

Subject: GPS Week Rollover**Ref. Publications:**

ICAO Annex 10, Aeronautical Telecommunications, Volume I, Radio Navigation Aids.

Applicability:

Pilots and air operators who use global positioning system (GPS) receivers in on-board systems, air navigation service providers, competent authorities.

Description:

The purpose of this SIB is to raise stakeholders' awareness concerning the potential adverse effects of the GPS week rollover on systems that are used for navigation or time synchronisation. The GPS provides position, navigation and timing information to many systems used in aviation: on-board Global Navigation Satellite Systems receivers, Flight Management Systems, Enhanced Ground Proximity Warning Systems, Air Traffic Management Systems, and Surveillance Systems.

Among other messages, the GPS transmits the date and time in a specific format that consists of the current week and the current number of seconds in the week.

However, the field that contains the week number is a 10-bit binary number. This limits the range of the week number to 0 – 1023, or 1024 total weeks. The GPS week zero started 06 January 1980, and the first reset of the 1024 weeks counter happened on 21 August 1999. The next reset of the week counter from 1023 to zero will be on 06 April 2019.

To mitigate any adverse effects of the GPS week rollover, GPS receiver manufacturers often shift the 1023 window with reference to another date within the receiver. One common method is to use the date of the firmware as a reference. Using this method, the problem could also occur, but on a different date and in a different year from the actual GPS rollover date. More details can be obtained from the [US Homeland Security Memorandum](#).

As the GPS time is ahead of UTC time by 18 seconds, the GPS week rollover will occur on Saturday 06 April 2019, at 23:59:42 UTC.

At this time, the safety concern described in this SIB does not warrant the issuance of an operational directive under Commission Regulation (EU) [965/2012](#), Annex II, ARO.GEN.135(c), nor any safety directive action under Commission Regulation (EU) [139/2014](#), Annex II, ADR.AR.A.040.

This is information only. Recommendations are not mandatory.



Recommendation(s):

In order to mitigate any safety risk related to the GPS week rollover, EASA recommends taking the following proactive measures:

- Assure that the latest software update is installed on potentially affected GPS receiver(s).
- Request information from the GPS receiver manufacturer regarding its robustness against the GPS week rollover.
- If possible, perform tests that simulate the GPS week rollover, e.g. using a GPS simulator.

If it cannot be confirmed that a particular type of GPS receiver is not affected by the GPS week rollover, it should be assumed that a failure of the systems that rely on data from that GPS receiver might occur, and appropriate mitigation measures should be established.

Contact(s):

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