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**DYNAMIC POSITIONING CONFERENCE**  
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**DESIGN AND CONTROL SESSION I**

**Enhanced DP Control Systems**

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# Enhanced DP Control Systems

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# Introduction

- Traditionally, redundant DP systems were based on running machinery.
- DP operations must be carried out with many thrusters and generators connected, regardless of weather condition.
- This result in high cost and environmental impact.



# Introduction

ABS and DNV have extended their DP notations:

- ABS DPS-2 and DPS-3 notations with EHS-C
- DNV DYNPOS-E and DYNPOS-ER

The new notations allows for a more flexible operation of the thruster and power systems.

Additionally, an alternative DP-control system should be available in the DP control centre.

# Topology



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The redundancy within the Main DP control system shall ensure continuous operation in the case of a single failure within the system. For more complicated failures or accidents it might be necessary to transfer control to another control system.



# Topology: Independent Joystick



- Operated from the Main DP control centre.
- No communication link with the Main DP control system.
- Automatic heading control.
- Vessel position controlled by joystick.



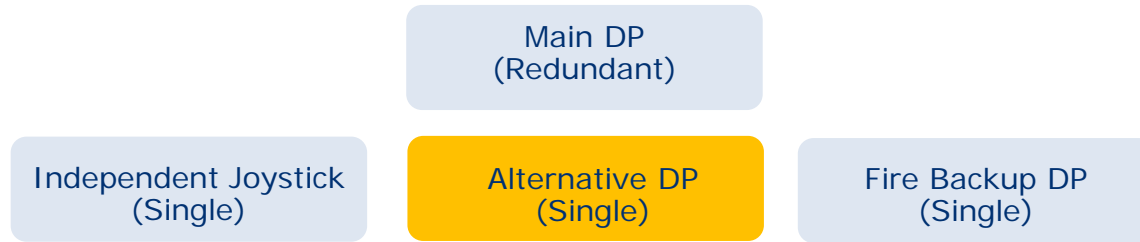
# Topology: Fire Backup DP



- Operated from Backup DP control centre
- May share communication link with the Main DP control system.
- "Hot backup" waiting mode available.
- Automatic heading and position control.
- Main DP control system to monitor the status.



# Topology: Alternative DP



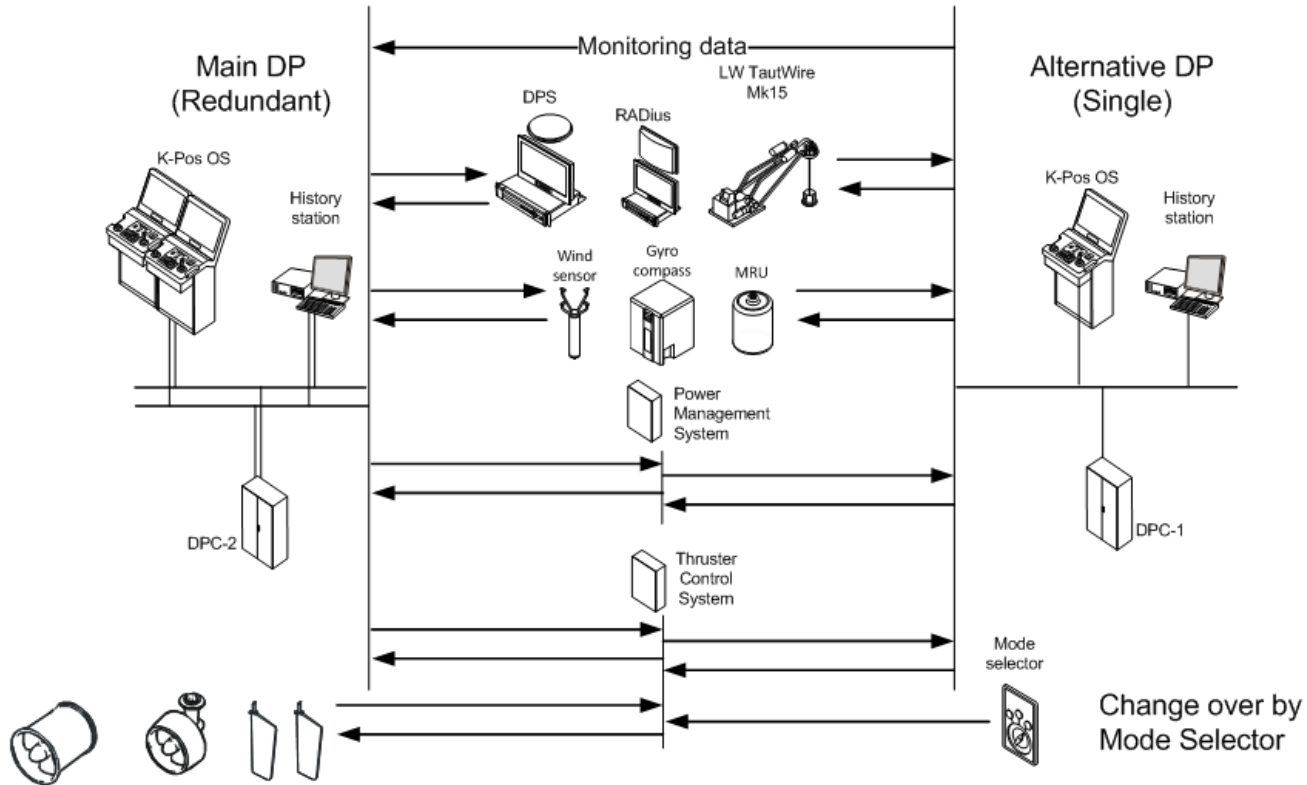
- Operation available from the Main DP control centre.
- No communication link with the Main DP control system.
- "Hot backup" waiting mode available.
- Automatic heading and position control.
- Main DP control system to monitor the status.
- Data recorder log the Alternative DP control system.



# Topology: Enhanced DP control system



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# Redundancy

In the enhanced DP system, the following may be considered to contribute to redundancy:

- Standby generators
- Change-over mechanisms for thrusters

Automatic start-up of available thrusters is not accepted as contributors to redundancy.



## DP consequence analysis and online DP capability plot

With *standby ready* and *change-over ready* signals interfaced to the Main DP control system:

- Standby generators
- Change-over mechanisms for thrusters

are taken into account in the calculation of worst single failure analysis.

The analysis consider that the most significant standby unit fails to connect.



# DP system and Power Management integration

- Synchronization assist
- Zero bus-tie current mode
- Adapted thrust set points
- Adapted load ramp
- 2nd order priority power



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## Conclusion

The new DP notations covers what ship owners and suppliers have asked for. Several vessels are now in the project or building phase with the new notations.



The Songa Equinox is a DP-3/Mooring rig with additional DYNPOS-ER notation. In June 2013 a successful factory acceptance test was held for the Kongsberg Maritime system.



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