



proserv

INGENIOUS SIMPLICITY

Extending The Life Of Obsolete And Unsupported Subsea Control Systems

Michael Lewis
Regional Manager Subsea Systems

SUT ETM 12th April 2017

AGENDA

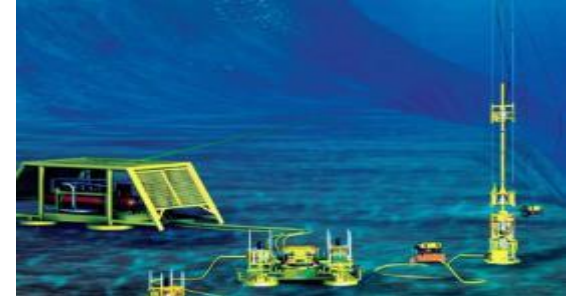


- Why upgrade older generation control systems?
- Applications
- Technical challenges faced
- Benefits
- Case Studies

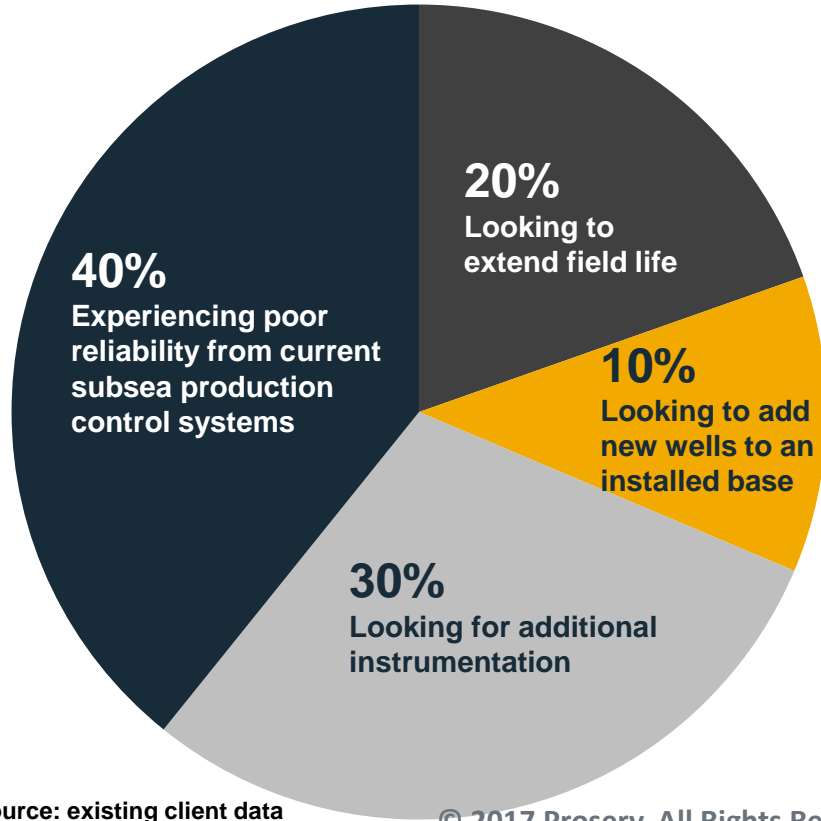
Why Upgrade Existing Brownfield Systems?

Brownfield subsea fields are an important segment of global offshore oil and gas production.

With over **80%** of the world energy use reliant on fossil fuel the maintenance and optimisation of these often aging subsea assets is an economic necessity for the industry.



Development motivation for brownfields



High reliability of hydrocarbon production and reliable revenue return on investment is a fundamental of Operator Business Planning.

Many Operators are experiencing multiple challenges in maintaining or extending existing field life or functionality to meet business opportunities.

Availability and commercial viability of OEM solutions often exacerbate the risk of production reliability or not commercially feasible making the Business Plan unachievable.

- Data Modules – for additional instrumentation
- SEM replacement – for extending field life, obsolescence or improving reliability
- Additional SCM's to an existing field to add wells to a third party control system



- Communications on an existing infrastructure – co-exist the key to phased field change outs.
- SEM replacement – Physical size and interfaces
- Legacy systems – Availability of Spares

Typical Process

- Review of Operators needs/problems
- Submit technical solution
- Review solution offered with operator
- Conduct project specific testing
- On conclusion of testing a full technical and commercial proposal is issued to the client
- Project Execution
- Installation and Commissioning

A2G Subsea Electronics Module

- Offers high-speed, copper-based, multi-drop networks as a viable alternative to fibre optic infrastructures
- Maximises flexibility and optimises functionality providing more powerful communications and instrument support.
- Increases accessibility for remote usage through its webpage interface.
- Can be used to co-exist with existing networks, is fully back compatible with existing technology and doesn't require proprietary software for remote configuration and support.
- Fully compliant with subsea control and instrumentation standards; ISO 13628-6, API 17F, SIIS, IWIS



The Challenge:

As subsea assets enter their next phase of extended production to support the offshore infrastructure there is risk to continued production and revenue.

Aging subsea equipment often has insufficient support from the OEM because of spares obsolescence or because the required technology knowledge/expertise is no longer available.

The typical solution is for a full system upgrade, discarding the old technology and equipment, which is frequently uneconomical particularly when such an operation necessitates an extended full field shut-in and significant loss of production.

Without a viable solution the asset remains at risk and underperforming, ultimately leading to premature abandonment and poor financial returns.

Proserv approach:

Proserv's co-exist and retrofit technology enable a well life upgrade path without expensive full system shutdowns so maximising the use of existing assets.



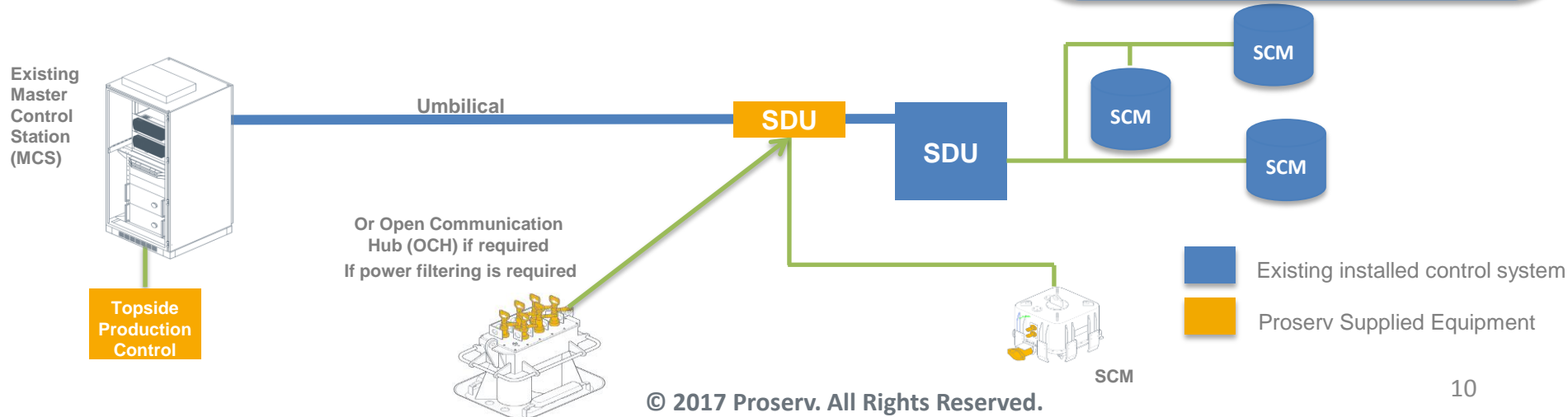
Extend fields for additional wells

The Challenge:

Bringing additional wells into the installed 'brownfield' infrastructure or expanding the aging asset to compensate for tailing production may be problematic if the OEM no longer supports the technology. Full system upgrades can be cost prohibitive and even where extension options are available the OEM options need a competitive alternative.

Proserv approach:

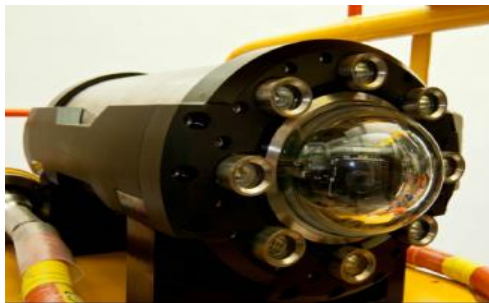
Proserv co-exist technology enables field extensions without affecting the existing control system or the need for spare umbilical conductors or a new umbilical, therefore minimising any production downtime



The Challenge:

Brownfield upgrades often require additional instrumentation to monitor aging assets (for leakages or vibration) or for production performance (multiphase flow). The challenge is to optimise production in the short term and maximise economic field life and recovery.

Older installed subsea production control systems rarely have the functionality or capability required to support the new monitoring capabilities that exist today.



Proserv approach:

Proserv's powerful communications and co-exist options enable brownfield instrumentation upgrade on existing subsea systems without new umbilical infrastructure and with minimal production downtime.



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 Approach

- Utilise same electrical power unit where possible
- Mimic DCS interface to avoid confusion for personnel
- Install topside control unit for DCS interface



- The state-of-the-art Artemis 2G, OCC and OCH technologies enables multiple upgrade paths and subsea topologies
- Fully supported SCM electronics with obsolescence management
- Maximised use of existing infrastructure to reduce CAPEX and risks
- Opportunity for phased upgrade without affecting production
- Remote support and service provision
- Improved subsea production system reliability

Case Study: Norwegian Sector

Brownfield Upgrade –SCM Retrofit

Project Background

The operator has a requirement to refurbish an older generation SCM's that have obsolescence and fault issues, particularly with the subsea electronics. The OEM are unable to support the system, or supply spare SEMs.

Scope of Work

Refurbish a used SCM by installing a Proserv A2G SEM with redundant power and communications. Reuse all hydraulic parts and sensors, replace only if necessary. Interface to Siemens DCS by legacy MODBUS map.

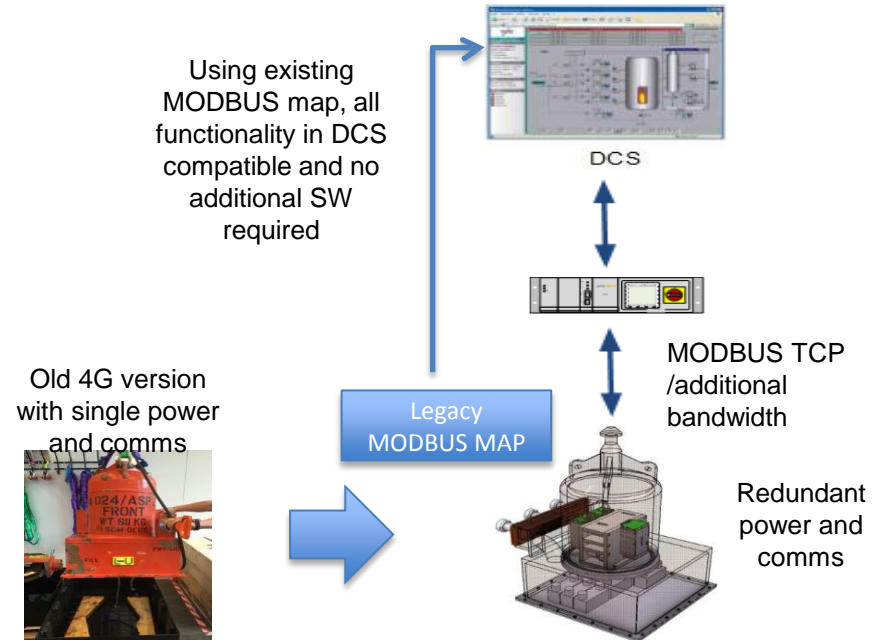
Benefits

Cost effective solution, most parts will be reused. Accelerated delivery, SCM will be refurbished in 8 – 10 weeks, locally in Norway. Redundant power and communications, high bandwidth and open topside interface. Market leading SEM reliability.

Client:
Confidential

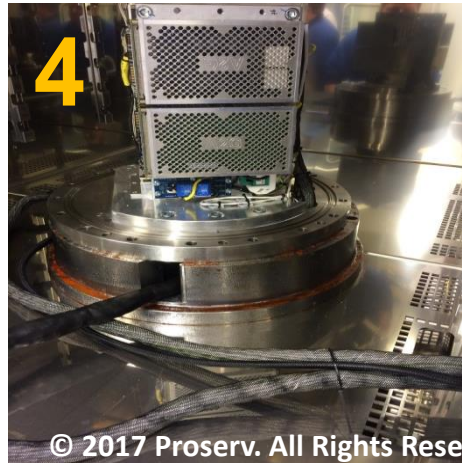
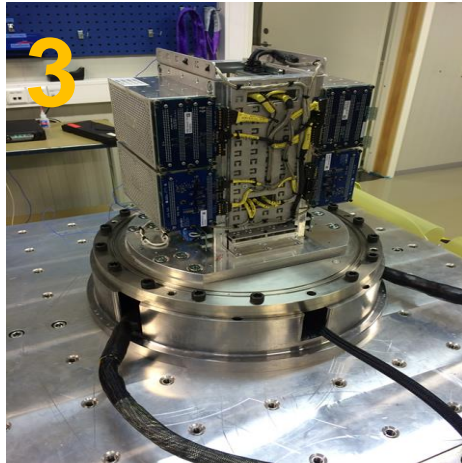
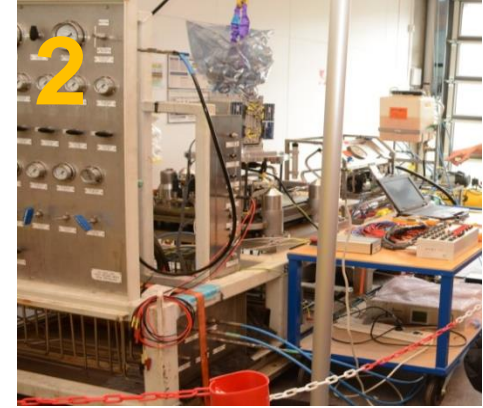
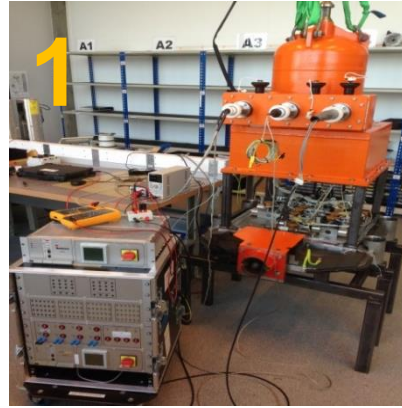
Location:
Norway

Equipment:
A2G SEM



Test program

1. FAT test SEM without hydraulics
2. FAT test SCM with hydraulics
3. SEM Vibration test
4. SEM Temp cycling
5. SEM hyperbaric test



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. It has suffered from repeated failures, unscheduled shutdowns, and limited support leading to a significant loss of production.

Scope of work

A study was undertaken to consider the implications of SEM replacement within each SCM,. 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

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.



Thank You

