



SUBSEA CONTROLS PROJECT REFERENCES

INTRODUCTION

Proserv has been manufacturing control systems in the UK since 1976 and has considerable experience in subsea production system engineering and subsea control system design.

As the industry technology has advanced into locating much of the production equipment on the seabed so Proserv has developed control, monitoring and safety shutdown systems which are able to operate in this equipment either from the surface, or the subsea environment.

Early involvement in the Subsea arena began for Proserv in the 1980's with the design and prototype manufacture of our own subsea control module, using our in-house spool-type control valves. These whilst initially adapted and evaluated for subsea use did not show the degree of durability of the carbide shear seal type valves used in our subsea control systems today.

A number of subsea hydraulic systems for short step-outs and SSIV controls were made, but it was the development of our **Wellcon** multiplexed electronic programmable control modules employing shear-seal valves that established Proserv presence in the subsea market.

In 1992 our first complete multiplexed Electro-Hydraulic subsea control system was developed and the first full system deployed the following year.

In 1999 the **Artemis** subsea control system was developed adding deep water ROV deployment to the product line.

The inclusion of the Sicom **OCC** modem technology in 2007 enabled open and high performance subsea network availability.

In 2014 Proserv launch the latest generation subsea electronics Artemis 2G (A2G) which provides operators with a reliable, more accessible and flexible system with increase data and power performance and full compliance with latest SIIS, IWIS, ISO and API specifications

With much more reliance on oil and gas field life extension and brownfield expansion of older field the Artemis and **A2G** technology from Proserv now provides an alternative to using the original Equipment Manufacture with the Augmented Controls Technology (ACT) provided by Proserv subsea controls technology.

In 2017 the latest **OCX** modem from Proserv provides greater communication processing, extended bandwidth and inbuilt configuration tools to provide our solutions with up to 4Mbps data speeds over distance on powerline copper for use with MPFM instrumentation and subsea video on installations.

PROJECT PROFILES

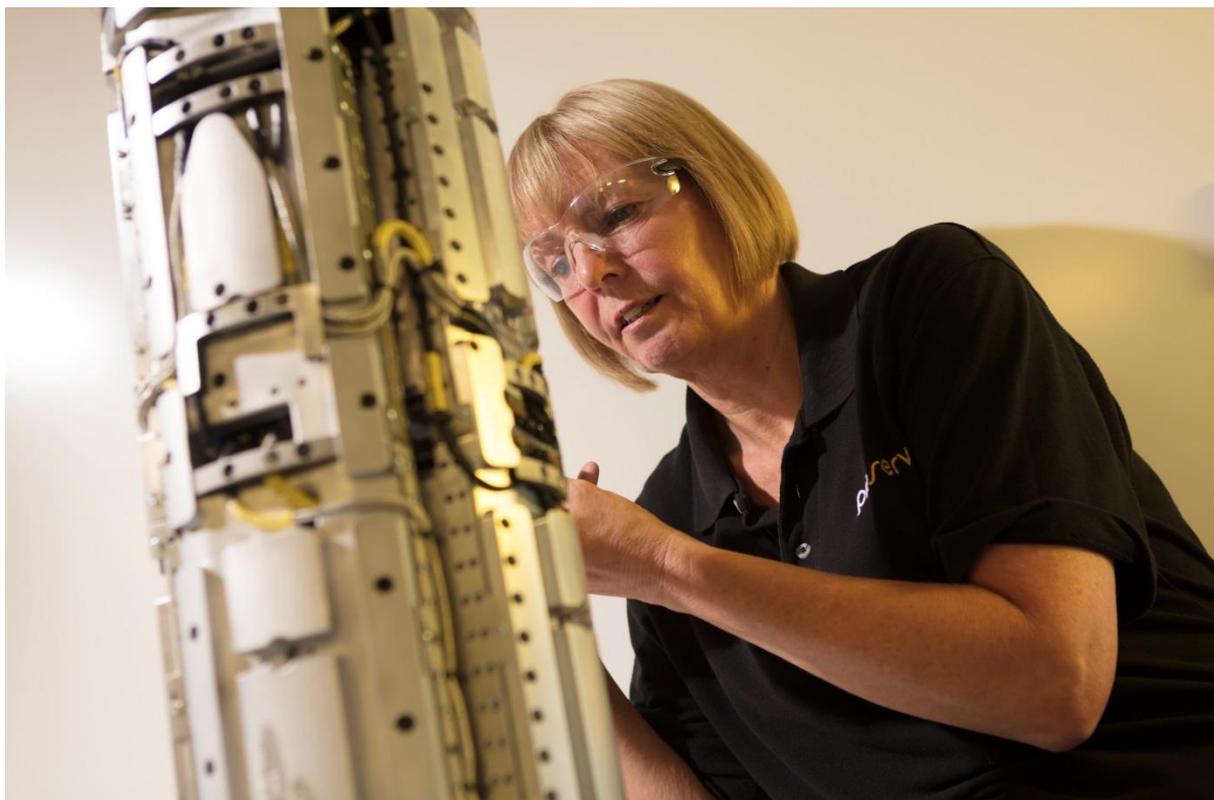
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Project	Zennor Finlaggan
Client	Zennor Petroleum
Completion Date	In Production
Water Depth	Shallow North Sea
Step out Distance	20km
No. of SCMs	2
System	Artemis 2G
Intervention Method	ROV using Running Tool
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Background	Zennor Petroleum required a flexible solution capable of using a number of host facilities as that was not determined when the project was first sanctioned
Solution	The A2G subsea controls solution provided supports both the longer and shorter step out requirements determined by the eventual host facility
Scope of Supply	Full Subsea Control System, including topside MCS, HPU and TUTU. Subsea; SSIV Instrumentation, Manifold Subsea Chemical Metering and Instrumentation, 2 Production SCMs and Tree Instrumentation, and SCM Running Tool rental
Conclusion	The tailored approach of the SCM mounting base to the tree enabled the successful integration of the Proserv controls onto the GE subsea Xmas Tree and therefore the selection of the preferred XT vendor and Controls vendor without the need to compromise either contracts



Project	Premier Bison, Iguana & Gajah Puteri Development (BIGP)
Client	Premier Oil
Completion Date	In Production
Water Depth	80m
Step out Distance	21km
No. of SCMs	3
System	Artemis 2G
Intervention Method	ROV Self-Aligning
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	Indonesia
Background	Premier had a complex host platform arrangement with 2 subsea wells powered from the Pelican platform and 1 from the Naga platform. Both platforms are normally unmanned (NUI) and control is from a third host platform Gajah Baru. This is then further complicated by Pelican and Naga having no safe area for EPU or Subsea Comms, and Gajah Puteri (GP) requiring control from a 4 th platform AGX.
Solution	The complex surface controls required distributed power and controls systems with fibre optic connections between platforms. The hazardous area required distributed explosion proof EPU solution. Subsea, the tree instrumentation also required front mounted connections on the SCM to avoid mounting base penetrators.
Scope of Supply	Full Subsea Control System, including topside SCU, HPU and EPU on each platform, 3 Production SCMs and Tree Instrumentation
Conclusion	The topside controls distributed between 4 platforms and the requirement for SCM housing mounted instrumentation connections required an ingenious solution without including excessive complexity



Project	Talos Boris & Tornado SCM Refurbishment - ACT
Client	Talos
Completion Date	2017
Water Depth	760m
Step out Distance	10.5km
No. of SCMs	6 x GE Modpod A2G upgrades - ACT
System	A2G
Intervention Method	ROV
Xmas Tree Supplier	GE
Control Method	Electro-Hydraulic
Location	Gulf of Mexico
Background	After reports of the system of failing the operator was told by OEM that much of the installed subsea equipment was obsolete. Upgrades using replacement OEM equipment were considered by Talos as too expensive.
Solution	Proserv provided a solution to integrate both Typhoon and Boris fields into the existing Phoenix field already controlled by Proserv. Proserv replaced the OEM canister with Proserv A2G SEMs in each ModPod SCM and the Topside expansion unit to hold communications and power units to integrate with existing Proserv control system. The first upgraded SCM install used coexist technology with the OEM subsea power as source. Further SCMs will use the Proserv EPU's to provide subsea power.
Scope of Supply	Topside Expansion MCS within the existing MCS PLC rack with EPU and TPCUs for the system. 6 retrofit SCMs A2G SEMs complete with new running tools and test stand
Conclusion	Successful coexist testing and integration of the A2G SEM into the OEM SCM has enabled long term support for this project and later expansion.



Project	CNR Ninian
Client	CNR
Completion Date	2017
Water Depth	132m
Step out Distance	0.5km
No. of SCMs	2
System	Artemis 1G
Intervention Method	Diver
Xmas Tree Supplier	N/A
Control Method	Multiplexed Electro-Hydraulic
Location	UK North Sea
Background	The Ninian Central Platform (NCP) is located in the Central North Sea approximately 240 miles North East of Aberdeen and has been on-stream since 1982. The Oil and Gas pipelines are protected by Subsea Emergency Safety Valves (SSESVs) which are controlled by a GEC Avionics control system (built by Brisco Engineering now part of Proserv), supplied in 1990. The system was at the end of its 25 year design life and was no longer supported.
Solution	Proserv replaced the previous two GEC SCMs with a single field proven Artemis SCM with internal dual redundant SEMs; thus minimising system complexity.
Scope of Supply	Replacement MCS, EPU, Umbilical and Subsea Control Module with flying leads for SSIV control
Conclusion	Working closely throughout the project life-cycle with the client CNR International has ensured requirements and expectations are clearly understood and managed.



Project	Apache Callater
Client	Apache North Sea
Completion Date	2017
Water Depth	Shallow North Sea
Step out Distance	12.5 km
No. of SCMs	2
System	Artemis 1G
Intervention Method	Diver
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	Greenfield extension to the Beryl Alpha platform using new MCS and HPU topside. Central field Manifold controls including SCM. Initially 1 Tree SCM and controls set with extension for 7 others
Comments	Design of new SCMs based on the Bacchus, Aviat and FNT projects and interchangeable throughout using backward supported A1G technology



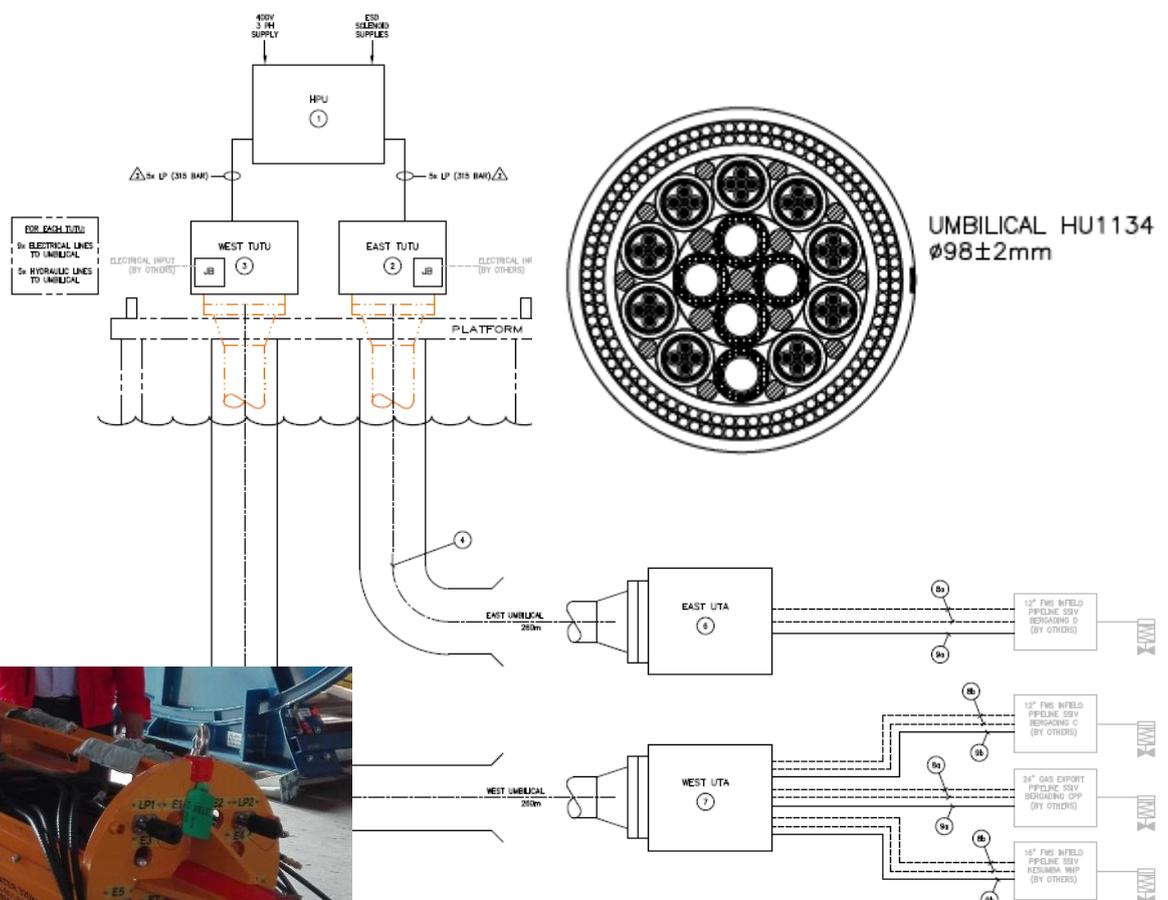
Project	BP Shah Deniz
Client	BP Exploration
Completion Date	2017
Water Depth	600m
Step out Distance	N/A
No. of SCMs	N/A
System	Direct Instrumented
Intervention Method	ROV
Xmas Tree Supplier	N/A
Control Method	Direct Instrumented
Location	Azerbaijan
Scope of Supply	Hydrate Remediation System used to tie in either side of a recognised hydrate formation managed the pressure drop either side and inject chemicals. Scope include manifold and mudmat with choke, isolation valves, injection valves, and instrumented pressure / temperature including surface monitoring system
Comments	System is mobile in nature using workover umbilical for surface monitoring and ROV operator manifold valves



Project	Statoil Visund (ACT)
Client	Statoil
Completion Date	2016
Water Depth	335m
Step out Distance	900m
No. of SCMs	1 refurbishment ACT SCM
System	Replacement A2G SEM
Intervention Method	ROV
Xmas Tree Supplier	Aker
Control Method	Electro-Hydraulic
Location	Norwegian North Sea
Background	Statoil had a requirement to refurbish older Aker 4G SCM modules that had obsolescence and fault issues, particularly with the internal electronics (SEM) The OEM was unable to support the system or provide spare parts
Solution	Provide an Augmented Control Technology (ACT) system with new electronics and existing external hardware
Scope of Supply	Refurbish the used Aker 4G SCM module by installing a Proserv A2G SEM with redundant power and communication Reuse all hydraulic parts and sensors, replace only where necessary. Interface to topside Siemens DCS by legacy MODBUS map
Conclusion	Proserv provided a cost effective solution in 6 weeks using A2G technology and pre-purchased SEM. This gave high bandwidth and open topside interface with redundant power supply and communication and greater instrumented inputs that was not available from the OEM



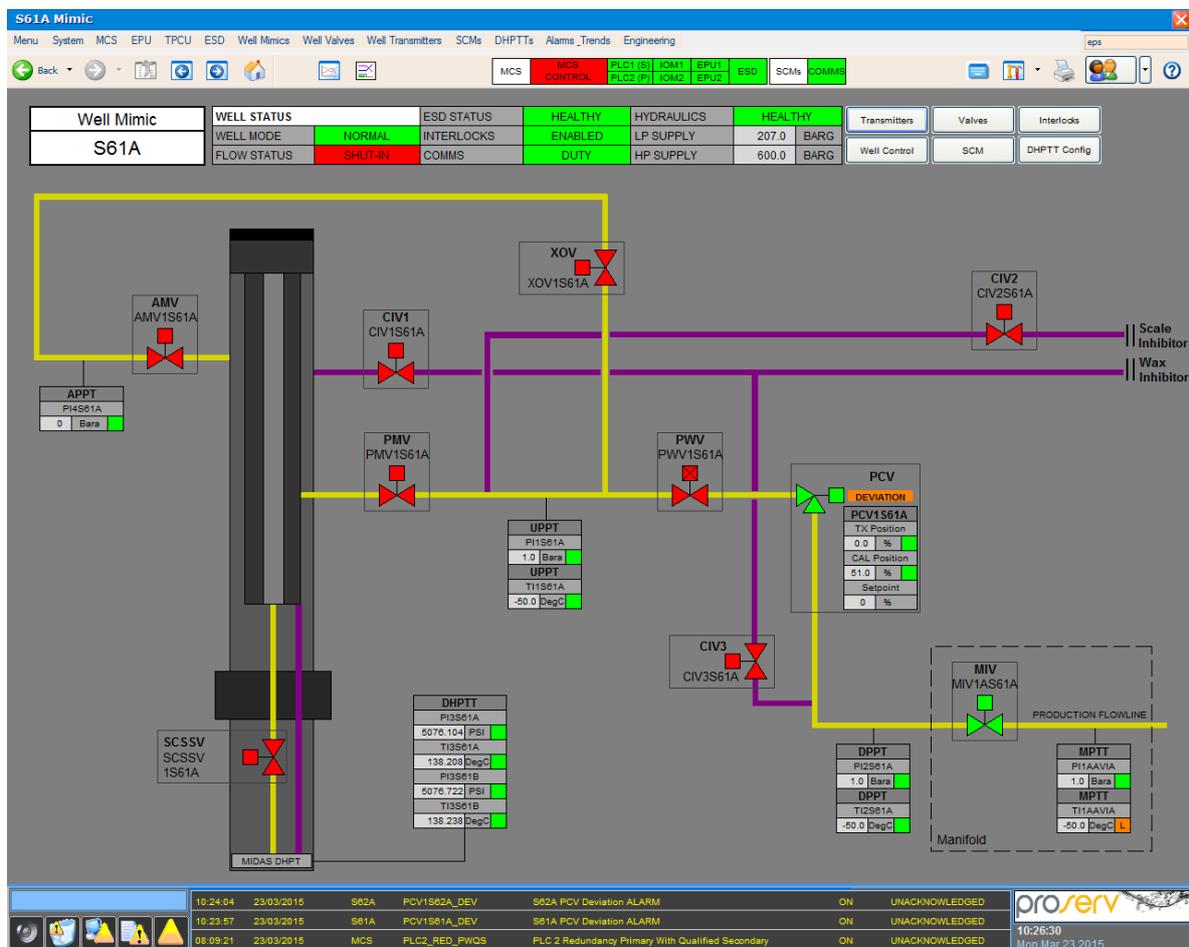
Project	Hess Bergading Development
Client	Hess Malaysia
Completion Date	2016
Water Depth	
Step out Distance	250m
No. of SCMs	N/A
System	Direct Instrumented
Intervention Method	Diver Only
Xmas Tree Supplier	N/A
Control Method	Direct Hydraulic
Location	Malaysia
Scope of Supply	SSIV control system for infield and gas export pipelines. Surface HPU and control panel with monitoring provision, surface umbilical termination, subsea umbilical and termination, and flying leads to SSIVs
Comments	UK design and fabrication with final assembly, termination and testing completed in Proserv site in Malaysia



Project	EnQuest Scolty Crathes
Client	EnQuest
Completion Date	2016
Water Depth	105m
Step out Distance	25km
No. of SCMs	2
System	Artemis 1G
Intervention Method	Diver
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	2 well subsea control system in two drill centres; Crathes at 18km and Scolty at a further 7km. Each controlled using tree mounted SCM and manifold mounted distribution system. Surface HPU, MCs and TUTU included on Kittiwake platform
Comments	Proserv initially reviewed the specification and agreed changes to rationalise the control system to reduce cost and schedule impact Proserv responsibility for interface management between client, and other 3 rd party contractors as well as controls. Proserv Interface Engineer specifically allocated for this project



Project	Apache Far North Triassic
Client	Apache North Sea
Completion Date	Q1 2016
Water Depth	110m
Step out Distance	4.7
No. of SCMs	2
System	Artemis 1G
Intervention Method	Diver
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	MCS, HPU, TUTU, Jumpers
Comments	Utilises the SCM and XMT from the Bacchus project with new surface equipment mounted on the Beryl Bravo platform



Project	EnQuest Ythan
Client	EnQuest
Completion Date	2015
Water Depth	170m
Step out Distance	17km
No. of SCMs	1
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	Distribution system designed to be diver handled under the protective structure of the XMT. Distribution provided to 3 wells from single XMT
Comments	Don System Extension



Project	Hess Stampede Development
Client	Hess
Completion Date	Currently In Manufacture
Water Depth	3700 ft
Step out Distance	24km
No. of SCMs	13
System	Artemis 2G
Intervention Method	ROV
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	GOM
Scope of Supply	Subsea Control System for the development of 12 subsea wells
Comments	SCM on-board accumulation design negates the requirement for separate tree mounted SAM



Project	Apache Aviat Development
Client	Apache
Completion Date	2015
Water Depth	
Step out Distance	24km
No. of SCMs	3
System	Artemis 1G
Intervention Method	Diver with active mounting base
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	Subsea Control System for 2 trees based on the Aviat field 24k from the Forties Alpha platform
Comments	The SCM design is identical and interchangeable with the Apache Bacchus SCM



Project	Petrobras Drill Pipe Riser (DPR)
Client	Weatherford
Completion Date	2015
Water Depth	2500m
Step out Distance	-
No. of SCMs	10
System	Artemis 2G
Intervention Method	ROV
Xmas Tree Supplier	Multiple
Control Method	Multiplexed Electro-Hydraulic
Location	South America
Scope of Supply	Deep Water IWOCS system designed for operation on multiple Mobile Drilling Units and service in country Brazil. Scope includes Zone 1 Hazardous Area control room , separate HPU and subsea DPR frame with on board accumulation
Comments	40 function SCM with dual A2G SEM. Subsea scope based on EPR supply from 2 years early with improvements to topside control cabin and HPU.



Project	Nobel Gunflint Development
Client	Nobel Energy
Completion Date	2015
Water Depth	1,860 m
Step out Distance	38 km
No. of SCMs	3
System	Artemis 2G
Intervention Method	ROV
Xmas Tree Supplier	
Control Method	Multiplexed Electro-Hydraulic
Location	Gulf of Mexico
Scope of Supply	Surface MCS with remote station, HPU and TUTA. Subsea UTA and Distribution including Mudmat. Dual SEM SCM with Fibre Optic communications to OCH
Comments	Uses dual A2G SEMs with SIIS L2 instrumentation and fibre optic communications to dual OCH



Project	Talos Phoenix Development
Client	Talos
Completion Date	2015
Water Depth	650 m
Step out Distance	4.7 km
No. of SCMs	4
System	Artemis
Intervention Method	ROV
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Gulf of Mexico
Scope of Supply	MCS with remote operating terminal, HPU, TUTA. Subsea UTA with dual SEM SCM mounted on UTA
Comments	Fast reaction project from limited specification requirements. Client relies heavily on Proserv expertise to specify and design subsea control system



Project	CNR Toni Development
Client	CNR
Completion Date	2015
Water Depth	
Step out Distance	11 km
No. of SCMs	2
System	Artemis
Intervention Method	ROV
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	New MCS and OCH to co-exist with current system used on Toni. Include two new well control SCMs
Comments	Upgrade the existing CNR Cameron supplied control system on the Toni Field. Key requirement included the incorporation of in-well instrumentation using an Open Communications Hub (OCH) and 2 additional Subsea Control Modules (SCMs). The existing topology utilised separate communications and power.



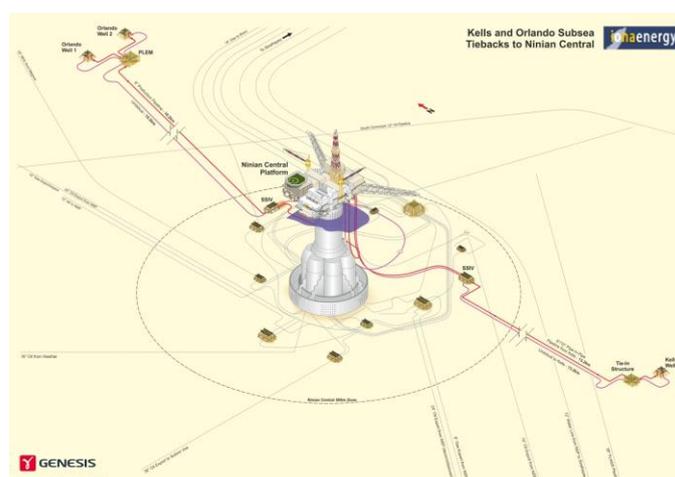
Project	Taqa Cladhan Development
Client	TAQA
Completion Date	2015
Water Depth	160 m
Step out Distance	16.5 km
No. of SCMs	4
System	Artemis
Intervention Method	ROV
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Surface MCS, HPU and TUTU with SSIV control in HPU. Subsea Distribution with 2 sets of Production Tree equipment and 1 Water Injection Tree equipment including SCM, SCMMB, Pressure and Temperature Tx and GLFM
Comments	SCMMB includes mounting for the Tree Pressure Transmitters to allow ease of access for diver replacement if necessary



Project	Talisman Montrose Cayley and Shaw
Client	Talisman
Completion Date	2015
Water Depth	95 m
Step out Distance	10 & 17.5 km
No. of SCMs	7 plus 5 OCH
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	MCS, HPU, 3 SSIV Panels, 3 TUTUs. Each drill centre includes SDU, OCH, Manifold mounted SCMs, pressure, temperature transmitters, GLFM, WIFM
Comments	Fibre Optic communications system. Open Communications Hub on each manifold enabling high speed communications to manifold mounted MPFM and SCMs



Project	Iona Orlando Field Development
Client	Iona Energy
Completion Date	On hold
Water Depth	142 m
Step out Distance	11 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	GE
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Surface MCS and HPU shared with Kells project, Subsea Manifold mounted SCMs and SCMMB
Comments	SCM designed to be compatible with the Kells project which includes functionality to monitor and control Xmas Trees from three different manufacturers
<hr/>	
Project	Iona Kells Field Development
Client	Iona Energy
Completion Date	On hold
Water Depth	135 m
Step out Distance	14 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	Cameron and FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Surface MCS, HPU and TUTA, Subsea Manifold mounted SCMs and SCMMB
Comments	System is designed to operate two different subsea tree designs from separate manufacturers. The SCM includes functionality to operate both trees and instrumentation which differs on each.



Project	Ithaca Anglia ACT
Client	Ithaca
Completion Date	2015
Water Depth	50m
Step out Distance	5km
No. of SCMs	2
System	A1G ACT
Intervention Method	Diver
Xmas Tree Supplier	GE
Control Method	Electro-Hydraulic
Location	North Sea
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 Supply	A study was undertaken to consider the implications of SEM replacement within each SCM, including the use of existing inductive couplers that 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
Conclusion	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



Project	Maersk Flyndre and Cawdor Field Development
Client	Maersk Oil and Gas
Completion Date	2015
Water Depth	70 m
Step out Distance	25.1 km
No. of SCMs	3
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Surface MCS, HPU and TUTA, Subsea Manifold mounted SCMs and SCMMB
Comments	Each SCM includes an electrically latched fail closed valve on the LP header to vent Tree valve controls in the event of an ESD, improving the closure time against an hydraulic ESD equivalent



Project	Anadarko Lucius
Client	Anadarko
Completion Date	Delivered May 2013
Water Depth	7000ft
Step out Distance	65000ft?
No. of OCHs	2 SMIM's 1 x Compact SMIM
System	OCH (Open Communication HUB)
Intervention Method	ROV
Xmas Tree Supplier	Aker
Control Method	Fiber Optic and Powerline Communications
Location	GOM
Scope of Supply	Topside Control Cabinet and Communications Server 2 x 6 output Subsea Meter Interface Modules - SMIM 1 x 2 output Subsea Meter Interface Modules - cSMIM
Comments	This Project required 2 retrievable high bandwidth and high power subsea modules using FO communications. Each controlled up to 6 MPM multiphase flow-meters at each drill centre. Additionally a further step-out requiring 1 smaller compact module controlling up to 2 MPM meters was provided using Proserv power-line technology.



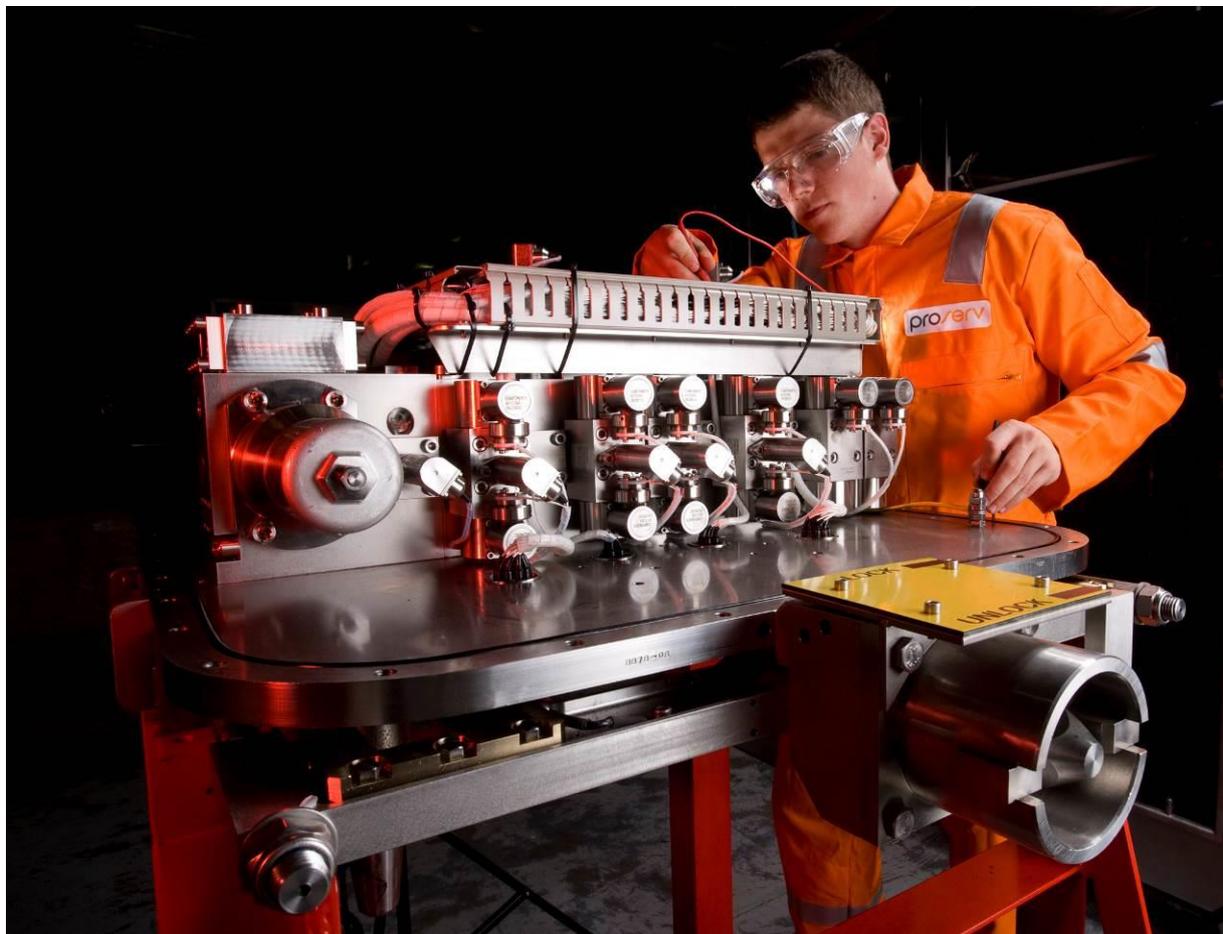
Project	Hess Tubular Bells
Client	Hess Corporation
Completion Date	2014
Water Depth	1370 m
Step out Distance	13 km
No. of SCMs	6
System	Artemis
Intervention Method	ROV Lift Line Installation
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Gulf Of Mexico
Scope of Supply	Surface MCS, HPU and TUTA, Subsea Tree mounted SCMs and SCMMB with ROV recoverable SAM and Tree Transmitters in scope
Comments	5 HP 15Ksi functions with 5Ksi LP functions taking the full system to 26 Functions. Dual SEM SCM with each SEM supporting serial external transmitters and dual DHG cards (4 cards in each SCM)



Project	Premier Dua Field Development
Client	Premier Oil Vietnam Offshore (POVO)
Completion Date	Delivered 2013
Water Depth	93 m
Step out Distance	17 km
No. of SCMs	4
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	GE Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Vietnam (Nam Con Son Basin)
Scope of Supply	Surface MCS, HPU and TUTA, Subsea Manifold mounted SCMs and SCMMB with CMV on each SCMMB
Comments	Subsea Control System is mounted on manifold SDU sub structure. Each SCMMB includes chemical isolation valves and metering valve. Common manifold functions control and monitored from any one of 4 SCMs



Project	Perenco Well 53/02A-14A Tie Back
Client	Perenco
Completion Date	Delivered 2013
Water Depth	
Step out Distance	9 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver
Xmas Tree Supplier	GE Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern North Sea
Scope of Supply	1 Well Subsea Control System
Comments	System manufactured utilising some equipment which had been mothballed and stored following cancellation of the Bure North project in 2009



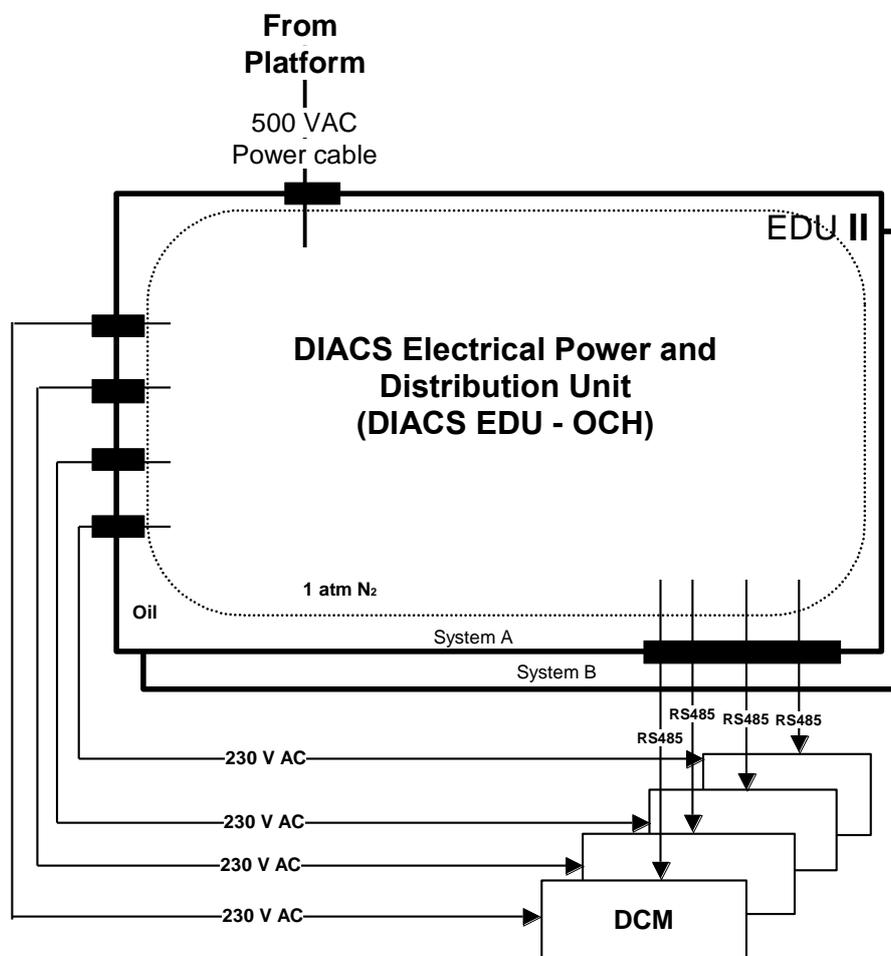
Project	Petrobras Early Production Riser (EPR)
Client	Weatherford
Completion Date	Delivered 2013
Water Depth	2500m
Step out Distance	-
No. of SCMs	1
System	Artemis
Intervention Method	ROV
Xmas Tree Supplier	Cameron plus others later in project
Control Method	Multiplexed Electro-Hydraulic
Location	South America
Scope of Supply	EPR Control System for WOCS in 2500m water. 40 EH functions using three pressure levels. Topside control cabin with HPU and LER
Comments	Dual SEM, in-SCM flow meters, twin lockdown drive, deep water operation accumulation on separate pressure systems



Project	Shell Princess
Client	Shell
Completion Date	Delivered 2012
Water Depth	1100 m
Step out Distance	5 km
No. of OCH's	1
System	OCC communication on power line co-exist with FMC KOS 150
Intervention Method	ROV Installation
Xmas Tree Supplier	FMC Kongsberg Subsea
Control Method	Multiplexed Electro-Hydraulic
Location	GoM
Scope of Supply	Provide communication from topside system to the subsea via power line communication co-exist with FMC KOS 150 modems. Provide topside AC Power Control for the system. Transform AC high-voltage to DC and provide power management subsea to all instruments. Integrate ATS and DTS on 1 downhole fiber
Comments	Achieved bandwidth approx. 320kb/sec



Project	Statoil Snorre B
Client	Statoil
Completion Date	Delivered 2012
Water Depth	335m
Step out Distance	1 km
No. of EDU's	6
System	Proserv Powerline communication technology (OCC) canisters integrated in Vetco GE POD to establish electrical power and communication infrastructure to Downhole Control Modules
Intervention Method	ROV Installation
Xmas Tree Supplier	GE Oil and Gas
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea – Norwegian sector
Scope of Supply	Spare parts
Comments	The initial system was delivered to Snorre B in year 2000 including 27 smart well (DIACS).



Project	CNR Lyell
Client	Framo Engineering / CNR
Completion Date	Delivered 2012
Water Depth	200 m
Step out Distance	8.5 km
No. of OCH's	1
System	OCC communication on power line
Intervention Method	Diver Installation
Booster Pump Supplier	Framo Engineering
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea – British sector
Scope of Supply	Open Communication HUB for 1 Subsea Multiplexer system with Power Line modem Communication, for interfacing of process transmitters and control of direct control valves on the Lyell Subsea Multiphase Booster Pump. Non-redundant system, topside TPCU rack.
Comments	OCH – version with 1 input power and communication and 2 output/inputs with interfaces to the booster pump.



Project	EnQuest Knightsbridge Ardmore
Client	EnQuest
Completion Date	Currently In Commissioning
Water Depth	90 m
Step out Distance	4 km
No. of SCMs	10
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	9 well control system over two umbilicals from the Usi Gorm FPSO
Comments	The subsea control system is designed for control and monitoring on the manifold and Production Xmas Trees using tree mounted SCMs



Project	Valiant Causeway
Client	Valiant Petroleum
Completion Date	Installed 2012
Water Depth	150 m
Step out Distance	16 km
No. of SCMs	3
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	3 well control system over two umbilicals from the Cormorant Platform
Comments	Production wells include ESP in well. Both umbilicals are installed with 3.5kV power cables in with the controls cables. Communications is copper rather than fibre based with signals having to work with the noise generated by the ESP power cables



Project	Statoil Heidrun
Client	Statoil
Completion Date	October 2011
Water Depth	360 m
Step out Distance	6.2 km
No. of OCH's	1
No. of SeaHawk's	2
System	Open Communication Hub (OCH) with SeaHawk subsea video camera's connected on the subsea template
Intervention Method	ROV Installation
Xmas Tree Supplier	FMC Kongsberg Subsea
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea – Norwegian sector
Scope of Supply	Provide communication from topside system to the subsea via broadband DSL communication to an OCH. The OCH has 4 open power and communication outputs with DSL and Ethernet communication, 240 VAC and 24 VDC power. Delivery of 2 subsea cameras for observation of possible leakage on template. Special monitoring leak during gas lift operation.
Comments	Achieved bandwidth approx. upto 10 Mb/sec



Project	Ithaca Athena
Client	Ithaca Energy UK Ltd
Completion Date	2011
Water Depth	132 m
Step out Distance	2 km
No. of SCMs	6
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Up to 8 well subsea control system with 5 wells developed in the first phase.
Comments	Manifold includes a multiphase flowmeter tied back through the SCS. Compact FPSO turret requires bespoke topside equipment designs



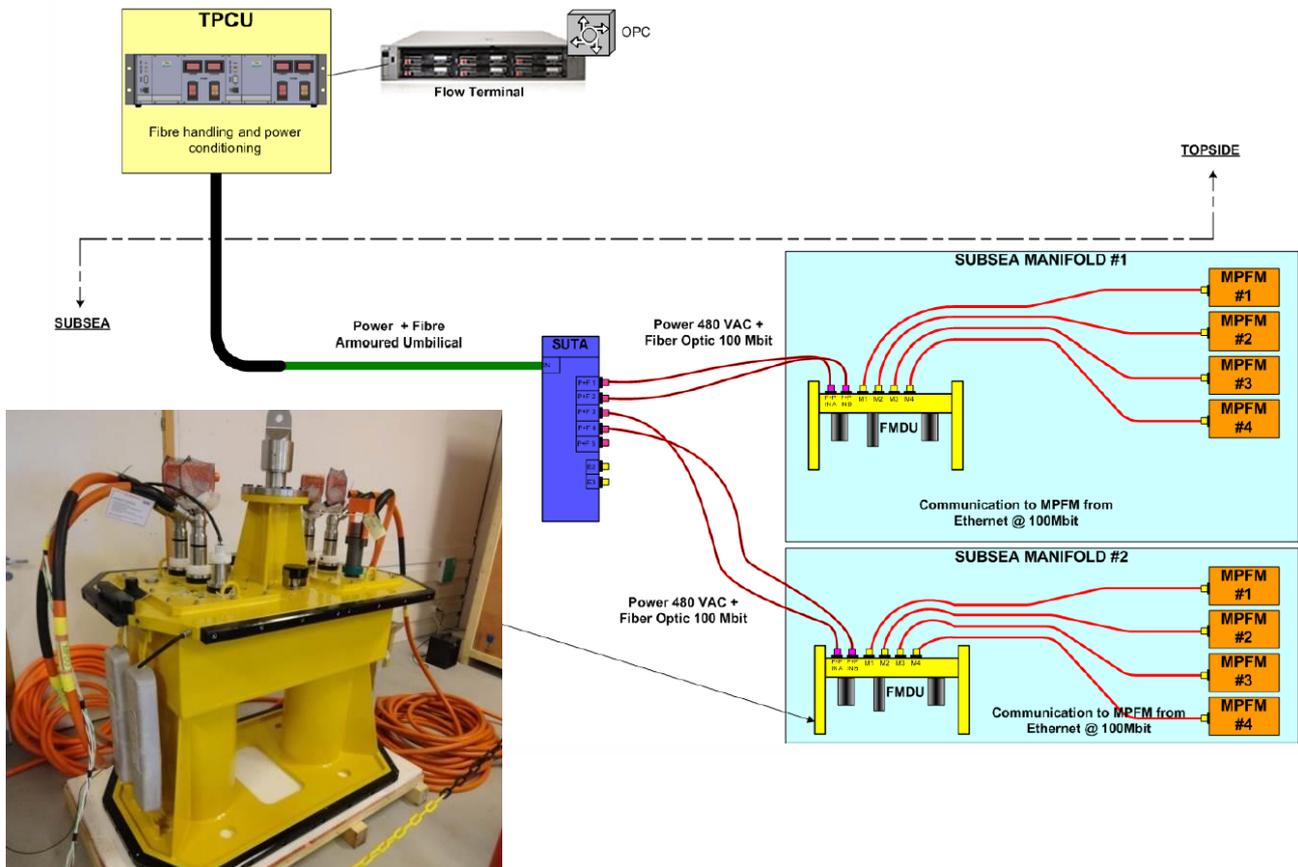
Project	Statoil Åsgard
Client	Statoil
Completion Date	2011
Water Depth	280 m
Step out Distance	Installed on several templates (5-20 km)
No. of SeaHawk's	1
System	SeaHawk subsea video camera connected on the subsea template
Intervention Method	ROV Installation
Xmas Tree Supplier	FMC Kongsberg Subsea
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea – Norwegian sector
Scope of Supply	Provide communication from topside system to the subsea via broadband DSL communication direct to a SeaHawk subsea camera unit for observation of possible leakage on template.
Comments	Achieved bandwidth approx. up to 15 Mb/sec



Umbilical
 Quad with 4 pins connector
 Including DSL + Power



Project	Chevron Jack & St. Malo
Client	MPM / Cameron / Chevron
Completion Date	2011
Water Depth	3050 m
Step out Distance	27 km
No. of OCH's	4
System	Open Communication Hub (OCH) with fiber optic and power line communication
Intervention Method	ROV Installation
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	GoM
Scope of Supply	4 off Subsea Meter Interface module (SMIM) for connection to 4 MPFM Flowmeters. 4 topside cabinets for power and communication to up to 40 MPM flowmeters. TCS – redundant Topside Controller Station for storage and data handoff to PAS.
Comments	Comm. interface – MPFM: Ethernet (Modbus over TCP/IP) Typical comm. Speed on 27 km umbilical: 100 Mbps (fiber) or 40 kbps – modulated on power-line



Project	BG Gaupe
Client	BG Group
Completion Date	2011
Water Depth	100 m
Step out Distance	8 km
No. of SCMs	2
System	Artemis
Intervention Method	ROV Installation
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	2 wells in Norwegian waters tied back to a UK platform with subsea distribution and manifolding at it's base.
Comments	Wells include NORSOK standard designs with smart in hole multi-zone completions operated from the well SCM



Project	GDF Juliet
Client	GDF Suez
Completion Date	2011
Water Depth	60 m
Step out Distance	28 km
No. of SCMs	4
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Dril-Quip
Control Method	Multiplexed Electro-Hydraulic
Location	Southern North Sea
Scope of Supply	2 well subsea control system plus manifold SCM
Comments	Tie back to unmanned platform and utilising an existing HPU/control room facility with minimal space for MCS



Project	Apache Bacchus
Client	Apache North Sea Limited
Completion Date	2011
Water Depth	100 m
Step out Distance	8 km using pipeline bundle
No. of SCMs	5
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	4 well subsea control system plus manifold SCM in a pipeline bundle step out.
Comments	Fast track project with caisson riser and pipeline bundle connection system



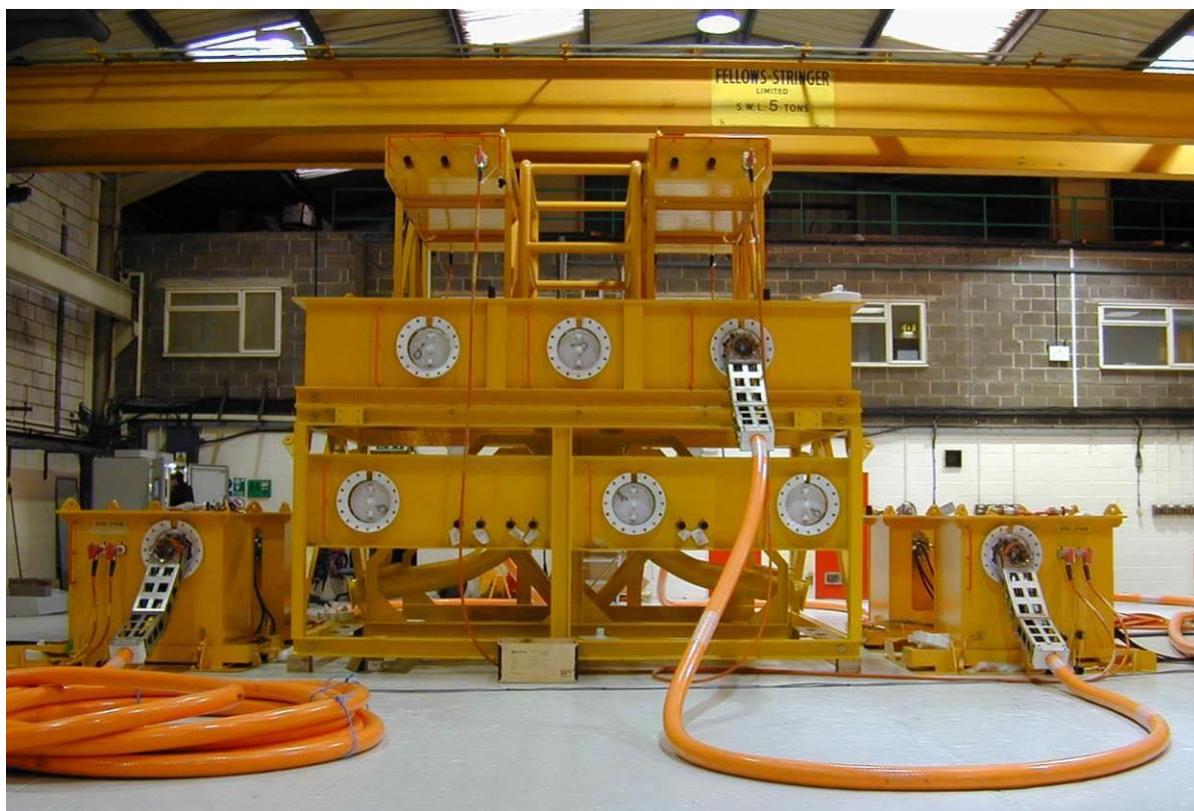
Project	EnQuest Don Fields Chemical Metering Project
Client	Enquest
Completion Date	Nov 2010
Water Depth	170 m
Step out Distance	17 km
No. of SCMs	N/A - 2 data modules used
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	N/A
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	2 manifolds retrofitted with Skoflo chemical metering valves controlled from existing subsea control system
Comments	Each manifold has a replacement roof section manufactured with subsea data module, controls valves and all cabling and tubing for installation



Project	Anadarko Caesar Tonga
Client	Anadarko
Location	Gulf of Mexico
Completion date	2010
Water depth	1500 m
Step out distance	25 km
Topside voltage	~700 VAC
Subsea voltage range	250 – 500 VAC
No of subsea modules	2
System	OCH (Open Communication HUB)
Scope of supply	2 subsea modules for up to 8 flowmeters 1 topside cabinet for data handoff and storage Test equipment
System description	Power and fiber-optic communication system for 4 Framo multiphase flowmeters. Topside data handoff with MODBUS interface. Fully redundant system with power management and internal diagnostics.



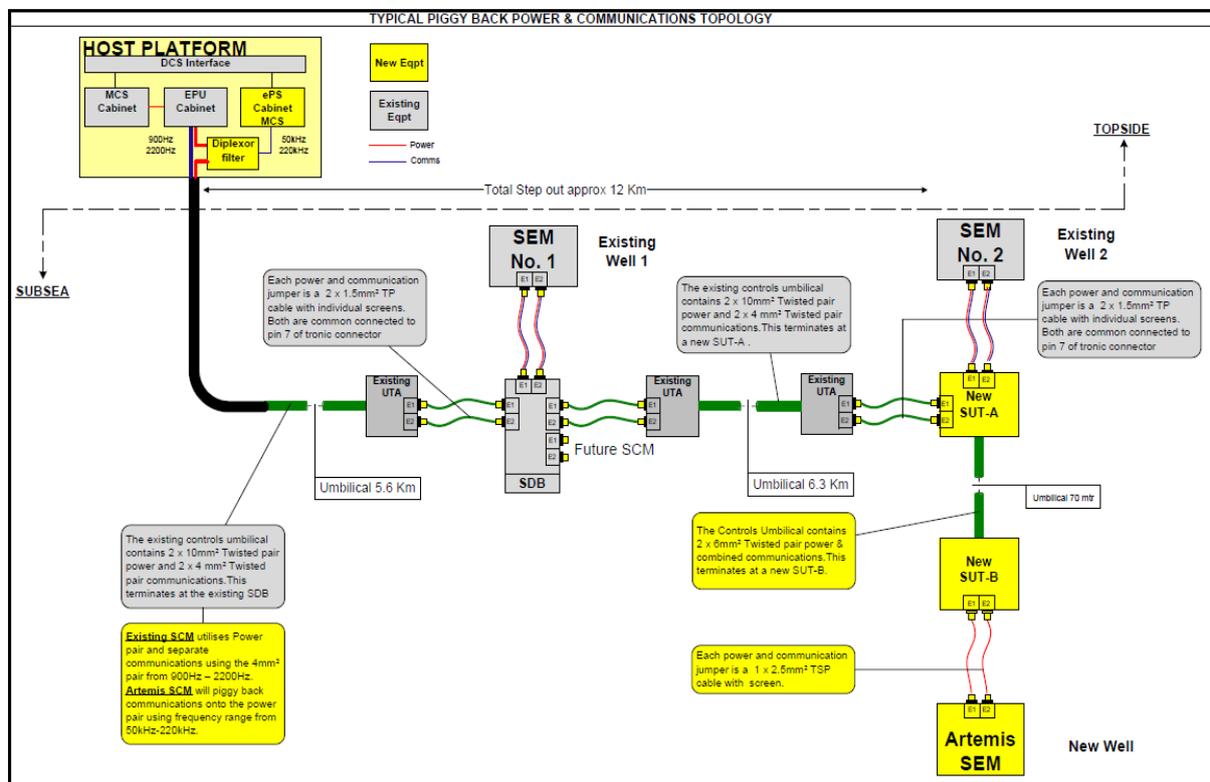
Project	KEI Terang Batur Sirasun
Client	Kangean Energy Indonesia
Completion Date	2010
Water Depth	250 m
Step out Distance	32.5 km to Sirasun East
No. of SCMs	6 in Phase 1
System	Artemis
Intervention Method	ROV Installation
Xmas Tree Supplier	DrilQuip
Control Method	Multiplexed Electro-Hydraulic
Location	Indonesia
Scope of Supply	Two phase project with Terang manifold installed in the first phase of 5 wells and the extension to Batur and Sirasun included in the second phase of another 4 wells
Comments	Wet Gas flow metering included within scope of supply. Site Integration Testing and local storage provided by Proserv in region and in country.



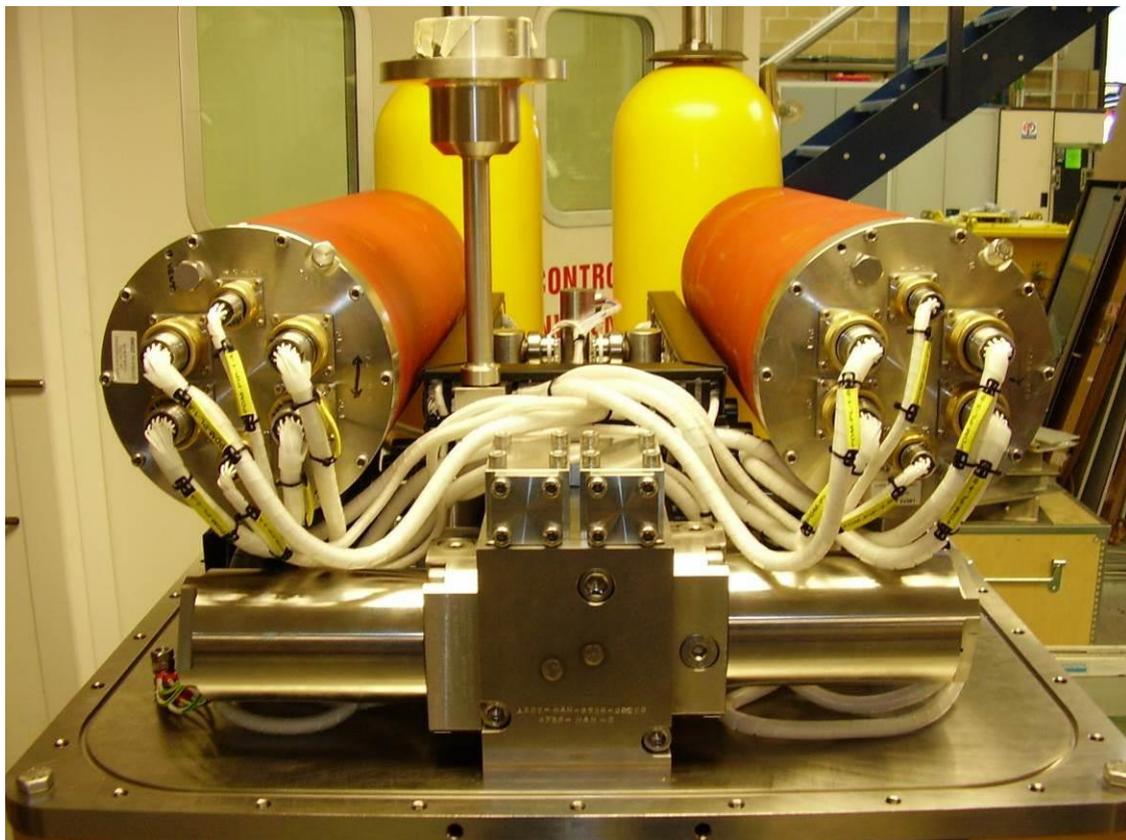
Project	ATP Telemark
Client	Bluewater Industries
Completion Date	2009
Water Depth	1400 m
Step out Distance	30 km
No. of SCMs	1
System	Artemis
Intervention Method	ROV Installation
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Gulf Of Mexico
Scope of Supply	Single well subsea control system. Proserv stock SCM and Mounting Base modification to suit project requirements allowing a fast track delivery.
Comments	ROV Deep Water Installation with 15,000 psi HP requirement and Smart Well hydraulics. HPU and TUTA manufactured in Proserv Kingwood Houston Office with subsea manufacturing completed in Great Yarmouth.



Project	Perenco Bure North
Client	Perenco
Completion Date	Project Cancelled 2009
Water Depth	
Step out Distance	12 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Upgrade EPU and SCM with SUTU and jumpers
Comments	SCM to communicate on existing umbilical already utilised for Aker solutions control system. Testing completed but project cancelled due to dry well before installation



Project	Centrica Seven Seas Wells Development
Client	Centrica
Completion Date	2009
Water Depth	30m
Step out Distance	14.2 km
No. of SCMs	3
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Subsea Multiplexed Electro-Hydraulic Control System with 3 SCMs including replacement for current BP Newsham system
Comments	SCMs have Dual SEMs to avoid single point failure



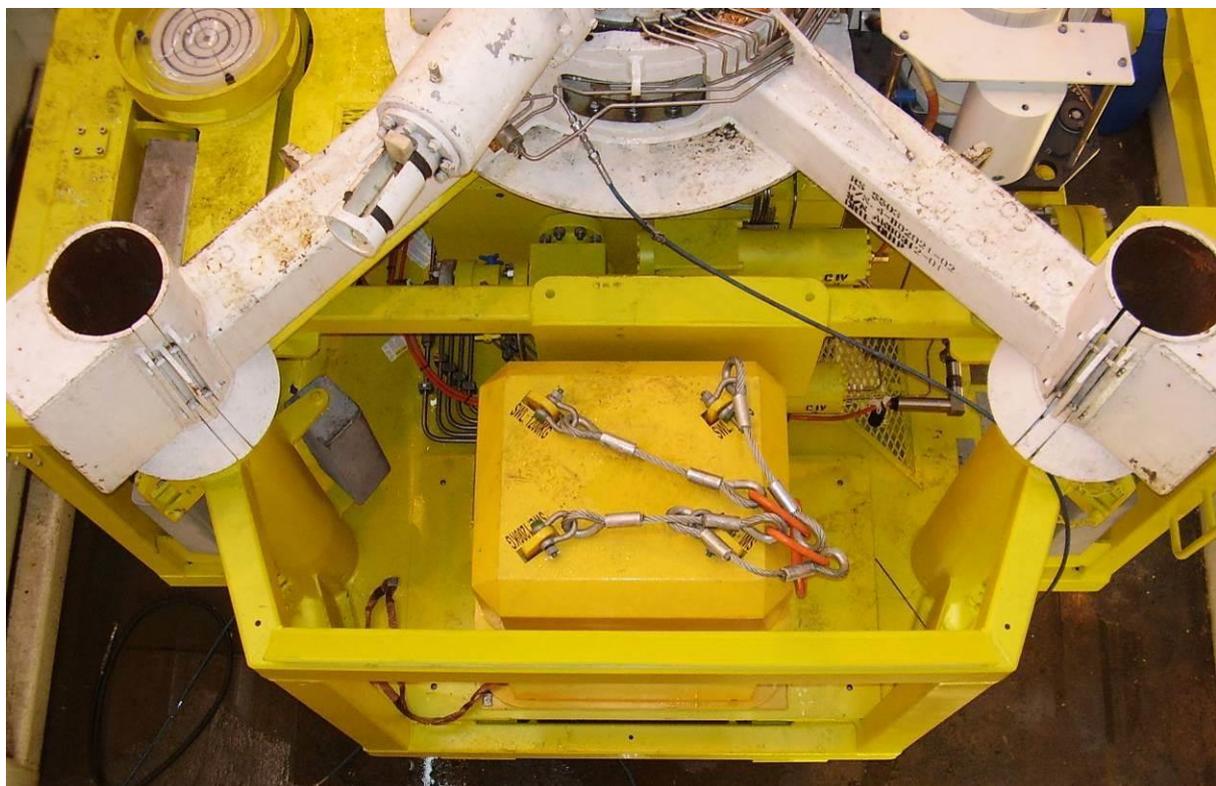
Project	Talisman Auk North Field Development
Client	Talisman
Completion Date	2009
Water Depth	150m
Step out Distance	11 km
No. of SCMs	4
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Scope of Supply	Subsea Multiplexed Electro-Hydraulic Control System with 4 SCMs, HPU, MCS, EDU and Subsea Distribution
Comments	Controls Umbilical installed within same trench Power Cable for 3 off ESPs. Communications systems operates using copper modems and digitally filters specific noise frequencies from HV cable proximity .



Project	RWE Topaz Well Development
Client	RWE
Completion Date	2008
Water Depth	40 m
Step out Distance	19 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Dril-Quip
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Single well SCM control system XT set c/w subsea XT transmitters.
Comments	SCM supplied from stock for SIT in order to meet fast track delivery required for XT installation.



Project	Bridge Resources Durango Well Development
Client	Technip
Completion Date	2008
Water Depth	11 m
Step out Distance	14 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver Installation
Xmas Tree Supplier	Dril-Quip
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Single well SCM control system c/w topside HPU, MCS and subsea XT transmitters.
Comments	SCM installed onto existing design XT requiring special design slim-line SCM to meet restricted space requirement. XT transmitters and tree mounted SCMMB delivered within 9 weeks to meet schedule.



Project	Petrofac Don Field Development
Client	Petrofac
Completion Date	Installed 2008
Water Depth	170 m
Step out Distance	17 km
No. of SCMs	12
System	Artemis
Intervention Method	Diver Installation and Intervention with SCM base stab connectors
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central Sector North Sea
Scope of Supply	6 Slot Subsea Distribution within over-trawl protective structure. Surface control system on Northern Producer FPF. SCMs located on FMC trees.
Comments	Subsea interface into water-cut meters Separate Signal and Power Subsea Chemical Metering Valves



Project	Tullow Wissey
Client	Tullow
Completion Date	Installed 2009
Water Depth	40 m
Step out Distance	11 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver Installation and Intervention with SCM base stab connectors
Xmas Tree Supplier	Dril-Quip
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Tie into the Horn and Wren platform for a single well control system.
Comments	Subsea Hydraulic Intensifiers used to generate HP fluid in SAM. Closed loop hydraulic fluid control system Combined safe area HPU and MCS for use on an unmanned platform with limited access and power.



Project	Granby / Mosaic Tristan NW
Client	Bluewater Industries
Completion Date	2007
Water Depth	40 m
Step out Distance	15.1 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	Extension to Perenco Davy system with Subsea SUT, Jumpers and SCM
Comments	Although North Sea application, client based in Houston



Project	CNR Lyell Multiphase Flowmeter Multiplexer
Client	CNR
Completion Date	2007
Water Depth	150 m
Step out Distance	8.5 km
No. of SDMs	1
System	Artemis
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Data Module Only
Location	North Sea
Scope of Supply	Surface Control Unit and Subsea Data Module for MPFM and Analogues
Comments	Multiplexing required for Multiphase Flowmeter data and associated analogues



Project	Maersk Dumbarton SSIV Multiplexer
Client	Maersk
Completion Date	2007
Water Depth	150 m
Step out Distance	200 m
No. of SDMs	1
System	Artemis
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Data Module Only
Location	Central North Sea
Scope of Supply	Surface Control Unit and Subsea Data Module
Comments	Subsea Data only required for monitoring of SSIV position and local pressure using limited existing umbilical cables.

Project	GDF Minke
Client	Gaz De France Britain
Completion Date	2006
Water Depth	45 m
Step out Distance	15 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	MCS, EPU Hydraulic and Electrical Jumpers, SCM
Comments	Controlled from a Dutch sector platform the Minke single well is actually in the UK sector.

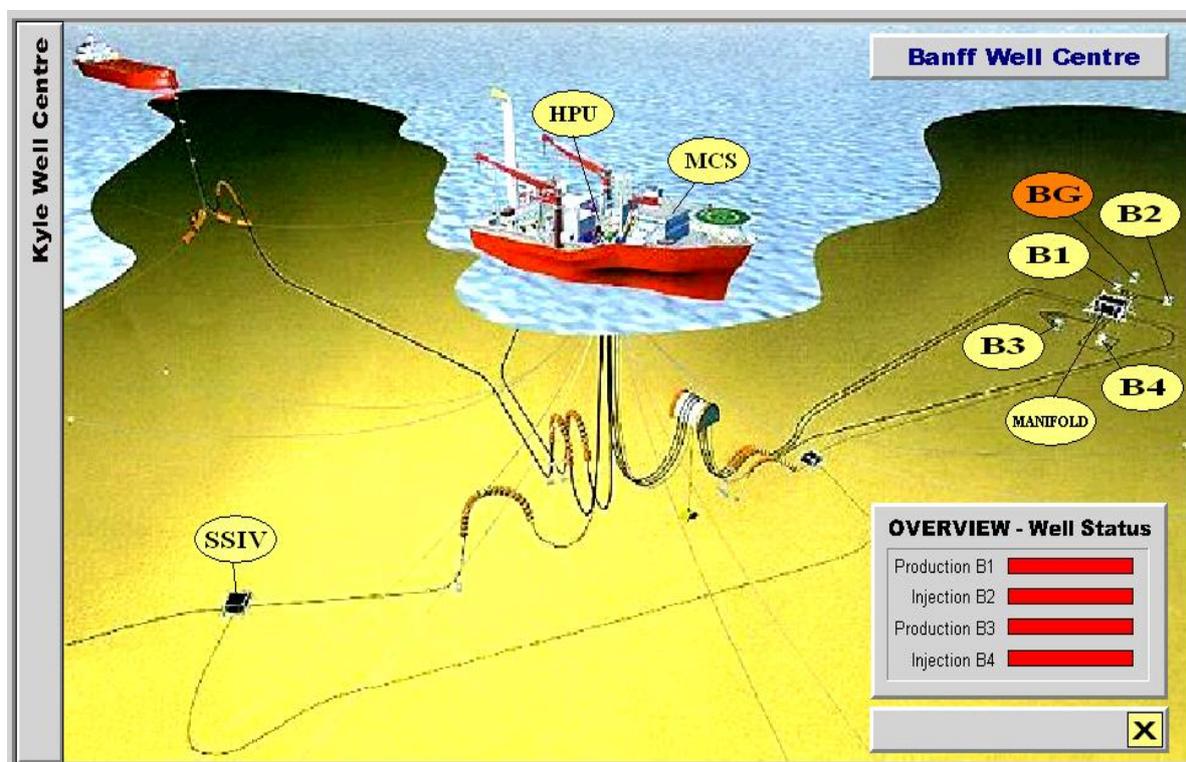
Project	Perenco Davy East
Client	Perenco
Completion Date	2006
Water Depth	50 m
Step out Distance	7 km
No. of SCMs	1
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Scope of Supply	MCS, EPU, HPU Modifications to existing system, Hydraulic and Electrical Jumpers, SCM, SDU
Comments	Local client supported directly from our Great Yarmouth office.



Project	BG Miskar
Client	BG Tunisia
Completion Date	2006
Water Depth	
Step out Distance	3 km
No. of SCMs	4
System	Artemis
Intervention Method	ROV Guide Wire Running Tool Installation and Intervention
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Mediterranean
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, SCMMB, SDU, Subsea Instrumentation
Comments	Project includes integration of Framo Multiphase Flow Meter and Roxar Down Hole Pressure and Temperature Gauge.

Project	BG Maria
Client	BG International
Completion Date	2006
Water Depth	
Step out Distance	12 km
No. of SCMs	3
System	Artemis
Intervention Method	ROV Guide Wire Running Tool Installation and Intervention
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	EPU, HPU Modifications to NW Seymour, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, SCMMB, SDU, Subsea Instrumentation
Comments	Project includes integration of Framo Multiphase Flow Meter.

Project	CNR Banff Phase II
Client	DSND later completed by PGS Operator later changed to CNR
Completion Date	1997 and then extended 2001, and 2004
Water Depth	90 metres
Step Out Distance	2-3 km
No. of SCMs	7
System	Wellcon
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Dril-Quip and FMC
Control Method	Multiplexed Electro-Hydraulic
Location	North Sea
Scope of Supply	Hydraulic Power Unit Master Control Station Electronic Power Unit Test Stands and Test Hydraulic Power Unit Subsea Electro-Hydraulic Distribution Subsea Control Modules Electro-Hydraulic Jumpers
Comments	Extensively extended the Ramform Banff system now has increased services and the addition of the Kyle control system. With 24 hydraulic functions for Production and Injection Well Control the SCMs are the most populated Wellcon SCM produced



Project	Addax Okwori
Client	Subsea 7
Completion Date	2006
Water Depth	150 m
Step out Distance	4 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	West Africa - Nigeria
Topside	MCS, EPU, HPU Modifications, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, Subsea Mud Mat and Protective Frame
Comments	Each SCM operates two production wells



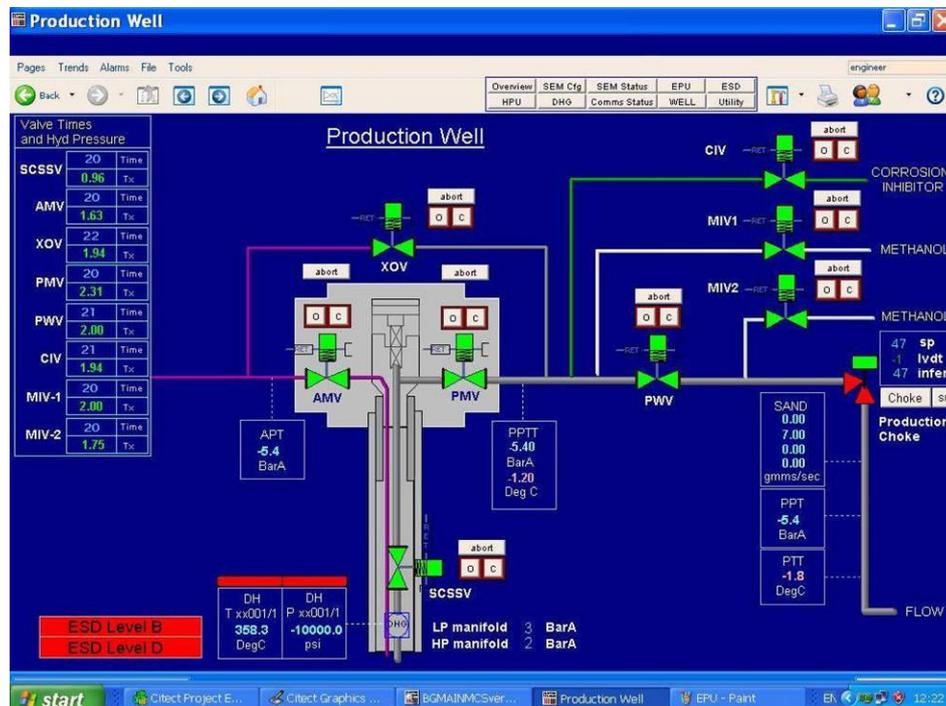
Project	Water Oil Ewing Bank
Client	Walter Oil
Completion Date	2005
Water Depth	750 m
Step out Distance	30 km
No. of SCMs	1
System	Artemis
Intervention Method	'Fly to Place' ROV Guided Installation and Intervention
Xmas Tree Supplier	Dril-Quip
Control Method	Multiplexed Electro-Hydraulic
Location	Gulf of Mexico
Topside	MCS, EPU
Subsea	SCM, SCMMB
Comments	System operates simplex hydraulics and electrical supplies



Project	BP Faragon
Client	Vetco
Completion Date	2005
Water Depth	N/A
Step out Distance	N/A
No. of SCMs	-
System	-
Intervention Method	N/A
Control Method	N/A
Location	Central North Sea
Topside	Hydraulic Power Unit
Subsea	-
Comments	Proserv supply of compact split HPU for location in limited footprint on Andrew platform



Project	BG North West Seymour
Client	BG International
Completion Date	2005
Water Depth	
Step out Distance	10 km
No. of SCMs	2
System	Artemis
Intervention Method	ROV Guide Wire Running Tool Installation and Intervention
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SUTU, SCM, SCMMB, SDU, Subsea Instrumentation
Comments	Later expanded to include Maria system and SCM modified for compatibility across systems.



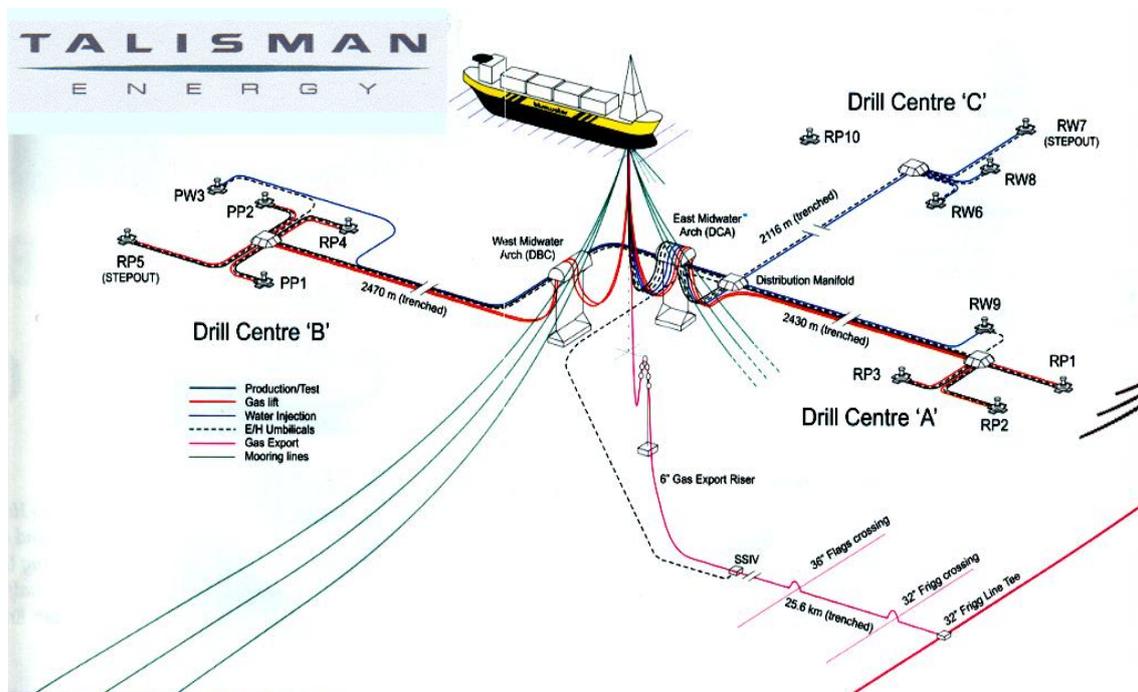
Project	DONG Stine
Client	DONG
Completion Date	2004
Water Depth	
Step out Distance	9.4 km
No. of SCMs	3
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Cameron
Control Method	Multiplexed Electro-Hydraulic
Location	Danish Sector North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SUTU, SCM, SCMMB, SDU, Subsea Instrumentation
Comments	ROV intervention on SUTU for installation of jumpers, however SCM is diver installed.



Project	Talisman Duart
Client	Talisman
Completion Date	2006
Water Depth	
Step out Distance	9 km
No. of SCMs	1
System	Wellcon
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS Hardware and Software Modifications
Subsea	Hydraulic and Electrical Jumpers, SCM
Comments	SCM kept compatible across Duart, TNT and Ross fields

Project	TALISMAN - Tartan North Terrace
Client	Talisman
Completion Date	2005
Water Depth	
Step out Distance	3.4 km
No. of SCMs	1
System	Wellcon
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU
Subsea	Hydraulic and Electrical Jumpers, SCM
Comments	SCM modified from the earlier Ross system to include a dual DHPT interface within the SEM. A software switch allows different tools to be accessed and maintains compatibility with the Ross field.

Project	Talisman Ross Field
Client	Coflexip Stena Offshore
Completion Date	1999 then extended in 2001 and 2002
Water Depth	115 metres
Step Out Distance	Up to 5 Km on four separate drill centres
No. of SCMs	13
System	Wellcon
Intervention Method	Diver
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Master Control Station, EE'p' Zone 1 rated Electronic Power Units, Hydraulic Power Unit, SCM Teststand, Test HPU Electro-Hydraulic Distribution Units, Umbilical Termination Units, Electro-Hydraulic Jumpers, 10 off Subsea Control Modules, Subsea Accumulator Modules, Subsea Instrumentation.
Comments	The Talisman Ross field remains the most complex and numerous system Proserv has produced. The system operates with four drill centres served from 3 umbilicals. One drill centre has piloted hydraulic shutdown, while another is served with electrical and hydraulic services from separate locations. Limitations on turret design required the EPU's to be installed in the Zone 1 area of the turret.



Project	Marathon Braemar East
Client	Marathon Oil
Completion Date	2003
Water Depth	
Step out Distance	12.5 km
No. of SCMs	2
System	Artemis
Intervention Method	ROV Guide Wire Running Tool Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, SCMMB, Subsea Instrumentation
Comments	First permanently installed Artemis system

Project	Talisman Hannay
Client	Talisman
Completion Date	2002
Water Depth	-
Step out Distance	14 km
No. of SCMs	2
System	Artemis
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM
Comments	System originally installed as Wellcon system and changed out for Artemis using equipment from the abandoned Kildrummie project.

Project	Talisman Kildrummie
Client	Talisman
Completion Date	2002
Water Depth	-
Step out Distance	-
No. of SCMs	-
System	Artemis
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM
Comments	System never installed and equipment later used for Hannay, and TNT projects.

Project	Brovig Chestnut
Client	Brovig
Completion Date	2001
Water Depth	-
Step out Distance	-
No. of SCMs	1
System	Artemis
Intervention Method	ROV Guide Wire Running Tool Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Location	Central North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, SCMMB
Comments	System had to be fitted into a restricted control room space. Supplied as a rental system and recovered from subsea after one year production.

Project	Centrica Rose
Client	Centrica
Completion Date	2003
Water Depth	25 m
Step out Distance	10 km
No. of SCMs	1
System	Wellcon
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	Vetco
Control Method	Multiplexed Electro-Hydraulic
Location	Southern Sector North Sea
Topside	MCS, EPU, HPU, TUTU
Subsea	Hydraulic and Electrical Jumpers, SCM, SCMMB, UTDA Tree Instrumentation
Comments	Due to the restricted space on the host Amethyst platform the HPU, MCS, EPU and some of the third party ESD and PCS system upgrades were contained within an integrated package. This not only saved space but allowed the installation and pre-commissioning to be completed onshore thus saving time on this unmanned platform.



Project	Talisman Hannay Field Development
Client	Stolt Offshore
Completion Date	2001
Water Depth	120 metres
Step out Distance	14 km
No. of SCMs	1
System	Wellcon
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Subsea Control Modules – incorporating smart well technology, Electro-Hydraulic Termination and Distribution Units, Subsea Accumulator Module. Hydraulic Power Unit, Master Control Station and Topside Umbilical Termination Unit.
Comments	This one well subsea system was designed with VHP (15,000 psi) down hole function lines for Smart Well completion valves. This SCM was later recovered and replaced with an Artemis system when a second well was added

Project	Ranger Kyle Phase 2 Field Development
Client	Kaeverner Oil & Gas for early stages and later Maersk Contractors and CNR directly
Completion Date	1999 and still extending
Water Depth	110 metres
Step out Distance	21 km
No. of SCMs	6
System	Wellcon
Intervention Method	Diver Installation and Intervention
Xmas Tree Supplier	FMC
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Subsea Control Modules, Electro-Hydraulic Termination and Distribution Units, Subsea Accumulator Modules, Subsea Instrumentation. Master Control Station, Hydraulic Power Unit.
Comments	Originally designed and installed for operating from the Maersk Curlew, the Kyle system was installed with two separate drill centres at 18 km and 22.5km. This system has since been disconnected from Curlew and controls are currently provided from the slightly closer Ramform Banff.

Project	Amerada Hess Flora & Fife Field Developments
Client	Bluewater
Completion Date	1998
Water Depth	250 metres
Step Out Distance	10 km
No. of SCMs	10
System	Wellcon
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	MCS, EPU, Subsea Control Modules Electro-Hydraulic Termination and Distribution Units.
Comments	Originally the Flora and Fife SCMs were built for the Durward and Dauntless fields. 11 SCMs were built in total. These were later modified for the Flora field to improve the communication over the 10 km umbilical

Project	Amerada Hess Angus Field
Client	Amerada Hess Limited
Completion Date	2002
Water Depth	250 metres
Step Out Distance	18 km
No. of SCMs	1
System	Wellcon
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Subsea Control Module upgrade and MCS hardware and software changes
Comments	The Angus field was added to the already modified Flora and Fife development for production from the Usi Gorm. Due to the longer 18km step-out the system was split into two with a different communications transceiver used for the longer step-out system.

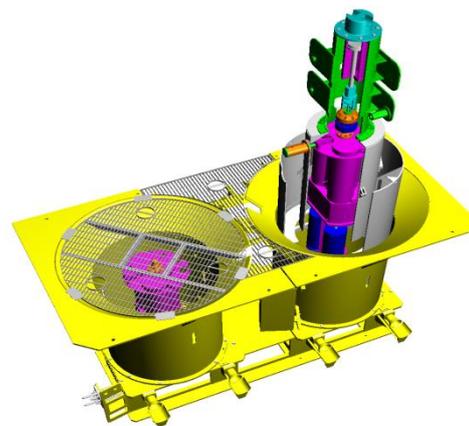
Project	Conoco MacCulloch
Client	SLP Engineering Ltd
Completion Date	1996 and extended in 2002
Water Depth	150 metres
Step-out distance	3 & 5 km
No. of SCMs	6
System	Wellcon
Intervention Method	Diver (ROV to Subsea Tree Interface)
Xmas Tree Supplier	Dril-Quip and Vetco
Control Method	Multiplexed Electro-Hydraulic
Package Location	Equipment Summary
Scope of Supply	Master Control Station, Electrical and Uninterruptible Power Units Hydraulic Power and Umbilical Termination Units SSIV Interface and Jumpers, Subsea Umbilical Termination Units and Weak Links. Subsea Control and Accumulator Modules. Instrumentation and Interface Stabplates
Comments	One of the first multi-well subsea control systems installed the MacCulloch field is still supported and continues production and potential remaining for extension



Project	Kerr McGee Janice and James
Client	Kvaerner Oil and Gas
Completion Date	1998
Water Depth	150 metres
Step Out Distance	2 km
No. of SCMs	3 Subsea Data Modules
System	Wellcon
Intervention Method	Diver, ROV Terminations
Control Method	Multiplexed Data Gathering with Direct Hydraulic Controls
Package Location	Equipment Summary
Scope of Supply	Subsea PLC Master Control Station and Hydraulic Power Unit Subsea Data Acquisition Modules, Electro-Hydraulic Distribution Units and Jumpers.
Comments	Janice utilises the same front end HMI and PLC control as a standard subsea control system. The hydraulic functions however are topside with subsea data acquisition only.

Project	Petrobras MacManifold
Client	DSND Consub
Completion Date	1998
Water Depth	1000 metres design
No. of SCMs	3
System	Special ROVCON system based on Artemis SEM and Wellcon hydraulics
Intervention Method	Special build ROV Guidewireless Running Tool Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Master Control Station and Hyd. Power Unit. Subsea Control Module Electro-Hydraulic Termination and Distribution Units
Comments	Large 32 function special SCMs designed for this system, with their own running tool design. Dual SEM operated.

Diverless SCM, Running Tool and Landing Base.



Project	Petrobras P27
Client	Hyundai Heavy Industries
Completion Date	1997
Water Depth	N/A
Step Out Distance	N/A
Intervention Method	N/A
Control Method	Turret Mounted Well Control Racks
Package Location	Equipment Summary
FPSO / Turret	Subsea Controls Hydraulic Power Unit, Surface Accumulator Skid, Well Control Racks for subsea wells.
Service	Detail System Design and Manufacture Factory Function Testing, Site Integration Testing, Offshore Commissioning.

Project	Petrobras P33 / P35
Client	Hyundai Heavy Industries
Completion Date	1997
Water Depth	N/A
Step Out Distance	N/A
Intervention Method	N/A
Control Method	Turret Mounted Well Control Racks
Package Location	Equipment Summary
FPSO / Turret	Subsea Controls Hydraulic Power Unit, Surface Accumulator Skid, Well Control Racks for 22 subsea wells, Turret Valves Hydraulic Power Unit.
Service	Detail System Design and Manufacture Factory Function Testing, Site Integration Testing, Offshore Commissioning.

Project	Shell Gannet E & F Field Development
Client	Rockwater
Completion Date	1997
Water Depth	Metres
Step out Distance	Km
Intervention Method	Diver Installation and Intervention
Control Method	Multiplexed Electro-Hydraulic
Package Location	Equipment Summary
Subsea	Electro-Hydraulic Termination and Distribution Units.
Services	Detail System interface design and manufacture Factory Function / Integration Testing

Project	Amerada Hess Durward and Dauntless
Client	Bluewater Engineering BV
Completion Date	1996
Water Depth	100 metres
Step-out Distance	3 and 4 km + 2 km for Satellite Wells
No. of SCMs	-
System	Wellcon
Intervention Method	Diver (ROV to SDU Isolation Valves)
Control Method	Multiplexed Electro-Hydraulic
Scope of Supply	Master Control Station, Hydraulic and Electrical Power Units, Umbilical Termination Assemblies, Riser Base and Seabed Umbilical Termination Units + Jumpers. Subsea Distribution Units, Subsea Control and Accumulator Modules, Instrumentation and Interface Stabplates
Comments	The D&D field originally had 11 SCMs. Shortly after the installation of the first phase the project was abandoned and the SCMs later used for the Flora, Fife and Angus fields

Project	Conoco Banff
Client	Coflexip Stena Offshore
Completion Date	1996
Water Depth	90 metres
Step-out distance	Directly above Subsea Wellhead
Intervention Method	Diver
Control Method	Multiplexed Electro-Hydraulic and facilities for Direct hydraulic operation as Back-Up
Package Location	Equipment Summary
Control Room Rig Floor	Master Control Station, Electrical and Uninterruptible Power Unit Hydraulic Power and Control Units
Subsea Tree	Topsides Interface Panel and Workover Control Panel Subsea Control Module and Tree Instrumentation
Service	Project Management Detail System Design and Manufacture Factory Integration Testing On and Offshore Integration Testing

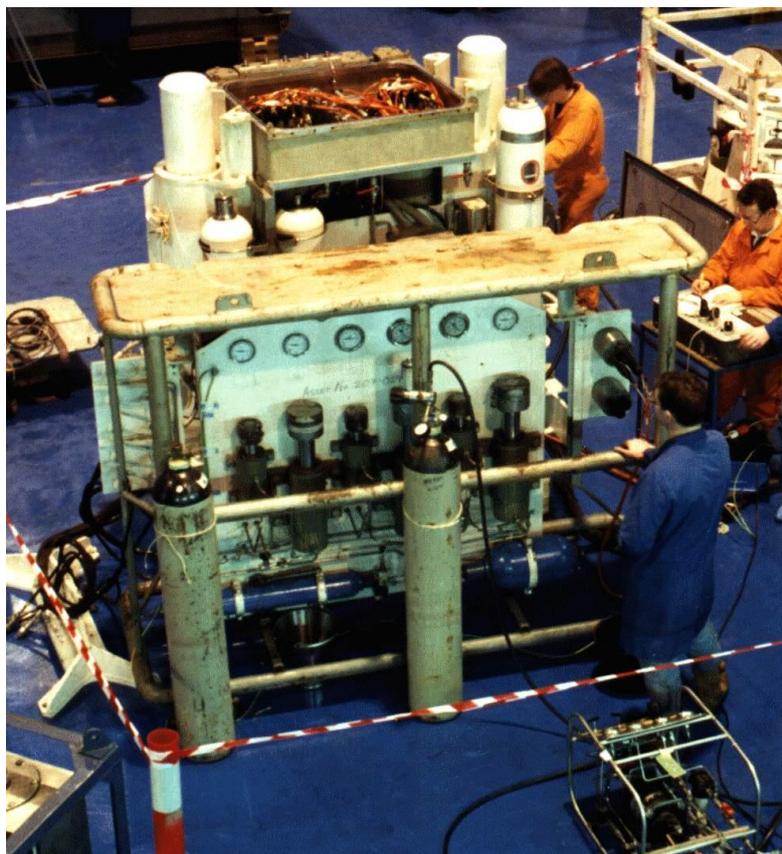
Project	BP Newsham
Client	John Brown Engineers and Constructors
Completion Date	1995
Water Depth	35 metres
Step-out distance	6 km
No. of SCMs	2
System	Wellcon
Intervention Method	Diver
Control Method	Multiplexed Electro-Hydraulic
Package Location	Equipment Summary
Local Equipment Room	Integrated Control and Fire/Gas System with Telemetry Interface and Microwave Link to Land Base
Platform	Hydraulic Power Unit and Topside Umbilical Termination Unit
Subsea Manifold	Subsea Distribution Unit
Subsea Trees	Subsea Control Modules, Instrumentation and Interface Stabplates
Comments	BP Newsham was the first Wellcon SCM installed in 1993 and is still producing to this day

Project	Emerald Extension Well & Satellite Choke Base
Client	Midland and Scottish Resources Plc
Completion Date	1993
Water Depth	150 metres
Step Out Distance	2 km
Intervention Method	Diver
Control Method	Acoustic - Electro-Hydraulic
Package Location	Equipment Summary
Control Room	Upgrade of Existing Subsea Control System Computer and Well Control Panel
Subsea Tree	Acoustic Transducer and Transponder Subsea Control Module, Subsea Battery Pack and associated Jumper Cables
Service	Conceptual Design Project Management Detail System Design and Manufacture Upgrade of Existing FPSO Equipment Factory Integration Testing Onshore and Offshore Integration Testing

Project	Sovereign Emerald
Client	Davy Offshore
Completion Date	1990
Water Depth	75 metres
Step Out Distance	0.5, 2.2 and 4.4 km
Intervention Method	Diver
Control Method	Direct Hydraulic
Package Location	Equipment Summary
FPSO	Hydraulic Power Unit and Control Panel for control of both Subsea Wells and Connectors
Service	Detail System Design and Manufacture Factory Function Testing

Project	Total North Alwyn Subsea Project
Client	Total
Completion Date	1989
Water Depth	50 metres
Step Out Distance	4 km
Intervention Method	Diver
Control Method	Multiplexed – Hydraulic
Package Location	Equipment Summary
Platform Subsea Tree	Hydraulic Test Panel Subsea Control Module – Hydraulic Components, SCM Teststand
Service	Project Management Detail Design and Manufacture Factory Function Testing

The Total North Alwyn SCM under FAT prior to delivery.



Project	Placid L10-S1
Client	Placid
Completion Date	1988
Water Depth	50 metres
Step Out Distance	4 km
Intervention Method	Diver
Control Method	Pilot Hydraulic
Package Location	Equipment Summary
Platform Subsea Tree	Hydraulic Control Panel Subsea Control Module, Diver Intervention Panel and Interface Stabplates
Service	Project Management Detail System Design and Manufacture Factory Function Testing Offshore Integration Testing

