Product Bulletin

GEOSPATIAL DIVISION
March 2019

GPS WEEK NUMBER ROLLOVER (WNRO)

Note: This bulletin only covers Trimble brand Survey, GIS and Real-Time Network products.

GNSS receivers that rely on Global Positioning System (GPS) face a notable event on April 6, 2019, because it marks a reset of their date information known as the GPS Week Number Rollover (GPS WNRO).

The last rollover occurred 19.7 years ago, pre Y2K, and while the vast majority of GPS users won't notice any difference on April 6, some may be concerned about a potential impact and want more information to ensure they are prepared.

The Trimble Geospatial Division is proactive in addressing potential GPS WNRO issues to make sure our products continue to work as expected. For the upcoming rollover, Trimble started assessment and testing of GPS-related hardware and software well in advance. As a result, when April 6 arrives, we expect little-to-no issues for Trimble Survey, GIS and Real-Time Network product users running current firmware and software versions.

Still curious about the GPS WNRO? Here is an overview and more details on what to expect.

Background
GPS is a network of more than 30 satellites developed in the 1970s for military use, today is used broadly to deliver accurate positioning information for a wide variety of applications including surveying, mapping, earthmoving, navigation and many others.

GPS provides a current date and time, represented as a week number. The week number parameter is generated via a 10-bit binary number. The valid range for the week number parameter is 0 to 1,023, for a total of 1,024 weeks. After that time, the week number rolls over to 0. The first week number period started when GPS was launched in January 1980, and the last GPS WNRO was 19.7 years ago, on Aug. 21, 1999. The next WNRO occurs on April 6, 2019, when the week number will again reach the maximum value of 1,023 and roll over to 0. Any GNSS receiver that does not account for this rollover will report the date is Aug. 22, 1999.

Due to the WNRO, a GPS receiver that does not have compliant firmware could potentially see errors. To guard against this, users are encouraged to make sure they have compliant firmware versions for their receivers.

Trimble's approach
Trimble's product management and engineering teams are proactive in their approach to GPS WNRO and take into consideration rare and known events in ongoing design and development of products that use GPS. The teams have developed various product assessment plans that include testing hardware and software related to receivers.

Trimble has performed tests using a GNSS simulator to verify the receiver firmware correctly handles the week rollover in different scenarios, including real-time kinematic and static surveys with various input and output messages, as well as data file format conversions.

Assessments are now in final testing stages and our teams expect that receivers with compliant firmware will perform seamlessly during and after the rollover.

What should I do to prepare for GPS WNRO?
The vast majority of GPS users, particularly Trimble receiver users who've kept their firmware updated, should **not** notice a difference on April 6, and no preparation is required. To verify you're using the current firmware, refer to Trimble Installation Manager and check these support documents:

- Trimble Survey GNSS Products
- Trimble Real-Time Network Products
- Trimble GIS GNSS Products

It's also worth noting: Trimble always recommends its customers have quality checks in place before or during the collection of data, such as checking into known control points, to ensure equipment is working properly.

Trimble receivers with compliant firmware are expected to continue to operate normally during and after the GPS WNRO. Trimble also does not anticipate the need for a reset of any products that have been verified to support the WNRO.

In the case of legacy products built before the 1999 rollover, some already exhibit issues in that they will incorrectly report the GPS week number. For example, the pre-1999, end-of-life Trimble 4700 and 4800 GPS receivers have incorrectly reported the GPS week since February 2016, which is explained in this Support Note.