

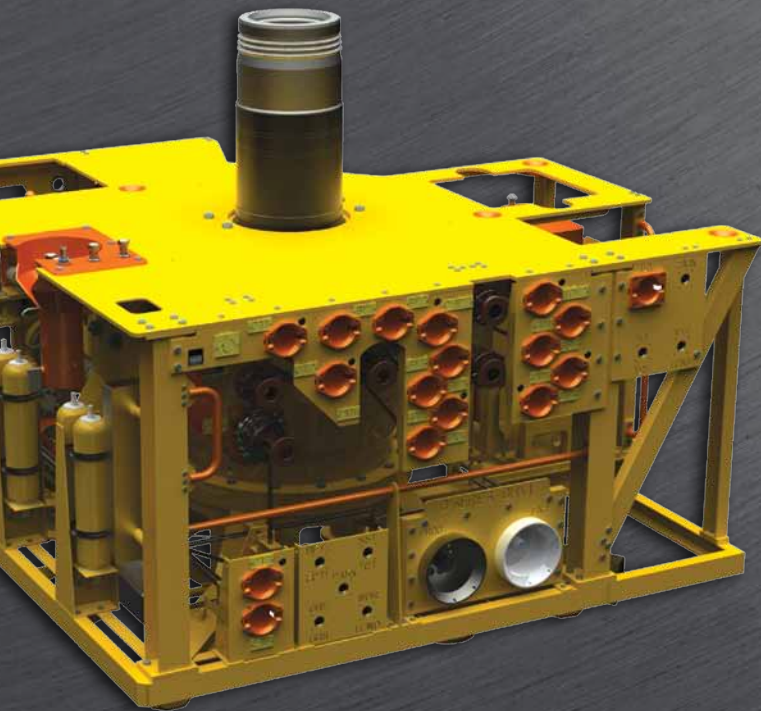
# VetcoGray SemStar5-R™ remote electronics module

Flexible subsea data hub for use in subsea processing and other applications

SemStar5-R™ is a free-standing subsea data hub package designed for installation on subsea trees, manifolds, and process facilities.

The unit is deployed and retrieved by ROV with connections to the subsea control and instrumentation system made with wet-mateable ROV-deployed jumpers – using either electrical or fiber-optic connections.

The external package is fully marinated for long-term subsea immersion and the internal data hub multiplexing unit is an application-specific configuration of the innovative VetcoGray SemStar5™ subsea electronics module.



## Enhanced reliability

**DHPT canister** – enables the DHPT interface to be housed outside the SEM and mounted separately on the tree structure reducing lead times for SCM deliveries by removing the dependency on completion vendor selection. This approach also enables the accommodation of dissimilar downhole completions within a field

**Instrumentation upgrades** – SemStar5-R can act as a standalone power and communications interface to support instrumentation upgrades or remote instruments while utilizing the existing control system infrastructure

**Communications hub** – as a subsea data hub, SemStar5-R serves as a communications gateway supporting in-field distribution architectures which require distributed data routing and communications media conversion

**Distributed controls** – acting as a traditional multiplexing hydraulic controller, in conjunction with a mini hydraulic control module, SemStar5-R can be used to operate subsea equipment requiring a limited number of control and monitoring functions

**Brownfield upgrades** – SemStar5-R can be used to facilitate brownfield upgrades, enabling easy integration of additional functionality and staged upgrades of field hardware



VetcoGray SemStar5-R



## VetcoGray SemStar5-R embodies the innovative SemStar design features

The VetcoGray SemStar5 is a fifth generation subsea electronics module for production control system applications. It captures the design heritage and learning from over 25 years of subsea experience. This enhanced new design delivers: open architecture communications access, modular TCP/IP backplane architecture, support for industry-standard interfaces, enhanced reliability and obsolescence mitigation, and enhanced ruggedization to exceed ISO 13628-6 requirements.

### Communications

- SemStar5 uses an internal and external ethernet data bus supporting TCP/IP
- Flexible subsea communications options are provided by:
  - Fiber-optic modems up to 1 Gbit/sec data rate for ranges up to 200 km
  - DSL-5 Mbit point-to-point up to 30 km
  - Variable speed copper modem (VSCM) speeds from 9.6 K to 115.2 Kbps in multi-drop applications
  - Direct ethernet
- IP enabled
- Plug & Play subsea LAN

### Enhanced reliability

- Redundant DC power supply to internal modules
- Redundant 100 BaseT ethernet "Distributed Star Topology" for backplane and inter bay communications
- Single Board Computer (SBC) based on 32-bit microcontroller is fitted to any module that requires processing capability
- High-integrity, industrial Real Time Operating System (RTOS)

## Obsolescence management for electronic components

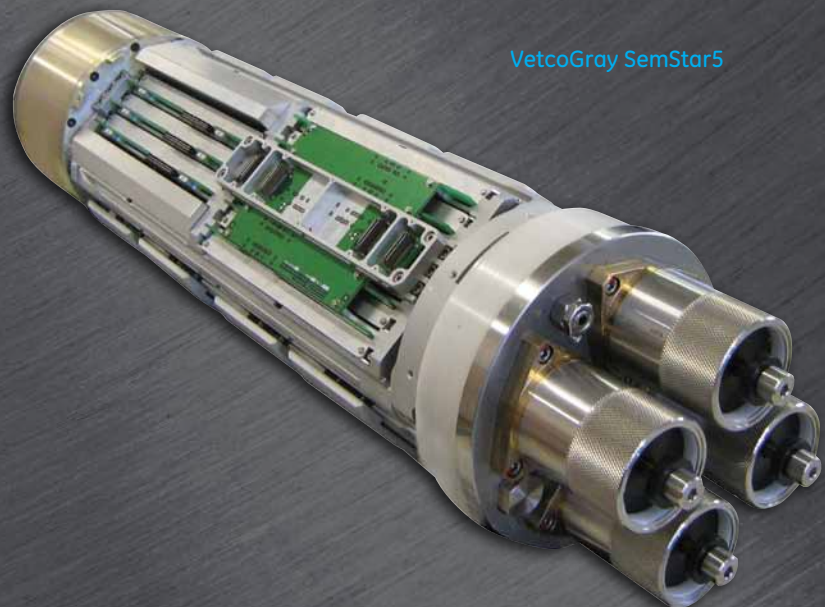
- Design includes significant 'future proofing' features
- Components assessed as 'high risk' are grouped onto replaceable modules
- Component Obsolescence Monitoring Program already active to industry standards (COG-compliant)

### Ruggedization

- Thermal Management design practices validated through thermal modelling
- Robust mechanical construction to meet the shock, vibration and temperature cycle requirements of ISO 13628 Part 6
- Highly accelerated life testing program designed to verify robustness and to validate reliability prediction
- High speed ethernet backplane permits full analysis when undertaking unit environmental stress screening

### Industry standard interfaces

- SemStar5 provides the following industry standard interfaces:
  - SIFS (Levels 1, 2 & 3)
  - IWIS (Including PPP channels)



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GE imagination at work