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GPS potential performance issues

Category: Navigation

Issue date: 28/05/2014

Area: Worldwide

We would like to advise our Members of the potential threat that exists regarding failure of Global Positioning Systems (GPS) on vessels. This may occur due to natural causes such as solar storms/natural phenomena experienced in high latitudes or due to deliberate and malicious jamming of GPS signals. This could result in the loss of the GPS service over a large geographical area, possibly inaccurate and misleading data or even the complete failure of a vessel's GPS receiver.

During trials conducted by the General Lighthouse Authorities of the United Kingdom and Ireland it was observed that where the GPS signals were lost, alarms from all the instruments which had the GPS feed sounded. This can lead to not only a potentially hazardous navigational situation but also an added distraction whilst trying to perform a safe navigational watch due to the constant sounding of the alarms.

In regards to the Electronic Chart Display and Information System (ECDIS) during the trials, loss of the GPS signals caused the failure of the GPS feed to the ECDIS which subsequently became static and no longer displayed the current position of the vessel. It is recommended that in the event of such a situation occurring, the ECDIS should be turned off completely to avoid confusion until the situation is resolved.

It was also noted that if the ECDIS or the autopilot is capable of executing a passage plan, in the event of this automatic mode being used at the time of GPS failure, the vessel may stray off its course without any warning to the navigating officers.

In addition to the shipboard failures experienced during the breakdown of the GPS, some aids to navigation can also be affected, namely the synchronisation of lights on navigational marks and buoys. When positioned close to each other, certain buoys are synchronised using a GPS time source to flash at the same time or in sequence to make them more conspicuous to the mariner and easier to identify. In the event of GPS failure, the aids to navigation would be unable to synchronise with the GPS time source and therefore would be unable to flash as required. This would result in the specific flashing characteristics of the buoys not corresponding to that shown on the navigational chart, which in turn may cause confusion to the navigating officers. Whilst there are new technologies in the market currently being tested to supplement GPS position fixing, this further underlines the necessity to ensure the vessel's position is fixed by more than one method, preferably including non-electronic means such as visual fixes.

We would like to take this opportunity to reiterate to our Members the importance of checking the performance of all bridge equipment and to ensure procedures are in place to maintain the continuous safety of the vessel in the event of GPS failure.