

Experiences of Leap Second Adjustment Operations and Questionnaires in Japan

Yasuhiro Koyama, Tsukasa Iwama, Hiroyuki Ito, Yuko Hanado, and Mizuhiko Hosokawa
National Institute of Information and Communications Technology, 4-2-1 Nukuikitamachi,
Koganei, Tokyo 184-8795, Japan

National Institute of Information and Communications Technology (NICT) in Japan has responsibilities to generate and to maintain Japan Standard Time (JST), and to disseminate the JST throughout the country. For these purposes, NICT is operating multiple sets of Cesium frequency standard systems and Hydrogen maser systems to generate stable and reliable time scale. JST is generated and maintained from the ensemble of the signals from these frequency standards. NICT operates the satellite communication link for TWSTFT (Two-Way Satellite Time and Frequency Transfer) link between Asian region and Physikalisch-Technische Bundesanstalt (PTB) in Germany through the collaborations with the National Metrological Institutes in the Asian region to contribute clock data in the region to establish Coordinated Universal Time (UTC). NICT is also participating in the GNSS (Global Navigation Satellite Systems) time link network and both TWSTFT and GNSS data are used for UTC establishment.

From these circumstances, NICT has been trying to perform smooth operations of the past Leap Second adjustments to the JST. NICT is operating two Low Frequency Standard Frequency Stations to transmit time code based on the JST for radio clocks, the Stratum-1 Network Time Protocol servers, the Telephone JST Dissemination System, and GNSS time transfer services to provide the trusted time source to time stamp service authorities. In the events of all adjustments of leap seconds in the past, we conducted smooth operation of all of these services and tried to provide information to the users of the JST in advance. As the result of such careful preparations and efforts, there has been no major confusions in Japan resulted from the leap second adjustments. Along with these efforts, questionnaires were conducted to gather information concerning the influences from leap second adjustments and opinions towards the possible future changes to UTC twice in 2001 and in 2007. The results of these questionnaires have been submitted to the Working Party 7A of the Study Group 7 under the International Telecommunications Union Radiocommunications Sector (ITU-R). Although the results were not simple, at least it was appeared that the broadcasting carriers, telecommunications carriers and time stamp authorities are supporting the proposed change to the UTC.

In this presentation, recent updates of the experiences in Japan at the timing of the conference will be reflected.