Position reference problems again! The dangers of recalibrating

Undesired event

DP Event • Published on **22 December 2023** • Generated on **24 January 2025** • DPE 04/23

The dangers of recalibration. Shallow water environments pose specific challenges for hydroacoustic systems.

Overview

A diving vessel was operating in approximately 25m of water depth. Four Position Reference Systems (PRSs) were in use, two DGNSS & two HPRs, weighting of the PRSs was equal for all four selected into DP Control.

The vessel was asked to make a series of moves, during this time the HPR references both began to drift in the opposite direction to the two DGNSSs, thruster activity increased.

The DPO on duty decided to re-calibrate DGNSS#1, in doing so deselected DGNSS#1 from DP Control. This resulted in a greater weighting being applied to the HPRs. This caused the vessel to drive off position in favour of the HPR position referencing. Over the next 40 minutes, all PRSs were re-calibrated resulting in a 40m position loss.

What happened?

DGNSS#2 was under-weighted when DGNSS#1 was deselected – consequently the DP model relied on the flawed HPR positions.

Every time a PRS was recalibrated, it created a new origin for that reference, effectively walking the vessel away from the original set point. Original equipment manufacturer (OEM) operator manuals should be consulted as they hold a wealth of information which is often overlooked.

According to the OEM investigation report, water column conditions and reflections contributed to bad position data from the HPRs.

Conclusion

Shallow water environments pose specific challenges for hydroacoustic systems due to factors like multipath interference, reverberation, surface and bottom reflections, sound speed variability, ambient noise, and sedimentation. Addressing these issues requires a combination of advanced technology, adaptive strategies, and a thorough understanding of the local marine environment.

The choice of PRS (specifically hydroacoustic) was not suitable for 25m of water depth in this case. The crew should be aware that the reliability of HPR in such shallow water can be significantly degraded. The transducer head and the transponder head on the seafloor may also not have sufficient vertical separation. An alternative option may have been the use of Taut-wire. It is noted that the vessel was fitted with two lightweight Taut-wire systems.

Many DP event reports involving “PRS recalibration” have been sent to IMCA in the past. This is often one of the most misunderstood tasks a DPO can perform. No matter what type, the first PRS that the DP controller enables and accepts establishes the “reference origin” or the origin in the internal coordinate system. The “reference origin” is shown in relation to subsequent PRSs that are enabled. To recalibrate the “reference origin” all PRSs must be disabled, and the first PRS enabled will determine the new “reference origin”. In theory, every “recalibration of the reference origin” will result in a change in the

vessel’s geographical position.

OEM operator manuals contain a wealth of information which will aid the operator. Further bridge exercises and drills are encouraged with an emphasis on loss or degraded PRSs. The ramifications of recalibrating the reference origin must be thoroughly understood.

The case studies and observations above have been compiled from information received by IMCA. All vessel, client, and operational data has been removed from the narrative to ensure anonymity. Case studies are not intended as guidance on the safe conduct of operations, but rather to assist vessel managers, DP operators, and technical crew.

Any queries should be directed to DP team at IMCA. Share your DP incidents with IMCA online. Sign-up to receive DP event bulletins straight to your email.