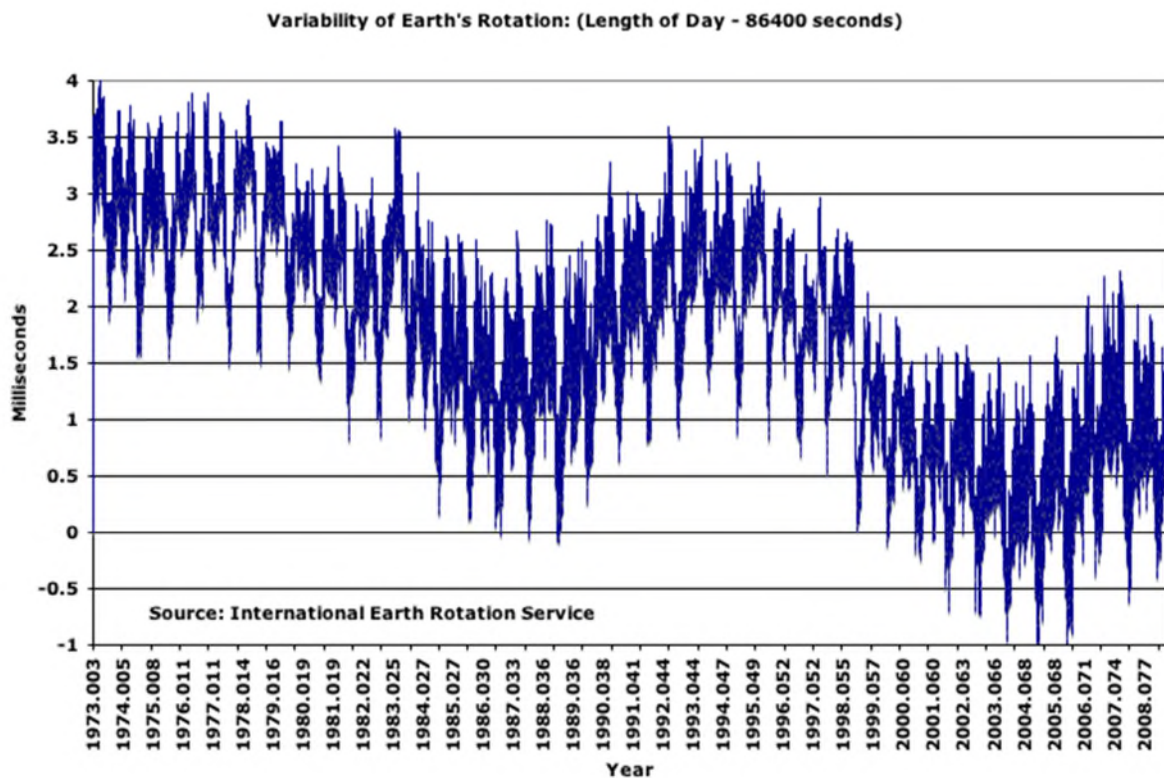


Introduction:

The leap second issue is not just about the leap second but the choice of method to define time. It can be further simplified to having a time system related to the rotation of the Earth (solar time) or the radiation emitted by the caesium-133 atom (atomic time).

Why the leap second is required

The rotation of the earth is irregular therefore to keep time based on the Earth's rotation (solar time) and fixed periodic systems (atomic time) the leap second has been introduced.



Leap seconds can be added and removed, and there is no regular periodicity to when the leap second occurs. Typically it happens annually on June 30^h but this is not always the case. The objective is to keep the difference between UTC and UT1 (solar time) less than 0.9s

The leap second is added by allowing the second count to go to 60



Leap Second Issues

Examples of issues surrounding the leap second are:

Difficult for software programmers to deal with as the leap second is added or removed at irregular time intervals.

The insertion of the leap second can create havoc with systems. In the Northern hemisphere this is not as problematic, as it happens in the middle of the night. However, throughout Asia the insertion is during the day.

The derivation of the when the leap second will next be added cannot be forecast in advance by more than six months.

Telecommunications relies on precise timing, and the addition of a leap second forces many systems to be turned off for a second every year of two. To get all such systems in a global industry cycled on and off in sync can be a major headache

World Radio Council 2015

The leap second is being addressed at the upcoming World Radio conference under agenda item 1.14

AGENDA ITEM 1.14

*1.14 to consider the feasibility of achieving a continuous reference time-scale, whether by the modification of coordinated universal time (UTC) or some other method, and take appropriate action, in accordance with Resolution **653 (WRC-12)**;*

Resolution 653 (WRC-12): Future of the Coordinated Universal Time time-scale.

Four methods (options) are proposed to satisfy the agenda item:

- 1) Remove the leap second insertion or deletion from the definition of UTC in order to make it become a continuous time-scale and either retain the name UTC or adopt a new name.
In simple terms, stop inserting the leap second and let UTC and UT1 drift apart. UT1 is mean solar time.
- 2) Keep the current definition of UTC, disseminate the UTC time-scale and also disseminate a continuous time-scale on an equal basis.
In simple terms keep UTC as is with its inserted leap seconds, and introduce and atomic based time scale. I.e. two time scales are available for use. Both systems will be broadcast.
- 3) Keep the current definition of UTC and enable the recovery of the International Atomic Time (TAI) that is offset from UTC only by an integer number of seconds and can be

reconstructed from the current implementation of UTC or use a continuous system time-scale

In simple terms, UTC with its leap seconds will be maintained, however, continuous time systems can be used where required alternately atomic time can be derived from the current UTC time with the appropriate current off set added. Only UTC would be broadcast.

- 4) No change to the definition of UTC in the Radio Regulations.
In simple terms status quo, no change.