

Discussions on the future UTC in the International Astronomical Union

Mizuhiko Hosokawa* and IAU working group on redefinition of UTC

* National Institute of Information and Communications Technology,
President: IAU Commission 31, Time

Outline

1. IAU and UTC, an introduction
2. Discussions in the past IAU WG
3. Current activities in the Working Group

1. IAU and UTC

Time is deeply related with astronomy

Oldest way of time measurement,

Research on Time scales and Reference frames

Astronomy covers wide area. In IAU,

9 Divisions, 40 Commissions, 72 Working Groups and
Program Groups

Division A Fundamental Astronomy, 7Cs and 7WGs

→ Not all astronomers are interested in time

Time Systems and Time Scales

- Various types for various purpose
 - SI second (atomic clock, proper time)
 - **TAI**, GPS time (coordinate time)
 - UT, UT0, **UT1**, UT2 (Earth Rotation)
 - TCG, TDG (Geocentric)
 - TCB, TDB (Solar system barycentric)
- The astronomical community has been working to **provide measures of time**, to meet the **needs of users**, not only astronomers but physicists and space scientists as well.
The IAU considers this to be one of its responsibilities and intends to continue its support and to encourage further improvements in the future.

2. Discussions in the past

- First WG; the ITU SRG asked the IAU (and other international organizations) to provide their opinions and suggestions.
- A resolution to establish a working group to discuss the redefinition of UTC was adopted by the IAU.
- The new working group should discuss whether there is a requirement for leap seconds, as well as the possibility of inserting leap seconds at pre-determined intervals, and considerations about the tolerance limits for UTC-UT1.
- Chaired by D. McCarthy
- Six years' discussion since 2000, Final report in 2006 :

WG Final report in 2006

- No consensus** at the working group on supporting or rejecting a change in the definition of the UTC due to the many pros and cons from the different points of view;
- One agreement** on one practical request; To allow sufficient time before implementing any changes to the definition.
- Experience**; Insertion of the leap second on 31 December 2005, IAU community was **not significantly affected** adversely by any problems. **A significant investment** in personnel time and effort is required to prepare for the insertion of the leap second.

3. Current activities

- 2012, WG on the redefinition of UTC was established again under the Division A, to contribute to RA2015.
- The working group should consider the following various aspects of the desirable timescale.
 1. the current requirements for civil time scales;
 2. the options for satisfying the future requirements for civil time scales;
 3. the option of retaining UTC as it exists, and also distributing a purely atomic time scale;
 4. the impact on the work of astronomers of a redefinition of UTC to make it a continuous timescale, eliminating the occasional insertion of leap seconds;
 5. whether a new continuous timescale for dissemination world-wide should be adopted and how this should relate to TAI;
 6. whether the IAU should recommend that issues related to the definition of reference timescales should be decided by the General Conference for Weights and Measures (CGPM) rather than the ITU;
 7. alternative means of distributing UT1, UTC and/or a new continuous timescale.

Recent discussions

- Quite a few WG members explicitly exhibit the preference of “Status Quo”. Also there are objections from some members.
- Major part of astronomers show any opinion
-> few knowledge or interest?, confidence of free from any change?
- Pulsar community; At least the last two leap-second adjustments have caused significant disruptions to observations at Parkes, with the system being down for several hours following the leap-second insertion.
- Many other options?

Summary of the recent discussion

- Not all, but some of IAU members are very much interested in the future UTC, especially astronomical observers who use the telescopes.
- Among them, some are supporting the status quo, some are objecting. Quite a few WG members express they prefer the status quo explicitly.
- There are also opinions that the change of the UTC will not affect astronomers seriously.
- Some groups such as pulsar astronomy community strongly supports the elimination of the leap-second adjustments since that have caused significant disruptions to observations.

Should we look back the 2006 WG report?