



Subsea Inspection

Subsea 2012

Aberdeen, UK



From AGR to Oceaneering



Field Operations' product lines



A turnkey provider of technical integrity of process equipment and structures throughout the lifetime of your Oil & Gas field.



Inspection & Integrity Services



Maintenance Management



Subsea services



We operate, maintain and provide managerial and technical support to your oil and gas facilities, and CO2 storage plants.



Operations & Maintenance



Alternative energy

Oceaneering International, Inc.



- Founded in 1964
- Listed on NYSE
- 67 locations in 21 Countries
- Approximately 8200 Employees
- More than \$1,9 billion yearly revenue (NOK 11 mrd) (2010)
- Operate from 7500 msw through to outer Space

Remote Ultrasonic Inspection Pigging tools

UW-01-4000	1
UW-02-1000	1
UW-03-1000	1
UW-04-1800	1
UW-05-1860	1
UW-06-4200	1
UW-07-2300	1
UW-08-5800	1
UW-09-10000	1

SELF PROPULSION TOOLS - PIPE INTRUDER

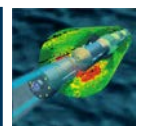
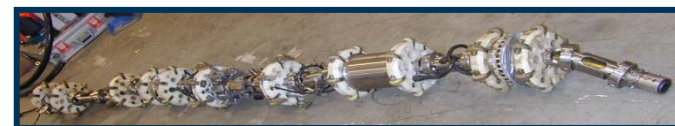
8"-10" Pipe Intruder	1
12" - 16" Pipe Intruder	2
18" - 30" Pipe Intruder	1
42" + Pipe Intruder	1

WALL THICKNESS TOOLS - THE PIPESCAN SYSTEM (PSS)

Pipe Scan 6"-8"	2
Pipe Scan 10"-18"	3
Pipe Scan 20"-30"	2
Pipe Scan 32"-40"	2
Pipe Scan 42" +	1

CRACK DETECTION TOOLS - THE WELD SCAN SYSTEM (WSS)

8" Weld Scan	1
10" Weld Scan	1
12-14" Weld Scan	1
26-30" Weld Scan	1

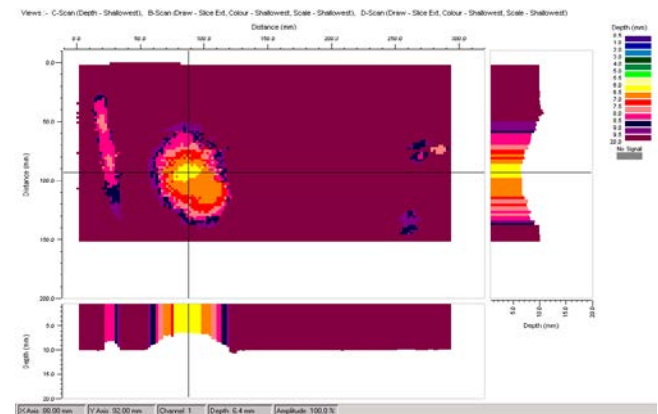
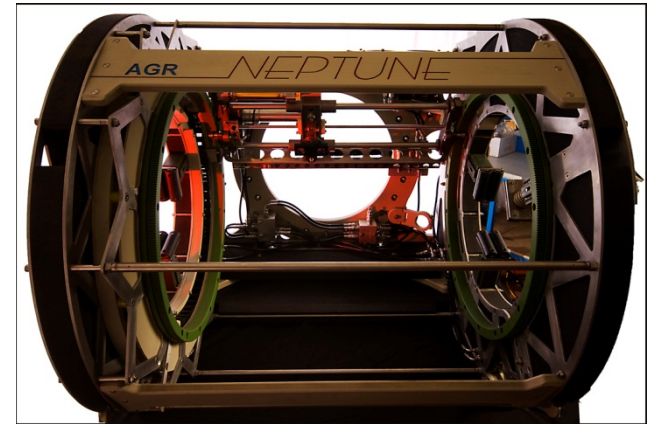


Neptune description

The Neptune scanner performs a full external 360 degree, by 500mm long, ultrasonic examination of selected pipeline sections collecting high resolution, images and numerical data on volumetric weld integrity plus wall thickness detail.

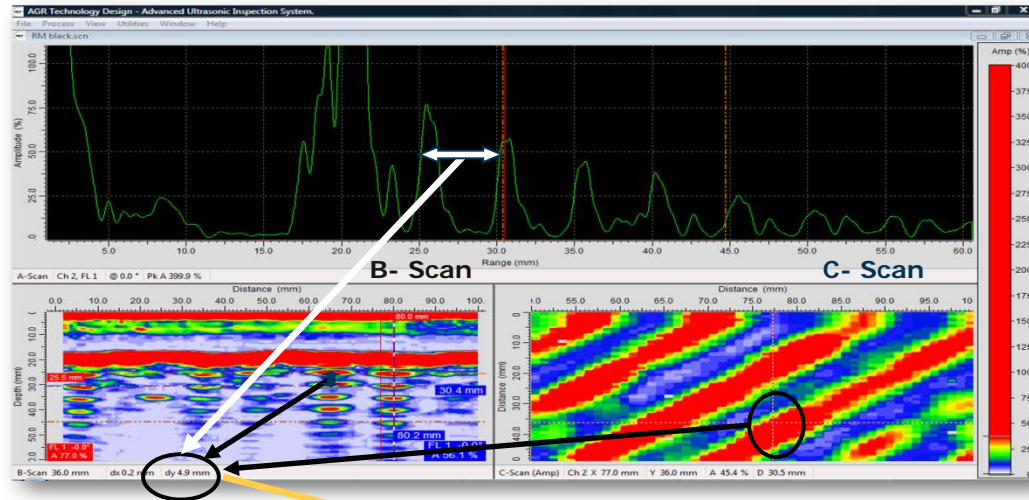
The Neptune systems have hydraulically opening and closing jaws, and self centring clamps that can accommodate a range of pipe sizes from 6" to 21" in diameter.

This ROV deployed tool provides oil and gas operators with a cost effective way of quantifying the integrity of pipelines at key points along their length avoiding the costly intervention of saturation dive teams and Dive Support Vessels.

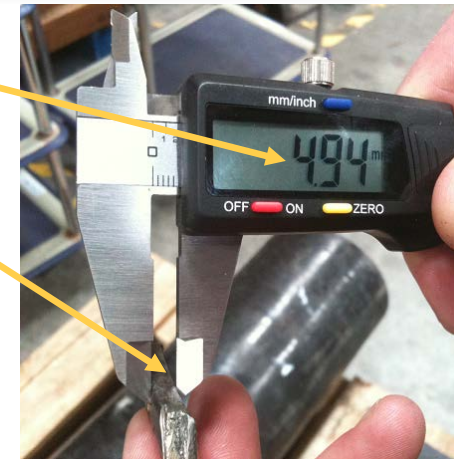


Neptune – ultrasonic scan

Measurement correlation
5.0mm wires



Original Neptune
ultrasonic scan images
A, B & C-Scans

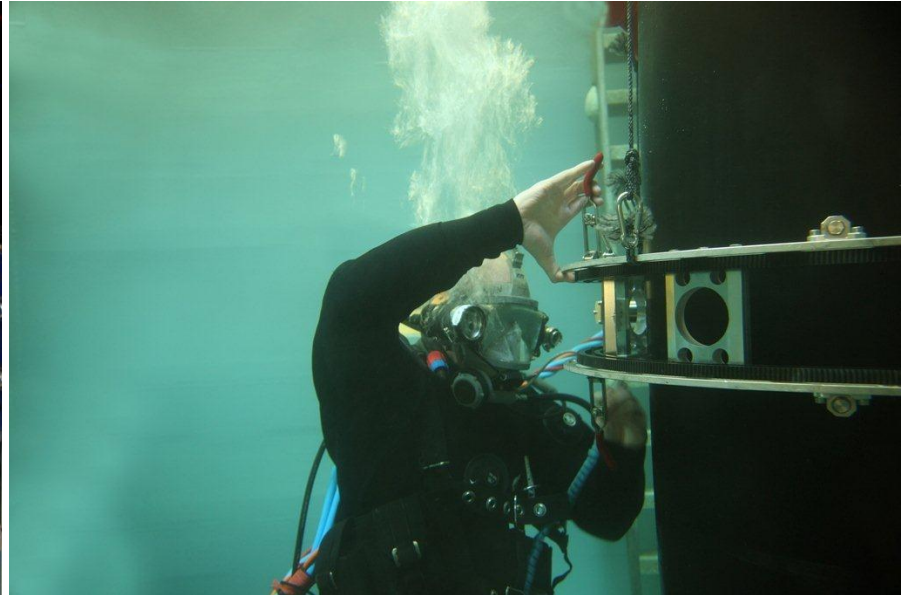
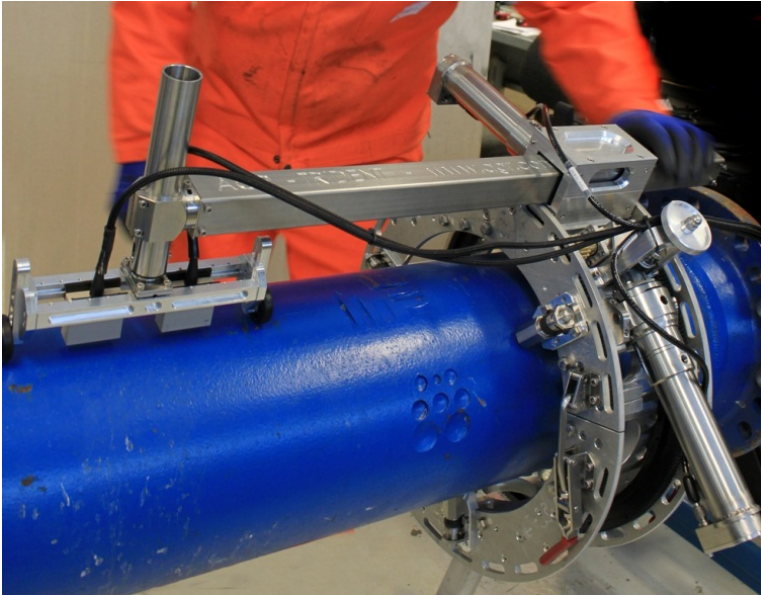


Neptune deployment



Work Class ROV deployment – using 'sticky foot'

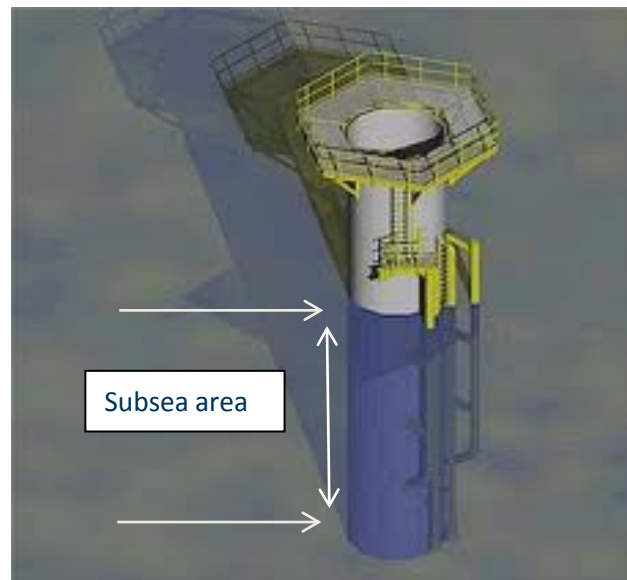
Trident - ultrasonic inspection



Trident is a light weight, manually deployed scanner that performs a 500 millimetre long by 360 degree circumferential ultrasonic examination of subsea pipeline sections.

It can collect high resolution, imaged and empirical data on any reduction in wall thickness and monitor weld condition.

The Monopile Scanner



Offshore Monopile standing
in 30m Seawater.

The Monopile Scanner

A specific inspection tool designed, built and validated for ROV deployment with a full independent and HSE compliant operation performed from within the Monopile.

The inspection system comprised a bespoke two axis scanner, fibre optic umbilical and electronics pod. See Figs 2 & 3 below.

The scanner was designed to enable deployment of two separate probe pans in two orientations; this enables both screening and code compliant inspections to be performed without recovery on both longitudinal & circumferential welds.

The electronic pod supports a 16 channel ultrasonic system, motor controller, 3 feed camera server and fibre optic telemetry.



Monopile Scanner Overview



The Monopile Scanner

The tool design provided full volumetric TOFD weld coverage in one pass with the further option to perform Pulse Echo corroboration scans of any flaws to allow code compliant sentencing of such flaws.

The scanner was located by the ROV in the appropriate position on the welds and held in place by four powerful suction cups during scanning.

The inspection comprised TOFD screening to rapidly locate and position any defective areas within the circumferential and vertical longitudinal Monopile welds. Identified flaw areas would then be inspected using

Pulse Echo transducers in accordance with the relevant codes to establish whether or not they met the acceptance criteria.

Scanner Probe Pan and Suction Cups

The Monopile Scanner



Due to the entry space constraints the bespoke equipment had to be disassembled into components small enough to pass through a structural man way then reassembled below the man way. The process was likened to ‘building a working ship in a bottle’.



Launching ROV Integrated Scanner within the Monopile.