Customer Application Story
Marine Automation

Making ship automation more flexible and less expensive

Summary

- Marine automation system suppliers often tie customers to proprietary hardware and software. These practices make it difficult to find parts and obtain support or service for these proprietary systems.

- Phoenix Contact's open system automation platform frees builders and customers to use a wider range of products and build a better product.

- Offshore Automation Systems uses Phoenix Contact's products to allow more connectivity with standard marine and industrial products and to simplify the levels of software integration. These products make ship automation more flexible, less expensive and more reliable.

Customer Profile

Offshore Automation Systems (www.offshoreautomationsystems. com) in Port Salerno, Florida, specializes in monitoring and control systems for small ships and yachts. The heart of the system is Phoenix Contact's automation platforms.
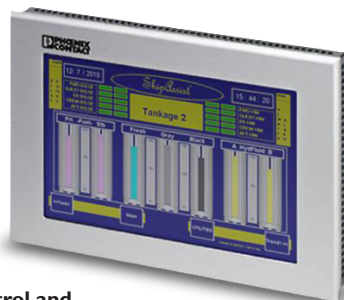
HMIs are used for local control and monitoring of vessel systems.

A ShipAssist solution can be used for facility management, power distribution control, monitoring and alarming for yachts, expedition and research vessels, supply ships and offshore platforms. This supply vessel is a good prospect for a ShipAssist Installation.

Challenge

Maintaining and operating a small ship or a luxury yacht shouldn't be as complex and time consuming as running the space shuttle. But many vessels use proprietary control and monitoring systems, tying you to specialized parts and service personnel. According to Keith Long of Offshore Automation Systems, this makes a relatively simple job difficult and exhausting.

This is particularly true of some shipboard facility management systems. These systems are used to control and monitor the ship's facilities, such as AC and DC power source and distribution centers, alarms, bilges, pumps, tank levels, hydraulics, lighting, HVAC and other non-propulsion systems. Offshore Automation Systems set out to change this reliance on expensive and proprietary control and monitoring equipment with the development of ShipAssist.

Long explained, "ShipAssist is a shipboard facility management system providing integrated control, monitoring and alarming of

your vessels assets on a proven, cost effective and open system platform featuring commercial off the shelf (COTS) parts and Phoenix Contact Automation products.

"This permits a shipboard or offshore automation system to be built and maintained at lower costs, providing a wider range of available parts with higher reliability and less down time. This automation system can be maintained, repaired and modified by any qualified electrical technician — not just by an authorized dealer or specialized technicians."

Solution

ShipAssist can be used on yachts, expedition and research vessels, supply vessels, and manned or unmanned offshore platforms. ShipAssist uses automation components from Phoenix Contact. These components include industrial controllers, I/O hardware, operator interface panels and software. Phoenix Contact's technology reduces complex levels of unnecessary software while providing seamless integration with standard industrial and marine products.

The Phoenix Contact Inline ILC series programmable logic controller (PLC) is the heart of the ShipAssist control and monitoring system. The PLC uses standard industrial digital and analog I/O modules to communicate with and control on-board equipment and subsystems. ShipAssist's implementation connects to Ethernet, Canbus and Modbus devices seamlessly. The control bus power distribution is based on Phoenix Contact's Clipline industrial connectors, and the control power is managed by Phoenix Contact's Quint Power supplies. These Phoenix Contact parts are on the American Bureau of Shipping's approved design list.

The PLC control and monitoring program is developed with Phoenix Contact's PC Worx programming software. This programming software allows the PLC to be programmed with IEC-61131 standardized programming languages. These languages can be mixed and matched in one PLC application program as required by the specific application. All these automation components are based on years of development in the process control and automation industry, and are rugged, reliable and inexpensive.

ShipAssist's network communications are a managed Ethernet redundant ring network with hubs at each HMI. This monitored

ShipAssist electronics are housed in standard plastic or stainless steel NEMA 4X industrial enclosures to protect against hazardous and corrosive environments.

ring can handle cable failures at any point in the network without loss of communications. The Ethernet ring also permits simple installation of distributed automation components such as HMIs, control cabinets or equipment gateways.

The control panels are built to exceed many of the regulating standards, and UL labeled control panels are available. Many of the Standards Development Organization (SDO's) agencies' guidelines are used for the systems' development so they will fit the application.

The PLC is installed on a single compact rail within each control panel with internal bus infrastructures for module power, self-test diagnostics and digital and analog data I/O. The Phoenix Contact Quint power products provide dual power sources, one AC- and one DC-driven. In the event of a power loss, each supply is capable of supporting the ShipAssist control system. These Phoenix Contact power products are continuously monitored by ShipAssist and will notify the user in an event of a power loss.

ShipAssist also provides critical manual override controls for power distribution, equipment circuits and alarms. A ship at sea can rely on the manual overrides and operate as normal in the unlikely event of an automation system failure.

Phoenix Contact products provide Offshore Automation Systems with standardized software and open system hardware allowing the use of industry standard off-the-shelf parts. This allows the builder and Offshore Automation the freedom to use the best parts available, or parts they already use, or cost effective parts, or any other builders' preference.

ShipAssist monitors and controls AC and DC power sources and load centers; hatches and doors; bilges and pumps; hydraulic systems; and other equipment. Tank levels are also monitored including fuel, hydraulic, oil, sludge, back water, gray water and fresh water. Canbus gateways are available for engine and other Canbus equipment. Offshore Automation can build-in maritime safety procedures that provide complete manual backup on these systems.

ShipAssist can resolve the "watchkeeping" issue for ships and for operators of ships and remote offshore installations. During operations, ShipAssist provides control and monitoring through its HMIs, so the captain and engineering personnel are constantly informed about the vessel's operations in real time, whether onboard or off.

In addition to the HMIs, all applications of ShipAssist can be remotely accessed by a web browser via a secure Ethernet link.
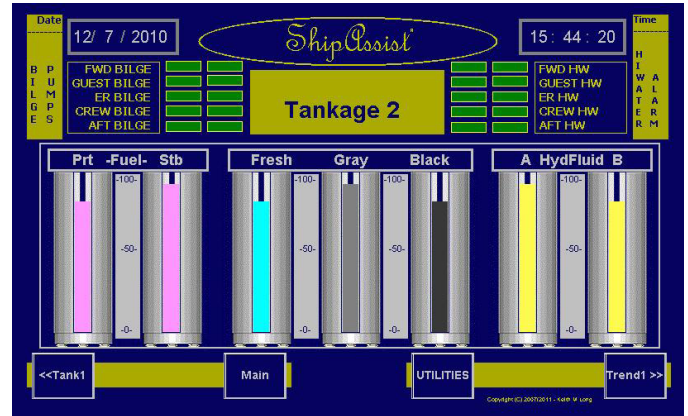
If ShipAssist finds a problem that warrants an operator's attention, it sounds a variety of local alarms, displays information on the HMIs, then can send e-mails, and/or places calls to the responsible personal.

Typical HMI displays are intuitive, and custom screens are available. These screens may be displayed locally on any HMI, on a shipboard web browser, or on a web browser anywhere in the world.

"With the help of Phoenix Contact's automation products, Offshore Automation brings reliable, proven, and cost-effective industrial systems to the maritime market," said Long. "Ship and offshore platform builders no longer have to rely upon expensive and rigid custom or proprietary systems."

Solution

Phoenix Contact's software and hardware make it easy to install or modify ShipAssist's distributed system architecture. Control centers and HMIs can be installed where they are needed, reducing long wire runs which reduce build costs.

Phoenix Contact's development environment provides ShipAssist with a dynamic platform of quickly developed operator screens and programs. Quickly developed applications and the choice of quality industrial and marine components provide an affordable, flexible and reliable system previously not available for this type of application.

After a detailed evaluation, Offshore Automation will recommend a complete solution, or an addition or modification to a system. All areas of concern for a project are outlined and detailed to meet the control and monitoring needs. Each automation component, whether furnished by Offshore Automation or by others, is installed, connected and tested for each system.