



NEWS! From the NAVAL OBSERVATORY

U.S. NAVAL OBSERVATORY

3450 MASSACHUSETTS AVE, NW

WASHINGTON, DC 20392-5420

U.S. Naval Observatory Press Release

Geoff Chester
U.S. Naval Observatory Public Affairs Office
(202) 762-1438
geoff.chester@navy.mil

Information Contact:
Dr. Brian Luzum
Head, Earth Orientation Department
U.S. Naval Observatory, Washington, DC
(202) 762-1444
brian.luzum@navy.mil

For Immediate Release, January 20, 2012

U.S. Naval Observatory to Add Leap Second to Clocks

WASHINGTON, DC -- On June 30, 2012 a “leap second” will be added to the world’s clocks at 23 hours, 59 minutes and 59 seconds Coordinated Universal Time (UTC). This corresponds to 7:59:59 pm Eastern Daylight Time, when the extra second will be inserted at the U.S. Naval Observatory’s Master Clock Facility in Washington, DC.

Historically, time was based on the mean rotation of the Earth relative to celestial bodies and the second was defined in this reference frame. However, the invention of atomic clocks defined a much more precise “atomic” timescale and a second that is independent of Earth’s rotation. In 1970, an international agreement established two timescales: one based on the rotation of the Earth, known as UT1, and one based on atomic time, Coordinated Universal Time, or UTC. The International Earth Rotation and Reference Systems Service (IERS) is the organization which monitors the difference in the two time scales and calls for leap seconds to be inserted in or removed from UTC when necessary to keep them within 0.9 seconds of each other. In order to create UTC, a secondary timescale, TAI, is first generated; it consists of UTC without leap seconds. When the system was instituted in 1972, the difference between TAI and UT1 was determined to be 10 seconds. Since 1972, 24 additional leap seconds have been added at intervals varying from six months to seven years, with the most recent being inserted on December 31, 2008. After the insertion of the leap second in June, the cumulative difference between UTC and TAI will be 35 seconds.

Confusion sometimes arises over the misconception that the occasional insertion of leap seconds every few years indicates that the Earth should stop rotating within a few millennia. This is because some mistake leap seconds to be a measure of the rate at which the Earth is slowing. The one-second increments are, however, indications of the accumulated difference in time between the two systems.

-more-

LEAP SECOND 2-2-2

The decision as to when to make a leap second is determined by the IERS, for which the USNO serves as the Rapid Service/Prediction Center. Measurements show that the Earth currently runs slow, compared to atomic time, at about one millisecond per day. These data are generated by the USNO using the technique of Very Long Baseline Interferometry (VLBI). VLBI measures the rotation of the Earth by observing the apparent positions of distant objects near the edge of the observable universe. These observations show that after roughly 1000 days, the difference between Earth rotation time and atomic time would be about one second. Instead of allowing this to happen a leap second is inserted to bring the two times closer together. We can easily change the time of an atomic clock, but it is not possible to alter the Earth's rotational speed to match the atomic clocks.

The U.S. Naval Observatory is charged with the responsibility for the determination and dissemination of precise time for the Department of Defense and is also the national reference for navigation. The U.S. Naval Observatory, together with the National Institute of Standards and Technology (NIST), determines time for the United States.

Information concerning the USNO, its mission, history, and programs, is available from our World Wide Web site at <http://www.usno.navy.mil/USNO>.