

Session – Design and Control

Title: **Better Analysis - Better Data - Better Decisions - Better Operational Risk Management = Delivery of Incident Free operations: Enabled by DynCap**

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Abstract

Operational Risk Management and focus on the Industrial Mission has been the tenet of the recent MTS Guidance Documents addressing delivery of incident free DP operations. There is increased awareness of the significance of Station Keeping Capability taking into account not only environmental conditions but also Post Failure Capability including ability to maintain position/heading within defined acceptance criteria during transient conditions. Effective Operational Risk Management and Mitigation depends upon reducing ambiguity in understanding of Station Keeping Capability and identifying gaps between theoretical capability and a reasonably accurate estimate of real Station Keeping Capability.

DP Capability has traditionally been calculated by a quasi-static analysis and the results are generally non-conservative, lacking proper handling of dynamic effects such as vessel motion, time-varying environment, and rate limitations in the propulsion and power system.

This paper presents a case study of a diving vessel with two main propellers and rudders, and equipped with a single stern tunnel thruster. The study includes a comparison of a traditional quasi-static analysis with a closed-loop time-domain simulation framework (DynCap), as well as examples of vessel DP footprints and transient motion after a failure. The results demonstrate that a more comprehensive capability study will provide results that are more accurate with respect to robustness of the DP capability towards failures, reveals the critical limitations of single stern thruster vessels, and validates the robustness in station keeping integrity provided by the addition of a second stern tunnel thruster in this case. The results of the study reinforces the need to consider the Industrial Mission Requirements in analytical, planning and execution efforts.

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