Yokogawa Offshore Solution

Bulletin 53U91A01-01E-A

Modular Automation for the Oil and Gas Industry

Yokogawa plays an important role in providing the key automation piece of the digital oil and gas field concept as pursued by many Energy companies.

Deploying automation for an offshore facility, such as Tension Leg Platforms (TLP), Spar, Semi-submersible, Floating Production Storage and Offloading (FPSO), Floating Liquefied Natural Gas (FLNG), Floating Storage and Regasification Unit (FSRU), etc. involves integrating and standardizing multiple modules. The turnkey solution fills the cultural and technical gaps between topside, hull, and subsea, providing the proper information to the enterprise level. Technology together with proper integration effort provides an efficient and sustainable foundation on which to grow towards the future.

Managing the Information Supply Chain

Technology should be integrated with the business in order to make timely and effective decisions. Yokogawa provides the information infrastructure and solutions from the measurement and control equipment to the enterprise in an integrated, modular, and reliable manner such that the enterprise has a greater visibility of the production and its safety, and performance.

Making critical field information fully visible is just the beginning

Seeing clearly provides the knowledge necessary to anticipate the changes required at the offshore facility. Knowing in advance enables the speed and flexibility to react in real time. And acting with agility, gives the ability to adapt to the ups and downs of the Oil & Gas industry. This is the vision and promise behind the Yokogawa automation solution.

ACT WITH AGILITY

Free of bottlenecks

Reduce delays, lost opportunities, knowledge silos

SEE CLEARLY

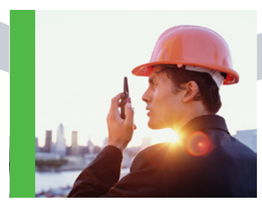
Less blind spots

Avoid guesswork, instability, sub-optimization

Minimize reactive measures, unexpected downtime, quality variations

Fewer surprises

KNOW IN ADVANCE



SOLUTIONS OBTAINED THROUGH EXPERIENCE

The offshore upstream industry faces ever higher demands and greater challenges, and increasingly difficult and hostile environments in which it must operate.

In recent years, there has been an increasing trend towards deep and ultra deep water exploration in the Gulf of Mexico and worldwide. Yokogawa's total solution plays an important role helping customers to meet the challenges of reducing both CAPEX and OPEX, while enhanced built-in technologies increase production. Our global as well as local experience provides the basis of our unique total solutions to meet the needs of this industry. With experienced upstream experts located in offices around the world, we provide quick and extensive support to meet the demands of our customers.

System Integration

As offshore facilities are getting larger by engaging multiple modules, system integration is key for offshore production automation. Yokogawa's CENTUM VP Integrated Process Control Platform and ProSafe-RS Safety Instrumented System for topside, hull, and subsea operation can be fully integrated to provide a single operator interface of the entire facility. In addition, Yokogawa has worked with various package suppliers from North America, Europe, and Asia, and has thoroughly tested the functionality.

The integration is not only limited to a single facility, but often includes the entire offshore fields and the onshore facilities which can be fully integrated with Yokogawa systems.

Main Automation Contractor

In many cases, industry expertise with skillful project management is necessary to execute a successful offshore project. Yokogawa can be a single point of contact offering a turnkey solution acting as the Main Automation Contractor.

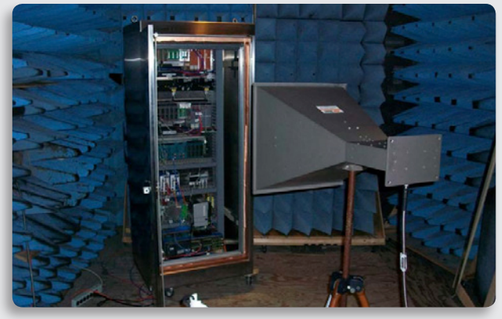
Yokogawa has extensive experience in front end engineering design, project execution, design engineering, implementation, site commissioning, etc. Yokogawa has been working with customers where we standardized the automation philosophy throughout the company by providing procedures and tools. For anything related to automation, the scope of supply and services can be tailored to meet most all customer's need.

Integration Scheme

During FAT

Hardware sustainability

Severe hardware sustainability tests have been performed for the both CENTUM VP and ProSafe-RS hardware. They have passed strict tests for vibration and electromagnetic interference and are certified by many classification societies such as ABS, LR, and BV. During several projects, Yokogawa has even extended the requirements of testing to evaluate and improve the sustainability to match the project specific requirements.

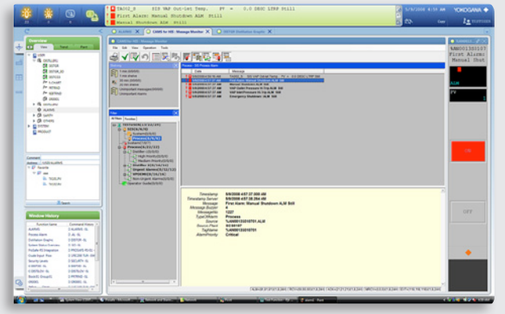


Radio Frequency Test

Alarm Management

Yokogawa's Consolidated Alarm Management Software (CAMS) is part of CENTUM VP and is used to manage alarms and event information from all core systems and sub-systems online. CAMS intelligently sorts alarms and displays only those alarms that require operator actions. CAMS provides definition and severity and consequences of those necessary alarms in accordance with EEMUA Publication No. 191 alarm management guideline and ISA-18.2.

Alarm Prioritization, Suppression, Filtering, Sorting, Eclipsing, Shelving, and Load Shedding are accomplished in a deliberate role-based manner according to user preference.

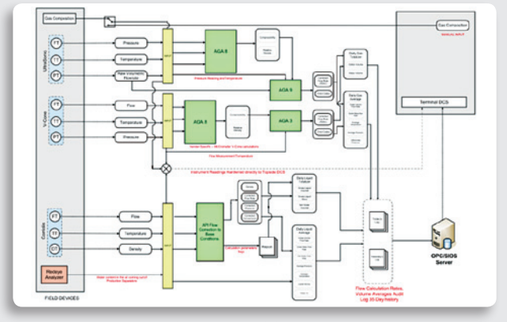


CAMS–DCS, SIS, and PLC Alarm Integration

Allocation Metering

Yokogawa's STARDOM remote terminal unit (RTU) controller has a powerful calculation module for crude oil and gas metering. For gas, Orifice (AGA3), Turbine (AGA7), Compressibility (AGA8), Ultrasonic (AGA9), SOS (AGA10), Coriolis (AGA9), and V-cone can be calculated for more than 12 meter runs.

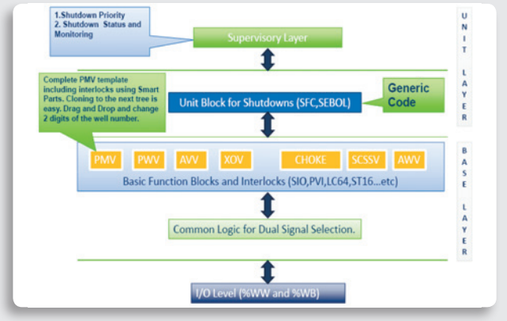
STARDOM can also act as a controller for meter proving, having standard communication protocol with the topside CENTUM VP for the measurement data and logs.



Allocation Metering

Topside - Subsea Integration

Seamless integration between Topside System and Subsea Master Control System is getting to be a common demand from the offshore field operators. Throughout various projects, Yokogawa has been standardizing functional templates to run the full Master Control System functionality into CENTUM VP platform. The advanced and reliable architecture will be the basis to make rapid progress to the Subsea Automation strategy.



Topside-Subsea Integration

Large scale system with high reliability

The reputation of Yokogawa's system comes from its high reliability and large scalability.
CENTUM VP which provide these features:

- Pair and spare CPU redundancy
- Full redundancy (Network, power, I/O, HMI, etc.)
- 1 million tags support
- Distributed Remote I/Os
- Full integration with ProSafe-RS safety system
- Onshore Remote Terminal Operator Station
- Integrated Alarm Management

Advanced diagnostics and remote access

By using FOUNDATION fieldbus Technology, all field device information (transmitter and valves) can be remotely managed by Yokogawa's Plant Resource Manager (PRM) device asset management software. Diagnostic information is provided to identify the cause of field device issues. This changes the current maintenance behavior from periodic maintenance to preventive and corrective maintenance. By connecting to the corporate LAN line, all diagnostics data can be accessed from the onshore office.

Increase Production, Reduce Cost

By using reliable hardware and proper configurations, the facility maximizes production time with minimal potential shutdowns. The key factors are:

- Use of reliable hardware
- Deployment of reliable applications to prevent problems
- Capture real-time data
- Preventive Maintenance by digital technology
- Understanding the cause of the issue ASAP

Yokogawa can offer a combination of various technologies to increase production and reduce the cost.

YOKOGAWA PRODUCTS INVOLVED IN OFFSHORE OPERATION

DCS

CENTUM VP

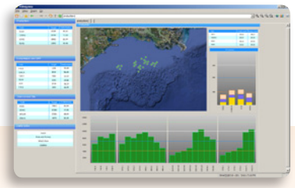
CENTUM VP is an Integration Distributed Control System used to manage and control the operation of the facility. CENTUM reliability is the de-facto standard in the industry by its unique Pair & Spare reliability technology and seven 9's availability. Through its evergreen policy, every release is backward compatible with the former CENTUM systems, which gives the customer the assurance for the long term viability of the system.

SIS and F&G

ProSafe-RS

ProSafe-RS is a TUV certified SIL 3 Safety Instrumented System for Emergency shutdown (ESD), Fire and gas (F&G), and Burner Management System (BMS) applications. Yokogawa's systems and work processes conform to both IEC 61508 and IEC61511 standards. ProSafe-RS achieves higher efficiency of operations through operational integration with CENTUM VP. A Single window is used to monitor and control both DCS and SIS/F&G data which enables easier start-up/ shutdown of the facility and maintenance override action.

SCADA DASHBOARDS



Supervisory Systems FAST/TOOLS™

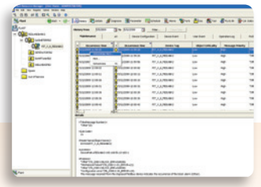
The FAST/TOOLS package is a powerful and open SCADA Host system.
The flexible communication capability and user interface, together with the scalability allows the overall operation of the entire offshore region. FAST/TOOLS can act as a data concentrator of multiple systems as well as the universal operator interface for the offshore assets. Bi-directional interface between the Enterprise systems enables quick decision making and optimization.

Field Instruments

DPharp EJX™

By utilizing a full digital sensor, the EJX910 Multivariable Transmitter can measure the accurate DP, SP, and temperature simultaneously. The unique silicon resonant sensor structure can provide stability for overpressure, and long term stability for 0.1% of URL for up to 10 years. In addition to the EJX series, Yokogawa has other variety of field instruments to meet most of our customer measurement applications.

Device Management



PRM® Plant Resource Manager

PRM is a field device maintenance and management system used to monitor and save diagnostic information from field devices. Utilizing a feature called device patrol, PRM will periodically identify field device issues and report them to a centralized location. The cause of the issue can be easily identified through clearly displayed diagnostics information.

PLC/RTU

STARDOM™

STARDOM is an PLC/RTU controller with advanced information technology in reliable hardware and inherits the ruggedness characteristics of the Yokogawa DCS, but with unrestrained configuration. This multi-purpose controller supports package unit control, oil and gas metering functionality, and unmanned platform control. This flexible and open controller is based on the IEC61131-3 standard with a portfolio library of advanced function blocks to provide a more modular functionality in process units.

Offshore and Beyond

Yokogawa total solutions cover not only the offshore facilities, but also the onshore processing facilities and pipelines. The vast experience for these applications can be integrated to optimize the overall operation capability and maintainability.

Increase Production and Reduce Cost Safely

Offshore Facility

CENTUM VP (DCS)
ProSafe-RS (SIS, F&G)
Exaquantum (DHS)
PRM (Asset Management)
UGS (Universal Gateway)
STARDOM (PLC)
Transmitters (EJX/YTA/etc.)
Analyzers
OTS

Onshore Office

VTSPortal

FAST/TOOLS
(Dashboards SCADA)

Unmanned Platform

STARDOM (RTU)

ProSafe-RS
(SIS, F&G)

Transmitters
(EJX/YTA/etc.)

Solar Panel

Existing Platforms

Other DCS
Other PLC

Why Yokogawa?

Yokogawa is being selected by the major energy companies as its automation partner because Yokogawa, focuses on delivering highly reliable solutions – from instrumentation to control and safety systems, as well as engineering, configuration and integration services and support, providing a turnkey automation solution. Explore Yokogawa's products to increase the efficiency and environmental performance of your offshore facilities, and ensure their safe and stable operation.

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