

Integrated Solutions

Converteam's unique position as a leading supplier of dynamic positioning, vessel automation and electric propulsion is the perfect platform for providing a fully integrated solution.

With a single point of responsibility, co-ordination of the dynamic positioning system with the propulsion drives, power system and vessel management system is simpler, ensuring better performance and safe, efficient operation, benefiting both the shipyard and owner.

Dynamic positioning interfaces can be embedded into the switchgear and variable speed drive cubicles, significantly reducing cabling and the time required to install on site, the complete assembly being fully pre-tested at the factory stage.

Diagnostics, Maintenance and Trending

The DP system is designed to have a high fault tolerance and incorporates self-diagnostic routines to aid swift fault finding. The networked solution enables

a high degree of web based diagnostic facilities, allowing the operator to view high level system network information as well as the ability to drill down to the modules at plant level.

The system also provides features to assist in diagnosing plant-side faults through comprehensive on-line chart recording techniques and 'free channel select' for monitoring any plant signal. Recording can be triggered by individual events or may be selected to run continuously. Results may be downloaded and stored for further analysis onboard or transferred to an office-based location onshore.

All modules have short circuit and loop monitoring to assist with swift fault detection in the field.

Remote Support

As an addition all C-Series systems can be equipped with a history station PC or remote support. This provides a black box logging facility that can record signal parameters for long periods of time. Data can then be transferred to

removable media for further analysis.

'ViSoR', the Virtual Support Room, provides remote support allowing experts located anywhere in the world to 'look over the shoulder' of the person physically at the equipment, and advise them to take appropriate action.

After Sales Service and Support

Converteam offers a wide range of after sales service and support packages tailored to meet individual customer requirements. These packages are supported via a world-wide network of support bases.

Some of the many key benefits of a support package are:

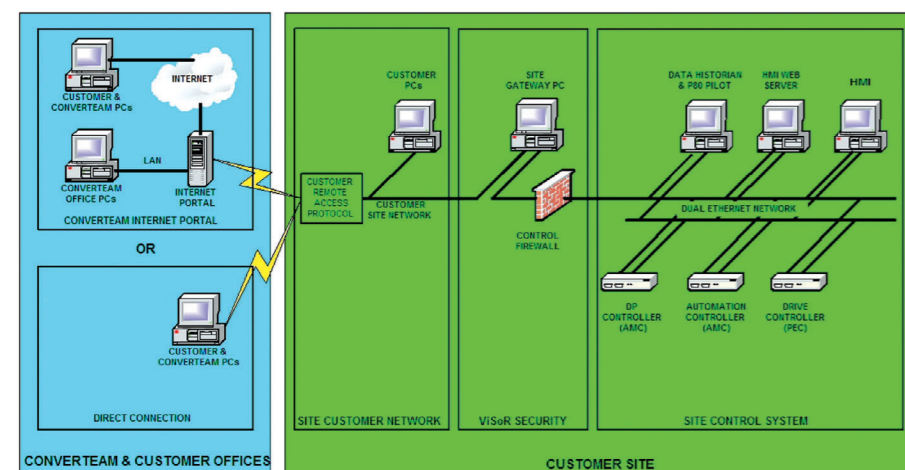
- Single point of contact
- Reduced rates
- 24/7 support
- mobilisation of engineers
- maintenance visits
- training
- vessel health checks
- spares management
- obsolescence

Converteam also provide managed system upgrade paths for its 'legacy' systems.

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ViSoR - The Virtual Support Room - System Architecture

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Dynamic Positioning (DP) enables a vessel to maintain heading and station, fixed or moving, by use of propulsors to counteract the effects of displacing forces such as wind, current and wave action. This method of manoeuvring, although simple, allows the system to control very complex operations safely and efficiently.

Converteam has been at the forefront of Dynamic Positioning (DP) technology for more than 30 years. During this time, more than 500 dynamic positioning systems have been installed on a vast range of vessels and applications worldwide, enabling customers to profit from Converteam's wealth of expert knowledge and experience. From the very first DPS 2050 through to the 900 series, A-Series, and now the C-Series workstations with the latest operator interface, Converteam has always focused on improvements to assist the operator and provide benefits to the customer.

Converteam has a long-standing reputation for delivering high quality, engineered solutions to meet and exceed customer expectations. Indeed, we believe that understanding the operational needs of customers is paramount to utilising the full potential of the system.

Our system allows flexible management of software within a controlled standard. This means every vessel is built from proven building blocks. All software has been rigidly tested before being installed into each ship, enabling Converteam to offer a high level of reliability and security, whilst still providing a unique system which meets the exact needs of the customer.

Traditionally, dynamic positioning systems were only used for a small amount of time during specialised operations.

Today's integrated dynamic positioning solutions provide manual lever control, combined joystick control, fixed and tracking control and now form a major part of the integrated bridge solution.



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System Flexibility

Converteam's DP systems are based on a modular approach to allow customers the flexibility to use the C-Series workstation design or within third party consoles. The modular design has proved very popular for both new and retrofit installations where the navigation bridge is compact and space is at a premium.

Modes of Operation

Manoeuvring

Manual Lever – Using individual levers to control each of the thrusters.

Joystick Manual – Combined control of all thrusters using a single joystick.

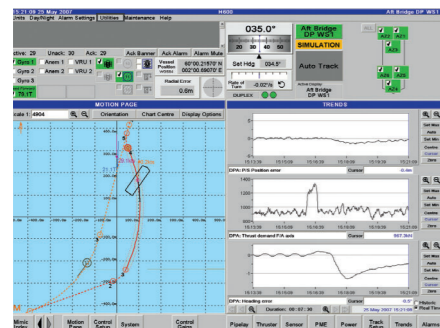
Hand Pilot – Manual control using the joystick for ahead/astern thrust with a turning moment control for rudder or stern azimuth control. This mode also incorporates conventional manual steering.

Joystick Auto – Combined thrust control using the joystick in manual for speed control with automatic heading control. Typically used during slow speed manoeuvring.

Autopilot – ahead/astern thrust set by the operator via the joystick or the operator may manually enter the vessel speed or propulsion speed into the system. Automatic heading control using stern propulsion and/or rudders to steer the vessel.

Tracking

Autotrack – Automatic tracking and heading control along an operator



Motion Page



DP Operator Panel

pre-defined track. For slow speed tracking utilising all thrusters.

Autosail – Automatic tracking and heading control along a pre-defined track. For high speed tracking utilising the stern thrusters and steering system.

ROV Follow – Automatic tracking and heading control to follow a mobile beacon attached to a submerged vehicle. Absolute tracking and reaction radius options are also available.

Enhanced ROV Follow – Automatic tracking and heading control. Also includes deepwater application tracking depressor and ROV.

Ship Follow – Automatic tracking and heading control, tracking the relative movement and heading of another floating structure. Typically used in PSV applications alongside platforms or FPSOs.

Enhanced Ship Follow – Automatic tracking and heading of fast moving structures such as barges.

Station Keeping

Auto Position – Automatic position and heading control. Operator has the facility to change position and heading required.

Minimum Power – Automatic position and heading control. The system will automatically seek the optimum heading to reduce forces and power on the vessel.

Weather Vaning – Automatic position control with heading allowed to settle into the environment. Typically used for standby operations enabling a reduction in power requirement.

Relaxed DP – Automatic position and heading control ensures a smooth thrust demand leading to fuel savings and a reduction of mechanical stress. This is also useful when only poor position measurement signal quality is available.

Autospeed – Automatic fore/aft and port/starboard vessel speed control using the joystick, requires input from a doppler log or DGPS. This also can be used with the joystick at zero position to provide a hover mode when main position reference systems are lost.

Application Features

Converteam's dynamic positioning system is suitable for all types of vessels and applications. The system can be designed so that it is integrated with other ship systems and so that it fits any bridge. In addition, Converteam can supply application-specific software to enable the customer to benefit from individually tailored solutions designed to meet their exact requirements.

Typical applications catered for include:

Survey, Cable Lay Modes – Automatic tracking and heading control with plough tension feed forward, product tension monitoring and protection, automatic vessel slowdown, and waypoint control for product or vessel track.

Shuttle Tanker Modes – Automatic tracking and heading control are provided in the form of approach, pickup and loading modes for ALP, FSU, FPSO and STL configurations.

Dredger Modes – Automatic tracking and heading control with drag head static load calibration, drag head tension feed-forward, drag head position compensation and poor mixture feed-forward.

Cruise Liner Modes – Automatic position and heading control with additional joystick anchor functionality.

Drilling Modes – Automatic tracking and heading control with riser follow, slow acoustic update rates, minimising loss of position on blackout recovery, doppler log with model control.

Pipe Lay Modes – Position control for incrementing pipe lengths, improved gain control during transition from anchors to thrusters, dual barge operations and status information on the pipe laying equipment. Vessel tracks are calculated from pipe routes and displayed on the latest map overlays giving a comprehensive suite of operator features.

Classification

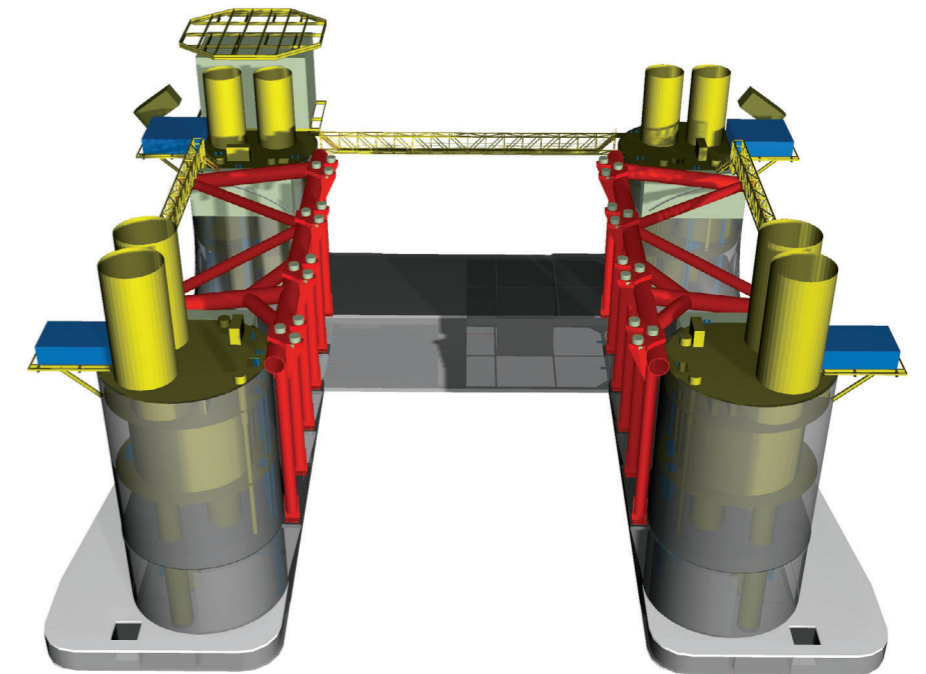
The DP system meets all the major classification society and regulatory requirements such as Det Norske Veritas, Lloyd's Register, Bureau Veritas, American Bureau of Shipping, Norsok, US Coast Guard and International Maritime Organisation recommendations.

Where appropriate, type testing has been performed and systems can be custom-built to meet high level shock, vibration and temperature limits for special applications.

Class 1

The system may be stand-alone with discrete interfaces or may form part of a larger networked system. In addition to the Simplex DP system, some regulating bodies now require an independent joystick system as a back up. The joystick system can be expanded to provide further portable or fixed control panels for forward, aft or bridge wing locations.

The joystick can be upgraded to include dynamic positioning functionality with a simple software and hardware upgrade to provide Human Machine Interface (HMI) facilities.



MPU – Heavy Lifter - Class 2

Class 2

In Class 2 and above, any single failure must not render the system inoperable. This philosophy is applied throughout the vessel design including the switchboards, propulsion and power generation.

Where the regulating authority requires an independent joystick in addition to the redundant dynamic positioning system, the thruster communications are arranged to provide an extremely high level of isolation, with the DP and independent joystick systems using different interface methods.

With an integrated solution, the thruster changeover logic between the thruster manufacturer's local controls, bridge manual controls, joystick control and dynamic positioning can all be taken care of by the Converteam system. Triple voting systems provide an even higher level of integrity, with three DP systems operating in parallel and with associated sensors also in Triplex. The system compares the three input signals and employs two out of three voting techniques. Output signals are conditioned in a similar way.

Class 3

Class 3 provides triple redundancy in terms of equipment failure and must also remain operable in case of fire or flooding. This is achieved by having the third DP system located in a back up control room, separated from the main control room by an A60 bulkhead. Similarly the sensors and position references associated with the back up system must have physical and electrical isolation.

This philosophy is employed throughout the vessel with engine rooms having A60 bulkhead separation and the power and propulsion system must be designed such that adequate power and thrust is available even under failure conditions.



Ice Maiden - Accommodation Vessel - Class 3