



Smarter  
Subsea  
Handling

Pioneers in controllable buoyancy

**Application of Variable Buoyancy Systems for Handling  
10s, 100s and 1000s of Tonnes in Offshore Energies  
Decommissioning and Construction**

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# Agenda

- **Marine Infrastructure Problems to Solve**
- **Decommissioning Needs and Pipelines Recovery**
- **ROVAR Technology – Key Features and Products**
- **ROVAR Applications – Decarbonisation & Energy Transition**
- **Application for Decommissioning Services**
- **Application for Recovery of Pipelines to Barge and to Land**
- **Key Points & Asks**



# Marine Infrastructure Install and Recovery – The Problems to Solve

## Vessels Utilisation and Functionality:

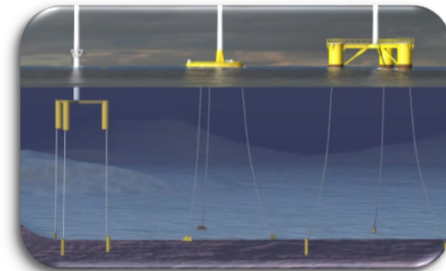
- Vessel markets bottlenecking with competing demands of oil & gas and offshore wind.
- Vessel rates increasing with impact on project economics.
- Need to increase non-DP vessels and vessels of opportunity.
- Need to increase lifting, handling and access versatility.

## Oil & Gas Decommissioning:

- Greater focus on circular principles, “make-use-recycle”.
- Need for subsea loads to be moved all axes on repeatable basis.
- Ability to access restricted areas where vessels cannot operate.
- Need for a repeatable solution for removal of pipeline bundles.

## Offshore Wind Construction:

- Hub-and-spoke underwater operations to boost productivity.
- Enabling project developers to access a wider vessel market.
- Need for repetitive subsea operations to free up larger vessels.
- Lower risk solution for mooring lines and dynamic cabling.



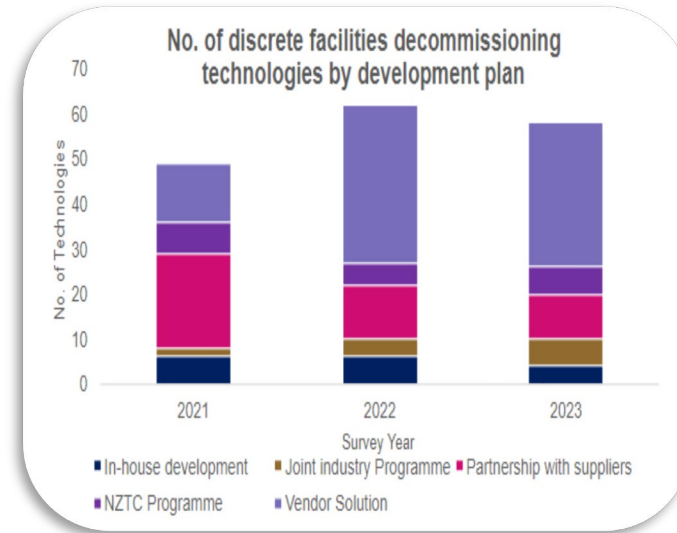
# General Decommissioning Needs and Pipeline Bundles Recovery

## Regulatory Needs of Decommissioning

- NSTA and OPRED support circular economy principles for decommissioning.
- Industry agreement to cut costs from £40 billion to £33.3 billion by 2028.
- £21 billion expected to be spent between 2023 and 2032.
- NSTA expects industry to deploy new, emerging and existing technology.
- Operators to increase participation in technology development and adoption.
- OPRED requires decommissioning plans for all pipeline bundles in the UK North Sea.
- OPRED has mandated that the abandonment of pipeline bundles “in-situ” shall no longer be approved, and a “clear-seabed” policy is required.
- 87 pipeline bundles, over 300km in UKCS, 80% <1m diameter, c.1 tonne/m

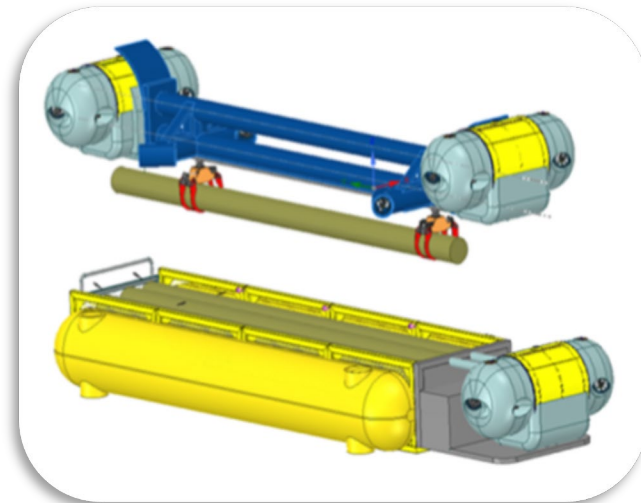
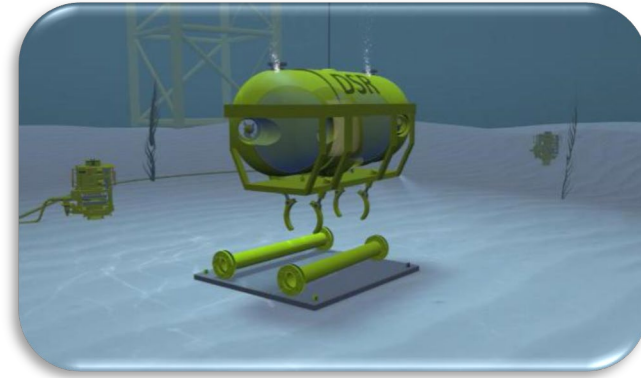
## Decommissioning Operational Opportunities

- Need for cheaper, repeatable, autonomous solutions with low emissions.
- Solutions need circular principles “make-use-recycle”, not “take-make-dispose”.
- Deploy solutions for lifting and handling infrastructure across all subsea sectors.



# ROVAR Technology – Key Features and Products

- Global 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, positioning control system, and axes sensing ;
  - Bespoke tooling and thrusters for handling and lateral positioning;
  - Lift repeatability varies with dewar caisson sizing, load and depth;
  - Intellectual property across patent families in Europe, Americas and China.
- Standard system, **ROVAR-20**: 20Te lifting and handling underwater vehicle specifically designed as vessel backdeck equipment for mobilisation during decommissioning and construction support across all offshore energies sectors.
- **ROVAR-BB** (Buoyancy Beam) designed to handle and spread the load of long structures underwater 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 both delivery and recovery for multiple items with independent and controllable lift.



# ROVAR Applications – Decarbonisation & Energy Transition

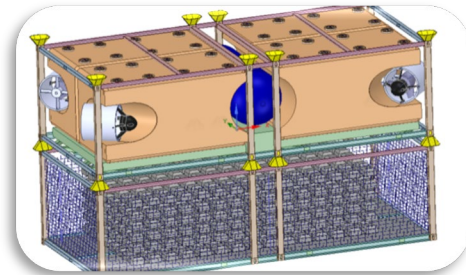
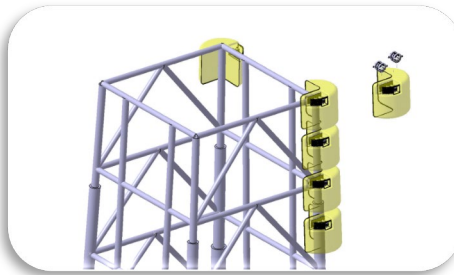
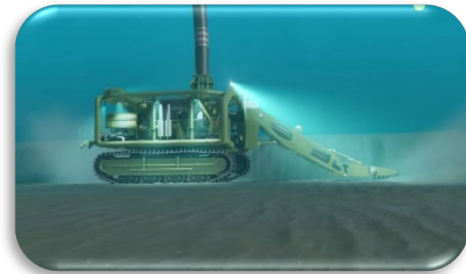
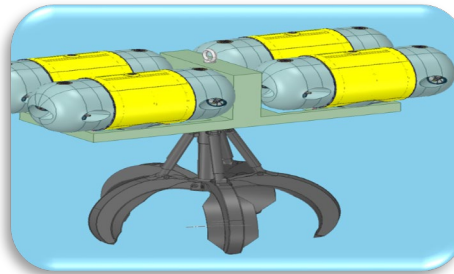
## Core Solutions / Decarbonisation & Energy Transition

- 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

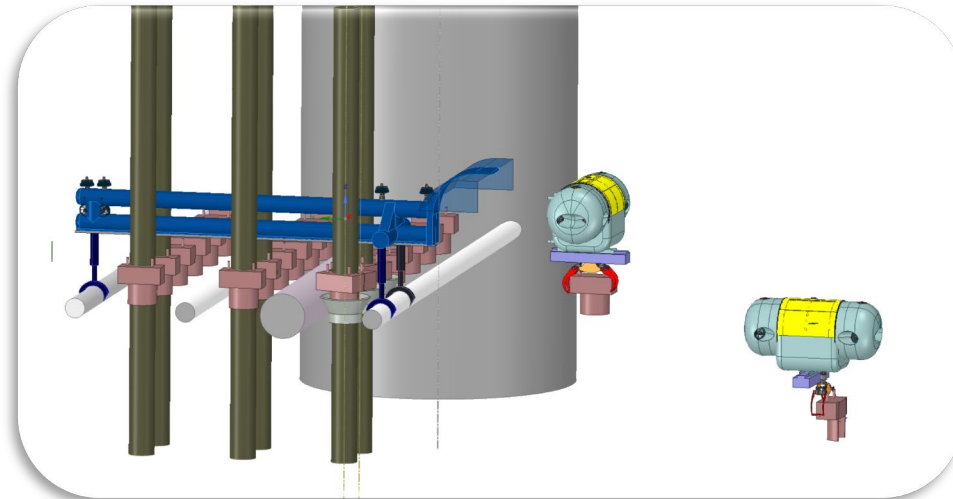
- “Pick and Place” and “Hunt and Gather” modes.
- Debris clearance and removal, “lift and shift”.
- Payload compensation for subsea and seabed vehicles.
- Small jacket lift and recovery, 1000+ Tes.
- Moonpool version for gantry lifts e.g. mattress deployment.
- Salvage and recovery of lost and derelict equipment i.e. ghost gear.



# ***ROVAR Application for Decommissioning Services***

**Decommissioning for oil & gas congested field clearance, removal and recovery:**

- **ROVAR-20 can be deployed from simple and small vessels, or from oil & gas and offshore wind platforms.**
- **Ancillary equipment includes ISO LIN container for refuel, power and control umbilical and multiple grabs.**
- **Dry lift weight less than 4Te with detachable wet-hook, and operating capability up to 20Te.**
- **Cycles 20Te loads surface to seabed, 8 times in 100msw, and 4 times in 200msw, with more cycles for lesser loads.**
- **ROVAR-20 is the perfect tool where there is restricted access in congested fields around fixed and floating platforms.**
- **Ideal for general decommissioning activity for the repositioning, removal and recovery of both subsea and seabed infrastructure for any sector application: Oil & Gas, Offshore Wind, Offshore CCS and Hydrogen, Defence and Aquaculture.**



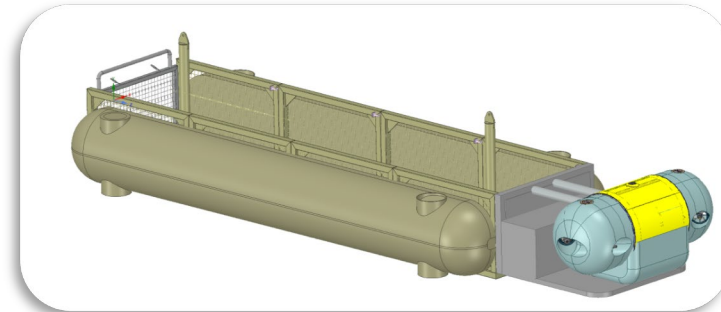
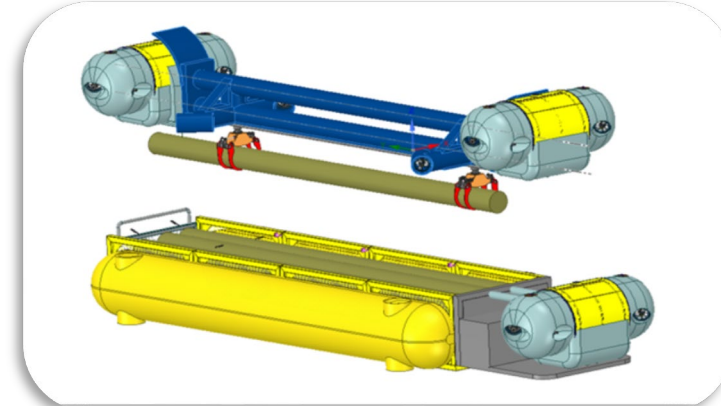
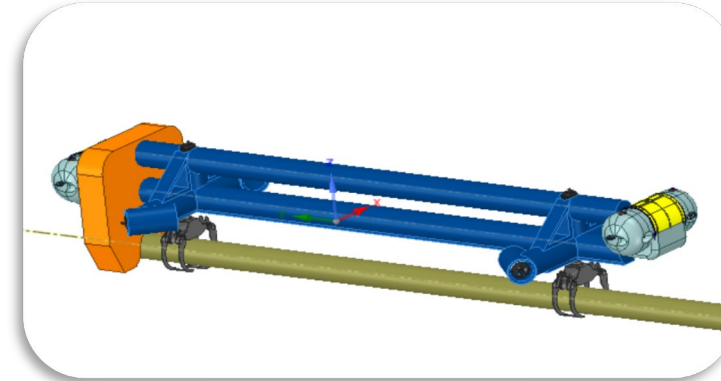
# ROVAR Application for Recovery of Pipeline Bundles to Barge and to Land

## Wet Basket and Barge Transfer Solution:

- *ROVAR* in two configurations, with *ROVAR-BB* operating as a cutting and handling beam for c.20m pipeline sections, and a *ROVAR-WB* unit operating as a controllable buoyancy Wet Basket.
- Recovery of the bundles to barge involves *ROVAR-BB* segmenting c.20m sections, handling into *ROVAR-WB* baskets, and then floated to the surface for transfer to a submersible barge and tug tow to land.

## Long Section Chained Tow to Land:

- Recovery without submersible barges has *ROVAR-BB* segmenting longer bundle lengths for tug tow to the coastal recycle yards.
- This solution uses *ROVAR-BB* in both cutting and lifting units to section c.150m lengths of pipeline bundle, stop or crimp the ends of the bundle sections and then lift to the splashzone.
- Once at the splashzone, conventional buoyancy units are supplemented for safety and chain-linking multiple sections for tow to recycling yards.
- On arrival at the yards, the chained sections would be lifted by quayside crane for processing and recycling.





# Key Points & Asks

- **ROVAR technology fully scalable to multiple oil & gas and offshore wind uses:**
  - Technology proven to TRL6+, preparing for TRL7, market ready end 25 start 26
- **Market driven Products:**
  - 20Te multi-purpose for extending capability of smaller non-DP vessels;
  - Buoyancy Beam for pipelines recovery, and positioning of mooring lines and cabling;
  - Buoyant Wet Basket for seabed repositioning, and self-lift seabed to surface.
- **Oil & Gas and Offshore Wind applications:**
  - Oil & Gas field clearance, removal and recovery, 10s to 100 Tes;
  - Decommissioning of oil & gas pipeline bundles for cutting, lifting and tow;
  - Construction support for infrastructure, both offshore wind and oil & gas;
  - Lifting and positioning of mooring lines and cabling for floating wind.
- **Partners and Supply Chain Collaboration required:**
  - Participants for final development & field trials of new UK technology;
  - Supply Chain / JV Partners (subsea engineering and marine contracting) for gotomarket;
  - Investing Partners for commercial deployment and scaleup.





# Smarter Subsea Handling

Pioneers in controllable buoyancy

**Marine cleantech variable buoyancy systems for the underwater and seabed lifting and handling of offshore energies and defence infrastructure**

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