

**US Radiocommunication Sector
FACT SHEET**

Study Group: US SG-7		Document No: USSG 7/001	
Reference: DRR TF.460-6		Date: 16 August 2010	
Document Title: United States Response to Questionnaire on a draft revision of Recommendation ITU-R TF.460-6, Standard frequency and time-signal emissions			
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Purpose/Objective: To provide the US response to the ITU-R Radiocommunication Bureau Questionnaire as issued in Administrative Circular CACE/516, 28 July 2010. The response will be a USSG7 submission for the meetings of SG7 in Geneva on 4 October and 13 October 2010.			
<p>Abstract: ITU-R SG7 will consider at its October 2010 meetings in Geneva the revised draft Recommendation ITU-R TF.460-6, <i>Standard-frequency and time-signal emissions</i>, originally submitted to the ITU-R in 2004 by the US. Recommendation ITU-R TF.460-6 defines Coordinated Universal Time (UTC) and recommends how it should be used. UTC is the time scale maintained through the General Conference of Weights and Measures and is the official time scale for most countries. Rec. 460-6 is referenced in the Radio Regulations. The proposed revisions to Rec. 460-6 eliminate the use of leap seconds in the UTC time scale no earlier than January 1, 2018.</p> <p>Leap seconds were devised to keep the UTC time scale in close alignment with earth time making UTC useful for celestial navigation. Since the late 1980s electronic navigation and communications systems have significantly overtaken celestial navigation and eliminated the need for complicating UTC with leap seconds. At the same time leap seconds are increasingly causing difficulties with various positioning, navigation and timing systems.</p> <p>USWP7A has prepared a proposed US reply to the questionnaire supporting the revisions to Rec. 460-6. USWP7A, in preparing the draft response, enjoyed the active participation of representatives of Federal Agencies including the National Institute of Standards and Technology (NIST), the United States Naval Observatory (USNO), the Naval Research Laboratory, the National Aeronautics and Space Administration, and the Jet Propulsion Laboratory.</p> <p>The America Competes Act of 2007 assigned the responsibility for the interpretation or</p>			

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modification of the official time (UTC) for the United States to the Secretary of Commerce in coordination with the Secretary of the Navy. Those responsibilities have been delegated to NIST and USNO by the Secretaries of Commerce and Navy respectively. Both NIST and USNO have played leading roles in the work of USWP7A.

The Department of Defense in 2009 issued a statement supporting the proposed changes requesting the effective date for discontinuance be no earlier than January 1, 2019. The Department of Commerce took “no position” on the proposed revisions. In 2008 NASA issued a statement supporting the revisions and the National Science Foundation assumed “no position.” No Federal Agency has expressed opposition to the revisions.

The astronomical community as represented by the International Astronomical Union (IAU) and the American Astronomical Society (AAS) has taken no formal positions on the revision after study and issuing reports. No other scientific organization or NGO has expressed strong opinions regarding the proposed changes to UTC.

The proposed responses to the questionnaire have been derived from the *U. S. Position Paper on the proposed revision to Recommendation ITU-R TF.460-6, Standard-frequency and time-signal emissions, 28 September 2008.*

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Radiocommunication Study Groups



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Subject: Draft Revised Recommendation TF460.6

United States of America

United states response

Questionnaire on a draft revision of Recommendation ITU-R TF.460-6, Standard frequency and time-signal emissions

Summary

The United States provides the responses contained in Annex 1 to the questionnaire from the Chairman of ITU-R Study Group 7 regarding the proposed revisions of ITU-R Recommendation TF.460-6 to eliminate leap second adjustments to Coordinated Universal Time (UTC). The U.S. responses appear in bold in the table.

Leap seconds were devised to keep the UTC time scale in close alignment with earth time making UTC useful for celestial navigation. Since the late 1980s electronic navigation and communications systems have significantly overtaken celestial navigation and eliminated the need for complicating UTC with leap seconds. At the same time leap seconds are increasingly causing difficulties with various positioning, navigation and timing systems.

Annex 1

<p>Do you support maintaining the current arrangement of linking UT1 and UTC (to provide a celestial time reference)?</p>	<p>NO</p>
<p>Do you have any technical difficulty in introducing leap second today?</p> <p>Experience in the US has shown that digital time distribution systems cannot deal efficiently with leap seconds. Reports from recent leap second events show that problems were detected at the hardware level, for example with some NTP servers, but the most striking fact is that the official procedure for the application of the leap second was not universally followed and that different communities applied different methods that led to inconsistencies in time and frequency measurements during the 100-120 seconds before the event; moreover, some systems were intentionally interrupted several hours before and after the event to prevent operational mishaps.</p> <p>Misunderstanding of the definition and uses of time scales and time synchronization systems – even in the case of people with expertise in matters related to time and frequency, causes confusion in using and accessing TAI, UTC, GPS and GLONASS times. This situation will most probably be compounded by the proliferation of continuous “pseudo time scales”, leading to the erroneous concept that a user could select one of these without serious consequences. Difficulties encountered in the use of UTC with leap seconds encourages the proliferation of continuous “pseudo time scales.”</p>	<p>YES</p>
<p>Would you support the revision of Recommendation ITU-R TF.460-6?</p> <p>The US supports the revision of Recommendation ITU-R TF.460-6 for the following reasons:</p> <ol style="list-style-type: none"> 1. Organizations involved with celestial navigation, space activities, global navigation satellite systems, telecommunications, network synchronization, and electric power distribution have all requested continuous time scales. 2. As systems become more complex and interdependent, the chances for more frequent and significant disruptions by the introduction of leap seconds will only increase. 3. The repeated effort and cost required of users to successfully accommodate the introduction of every leap seconds into UTC would be eliminated. 	<p>YES</p>

<p>4. UT1 values are easily and rapidly accessed through the Internet eliminating any need to link UTC with UT1.</p> <p>5. Arguments to retain leap seconds to keep UTC aligned with the Earth's rotation angle are not supported by the International Astronomical Union (IAU) or the American Astronomical Society (AAS) as neither, after study and issuing reports, take a position on this issue</p>	
<p>If it is agreed to eliminate leap second within 5 years after approval of the revision of Recommendation ITU-R TF.460-6, would that create technical difficulties for your administration?</p>	<p>NO</p>