



CGSIC GPS Week Roll Over Issue

***Edward Powers
US Naval Observatory (USNO)
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GPS Week Rollover

- ***GPS Time as defined in the legacy GPS navigation message (ICD-200), uses 10 bits to count GPS Week Numbers. This representation can only cover a finite period of 1024 weeks (19.7 year epoch).***
- ***GPS Time started on Jan 6, 1980***
- ***The first GPS Time Epoch ended on Aug 21/22 1999.***
- ***GPS Time is presently in its second Epoch which will end on April 6, 2019***
- ***It's up to the user receiver to resolve this week number ambiguity***
- ***Newer receivers fully compliant with GPS ICD should handle this event OK***
- ***In the Future the Modernized GPS Navigation (CNAV and MNAV) message has a 13-bit week number, which for all practical purposes solves this ambiguity***



What could happen

- ***UTC timing displayed and/or time tags of receiver data containing PNT information could jump by 19.7 years***
- ***Any month/year conversion could also fail***
- ***Navigation solution should be OK, but associated time tags could be incorrect thus still corrupting navigation data at the system level***
- ***And the failure is not limited to April 6/7 2019***
- ***A common fix for week number ambiguity was to hard code new pivot date, which shifts event to unknown date/time in future***
 - ***December 2014, older legacy USNO monitor receiver failed***
 - ***Feb 14, 2016 Endrun technology receivers using a Trimble GPS engine failed***
 - ***Aug 14, 2016 Motorola Oncore UT+ older firmware failed***
 - ***July 22, 2017 older Novatel GPS engine failed, notice was posted in Spring 2017 to upgrade firmware, but many did not check***



Does your receiver have a problem with GPS Week Roll Over



- ***Most newer receivers are likely going to be OK if ICD-200 was followed***
- ***Older receiver may be problematic***
- ***“Trust but Verify” consult you manufacture***
- ***Conduct testing using GPS simulator***