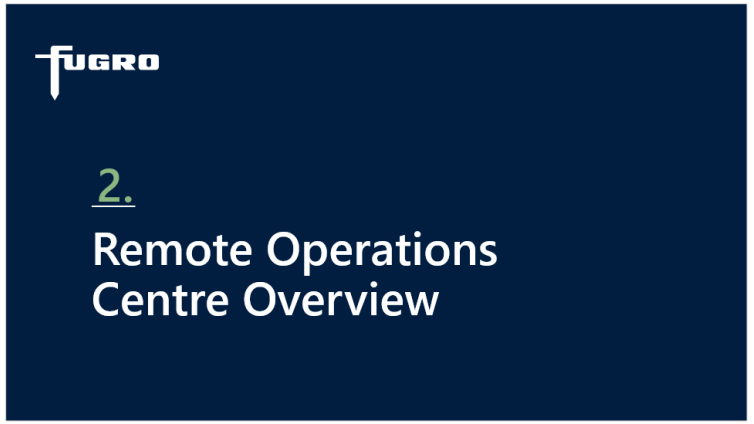
Remote & Autonomous Operations

1. Introduction

2. ROC Overview



3. ROC Case Studies

4. SEA-KIT USV

1.

Introduction

Introductions

Stephen Thomson

Business Development Manager

- 1. Introduction to Fugro
- 2. Remote Operations Centre Overview
- Q&A

Duncan Allen

Remote Positioning Manager

- 3. Remote Operations Centre Case Studies
- 4. SEA-KIT USV (Un-crewed Surface Vessel)
- Q&A

Mark Morrison

Remote Operations Centre Manager

- Q&A

Ross Macfarlane

USV Policy & Public Affairs Advisor

- Q&A

1. Fugro at a glance

Together we create a safe and liveable world

Geo-data is essential to design, build and operate any asset on this planet

Value throughout the Project Life Cycle

Integrated services to combine geotechnics, survey and subsea services in a cost-effective and sustainable way.

Concept & feasibility | Preliminary siting & routing | Permitting & consent | Design | Construction | Operation & maintenance | Decommissioning

Site Characterisation

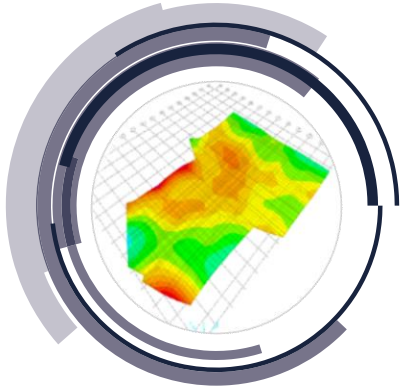
Asset Integrity

Unlocking insights from Geo-data

With our ‘triple A’ approach we help our clients to design, build and operate their assets safely and sustainably

Acquisition

Analysis



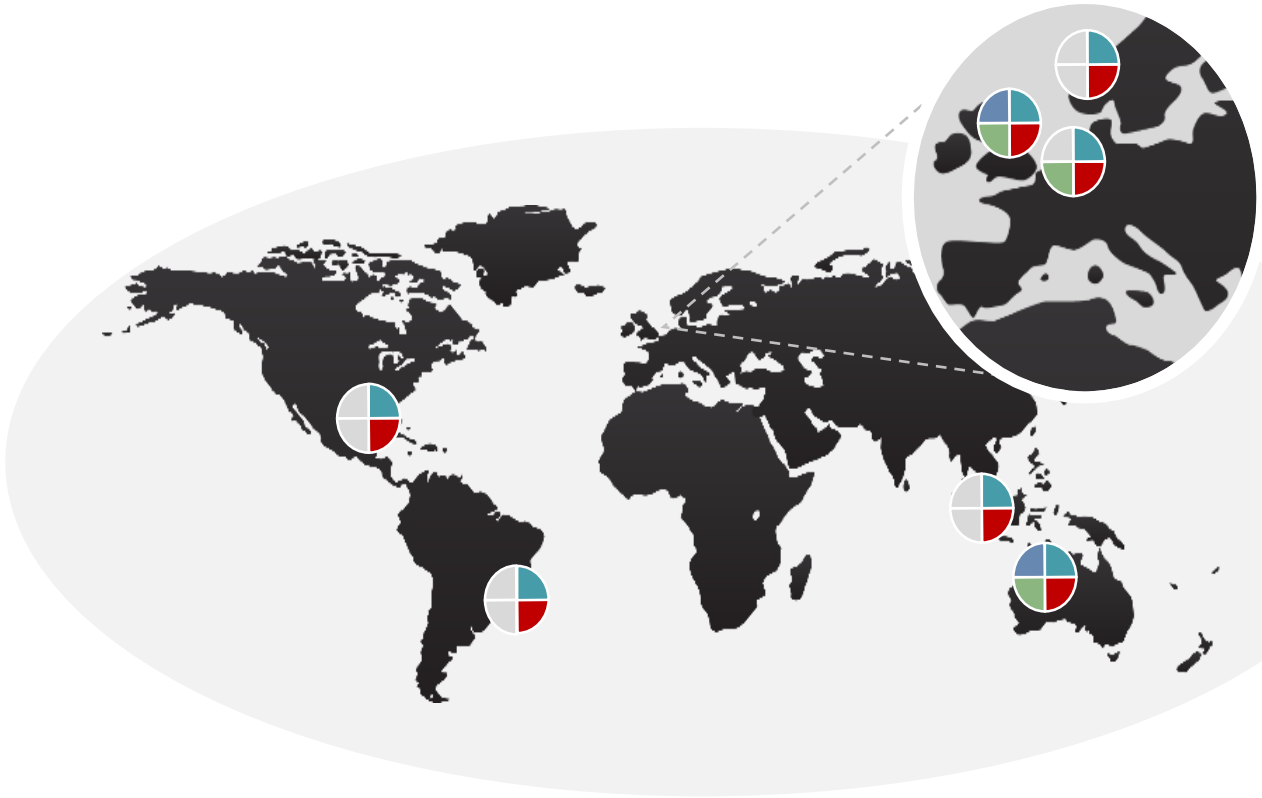
Advice

2.

Remote Operations Centre Overview

Fugro has global coverage for Remote Operations

Remote Positioning

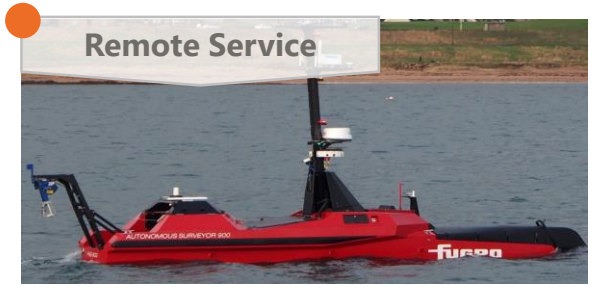


Remote Inspection

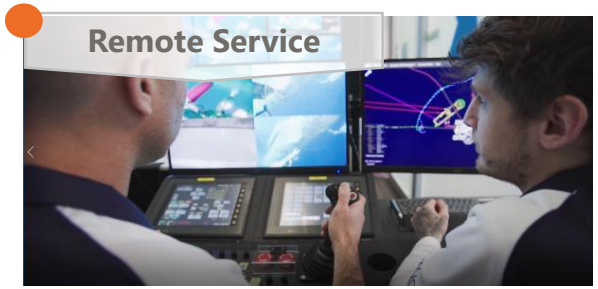
Back2Base

ROV Remote Piloting

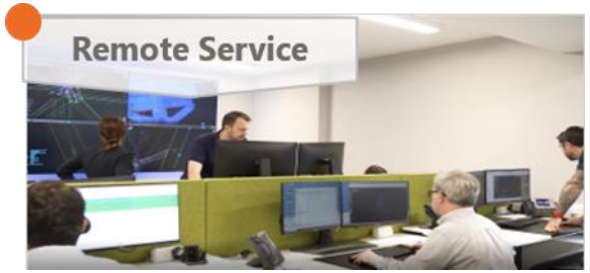
Remote Technologies and Solutions



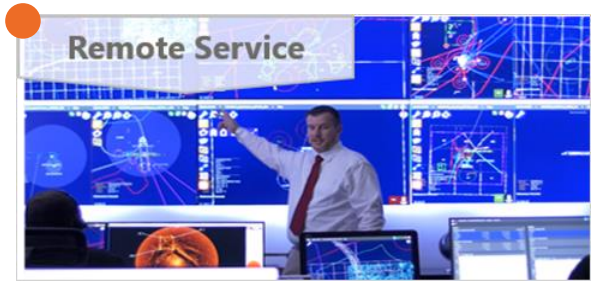
USVs (Un-crewed Surface Vessels)



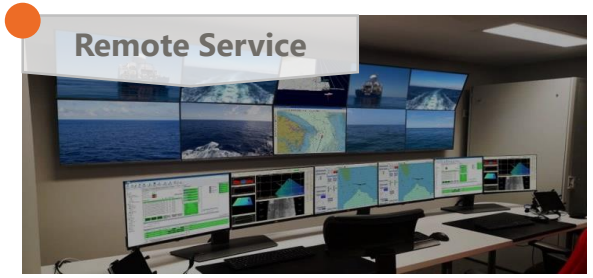
ROV/FCV Remote Piloting



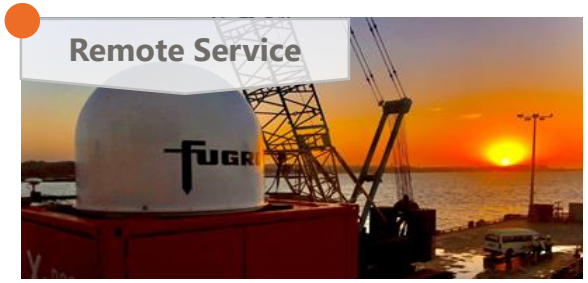
Data Transfer & Processing



Position Monitoring & Positioning Services

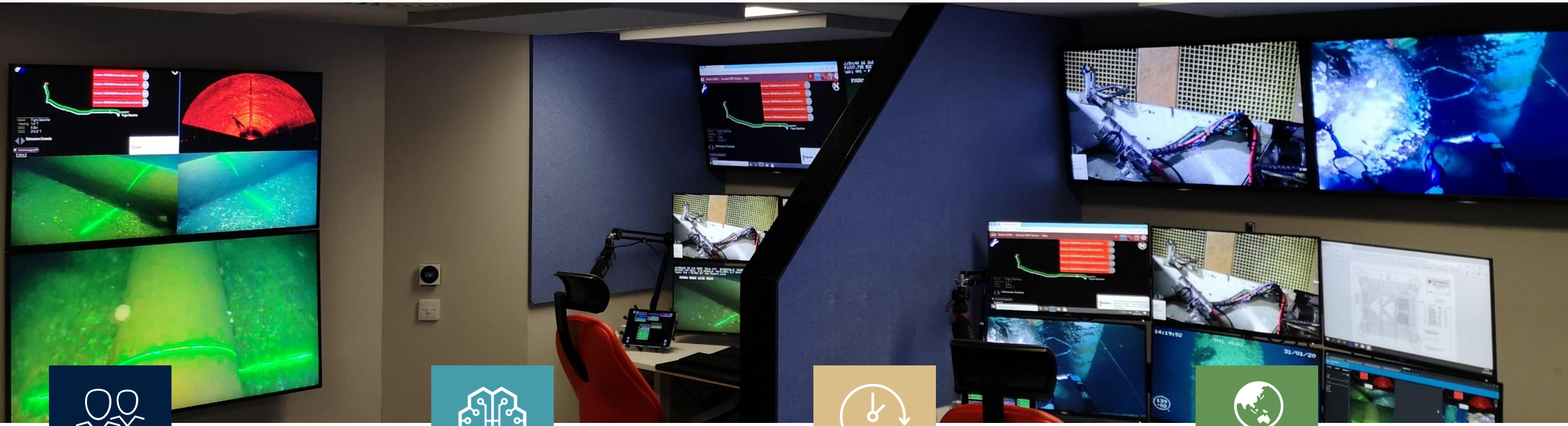


Video stream to ROV & online portal



Mobile communications solutions

The Benefits of Remote Operations



Safety Exposure

By moving people out of the offshore environment to a safer onshore ROC, built with people in mind

Faster Insights to Data

Bridging the gap between offshore and onshore using technology to enable collaborative working

Flexibility & Efficiency

By allowing our professional workforce to concentrate on the things that matter, when they matter most

Sustainability

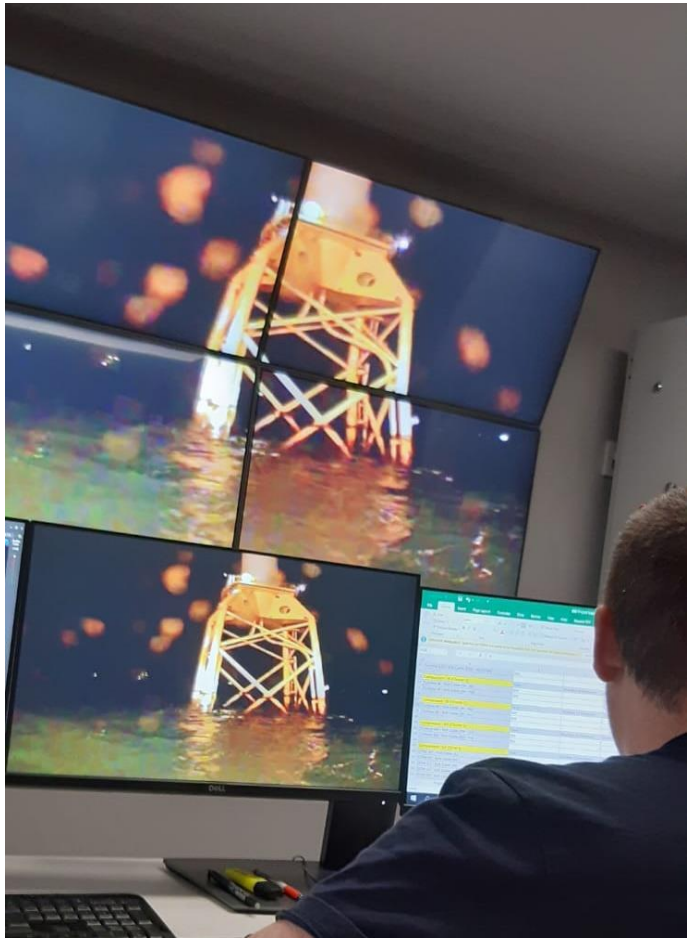
Decreasing greenhouse gas emissions by enabling the use of different vessel types and reducing personnel transfers

3.

Remote Operations Centre Case Studies

ROC Services Client track Record

Recent ROC Highlights (Aberdeen)



>150,000 hrs of operations

OWF Heavy Lift Ops (2020)

Belgium, Europe

Substation installation support

Workscope Overview

- Installation of two substations for an OWF
- Installation from a DP2 heavy lift vessel

Successes

- All operations required for position monitoring of the vessel undertaken from shore
- Provision of proposed vessel location relative to structure
- Communication between the bridge crew and the ROC

MBES (Multi-Beam Echo Sounder) Survey Work (2018-2019)

Denmark, Europe

OWF MBES survey from CTVs

Workscope Overview

- Identify a cost effective solution to low profit MBES (Multi-Beam Echo Sounder) survey work being undertaken by high-end survey vessels
- Utilise small vessels that don't have the space or uptime to justify deploying personnel onto the vessel

Successes

- Award to mobilisation to operation in under 10 days
- 88 sites covered in 6 days with all data transferred back to onshore data centre for processing and target identification
- Utilisation of remote services for MBES operations
- Utilised OARS, Back2Base, Starbases and remote services work flows
- Realtime MBES coverage solution to render MBES on map displays

Uncrewed Survey Vessel (2019-2020)

Scotland, Europe

Crewless inspection trials

Workscope Overview

- Trial project to demonstrate delivery of numerous systems contributing to crewless inspections
- Demonstrated Fugro's FAS (Fugro Autonomous Surveyor) and ROC (Remote Operations Centre)
- Acoustic survey of 5km of pipeline in 5msw to 40msw

Successes

- 2.3km of pipeline in 1.5 hours of acquisition at 4m H(s) seastate
- Remote Inspection System (RIS) equipment configured to facilitate four live video feeds from the FAS-902 to the ROC
- Presentation of live data Multi Beam Echo Sounder data to on-site Client representatives during operations and live video to off-site Client representatives and Fugro Senior Management.

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OWF Inspections (2019)

Scotland, Europe

Remote ROV support

Workscope Overview

- Latest ROC ROV testing across 4G network
- Video and audio transmission support from worksite to ROC
- Non-intrusive inspection
- Support client with survey services efficiently on ad-hoc basis

Successes

- Fugro Frontier mobilised c/w ROC 4G mobile equipment spread
- ROC configured for audio comms and video streaming
- ROC provided with positioning from OARS (Office Assisted Remote Services) on webviewer
- 100% of SoW completed ahead of schedule with no LTIs
- SoW (Scope of Work) completed inc Marine Growth (MG), Flooded Member Detection (FMD) & GVI (General Visual Inspection) on turbine jackets and multiple J-tubes
- ROC ad-hoc inspectors

4.

SEA-KIT USV

SEA-KIT

- SEA-KIT fit perfectly with Fugro's strategic vision for Geo-data collection, remotely and autonomously
- An Uncrewed Surface Vessel (USV)
- First 12m SEA-KIT USV available from June 2020
- Further 12m SEA-KIT USVs to EUAF & APAC in Q4 2020
- 24m (23.7m) SEA-KIT USV c/w bespoke eWROV for delivery H2 2021
- Purpose built ROV / AUV solution for 12m and 24m USVs
  - Enhanced sensor payload12m USV ROV =1.5m x 0.9m x 1.0m

SEA-KIT 12 Information

- Loitering capability: Force 10
- 12m USV station-keeping: 7m H(s)
- Endurance (survey mode): 150 days / 8,000NM
- Endurance (ROV mode): 30 days
- Sensors include:
  - 6 Fore & Aft CCTV cameras
  - 1 night vision camera
  - Radar
  - AIS
  - HiPAP
  - MBES
  - SVP

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Oysters & Beer

Autonomous boat makes oyster run

By Jonathan Amos
BBC Science Correspondent

9 May 2019 Share

The boat arrived at the Belgian port early on Tuesday

In a sign of things to come, an autonomous boat has just made a cargo run from the UK to Belgium.

The 12m-long Uncrewed Surface Vessel (USV) SEA-KIT Maxlimer crossed from West Mersea to Oostende on Monday night, carrying a box of oysters.

It relied on a range of technologies to safely navigate what is one of the busiest shipping lanes in the world.

https://www.bbc.co.uk/news/science-environment-48216966

Benefits to change

- Reduction in personnel
  - 0 personnel offshore
  - 0 effluent
- Reduction in fuel and CO2
  - <5% of equivalent DP2 vessel
  - Solar and wind charging ability
- Increased potential capabilities from a single platform
- Decreased risk
- Increased data opportunity

Further Industry Applications

- Logistics
- Support Vessel c/w AUV or remote ROV, which can enable:
  - All underwater ROV ops
  - Subsea surveys
  - Subsea foundation inspections
  - Environmental monitoring
- Platform to support above water inspections?

Presentation Summary

Changing the way we work

- Remote operations benefits include safety, project value, scalability & sustainability
- Global Remote Operations Centres built and fully functioning
- Remote operations are here with over 150,000 hours track record
- Proven track record within renewables
- Tried & tested USV available next month
- 12m USV with eROV available Q4 2020
- 24m USV with eWROV available H2 2021

What does the industry require?

Thank you

07468 757568

sc.thomson@fugro.com

https://www.fugro.com/