

# *Smarter Subsea Handling*

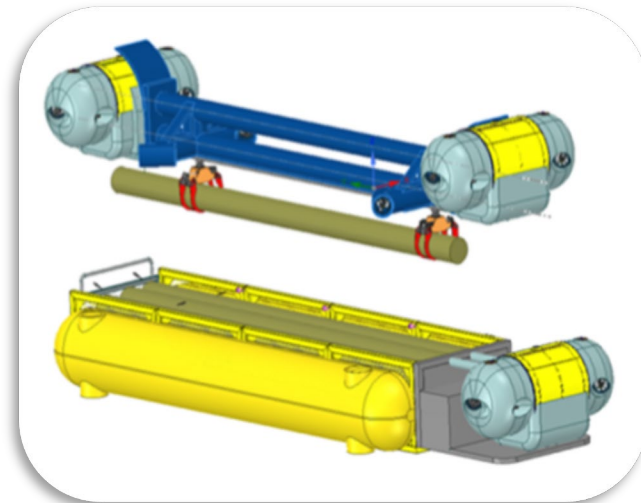
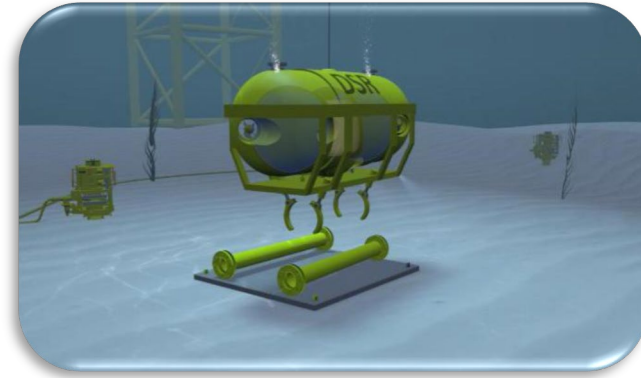
**Marine cleantech variable buoyancy systems for the underwater and seabed lifting and handling of offshore energies and defence infrastructure**

***ROVAR-20: Multi-functional Lifting and Handling Systems for Subsea Infrastructure Construction Support and Removal***



# ROVAR Technology – 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 and release gas in caissons, with control system and 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.
- **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 and recovery with independent and controllable lift.



# ROVAR Solutions – Core and Additional

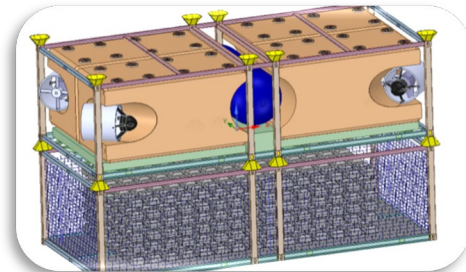
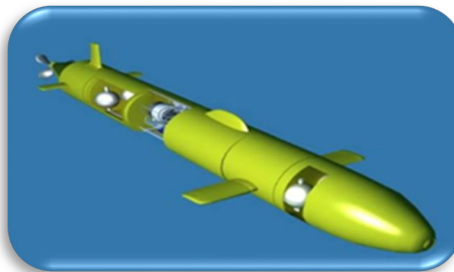
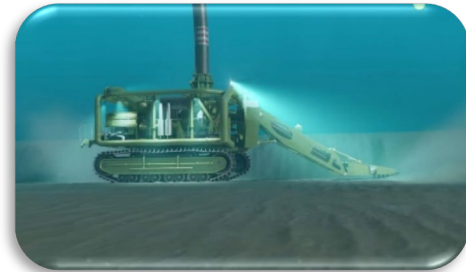
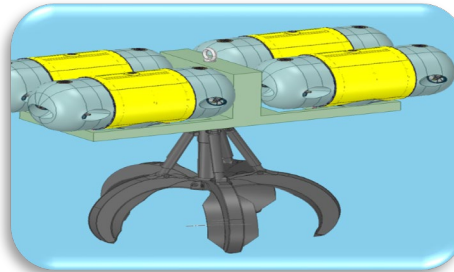
## Core Solutions / Decarbonisation & Energy Transition

- Decommissioning for oil & gas congested field clearance, removal and recovery, 10Tes 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.



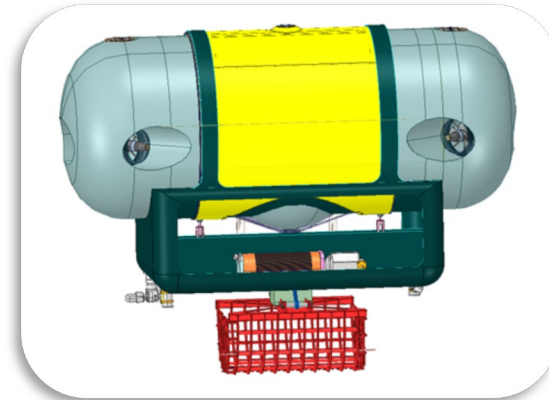
## Additional Solutions & Product Variations

- “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-20: Product Specification

- Smarter Subsea Handling has developed its standardised ROVAR-20 system, as an multi-functional 20Te underwater crane and subsea forklift.
- ROVAR-20 is configured around the proprietary variable buoyancy technology of Smarter Subsea Handling: ROVAR (“remotely operated vehicle for asset recovery”).
- ROVAR-20 can be configured with interchangeable grabs and attachments, allowing a full range of load shapes and sizes to be recovered.
- The operating sequence would normally be for ROVAR to be deployed from backdeck of a support vessel, though it can also be deployed from fixed and floating platforms.
- ROVAR-20 can lift and handle loads up to 20Te in all axes, for either the repositioning or removal of loads on the seabed, or for recovery of loads to surface.
- ROVAR-20 is ideal for “hunt and gather” and “pick and place” modes of operation where loads need moved to and from wet baskets, or for lift to backdeck or barge.
- The ROVAR-20 operating scope allows multiple lifts of up to 20Te, with extended repeatability for smaller loads.
- ROVAR-20 has a footprint of approx. 18m<sup>2</sup> and height of 4m, and is ideal for location backdeck on small vessels wanting to extending their capability.
- Buoyancy is provided from an integral liquid nitrogen supply which, on gasification, de-ballasts water from in-built caissons.
- Advanced systems control positioning, rate of ascent / descent and navigation.



# ROVAR-20: Product Uses and Operating Requirements

## Product Core Use:

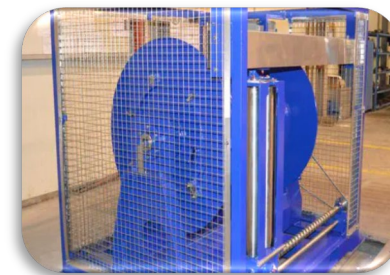
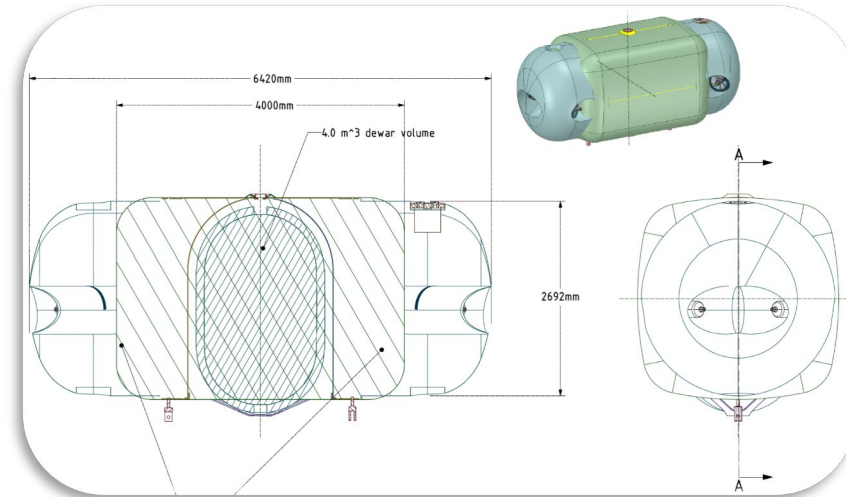
- Subsea and seabed all-axes lifting and handling which is not dependent on vessel positioning.
- Deployed as an underwater multi-functional crane and forklift.
- Operates in “hunt and gather” or “pick and place” modes capable of lifting up to 20Te, and larger loads in multiplex configuration.

## Uses for Oil & Gas and Offshore Wind

- Decommissioning for congested field clearance, removal and recovery.
- Construction support for infrastructure deployment, both offshore wind and oil & gas.

## Operating Requirements

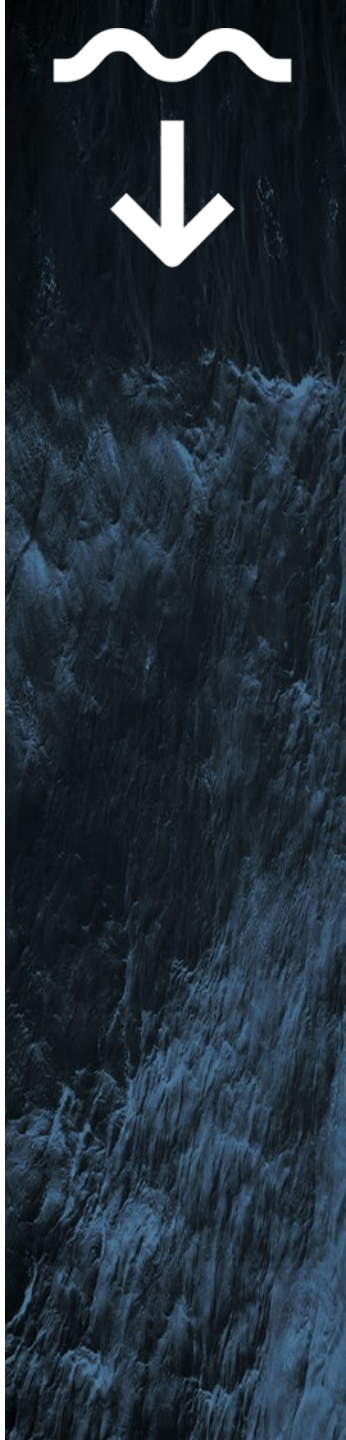
- Launch and Recovery 3+Te crane or A-Frame for deployment.
- Deck space: 18m<sup>2</sup>, LIN 9-18m<sup>2</sup>, Grab 1-5m<sup>2</sup>/each, Tether 1-2m<sup>2</sup>.
- Piloting and control centre for 2x2 persons (24hr operation).
- Power demand from 50kW to 250kW, 400 / 440 VAC 3 phase.
- Power from vessel or dedicated generator.



## ***Use Example: General Construction Support***

Construction support for infrastructure deployment, both offshore wind and oil & gas.

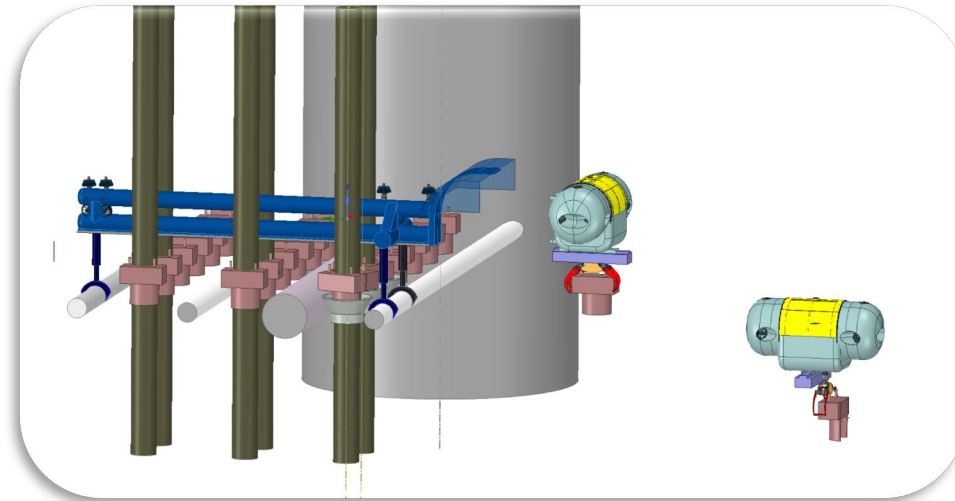
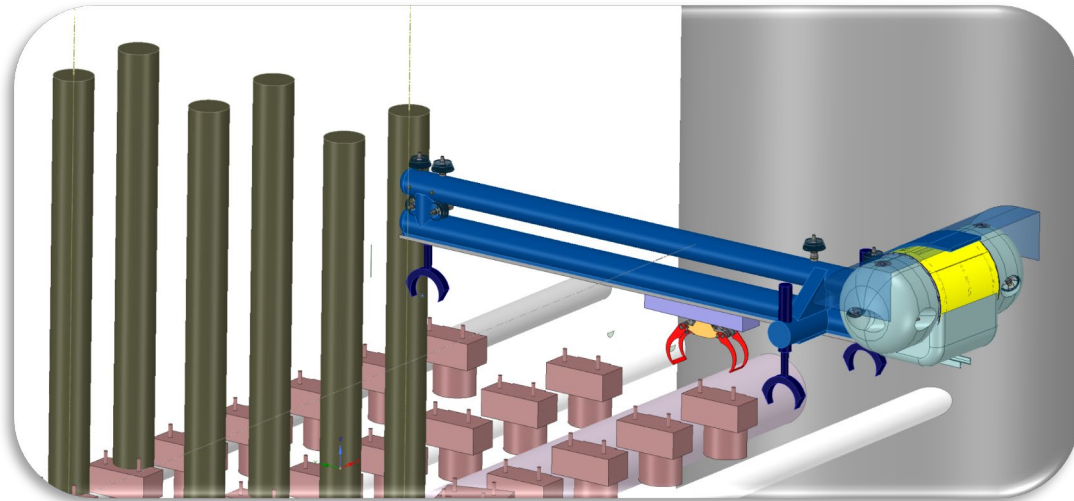
- ROVAR-20 is located aft on simpler and small operating vessels, enabling the same capability as larger vessels.
- Aft ancillary equipment includes ISO LIN container for refuel, power and control umbilical and multiple grabs.
- Dry lift weight less than 4Te, with operating capability up to 20Te, needing no vessel dynamic positioning.
- 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 for “lifting and shifting” operations on the seabed.
- Ideal for general construction support for moving marine infrastructure for any sector application: Oil & Gas, Offshore Wind, Offshore CCS and Hydrogen, Defence and Aquaculture.



# ***Use Example: General Decommissioning Services***

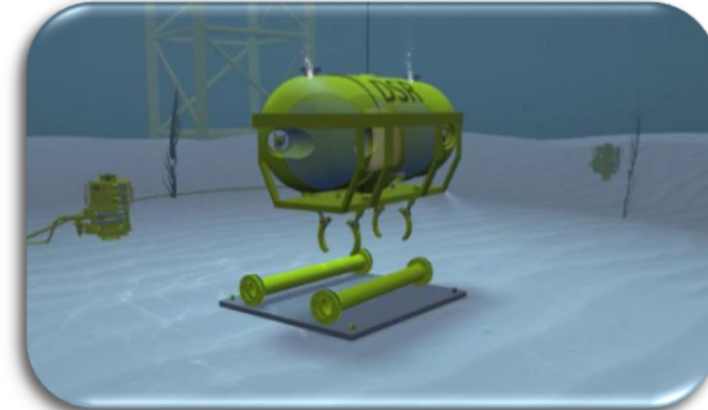
**Decommissioning for oil & gas congested field clearance, removal and recovery**

- **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-20 Opportunity Value

- **Feasibility:** All ROVAR solutions are multi-functional for decommissioning and construction support to both oil & gas and offshore wind.
- **Flexibility:** ROVAR-20 operates in multiple modes as underwater crane and seabed forklift.
- **Cost Effective:** ROVAR-20 operates from simpler and smaller vessels, thereby reducing cost per tonne lifted compared to larger vessels.
- **Reduced Emissions:** Large crane capacity is not required for repeatable lifts meaning smaller vessels deployed, reduced marine costs, reduced lifting risks and lower carbon emissions.
- **Repeatability:** ROVAR-20 allows multiple lifts on-location without large vessel spreads, with “hunt and gather” and “pick and place” capability for lifting and shifting loads on seabed and to and from wet baskets.
- **UK Supply Chain:** Provides credible options for using smaller, fit-for-purpose, lower-cost vessels in bottlenecked vessel market.
- **Multi-tasking:** Facilitates simultaneous operations, increasing supply chain efficiency and productivity.
- **Standardised:** System integrates industry standard subsea lift and grab tooling with options to include variety of subsea cutting tools.
- **Amortised Costs:** ROVAR-20 typically day rates at 40kGBP, though for large programmes, costs can be amortised to reduced day rates. Using simpler vessels, ROVAR-20 considerably undercuts CSOV and DSV costs.





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