

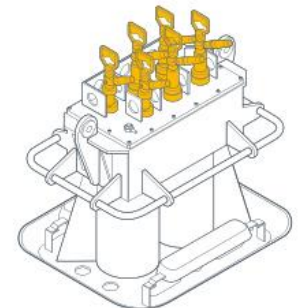
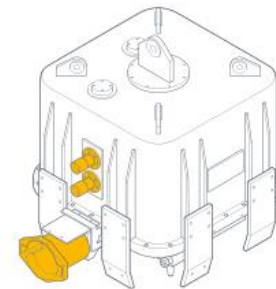
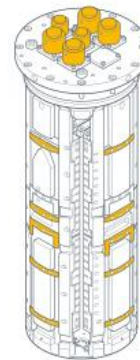
Proserv ACT

AUGMENTED CONTROL TECHNOLOGIES

Subsea Expo 2017

Proserv Helps Industry ACT During Hard Times

Bruce Stuart - 02 Feb 2017



proserv

INGENIOUS SIMPLICITY

Introduction

The Challenge For Us All...

- Low oil price and high lift costs...
- Yet over **80%** of the world energy use reliant on fossil fuel
- And subsea assets are an important part of this
- However the North Sea is in it's twilight years
- But the maintenance and optimisation of often-aging brownfield subsea fields is critical

The industry has a **moral** as well as an **economic obligation** to maximise total production from these difficult reserves.



How Long Can We Continue?

Current Industry Standards

Risk of Failure and Poor Reliability on already installed systems

- Failed wells without adequate support from the OEM require an alternative control solution to reinstate well production without full system replacement

Long Term Obsolescence Support for Extended Well Life

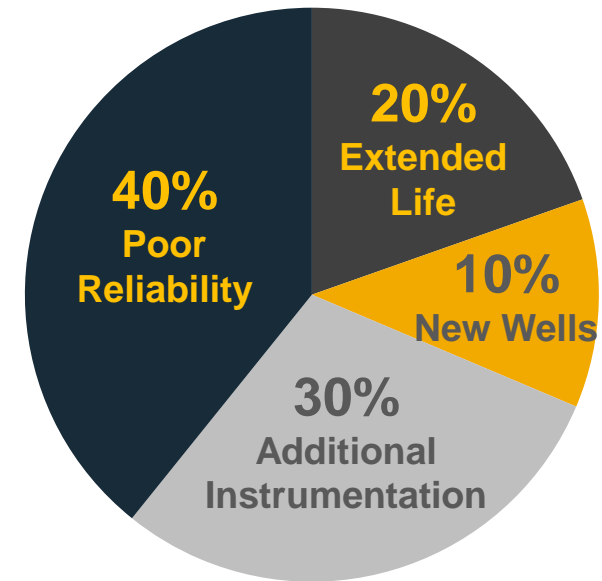
- Support for extended field life and even for original design life may have limited part obsolescence support and / or engineering support from the OEM

Extending Fields for Additional Wells

- Adding wells to brownfield subsea systems requires interfacing with existing and often unsupported aging technology both subsea and topside

Additional Instrumentation for Production Optimisation

- Instrumentation to provide essential information to maximise remaining production may not be supported by the existing control system



Subsea Systems & Services

Operator Challenges

Extend field for additional wells

Additional instrumentation for production optimisation

Risk of failure and poor reliability

Extended well life

Proserv Solutions

Co-exist

SEM Retrofit

SCM Refurbishment

Topside Upgrade

Proserv Toolkit



OCC



OCH



A2G



SCM



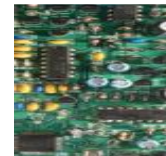
TIACS



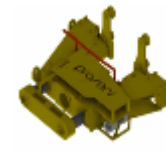
Subsea Interfaces



Monitoring SeaHawk



Topside Protocols



ROV Tooling



Hydraulics

Solution: Co-Exist

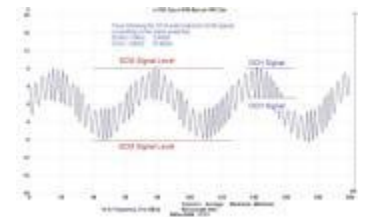
Co-exist is an exciting proposition for the Brownfield subsea market.

- Proserv's innovative Artemis 2G SEM (Subsea Electronics Module) used in the SCM and / or OCH enables an extremely flexible approach to communications in the subsea environment.
- The digitally filtered wide frequency signal is configured for each subsea module using an inbuilt analyser to optimise performance.
- This enables the Proserv control system to readily adapt to existing system noise and of course incumbent system signals.

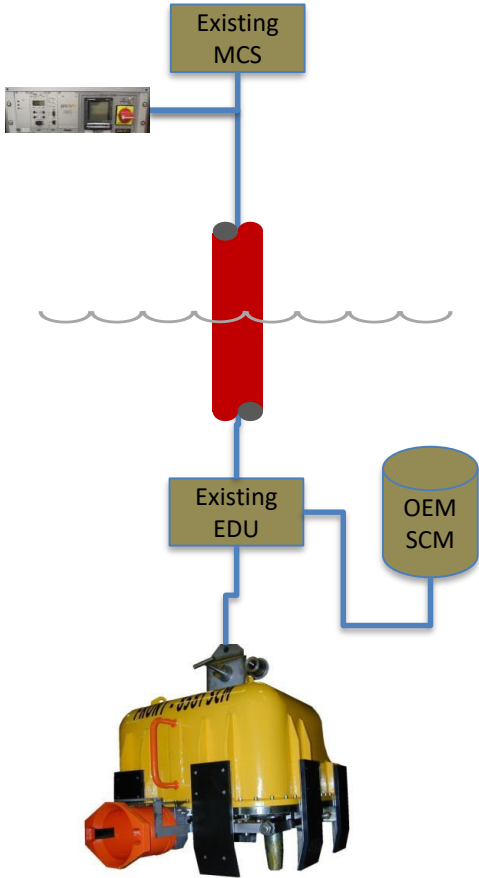
Co-exist enables Proserv to superimpose the powerful A2G controls onto a pre-existing control system using either the powerline or the existing signal line, without affecting the OEM control.



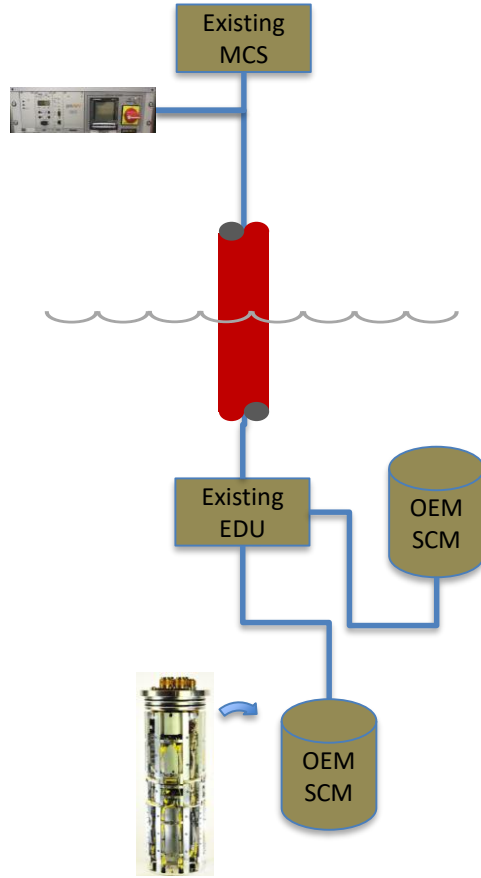
A2G Subsea Electronic Module



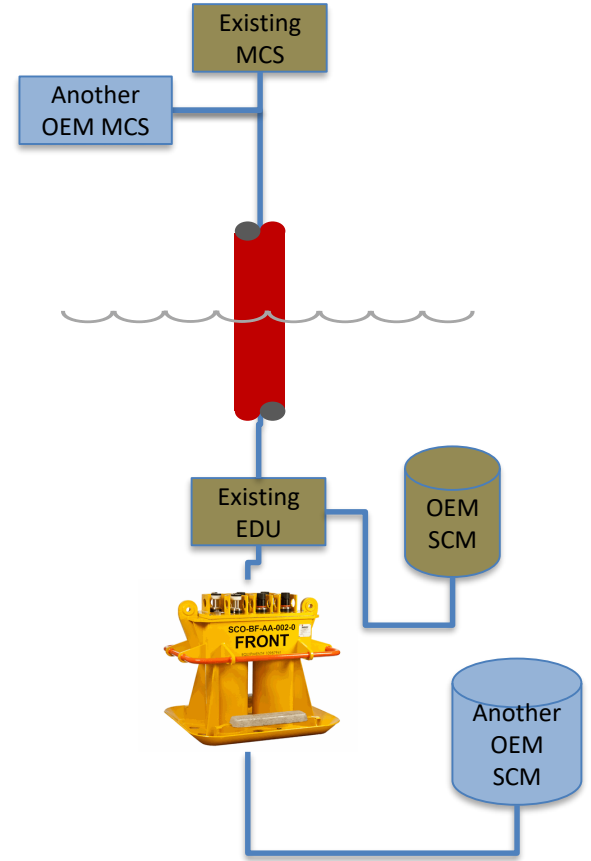
What does co-exist do for you?



Allows you to add a **Proserv SCM** to another OEM system



Allows you to retrofit a **Proserv SEM** into another OEM SCM



Allows you use **another OEM SCM** in your system

Solution: Retrofit existing SCMs and SEMs

“Brain Surgery”

The ability for Proserv to retrofit an established OEM’s SCM design with the A2G SEM is an innovative proposition for operators experiencing failing electronics or aging subsea equipment requiring long term support.

Retrofitting and refurbishing the OEM’s SCM provides:

- Maintenance of current subsea interfaces
- Latest specification SEM with additional interfaces available
- Fully supported SCM electronics with obsolescence management
- Maximise use of existing infrastructure to reduce CAPEX and risks
- As new SCM with upgraded functionality
- Opportunity for phased upgrade without affecting production
- Remote support and service provision
- Improved subsea production system reliability



SEM as received



Refurbish and Retrofit SEM



SCM ready for installation

Solution: Topside Upgrade



The solution for improving reliability or management of obsolescence also requires component level reviews of surface control systems associated with subsea controls.

This includes the Master Control Station, Electrical Power Units and Hydraulic Power Units.

Upgrade and modification of topside systems may be required to;

- Expand fields for additional wells
- Extend the control system supported life
- Add subsea instrumentation to an existing field
- Or retrofit and refurbish

Proserv Upgrade of Topside Systems

- Electrical, Fibre Optic, Chemical, Hydraulic

Case Studies

Project profile: Toni Field

Brownfield Upgrade - Subsea Additional Wells – Co-exist – Topside upgrade

Project Background

The Toni field is operated by CNR in Aberdeen. The field consists of two subsea templates (one Production and one Water Injection). CNR were unable to contract the OEM for controls to extend both templates to accommodate an additional well at each template. The OEM control module design was obsolete and no solution to add these wells was available without a full system replacement, which was not economically viable.

Solution

Proserv provided a Brownfield Upgrade solution. By utilising the power conductors for both communications and power Proserv minimised any cross talk between the two systems. This approach provided the client with a cost effective solution that did not require full system replacement, did not impact on the day to day operation of the Toni Field, provided the flexibility to continue to upgrade and add a further field into this controls infrastructure in the future.

Scope

Proserv upgraded the existing CNR subsea control system on the Toni Field using an Open Communications Hub (OCH) and 2 additional Subsea Control Modules (SCM's). The existing topology utilised separate communications and power, enabling Proserv to co-exist with the existing umbilical power cores and share these services with the incumbent system

Benefits

- Proserv enabled CNR to improve production from the Toni field by adding two wells without a full system change
- The flexibility of this co-exist system now enables CNR to consider other wells and other field tie-ins, which were otherwise not available
- Increasing the life and production from the Toni field

Client: CNR

Location: North Sea

Equipment: New SCMs and OCH

“Proserv stepped up to the challenge of providing a co-exist controls solution to ‘extend and enhance’ our aging subsea asset where no viable solution was available from the OEM”

Paul Hunter – CNR Aberdeen



Project profile: Visund

Brownfield Upgrade - Subsea

Additional Instrumentation – SCM Retrofit

Project Background

Statoil had a requirement to refurbish older OEM SCM modules that had obsolescence and fault issues, particularly with the internal electronics (SEM). The OEM was unable to support the system nor deliver spare parts.

Scope

Proserv refurbished the used 4G SCM module by installing a Proserv A2G SEM with redundant power and communication and IWIS option three downhole instrumentation interface. The old system was a single SEM SCM with only single power and communication and no downhole interface. The solution allowed all hydraulic parts and sensors to be re-used with only faulty parts being replaced.

The preferred solution was to interface with the topside Siemens DCS by legacy MODBUS map because modifications to the topside systems are time consuming and expensive.

Benefits

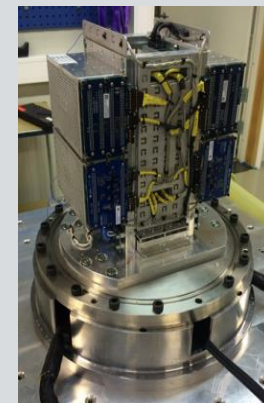
- Cost effective, since most SCM parts are durable and will now be reused
- Short lead time and turnaround within 6 weeks
- High bandwidth and open topside interface
- Redundant power supply and communication
- Flexible system
- Market-leading SEM reliability
- In-house SEM design – easy to manage obsolescence problems
- SCM with renowned warranty and expected lifetime

“No need to buy a new car when the breaks are worn out”

Client: Statoil

Location: Norwegian North Sea

Equipment: New SEM and Refurbished SCM



Project profile: Troll C

Brownfield Upgrade - Subsea Additional Instrumentation – Co-exist

Project Background

Because of operational limitations the client required regular video inspection of subsea infrastructure and valve isolation should a leak be detected. Typically ROV deployment was necessary every quarter and this was proving both very costly and logistically demanding.

Solution

Proserv provided a subsea monitoring system that co-exists with the original OEM control system. Proserv SeaHawk™ subsea surveillance is permanently positioned to monitor a defective methanol line during injection processes. If a leak is detected the Proserv system is also equipped with an electrical actuator position on the chemical isolation valve. The requirement for regular ROV deployment is now not necessary and all video inspection and valve actuation can be completed from the host facility without intervention, saving both the cost and logistics of ROV vessels in field.

Scope

A Proserv Open Communications Hub (OCH) with power-line communication is provided to co-exist with the OEM’s control system. The OCH is installed with two outputs for SeaHawk™ cameras and one output an electrical actuator. The electrical actuator is used for control of Methanol valve and operates using 48Vdc supply and RS485 communications from the OCH. A single SeaHawk™ camera is fitted in the first installation with a second available as a configurable SIIS L3 instrument for the future. The SeaHawk™ provides constant video monitoring detection or 3 minutes of high resolution video in every hour for analysis and identification.

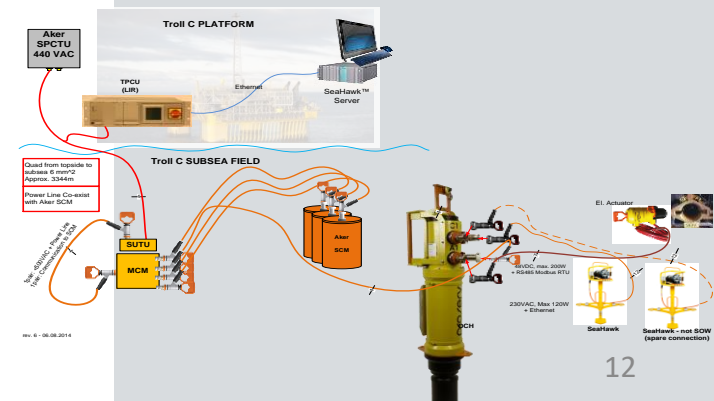
Client: Norwegian Operator

Location: North Sea

Equipment: SeaHawk and OCH

Benefits

- The Proserv control and monitoring system dramatically improves the system capability using existing infrastructure
- Provides a highly flexible system using configurable electrical actuator, subsea video monitoring or future SIIS L3 instrumentation
- Provides permanent subsea monitoring and actuation without the regular high cost of ROV intervention



Project profile: Anglia

Production enhancement - Subsea

Poor reliability – Obsolescence – SCM Retrofit

Project Background

A remote unmanned platform in the North Sea supports two subsea production wells linked to a Host platform. The subsea control system is over 20 years old, is unsupported by the OEM and has suffered from repeated failures, unscheduled shutdowns, and limited remote support leading to a significant loss of production.

Solution

Proserv provided a retrofit solution using the existing Subsea Control Module (SCM) hydraulic and mechanical hardware but replacing the Subsea Electronic Module (SEM) for a more reliable and fully supported unit. This provided a replacement solution with the incumbent Subsea Control Modules (SCMs) and thus an upgrade path to improve availability and support and system capability.

Scope of work

A study was undertaken to consider the implications of SEM replacement within each SCM, including the use of existing inductive couplers which are inherent in the system. Each SCM was disassembled, pre tested, retrofitted and FAT tested with new Proserv electronics. The surface control system was also replaced with a new MCS to replace the OEM system and provide communications to the retrofit SCMs

Benefits

- Significantly less expensive than a replacement
- Significantly greater technical performance and reliability
- Enables Production from an otherwise unproductive field
- Higher reliability and availability
- Optimised uptime
- State of the art electronics and connectivity
- Remote connectivity

Client: Ithaca

Location: North Sea

Equipment: Subsea Controls SEM and Surface Retrofit



Project profile: Princess

Brownfield Upgrade - Subsea Optimise System – Co-exist – OCH retrofit

Project Background

With a step out distance of 6 km and water depth of 1200 m, the challenge was to provide communication from an existing topside system to the subsea system via power-line communication, co-existing with FMC KOS 150 SCM's. The key requirement was to optimise system performance, delivering a design life of 20 years.

Solution

Proserv delivered a retrofit Open Communications Hub (OCH) solution to provide co-exist hi speed communications on the power line with existing SCM. This enabled the conversion of AC high-voltage to DC with the provision of power management subsea to all instruments.

Scope

The provision of high bandwidth communications and co-exist technology with the existing subsea system delivered all the key requirements on performance as set out by the client.

Benefits

The system was qualified to provide shared electrical power with the P6 Production SCM and utilise a fibre optic distributed temperature sensing and P/T gauges (FBGs) to monitor functionality of the P6 gas lift system. A marinised DTS (in-well Distributed Temperature Sensing) was developed and the installation of fibre optic technology provided a platform for Shell to evaluate fibre optic technology for future applications.

Client: Shell

Location: Gulf of Mexico

Equipment: Open Communications Hub





Any Questions?

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