

Solitons – Be mindful

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A number of our Members have submitted DP Event Reports which highlighted the phenomena of a sudden loss of position due to Solitons.

Solitons are large amplitude, often highly nonlinear, internal waves. They are responsible for complex vertical profiles of rapidly fluctuating ocean currents. These current profiles and their effects are not fully quantified and there is very little supporting data.

Solitons are difficult to predict. IMCA recommends that the bridge crew research their geographic area of operation and be mindful that the vessel is susceptible to sudden increase of sea currents.



The figure above shows how a Soliton can be shown on radar.

These waves can travel at two to four knots. This, along with the physical effects of the waves, can cause a sudden loss of position followed by severe ramp up of thrusters and generators.

In the case of DP vessels, there is insufficient time for the vessel mathematical model to update. The vessel may remain unstable in terms of position and heading for some time after, overshooting and hunting the set point values. At the same time, unreliable results will be obtained from subsea position references. Both taut wire and HPR systems will be degraded due to velocity of surface and subsea water with additional noise and aeration from thrusters.

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.

IMCA makes every effort to ensure both the accuracy and reliability of the information, but it is not liable for any guidance and/or recommendation and/or statement herein contained.

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