Smarter Subsea Handling

Decommissioning and 'The Circular Economy’

21st February 2024

Autonomous Lifting and Handling Systems for Subsea Infrastructure Construction Support and Removal

Fraser Dunsmore Pritchard, COO

Agenda

- Introduction
- Background and Opportunity
- ROVAR variable buoyancy Products & Solutions
- Integrating Decommissioning and Circular Economy
- Key Points & Asks

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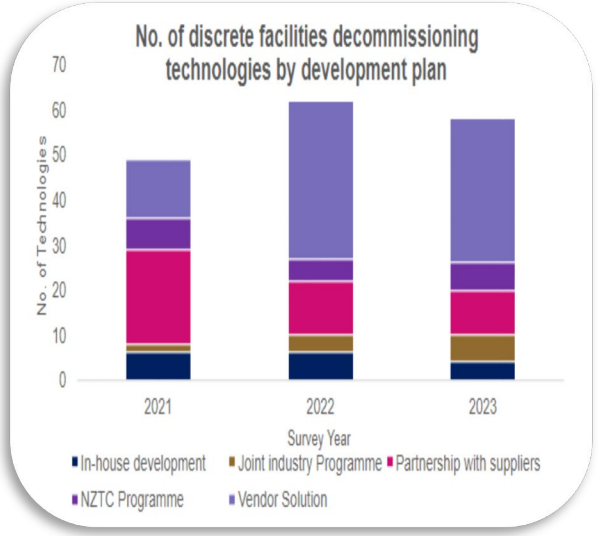
Decommissioning and the Circular Economy – Background & Opportunities

International and Regulatory Needs of Decommissioning

- **UN Circular Economy embraces diverse means to reduce, recycle and remediate**
  - **Convert from linear tasks to parallel and circular ones**
  - **Reduce manufacturing, consumption and use - doing more with less**
  - **Recycle processes and equipment – paralleling activity, "Swiss army knife"**
  - **Remediate the environment - minimising carbon and marine damage**
- **NSTA and OPRED are supporting these principles for decommissioning**
  - **Industry agreement to cut decom costs from £40 billion to £33.3 billion by 2028**
  - **£21 billion expected to be spent on decommissioning between 2023 and 2032**
  - **NSTA expects industry to deploy new, emerging and existing technology**
  - **Operators to increase participation in technology development and adoption**



Circular Decommissioning Opportunities

- **Need for cheaper, repeatable, autonomous subsea solutions with low emissions**
- **Deploy solutions in lifting and handling infrastructure across all subsea sectors**

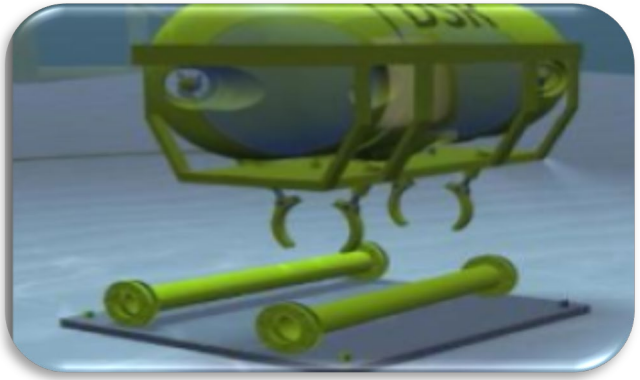
ROVAR – Key Features and Products

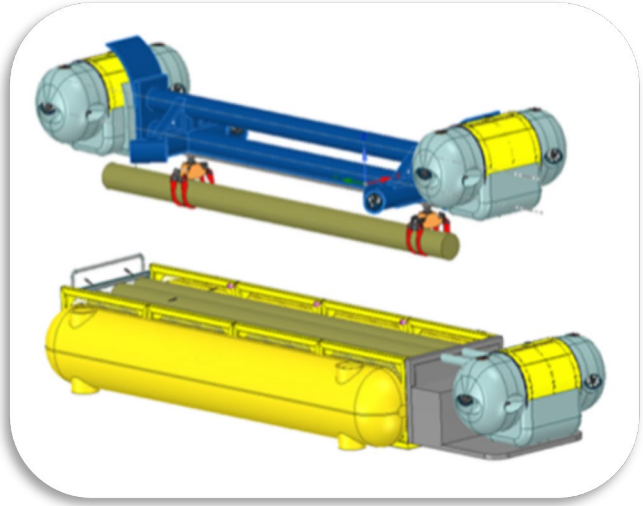
- **Patented cryogenic variable buoyancy system**
- ***ROVAR*: "Remotely Operated Vehicle for Assets Recovery"**
  - **Vapourised liquid nitrogen displaces seawater for buoyancy**
  - **Buoyancy controlled through gasification system, relief valves to retain / release gas in caissons, and control system and sensors**
  - **Bespoke tooling and thrusters for handling and lateral positioning**
  - **Lift repeatability varies with dewar caisson sizing, load and depth**

- **Standard system, *ROVAR-20*: 20Te lifting and handling AUV specifically designed as vessel backdeck equipment for mobilisation during decommissioning and construction support**

- ***ROVAR-BB* (Buoyancy Beam) designed to handle and spread the load of long structures such as cables, pipeline bundles, umbilicals and tubulars**

- ***ROVAR-WB* (buoyant Wet Basket) is an adapted seabed basket with integral buoyancy, designed to provide the means of multiple item delivery / recovery with independent and controllable lift**

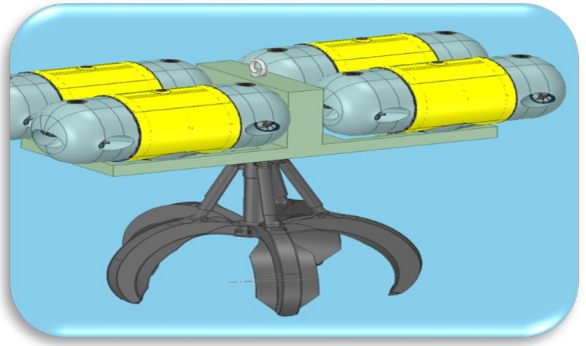


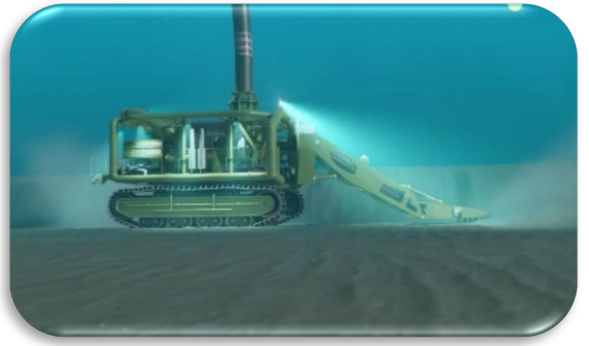


ROVAR Solutions – Core and Additional

Core Solutions / Decarbonisation & Energy Transition

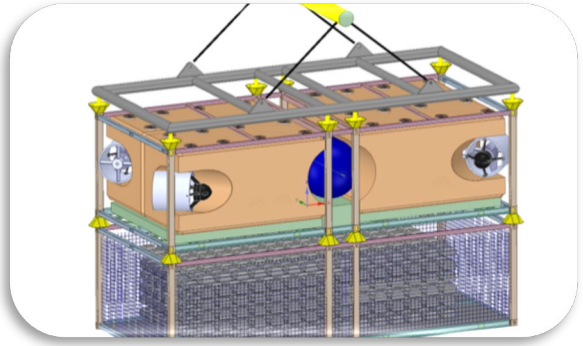
- **Decommissioning for oil & gas congested field clearance, removal and recovery, 10s to 100Tes**
- **Decommissioning of oil & gas pipeline bundles for cutting, lifting and tow**
- **Construction support for infrastructure deployment, both offshore wind and oil & gas**
- **Lifting and positioning of mooring lines, and dynamic cable handling for floating offshore wind**





Additional Solutions & Product Variations

- **“Pick and Place” and “Hunt and Gather” modes**
- **Boulder clearance and debris removal**
- **Seabed vehicle assist for payload compensation in different soil conditions**
- **Submersible autonomous vehicle variable buoyancy**
- **Moonpool version for gantry lifts e.g. mattress deployment**
- **Salvage and recovery of lost and derelict equipment i.e. ghost gear**



ROVAR – How it integrates Decommissioning into the Circular Economy

REDUCE & ELIMINATE

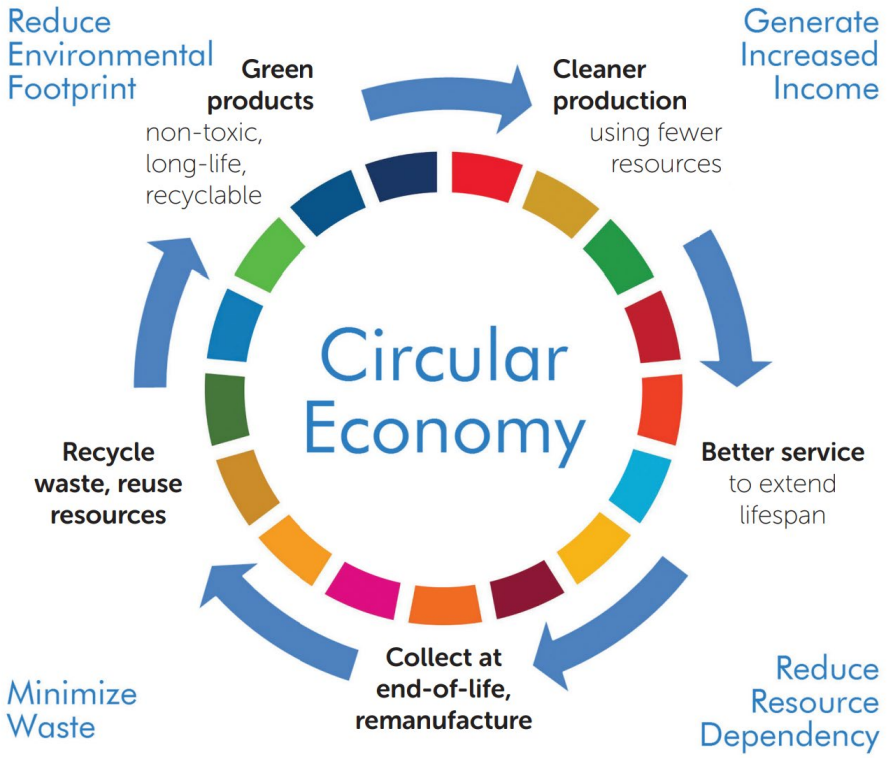
- **Reduces reliance on larger vessels for operations**
- **Expands functionality of small vessels to replace large vessels**
- **Reduces marine and subsea spread costs and consumables**
- **Reduces emissions of vessel and crane operations**

RECYCLE & REUSE

- **Enables parallel operations marine, subsea and seabed**
- **Allows developers to access a wider vessel market**
- **Simplifies recovery of infrastructure for reuse and repurpose**
- **Enables mobilisation for multiple operations**

REMEDIATE & REGENERATE

- **Reduces emissions and noise with use of smaller spreads and vessel**
- **Reduces marine impact with “pick and place” and “hunt and gather”**
- **Minimises seabed damage with controllable subsea handling**
- **Reduces marine life impact with low impact extended operations in adverse weather**



Key Points & Asks

- ROVAR technology fully scalable and adaptable to multiple scenarios
- Technology proven to TRL6+, currently preparing for TRL7
- Market driven Products – 20Te multi-purpose, Buoyancy Beam for pipelines and cabling, buoyant Wet Basket for self-lift
- ROVAR products demonstrate reduce, recycle, remediation principles
- Multiple uses promotes parallel and circular seabed and subsea operations
- Project Developer / Operator / Supply Chain required
  - Investing Partners for commercial deployment and scaleup
  - Participants for final development & deployment of new UK technology

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Smarter Subsea Handling – Meet the Team

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Interim COO & Advisory Board

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Roger Esson
Decommissioning and Net Zero

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Technology transfer, Asia

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