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6 March 2019

RN(19)03

TO: RADIO AND NAUTICAL SUB-COMMITTEE

**Copy: Marine Committee
All Full and Associate Members**

POTENTIAL ERRORS IN THE GLOBAL POSITIONING SYSTEM (GPS)

Action required: *Members are advised of the Global Positioning System (GPS) week number rollover event on 6 April 2019 and the potential impacts on GPS position and time on or after that date, and disseminate this information as widely as possible.*

Members are advised that a Global Positioning System (GPS) week number rollover will take place on 6 April 2019. This event may cause stand-alone GPS receivers and any other systems using GPS microchips to produce Universal Time Constant (UTC) data that is 19.7 years either in the past or future. This change is expected to generate errors in GPS position and time.

The week roll-over is not a unique event. It occurs every 19.7 years (1024 weeks) due to technical limitations on the way in which week numbers are stored. The event results in the stored week number being reset to zero with consequences for the display of time, month/year conversions, and times linked to position solutions. The last event occurred in 1980.

Whilst the event is due to occur on 6 April 2019, differences in the implementation of firmware by manufacturers may mean that stand-alone GPS receivers and any other systems using GPS microchips rollover after this date.

The risk of errors in both position and time on stand-alone GPS receivers and any other systems using GPS microchips is assessed as:

- Greater for units older than 10 years and units which have not had firmware updates in a similar timeframe are at higher risk of experiencing anomalies in position and time data; and
- Lesser for newer units, and units which have had available manufacturers' firmware updates applied.

In order to minimise the risk of errors Companies are recommended to consider:

- Checking with manufacturers for further information on GPS-dependent equipment and identifying any actions which may be required by the Company; and

- Identifying the effect this could have on the Company's ships, including but not limited to the conduct of navigation, and advising Masters to monitor their ship systems and equipment for errors from 6 April 2019.

The ICS Secretariat has raised the issue with CIRM and has been advised that following consultation, their navigation and communications equipment manufacturer members do not expect the rollover to have any impact on GPS receivers. However, any effects are not expected to be limited to navigation equipment. Any equipment or system using GPS microchips may be effected.

The United States Naval Observatory (USNO) also advises that position solutions from GPS should be unaffected.

Further information can be found at: https://ics-cert.us-cert.gov/sites/default/files/documents/Memorandum_on_GPS_2019.pdf

Any questions should be sent to the undersigned (matthew.williams@ics-shipping.org).

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