



# SUBSEA

## Subsea Controls



# TIS Manufacturing | Subsea Controls

**TIS Manufacturing provides a range of subsea controls products and after market solutions to fully service both OEM and third party equipment.**

## **Subsea Controls Products**

- ▶ MQC Stab Plates
- ▶ Umbilical Termination Assemblies (UTAs)
- ▶ Subsea Distribution Units (SDUs)
- ▶ Subsea Accumulator Modules (SAMs)
- ▶ Hydraulic/Electrical Flying Leads
- ▶ ROV Panels
- ▶ Test Stands
- ▶ Deploy Baskets
- ▶ Running Tools

## **Aftermarket Solutions**

- ▶ Survey Inspections
- ▶ Repair & Maintenance Plans
- ▶ Retrofits, Modifications & Upgrades
- ▶ Orbital & Autogenous Welding Services
- ▶ Recertification
- ▶ Spares Management
- ▶ Flushing & Pressure Testing
- ▶ Offsite Commissioning
- ▶ Pre-FEED & FEED Studies
- ▶ FMECA Surveys
- ▶ Reverse Engineering





# Subsea Controls | Orbital & Autogenous Welding Services

## TIS Orbital & Autogenous Welding Services

use a comprehensive library of qualified welding procedures for a variety of materials and sizes.

- ▶ Coded Welding Certification
- ▶ Inspection, Repair, Maintenance & Installation utilities pipework
- ▶ Materials: Stainless Steel, Inconel 625, Nitronic 50/60, Alloy 6Mo, Duplex and Super Duplex
- ▶ Competent Welding Operators and Inspectors
- ▶ Quality Specification: ASME IX, Norsok 601, ISO 15614-1
- ▶ Comprehensive Experience & In-house Technical Authority
- ▶ Socket Welds



# Subsea Controls | Case Studies

## Orbital Welding Workscape for 2x SDUs

TIS Manufacturing was contracted to deliver integral welding and fixed pipework in compliance with ASME IX certified procedures, for the completion of 2off client Subsea Distribution Units.

Workscape Included:

- ▶ 32x Socket welds coded to ASME IX
- ▶ 40x Butt welds coded to ASME IX
- ▶ DPI & Radiography Tests
- ▶ Bespoke Pipe Turning & Fitting
- ▶ Tubes sizes:
  - $\frac{3}{4}$ " x 0.104"
  - $\frac{3}{8}$ " x 0.065"
  - $\frac{1}{2}$ " x 0.065"
- ▶ Test & Flushing
- ▶ Work completed within 7 days



Before



After





# Subsea Controls | Case Studies

## Orbital Welding Workscape for 1x SDU

TIS Manufacturing was contracted to deliver integral welding and fixed pipework in compliance with ASME IX certified procedures, for the completion of 1off client Subsea Distribution Units.

Workscape Included:

- ▶ 150x Socket welds coded to ASME IX
- ▶ 40x Butt welds coded to ASME IX
- ▶ DPI & Radiography Tests
- ▶ Bespoke Pipe Turning & Fitting
- ▶ Tubes sizes:
  - 3/8" x 0.065"
  - 1/2" x 0.065"
- ▶ Test & Flushing
- ▶ Work competed within 10 days



Before



After

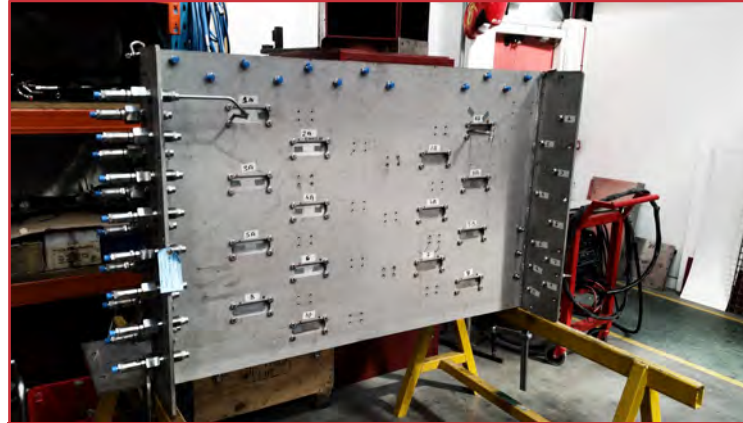
# Subsea Controls | Case Studies

## Orbital Welding Workscope for Subsea Chemical Distribution Panel

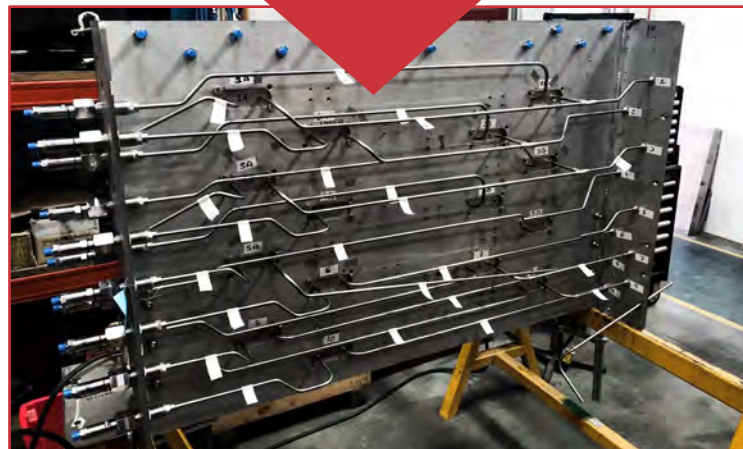
TIS Manufacturing was contracted to deliver integral welding and fixed pipework in compliance with ASME IX certified procedures, for the completion of a client Subsea Chemical Distribution Panel.

Workscope Included:

- ▶ 44x Socket welds coded to ASME IX
- ▶ Dye pen inspection
- ▶ Bespoke Pipe Turning & Fitting
- ▶ Tubes sizes:
  - $\frac{3}{4}$ " x 0.109"
  - $\frac{1}{2}$ " x 0.080"
- ▶ Test & Flushing
- ▶ Work competed within 7 days



Before



After





# Subsea Controls | Case Studies

## Orbital Welding Workslope for 10x Stab Plate

TIS Manufacturing was contracted to deliver integral welding of couplers and tubing tails with ASME IX certified procedures, for the completion of 10off client Subsea Stab Plate.

Workslope Included:

- ▶ 90x Butt welds coded to ASME IX, B31.3
- ▶ DPI & Radiography Tests
- ▶ Tubes sizes:
  - 3/8" x 0.065" (50)
  - 1/2" x 0.065" (10)
  - 3/8" x 0.125" (30)
- ▶ Work competed within 14 days



Before



After

# Subsea Controls | Case Studies

## DCV Test Station

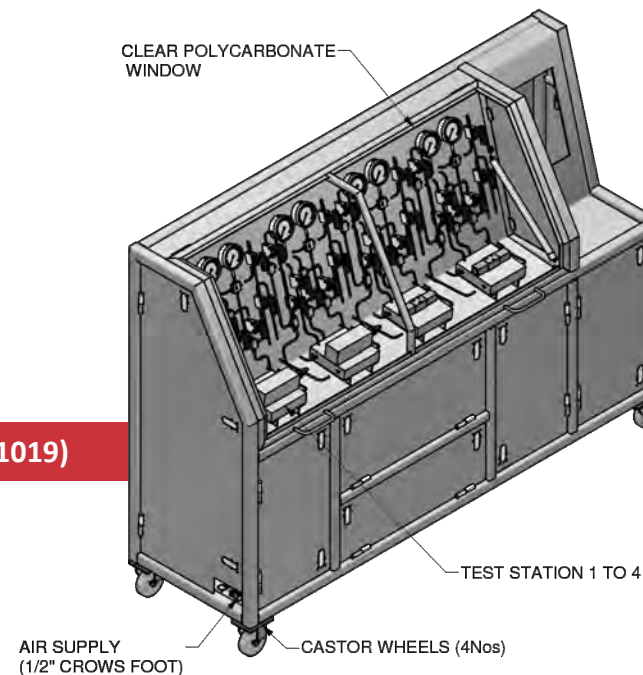
TIS Manufacturing engineered a revised model of a previously delivered DCV Test Station to upgrade the testing capacity, working pressures, control systems, data displays, and unit housing.

Upgraded DCV Test Station Features:

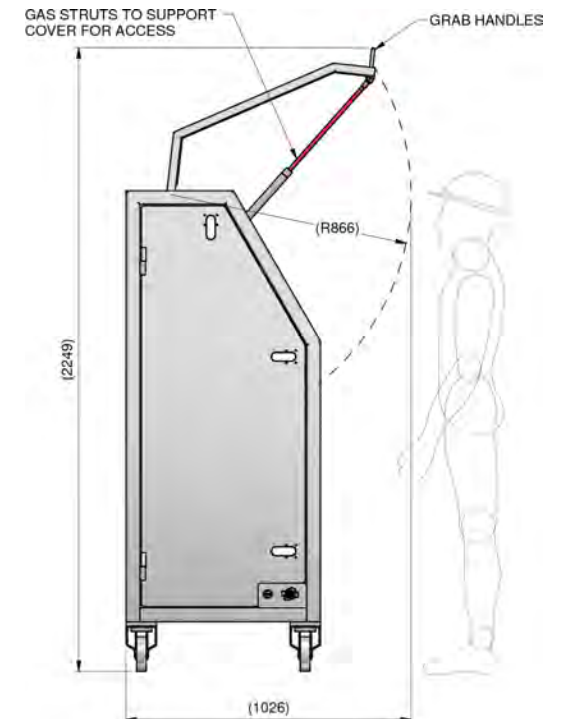
- ▶ Capacity of up to 4 Valves
- ▶ High (30,000 psi) and low pressure testing capability
- ▶ PLC system & HMI Display
- ▶ Independent pressure settings for pilot and control
- ▶ Cleanliness monitor built in to continuously check system
- ▶ Easy manifold block change over



Original Unit (CU-T-1011)



New Unit (CU-T-1019)



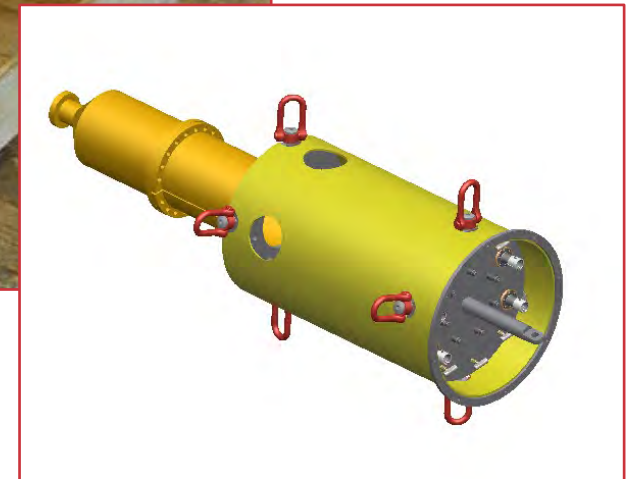


# Subsea Controls | Case Studies

## Umbilical Termination Assembly (Like-for-Like Replacement)

Workscope Included:

- ▶ Shallow water UTA (Umbilical Termination Unit)
- ▶ 2x LP, 2x HP, 2x Methanol (Super Duplex 2507)
- ▶ All lines with Subsea Needle Valves
- ▶ 4x Tronic connectors (two signal and two power)
- ▶ Delivery 35 weeks (due to Super Duplex Needle valves)

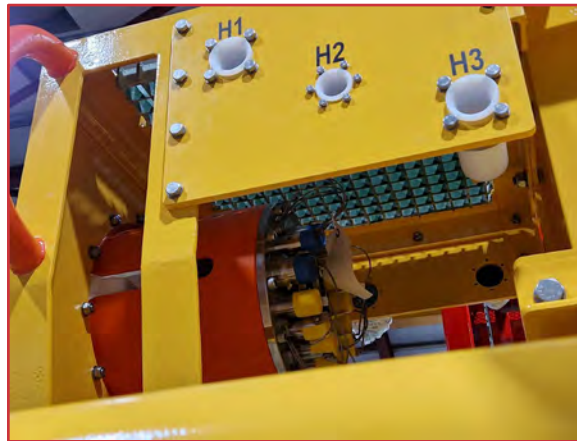


# Subsea Controls | Case Studies

## HFL / EFL Subsea Deployment Baskets

Workscope Included:

- ▶ DNV-ST-E273
- ▶ 2 set-off HFL & EFL mounting frames
- ▶ 2" OD ROV grab handles –API17H conformity
- ▶ Stab plate parking positions
- ▶ Hot stab receptacles
- ▶ Maximum deployment – 3000 metres
- ▶ 4-off sea fastening plates
- ▶ 16-off alloy anodes
- ▶ Pad eyes & Four-point lift forklift pockets
- ▶ 4 leg wire rope slings c/w shackles





# Subsea Controls | Case Studies

## Subsea Accumulation Module SAM (Like-for-Like Replacement)

Workscope Included:

- ▶ 4x LP 54L Accumulators
- ▶ 2x diver mate connectors
- ▶ DNV 2.7-3 Frame
- ▶ 5x Subsea Needle valves
- ▶ SAMMB (Mounting Base)
- ▶ 23 weeks delivery

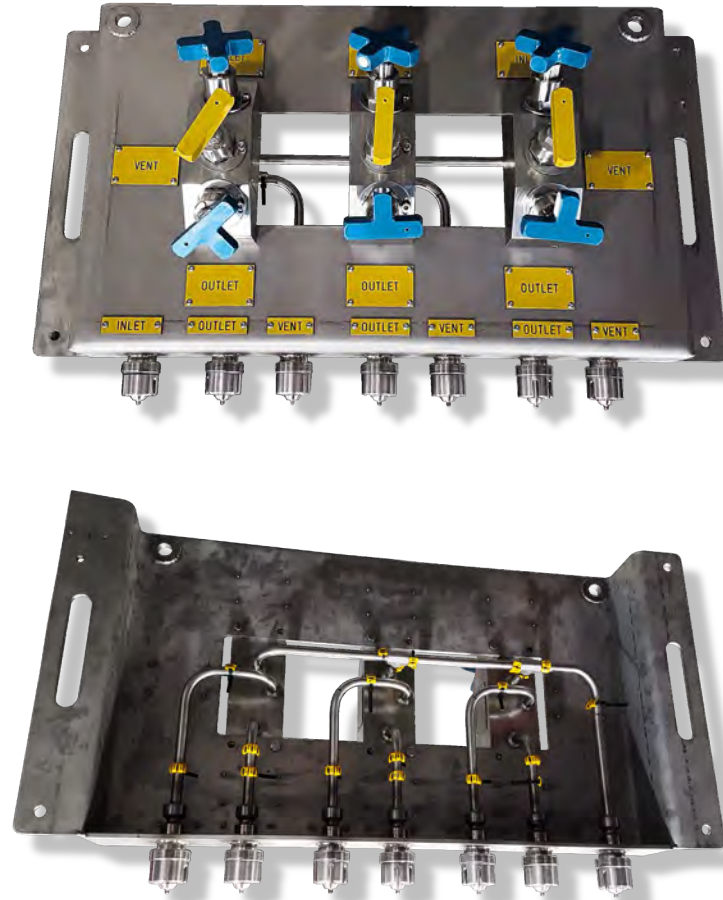


# Subsea Controls | Case Studies

## 3off Subsea Manifolds (Like-for-Like Replacement)

Workscope Included:

- ▶ 3off Diver Operated Subsea Manifolds
  - 1off Chemical Manifold
  - 1off LP Manifold
  - 1off HP Manifold
- ▶ ½" x 0.65 Socket & Butt welds to ASME IX
- ▶ 3/8" x 0.104 Socket welds to ASME IX
- ▶ Aker Solutions diver mate couplings
- ▶ Designed, flushed & tested for final delivery within 25 weeks



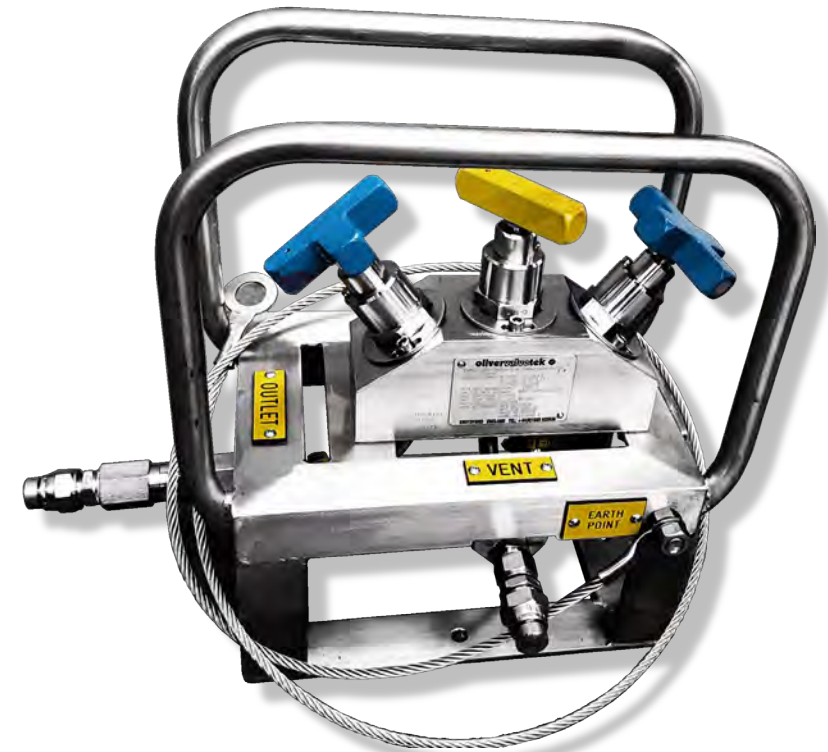


# Subsea Controls | Case Studies

## 2off Diver Operable Subsea Manifolds (Like- for-Like Replacement)

Workscope Included:

- ▶ 2off Diver Operated Subsea Manifolds
- ▶ Socket & Butt welds to ASME IX
- ▶ Designed, flushed & tested with in-house supplied house assemblies
- ▶ Rapid turnaround in 4 days



# Subsea Controls | Case Studies

## Subsea Well Control Package

TIS Manufacturing supplied tubing/pipework assembly, engineering support, project management support and SIT support for the completion of a client's Well Control Package as part of their Riserless Well Intervention System. A lightweight system (42T) with a 7 3/8" bore size with 10,000psi working pressure and consists of series of shear and seal valves capable of shearing wireline and other tool strings during emergency situations and sealing the wellbore.

Workscope Included:

- ▶ Engineering & project management support
- ▶ Pipefitting
- ▶ Mechanical assembly
- ▶ Workshop space





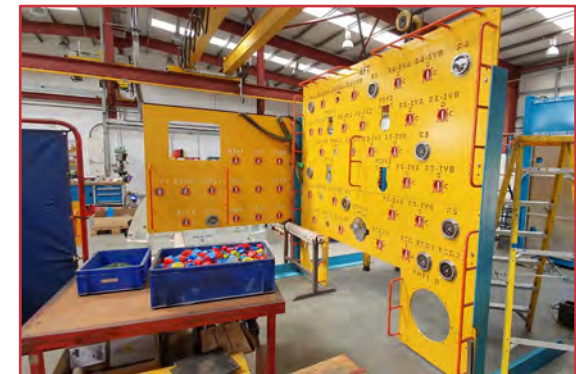
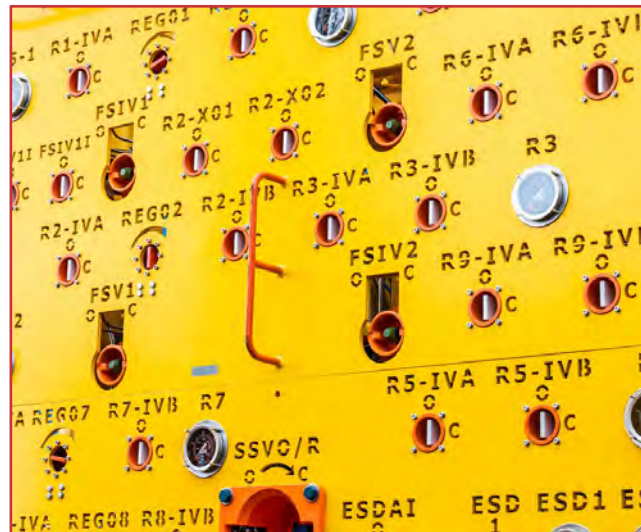
# Subsea Controls | Case Studies

## Subsea Service Module

TIS Manufacturing supplied tubing/pipework assembly, engineering support, project management support and SIT support for the completion of a client's Subsea Service Module as part of their Riserless Well Intervention System. Service Module provides hydraulic and electrical power, communication, and control to the Well Control Package, Pressure Control Head and Xmas Trees. The SSM consists of electro-hydraulic supplies fed from the surface which terminate at the umbilical termination head.

Workscope Included:

- ▶ Engineering & project management support
- ▶ Pipefitting
- ▶ Mechanical assembly
- ▶ Workshop space





# Subsea Controls | Case Studies

## Subsea Grease Injection Skid

TIS Manufacturing supplied engineering, pipefitting and assembly for the completion of a client's Subsea Grease Injection Skid. TIS Subsea Controls Engineers provided calculations to determine the required accumulators, while TIS Technicians provided pipefitting and general assembly for the unit in the TIS Workshop.

### Workscope Included:

- ▶ Engineering & project management support
- ▶ Pipefitting
- ▶ Mechanical assembly
- ▶ Workshop space





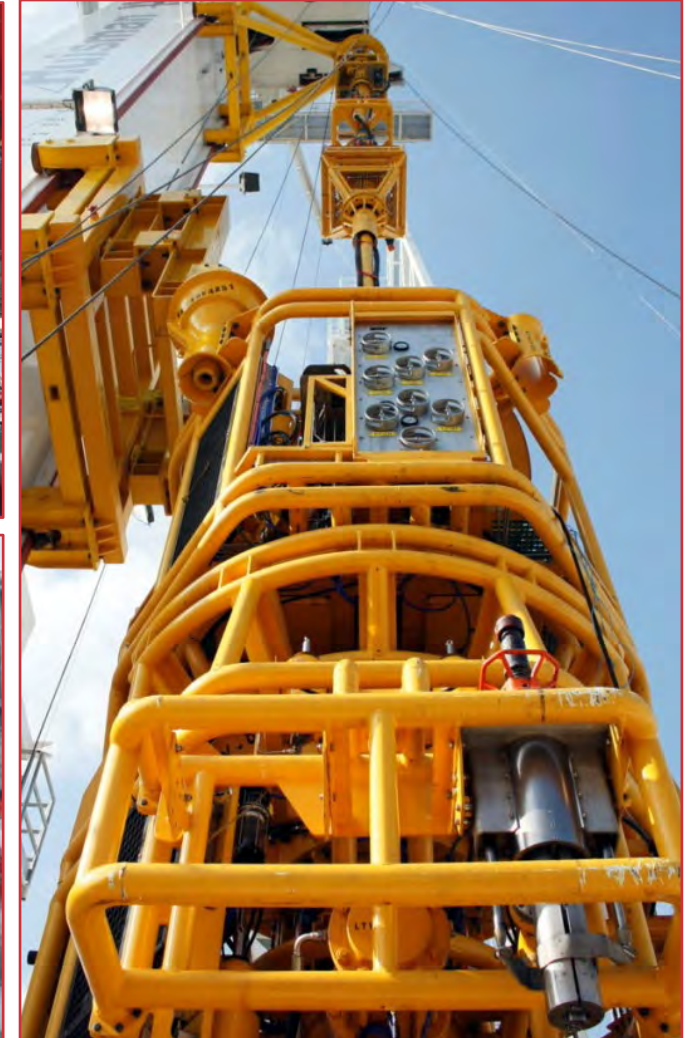
# Subsea Controls | Case Studies

## Subsea Intervention Lubricator Assembly (SIL)

TIS Manufacturing supplied engineering, fabrication, and assembly of several subsea modules for the Helix Well Enhancer SIL, a 7-3/8" bore single-trip system allowing wireline and coiled tubing well intervention from a dynamically positioned vessel. The delivery was designed to connect seamlessly with surface-based equipment supplied by TIS (Reelers, HPUs, Accumulator Skids, & Control Cabins).

### Workscope Included:

- ▶ Engineering, fabrication, and assembly of subsea modules
- ▶ Integration with topside equipment
- ▶ Topside supply - Reelers, HPUs, Accumulator Skids, & Control Cabins



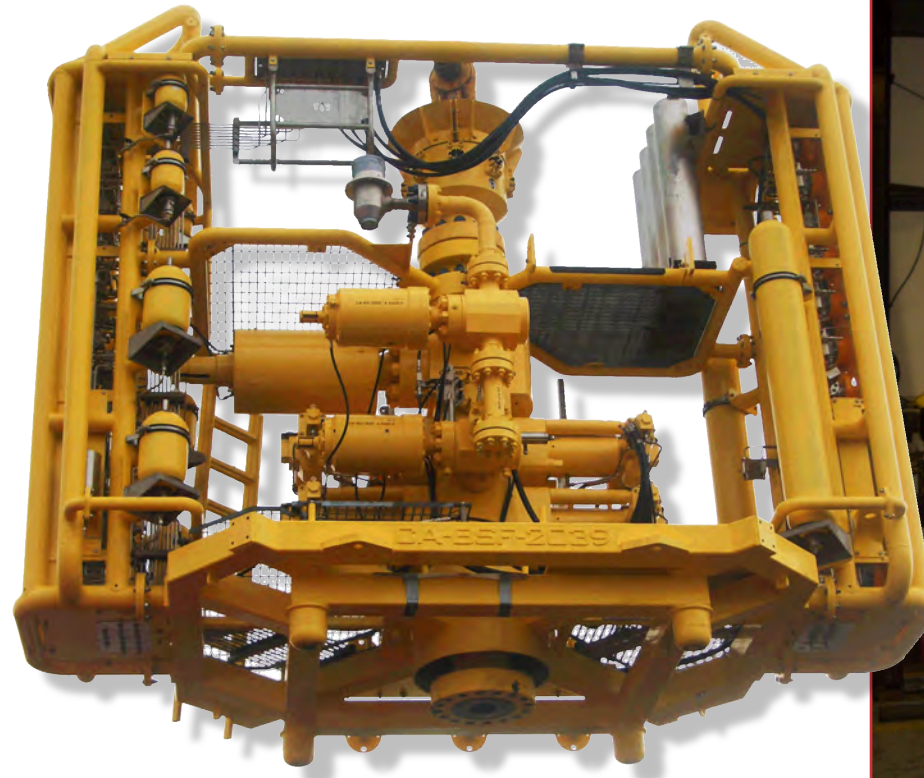
# Subsea Controls | Case Studies

## Subsea Intervention Lubricator Assembly (SIL)

TIS Manufacturing expertise had previously been honed during the production of a similar system for another Helix intervention vessel – the Seawell. The 5" SIL system on the Seawell can be deployed from a derrick without a conventional BOP and riser system, making it possible to rig up the tool and remove a tree cap within 24 hours.

### Workscope Included:

- ▶ Engineering, fabrication and assembly of subsea modules
- ▶ Integration with topside equipment
- ▶ Topside supply - Reelers, HPUs, Accumulator Skids, & Control Cabins







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