

Remote Control of a DP Vessel

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Wärtsilä Dynamic Positioning



Remote Control is Prolific



Why Remote Control and DP ?

- Consider a Platform Supply Vessel transporting material to an offshore platform
 - PSV leaves port and transits out to the platform
 - On arriving it will typically standby outside the 500m zone for a period of time
 - When the platform is ready the vessel will use the DP System to station keep near to the platform during offloading/loading operations
 - On completion the PSV will transit back to port
- Company rules require 2 DP Officers on duty while the PSV is using the DP System
 - For 24 hours operation this requires 4 DP Officers to be onboard, assuming 12 hour shifts
 - For many vessels only 3 deck officer positions are required leaving the 4th DPO with no job outside of DP operation
 - Can we move the 4th DPO ashore and provide sufficient capability such that they can fulfill their DP duties using remote control?

System Level Approach

- Shore Station requirements:
 - DP Workstation
 - Video of aft deck and structure
 - Select PMS data
 - Method of interacting with vessel VHF communication
 - Method of communicating with the ship's crew
- Communications system capable of carrying all of the data required between the shore station and the vessel

Communication Link

- Point to point
 - High speed (up to 500Mbps - BATS)
 - Can provide better security
 - Not feasible if vessel services multiple destinations

- Satellite
 - Wide coverage
 - 1 to 5 Mbps bandwidth typically
 - More latency
 - Internet access (security)

- 3G/4G
 - Limited coverage
 - >5Mbps bandwidth – can peak up to 50Mbps
 - Internet access (security)

4G Coverage (Tampnet)



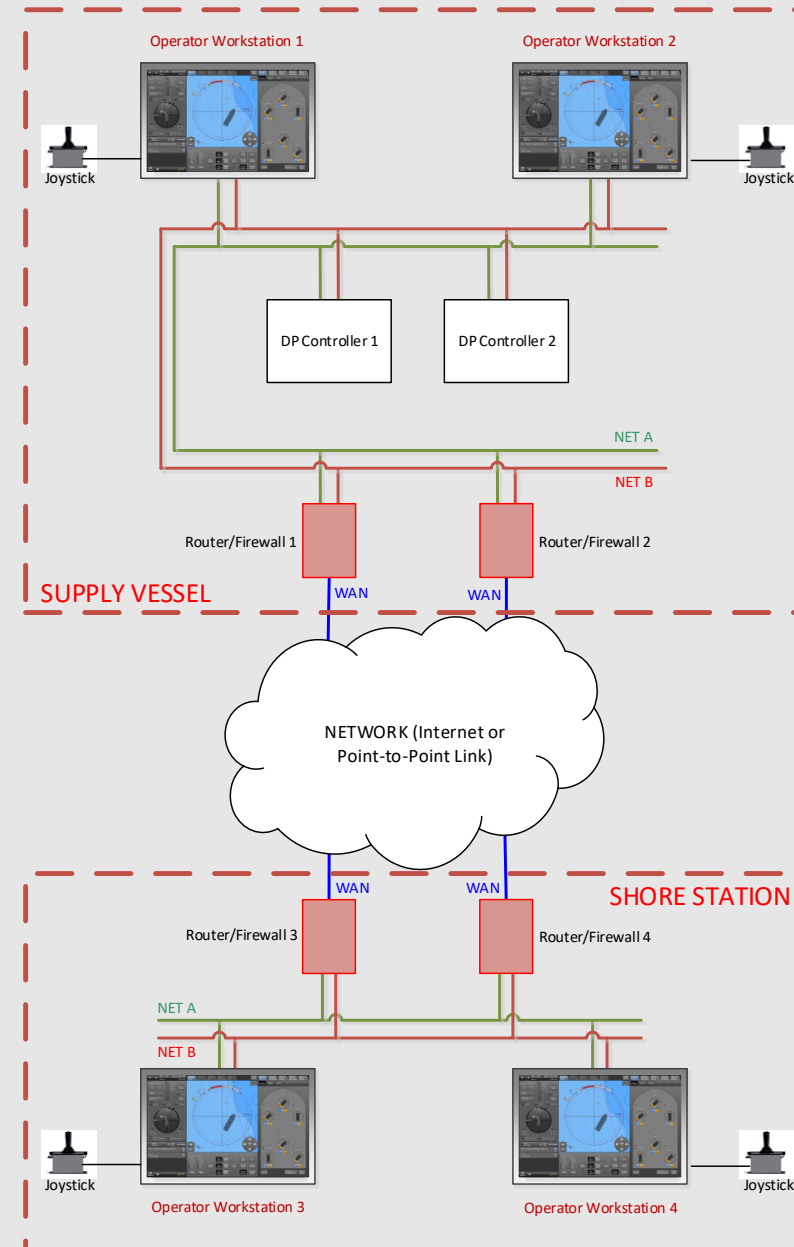
Communication Issues

- Cost of data
 - 1Mbps == 3.6Gb per hour
 - Data compression can be used to reduce bandwidth requirements, and also to help reduce costs
- Symmetry – generally for a vessel, satellite service is asymmetrical with higher bandwidth on download – unfortunately for remote control the larger data path is upload
- Security – 4G and satellite will provide connection to the internet
 - Given that the remote DP Workstation provides the capability to control vessel movement, link security must be robust
- Link performance
 - Throughput is not fixed and will throttle depending on many factors (sunspots, monsoonal rain, range, antenna shadowing, etc...)
 - Breaks in communication (link dropout) will occur

Extending a DP2 System

- A PSV will have a Class 2 system with redundant controllers and redundant networks
 - Extend both networks?
 - Require dual redundant comms links?
 - Different service type for each?
 - Require dual redundant routers?
 - Data aggregation?
 - Single or dual workstations at shore station?

- Remote workstation should look like just another workstation to the onboard DP System
 - Can take Mastership
 - All functions operational
 - Joystick available for manual operation



Extending a DP2 System

- 2 methods of operation from remote workstation
 - Manual using a joystick
 - Requires continuous communications
 - Any breaks in the comms link while manoeuvring results in loss of control
 - Autonomous using DP controller
 - Once onboard DP controller has been instructed it will continue operation regardless of connection of a workstation
- It is easier to move the vessel under the control of the DP controller
- Must include a loss of remote workstation action when the comms link is interrupted for a pre-determined period of time
 - Alert an on board crew member
 - If under joystick control switch to hold position?
 - If under DP control, continue?

Other Systems

- Video
 - Motion stabilize (can cause motion sickness)
 - 2 to 3 frames per second to reduce bandwidth requirements
 - Compression standard – each frame individually compressed
- Voice Communication
 - Extend VHF to shore station for comms with other vessels and platform
 - Alternates – cell? Sat phone?
 - Include ability to communicate with persons onboard vessel (phone extension)
- PMS
 - Extend alarms
 - Other?



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