Editorial – Keeping time

Earth rotates in relation to the Sun once every twenty-four hours, no more, no less. In this century prior to 2020, the Earth's rotation had been slowing down, and then in 2020 started spinning up again, due to a variety of minor terrestrial and celestial factors. Overall, the rotation of our planet slows down at approximately 2.3 milliseconds per century.

Due to movement in Earth's magma, the ice caps melting slightly (because liquid water is more dense than ice), and normal oceanic displacements, our moment of inertia is modified ever so slightly, accounting for some of the change. When enough milliseconds accumulate over time, scientists are considering altering our current time by adding or subtracting a leap second. Meanwhile, each day is precisely 24 hours long, not one day being longer or shorter than any other.

Because of the Earth's tilt on its axis, we experience seasons, which changes the amount of sunlight over a given spot during any day of the year. As a result, people are often heard to say that the days are getting longer or shorter, or that a particular day is the longest day of the year. Again, every day has precisely the same length of time, 24 hours. What people mean, however, is that the *daytimes* are getting longer or shorter, or that *daytime* on a particular day is the longest of the year.

From the Mayan calendar to atomic clocks we terrestrials have been interested in keeping time for one reason or another. Many devices have been invented to better help us keep track of time or even provide for us the time of day. One problem we've encountered is the time difference between locations on the globe. To solve that, we've roughly divided the planet into 24 time zones, each 360 ÷ 24 = 15 degrees wide, give or take.

Due to geographic, political, and convenience reasons, however, the time zones aren't as uniform as longitudinal lines would otherwise suggest. China and Greenland, for example, both span five time zones, yet only recognize a single official time zone for most of the country. On some continents such as South America, parts of one time zone that should normally be east of its adjacent zone is found on its west instead. Adding to the challenge, countries such as India and Venezuela are on a 30-minute boundary, and Nepal is on a 45-minute boundary.

To get us on the same page, we've developed a time system called GMT, or Greenwich Mean Time, which was based on a particular location in Greenwich, England. Today, our earthly time reference is its successor, called Coordinated Universal Time, abbreviated ***UTC*** by agreement. Using UTC, you and a DX contact can agree on the time and date of the exchange by referring to the same time, removing all ambiguity.

There are moments when it's convenient to refer to local time within our time zones, so the following chart summarizes the conversion between UTC time and most American locations:

To get	Do		To get	Do	Time Name
EST	UTC - 5	or	UTC	EST + 5	Eastern Standard
EDT	UTC - 4	or	UTC	EDT + 4	Eastern Daylight
CST	UTC - 6	or	UTC	CST + 6	Central Standard
CDT	UTC - 5	or	UTC	CDT + 5	Central Daylight
MST	UTC - 7	or	UTC	MST + 7	Mountain Standard
MDT	UTC - 6	or	UTC	MDT + 6	Mountain Daylight
PST	UTC - 8	or	UTC	PST + 8	Pacific Standard
PDT	UTC - 7	or	UTC	PDT + 7	Pacific Daylight
AST	UTC - 9	or	UTC	AST + 9	Alaska Standard
ADT	UTC - 8	or	UTC	ADT + 8	Alaska Daylight
HAT	UTC - 10	or	UTC	HAT + 10	Hawaii-Aleutian

Once we established a time standard and a time division agreement, we also had to agree on a written format. Not to be confused with *military time*, today's amateur radio standard has generally adopted the ISO 8601 recommendation of the HH:MM format,

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using the UTC 24-hour clock and without the "T" prefix. Here are some examples of the time 7:23 pm in different 24-hour clock formats:

- 1923 (military)
- 19:23 (amateur and other non-military)
- 1923R (military, with the time zone suffix)

BTW, the current UTC time is continually broadcast on shortwave frequencies from government-run radio stations WWV and WWVH 24/7/365. They're fed and controlled by NIST (National Institute of Standards and Technology), and broadcast a digital time code in a specific format each minute, including a digitally encoded BCD signal that announces the current time and date, interpretable by radio-controlled "atomic" clocks that can be purchased at most retail stores. You can listen to the broadcasts on 2.50, 5.00, 10.00, 15.00, and 20.00 MHz AM.

To conserve available energy during World War I by making better use of daylight hours, the US adopted Daylight Saving Time temporarily, and then permanently starting in World War II. Contrary to popular myth, Benjamin Franklin did not invent DST. Contrary to popular myth, farming was not the reasoning behind adopting DST. Regardless of its original intent, many are in favor of abolishing this practice of "springing forward" an hour in March and "falling backward" an hour in November to accommodate the time adjustment in an effort to save daylight.

A leap of faith

Speaking of time, our calendars have also undergone changes in world history. Following the use of the lunisolar calendar by Romans, Julius Caesar enacted a new calendar in 45 BC based on twelve months and added leap days every fourth year. Recognizing the increasing inaccuracies introduced by the Julian calendar, however, Pope Gregory VIII introduced the Gregorian calendar, in 1582, which we use today. The Gregorian calendar differs from the former in that leap days are excluded on century years except those evenly divisible by 400. This made 1800 and 1900 non-leap years, but made 2000 a leap year.

Anything to add? Email ***editor@utaharc.org***