



Monthly Newsletter of International URSI Commission J – Radio Astronomy

March 2020

Officers

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News Items - Greetings from the Chair!

- **COVID-19**

The COVID-19 pandemic is on all of our minds. I hope you and your family are staying healthy and adjusting to the demands of social distancing. At this point, the planning for 2020 URSI GASS continues. However, the URSI Secretariat and Board are very closely monitoring the situation. With the GASS scheduled for late August / early September we have a bit of time to see how this evolves before a decision regarding GASS is necessary. I will keep you informed.

- The planning for 2020 URSI GASS continues. Commission J received 208 abstracts! We were assigned 153 time slots for Commission J oral presentations so some will be moved to posters. A tentative Commission J program was created and submitted to the GASS organizing committee for approval. Once approved, I will contact the conveners with the session information and ask them to organize their session according to the allotted time and configuration within the overall GASS program.
- An early draft of the URSI resolution regarding its position on UTC leap seconds was included in the February 2020 issues of the Newsletter. In March, an ad hoc URSI committee was formed, in part, to address concerns voiced by members of Commission J about the initial draft. The Committee reviewed the draft carefully and made numerous changes to the wording and clarified URSI's position statement. The resulting resolution, which was presented to the URSI Board on March 27th, is included in this Newsletter. In essence, URSI supports removing the phase lock between the two oscillators (UTC and UT1), but keep track of the difference and disseminate this information. Both will be continuous but UTC will serve as the master clock.
- Looking for a past issue of the "J" Newsletter? The Newsletters and other URSI Commission J documents are archived at <http://www.ursi.org/commission.php?id=J#tab-section4> .



URSI Resolution

URSI Resolution for consideration at the GASS2020

Statements from URSI on the need for a continuous reference time scale

The URSI Council,

considering that

- a) the current practice of maintaining the Coordinated Universal Time (UTC) in agreement within 0.9 s from the Earth's rotation angle (UT1) by occasional leap second adjustments has been under discussion since late 1990s;
- b) the Radiocommunication Sector of the International Telecommunication Union (ITU-R) discussed the realization of time scale and dissemination of time signals via radiocommunication systems during its World Radio Conference 2015 (WRC-15) and resolved in Resolution 655 to further and more widely study the various aspects of current and potential future reference time scales, including their impacts and applications, in cooperation with URSI and other relevant international organizations;
- c) in 2018 the 26th General Conference of Weights and Measures (CGPM) formally confirmed in its Resolution 2 the definitions of International Atomic Time (TAI) and Coordinated Universal Time (UTC), and asked all relevant unions and organizations to work together to develop a common understanding on reference time scales, their realization and dissemination with a view to consider the present limitation on the maximum magnitude of UT1 - UTC so as to meet the needs of the current and future user communities;
- d) URSI Commission A organized a wider consultation with experts from the various fields to request their opinions on the adoption of a continuous reference time scale,

noting that

- e) the insertion of leap seconds has led to serious problems and breakdowns in modern worldwide applications which require a continuous time reference such as satellite navigation, distributed measurement systems and computer networks. In an attempt to minimize these problems, several actions have been put into practice by different users, either using a non-standard continuous time reference (i.e. GPS time) or adopting different procedures to synchronize to UT1. These actions have in turn caused confusion and errors to the users;
- f) due to the ambiguity during the insertion of a leap second, the metrological traceability to UTC that is required by some users is frequently not realized;

- g) there are still concerns about unforeseeable effects caused by changing the current method of maintaining UTC to agree with UT1 within 0.9 s;
- h) UT1 is necessary for applications such as space industry, Earth-based observations, for the transformation between the fixed and the rotating reference systems; and that for these applications real-time UT1 signal dissemination is needed;
- i) the definitive values of UT1 - UTC are provided by the International Earth Rotation and Reference Systems Service (IERS) on the internet, and are also available via other time dissemination techniques by radio signals, GNSSs and internet time protocols;
- j) TAI should not be considered as an option to achieve a continuous reference time scale; in its present form it provides only a frequency reference and is not disseminated by clocks,

recognizing that

- k) URSI passed the URSI Resolution of Strengthening the URSI and ITU relationship in its General Assembly in Lille, 1996, and resolved that the board shall work with ITU in the identification of precise topic areas of mutual concern, and prepare URSI statements on such topics in an appropriate form;
- l) a URSI-wide working group was formed in 2002 and the risks that the occasional leap second adjustments might cause were identified;
- m) the Commission A (Electromagnetic Metrology) of URSI expressed its opinion in 1999 that the procedure of leap second insertions should be stopped and thus UTC should become a continuous reference time scale, and that this position was confirmed in 2014 by a Resolution of Commission A,

resolves for URSI to make the following statements

- A) All GNSS are requested to consider broadcasting UT1 — UTC to a precision of a millisecond or better, within the constraints of their funding availability and development latencies. In addition, systems providing UT1 — UTC over the internet need to be hardened against cyber-attacks and should be supplemented with additional secondary sources that would meet the needs of users who only require knowledge of UT1 - UTC on the yearly basis;
- B) Radioscientists of the International Union of Radio Science (URSI) have identified various risks caused by the adjustment of leap seconds on UTC that are not predictable over the long term. It was also found that a unique and continuous reference time scale is essential for the scientific research and the related activities in Radio Science. They also concluded that many of the technological concerns associated with the need of adapting systems and software can be solved, and that the challenge is justified compared to the scientific and operational benefits of a continuous reference time scale. Therefore, URSI's position is to withdraw the present limitation on the maximum magnitude of UT1 - UTC after a suitable period of public notice provided that real time UT1 - UTC dissemination is achieved and no fatal problem is identified by 2023.

Members of the Ad Hoc Committee

Charge:

Draft the Statement from URSI on the need for a continuous reference time scale

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