



# WELL INTERVENTION

LWI Systems



# TIS Manufacturing | LWI Systems

**TIS Manufacturing has extensive experience in the provision of equipment and services specifically for LWI operations.**

## **Topside Equipment**

- ▶ Subsea HPUs
- ▶ (A60) Control Cabins
- ▶ Accumulator Skids
- ▶ AHC Wireline Masts
- ▶ Umbilical Reelers
- ▶ Umbilical Arch Sheaves

## **Subsea Controls**

- ▶ Fabrication, assembly and integration of proprietary subsea equipment:
  - Running Tools
  - Subsea Intervention Lubricators (SIL)
  - Grease Injection Packages



# LWI Systems | Subsea HPUs

**TIS Subsea HPUs** are designed to control and monitor subsea trees and associated subsea equipment during well intervention operations, and are typically accompanied by an IWOCs Umbilical Reeler as part of complete Intervention Workover Control Systems (IWOCs).

Bespoke HPUs can be engineered to govern multiple functions including pump control, subsea valve operation, ESD and EQD functions, all from a single containerised unit using a programmable logic controller system.

Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV complaint
- ▶ Stab Plate Hook-up
- ▶ PLC Systems
- ▶ Remote Control/HMI Functionality
- ▶ Enclosed Accumulator Bank
- ▶ Carbon or stainless steel construction



# LWI Systems | A60 Control Cabins

**TIS Control Cabins** are designed to accommodate multiple hydraulic electric control stations, monitoring stations, and workstations in a containerised or open console housing.

Bespoke units can be engineered to meet specific operational requirements, accommodate multiple control functions, and retain an operator friendly build that allows for easy maintenance in the field.

## Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV complaint
- ▶ A60 compliant
- ▶ Stab Plate Hook-up
- ▶ PLC Systems
- ▶ Remote Control/HMI Functionality
- ▶ Carbon or stainless steel construction





# LWI Systems | Accumulator Skids

**TIS Accumulator Skid Units** are designed to provide additional stored volumes of energy to enable changes to BOP Ram functions, speeds, controls, and higher shearing pressures during well intervention operations.

## Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV complaint
- ▶ Stab Plate Hook-up
- ▶ PLC Systems
- ▶ Remote Control/HMI Functionality
- ▶ Carbon or stainless steel construction



# LWI Systems | AHC Wireline Masts

**TIS AHC Wireline Masts** are designed for lightweight riserless intervention operations provided from a vessel of opportunity.

Features:

- › DNV 2.7-3 (Mast Frame)
- › Zone 2 CE ATEX / Rigsafe / Safe Area
- › Active Heave Compensation System
- › Integral Powerpack
- › Telescopic Boom c/w Automatic Latching System
- › Hydraulic Winch Local Control Console
- › Colour-coded Guy Rope Set
- › Mast Head Marker Beacon



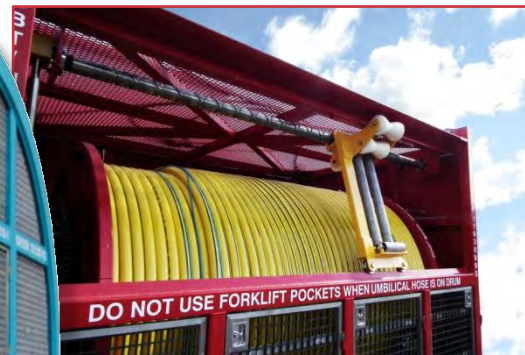
# LWI Systems | Umbilical Reelers

**TIS Umbilical Reelers** are designed to accommodate umbilical products with multiple hydraulic, chemical, electrical and fibre optic power and signal cores.

Bespoke umbilical reelers can be configured to deploy and recover any length and diameter of umbilical product.

## Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV complaint
- ▶ Stab Plate Hook-up Point
- ▶ Electrical & Hydraulic Slip Ring Assembly
- ▶ Automatic Spooling System with remote override
- ▶ Fail Safe Brake System
- ▶ Doors & Panels fitted with safety cut-off switches
- ▶ Remote Control Station
- ▶ Carbon or stainless steel construction





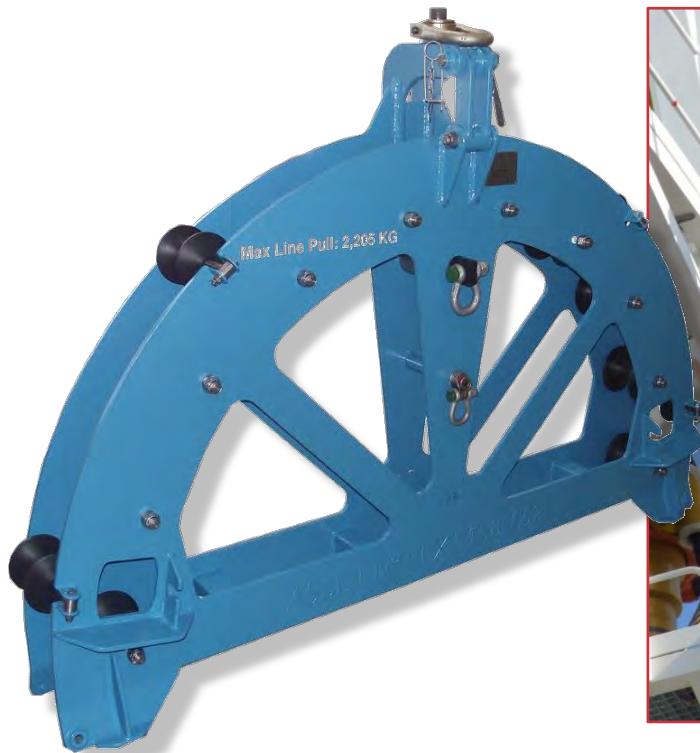
# LWI Systems | Umbilical Arch Sheaves

**TIS Umbilical Arch Sheaves** are designed to facilitate the deployment arrangement of umbilical product during well intervention operations.

Bespoke sheaves are engineered to accommodate any length and diameter of umbilical, and to adhere to the minimum bend radius of the product.

## Features:

- ▶ Large Diameter Nylon Rollers to prevent umbilical damage
- ▶ Anti Static Roller Material to eliminate risk of static ignition
- ▶ Spring Loaded Fixtures to allow quick release of the umbilical
- ▶ Lift Point Hinge Section to allow for umbilical to be fitted or removed while suspended
- ▶ Integral Fall Arrestor Securing Pin Assembly
- ▶ Designed to DNV 2.22 lifting standards
- ▶ Guy Line Fixture Points for stability





# LWI Systems | Case Studies | Oceaneering BORIS System

## Topside LWI Equipment Package

TIS Manufacturing was contracted to supply a topside lightweight well intervention package for the Oceaneering BORIS system. Supply included ATEX & IECEx Dual Certified Subsea Control HPU & A60 Control Cabin, as well as an Active Heave Compensated Wireline Mast

Workscope Included:

- ▶ Subsea Control HPU, A60 Control Cabin & AHC Wireline Mast
- ▶ ATEX & IECEx Dual Certification
- ▶ Integration with Client Topside Arrangement
- ▶ Integration with Client Software Control Systems

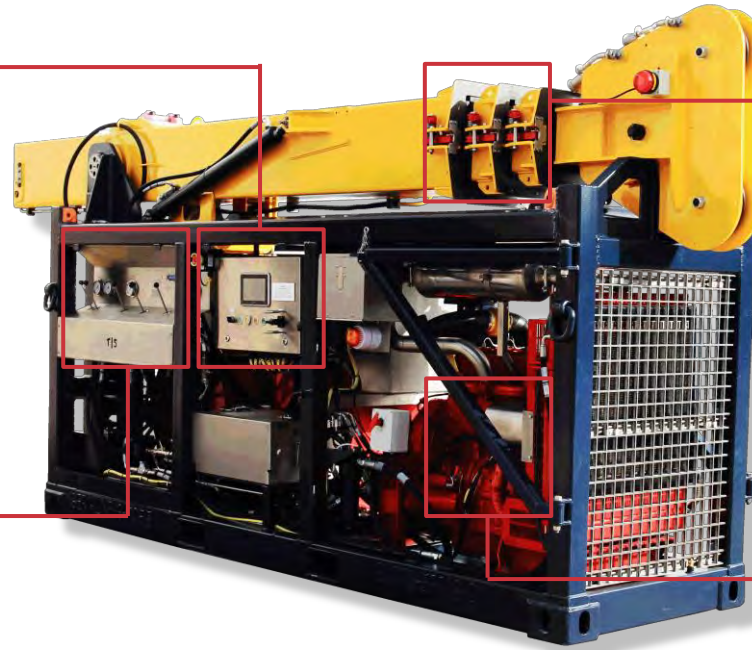


# LWI Systems | Case Studies | Oceaneering BORIS System | AHC Wireline Mast

The **Active Heave Compensation (AHC)** system increases the working weather window for offshore lifting operations while also providing safer deepwater seabed interfacing.

TIS Manufacturing's AHC systems use the latest computing hardware and software to ensure optimum processing speeds when calculating for heave compensation.

The **Mast Control Console** is fully colour-coded engraved stainless steel to simplify operator use. A Selector Valve diverts the hydraulic power supply between the mast and winch.



The four-section telescopic **Mast Boom** lies horizontal in transportation position and is erected to a vertical position by a double-acting hydraulic cylinder, before extending to full operational length by a three-stage integral telescopic hydraulic cylinder.

The Mast Frame houses a **JCB 444 Zone 2 Engine**, which is easily accessible by hinged mesh doors for start up and maintenance. This powerpack can also be used to power a double drum wireline winch, typically up to 0.25" wire.

# LWI Systems | Case Studies | Oceaneering BORIS System | AHC Wireline Mast

## TIS 40ft AHC Wireline Mast

TM-A-1004

UNIT DIMENSIONS (TRANSPORTATION)	
Length:	4,720 mm
Width:	1,120 mm
Height:	2,150 mm
Weight:	5,350 kg

UNIT DIMENSIONS (OPERATION)	
Deployed Height:	12,600 mm (41 ft)
Deployed Width:	4,470 mm (14.6 ft)
Deployed Length:	6,050 mm (19.8 ft)

CAPACITIES	
Quick Release Sheave SWL (optional):	2,275 kg
Winch SWL :	2,000 kg





# LWI Systems | Case Studies | Oceaneering BORIS System | Subsea Control HPU

The **Subsea Control HPU** is dual certified to CE Atex Zone 2 & IECEx, and the structure is DNV 2.7-1 compliant.

Controlled via a PLC in the accompanying Control Cabin, the HPU also features local manual controls for a 5,000psi LP system & 10,000psi HP system, 2x 600ltr reservoirs for supply/return, and a walled-off accumulator bank accessible by exterior doors.

Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV 2.7-1 compliant structure
- ▶ PLC System
- ▶ 5,000psi LP System
- ▶ 10,000psi HP System
- ▶ 2x 600ltr Supply/Return Reservoirs
- ▶ Walled-off Accumulator Bank



# LWI Systems | Case Studies | Oceaneering BORIS System | A60 Control Cabin

The **A60 Control Cabin** was designed in compliance with DNV 2.7-2 and is dual certified to CE Atex Zone 2 & IECEx.

It provides control functionality over the accompanying HPU via PLC system, and features a pressurised airlock, air conditioning, internal work stations, and external storage lockers.

## Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNV 2.7-2 compliant
- ▶ A60 compliant
- ▶ PLC System
- ▶ Pressurised Airlock
- ▶ Air Conditioning
- ▶ Internal Work Stations,
- ▶ External Storage Lockers



# LWI Systems | Case Studies | Expro RWIS

## Riserless Well Intervention System (RWIS)

TIS Manufacturing completed an extensive package of work for Expro, which included a Subsea Service Module (SSM), Well Control Package (WCP), 40ft AHC Mast, and an Auxiliary HPU. This equipment was to work in conjunction with Expro's Riserless Well Intervention System.

The Riserless Well Intervention System (RWIS) provides a reliable solution for carrying out cost-effective intervention and abandonment operations on all types of subsea wells.

Workscope included:

- ▶ Assembly, SIT support, engineering support, procurement support, project management of the SSM & WCP.
- ▶ 40ft AHC Wireline Mast (including FMECA study)
- ▶ Basic Auxiliary HPU





# LWI Systems | Case Studies | Expro RWIS | 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.

The Subsea 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



# LWI Systems | Case Studies | Expro RWIS | 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. The WCP acts as the primary safety barrier installed on top of the XT, providing pressure containment and preventing unintentional flow from the wellbore within the RWIS during operations.

## Workscope Included:

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



# LWI Systems | Case Studies | Expro RWIS | AHC Wireline Mast

## TIS 40ft AHC Wireline Mast

TM-A-1004-1

### UNIT DIMENSIONS (TRANSPORTATION)

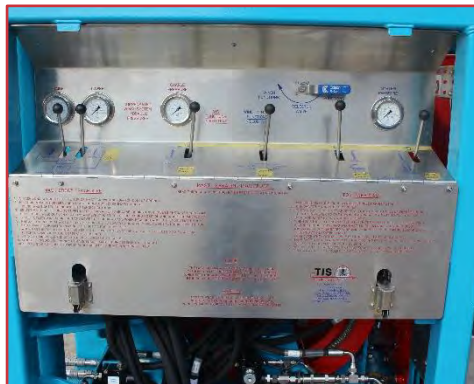
Length:	4,722 mm
Width:	1,217 mm
Height:	2,136 mm
Weight:	5,500 kg

### UNIT DIMENSIONS (OPERATION)

Deployed Height:	13,620 mm (44 ft)
Deployed Width:	4,470 mm (14.6 ft)
Deployed Length:	6,050 mm (19.8 ft)

### CAPACITIES

Utility Winch:	1,000 kg
Winch SWL :	5,444 kg





# LWI Systems | Case Studies | Expro RWIS | Basic Auxiliary HPU

## RWIS Basic Auxiliary HPU

The Basic Auxiliary HPU was designed in compliance with DNVGL-ST-E271 and is dual certified to CE Atex Zone 2 & IECEx. This unit consists of four main sections and brief description as below: XT Client System, Accumulator System, UTH Eject System, DHCI System.

### Features:

- ▶ ATEX & IECEx Dual Certification
- ▶ DNVGL-ST-E271 compliant
- ▶ Return Fluid Tank: 300 Litres
- ▶ Supply Fluid Tank: 700 Litres
- ▶ One-off LP recirculation pump: 500 psi
- ▶ One-off HP supply pump: 18,000 psi
- ▶ Four-off 50L HP Accumulators: 10,000 psi
- ▶ One-off 0.32L LP Accumulator: 3,000 psi
- ▶ ESD Control



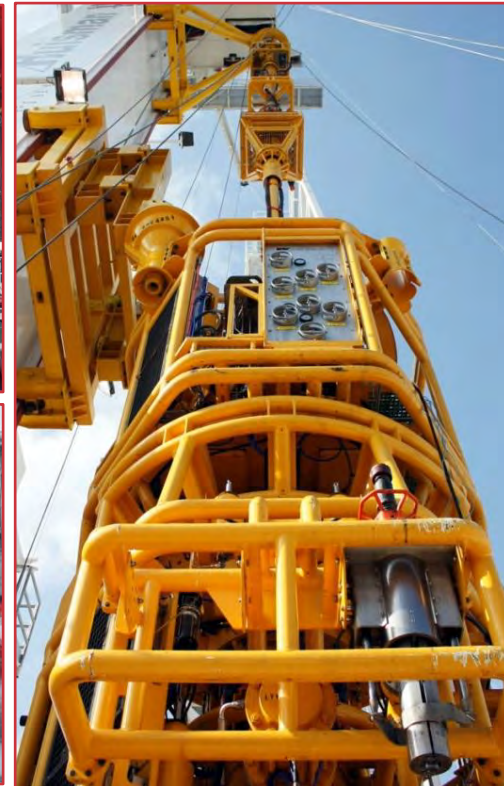
# LWI Systems | Case Studies | Helix SIL 2

## 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 connect seamlessly with surface based equipment also 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



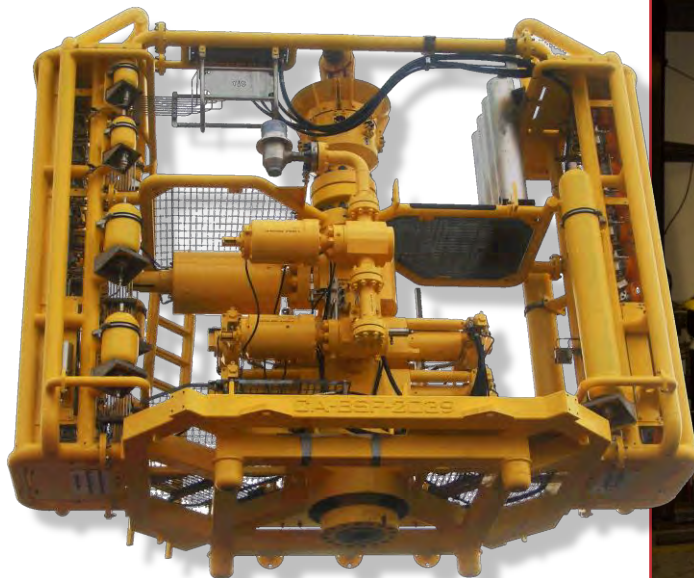


## Subsea Intervention Lubricator Assembly (SIL)

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



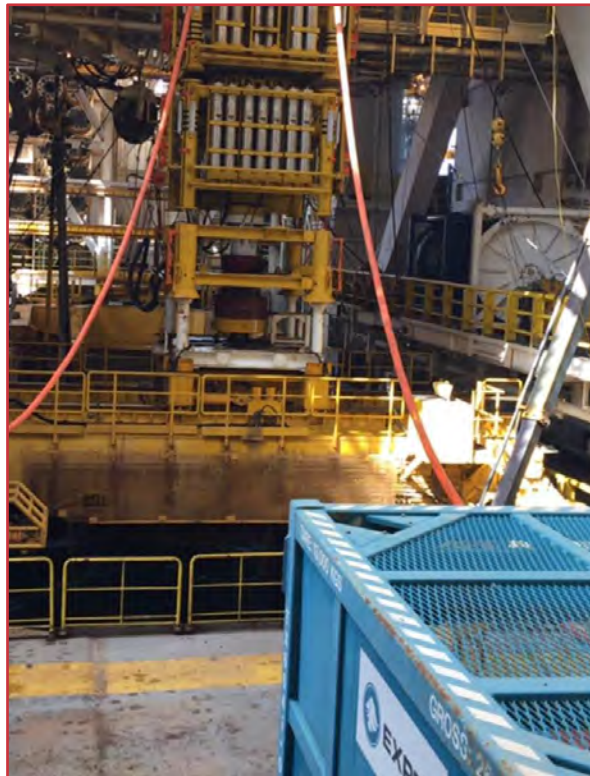


## Intervention Riser System (IRS)

TIS Manufacturing was contracted to supply a topside control package for the Expro's IRS system. Supply included Umbilical Reelers, Arch Sheaves, and Sheave Beam Clamp Assemblies for the system recently operating on P&A campaigns offshore Mauritania.

Workscope Included:

- ▶ Umbilical Reelers, Arch Sheaves and Sheave Beam Clamps
- ▶ Integration with Client Topside Arrangement



## Intervention Riser System (IRS)

TIS Manufacturing was contracted to supply a topside equipment for AKOFS Offshore's IRS system. Supply included an Umbilical Reeler, Gooseneck & Clamp Assembly, and Umbilical Storage Drums.

Workscope Included:

- ▶ Umbilical Reeler, Gooseneck & Clamp Assembly, and Umbilical Storage Drums
- ▶ Integration and Testing of Gooseneck & Clamp Assembly with Riser





[tis-manufacturing.com](http://tis-manufacturing.com)