

## A Packaged System Approach to DP Vessel Conversion

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### Abstract

As older offshore production areas become more and more congested and new exploration moves to deeper and deeper waters, the demand for dynamically positioned vessels continues to be strong. Rather than scrapping older vessels and replacing them with DP-capable newbuilts, many existing vessels can be upgraded for DP at a fraction of the cost of replacement.

A good DP system uses multiple azimuthing thrusters with either variable speed, fixed-pitch propellers or fixed-speed, controllable pitch propellers. The whole system is complex and comprises many components and subsystems. Proper integration of all parts of the system requires a good understanding of the interdependence of all critical system components.

Acquiring and installing the sub-systems in an existing hull is always challenging and often requires major vessel modifications requiring extensive design work and lengthy dry-docking.

This paper discusses a different approach to these challenges. The packaged system approach introduced here uses standard, pre-engineered modules provided by a single source as an integrated, factory-tested system. This system is designed to allow installation on any vessel without the need for modifications or dry-docking.

Real-world experiences with the implementation of this approach on a number of different vessels are discussed. A detailed description of the system is provided including DP system, deck-mounted thrusters and deck-mounted diesel-hydraulic power units. Thruster-to-vessel interface is discussed, including the effects from propeller ventilation, vessel motions, wave action and slamming impacts.

An overview is presented on how such a system satisfies Classification Society Rules for DPS-1 and DPS-2 including Failure Modes and Effect Analysis (FMEA) and Power Management System (PMS).

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