BENTHIC MAGAZINE

Deep·C®

TABLE OF CONTENTS

PRECISION AT DEPTH

The seabed is where every offshore story starts. It is a place of pressure, movement, and complexity, and it forms the foundation of everything we build. Deep C designs the tools that shape this world beneath the surface, engineered for precision and lasting performance.

Odd Gustav Kvalvåg, CEO

WHERE SCIENCE MEETS THE SEABED

NORCE has developed the PAMS (Polyp Activity Monitoring System), an innovative sensing technology and methodology to monitor coral welfare in their natural environment, and impacts resulting from use of the ocean space.

The use of space and resources at the ocean seafloor for humankind is creating challenges for marine life sustainability. This is particularly true for sessile bottom life such as deep-sea corals, which are at risk. These organisms and the habitat they represent for several other species of the ocean, including fish, are often considered hotspot of life with important role and function that need protection. In fact, industrial “License to operate” in areas with corals is regulated to avoid harm to corals. Observing these deep-sea key formations over time for signs of welfare changes requires specific non-intrusive technology and methodology. This has driven the development of PAMS at NORCE.

PAMS is based on detailed knowledge of deep-water coral biology and novel image analysis with machine learning capability to measure key attributes of coral and more specifically coral polyp behavior. The polyps are tiny anemone-like individuals that together form huge colonies that most shallow and deep-sea corals are made of. The polyps and their fragile tentacles are living entities that move in and out of their sheltered skeleton and they interact constantly with their environment for example to catch feed. These movements can be recorded using time-lapse images and their analyses can reveal important key aspects of coral welfare. But how does PAMS work in practice?

PAMS combines a hardware and software delivery – The PAMS hardware uses mostly off-the-shelf components such as "GoPro" cameras inside specifically designed commercial housing, rated to depths of 1000m, whereas most GoPro users are restricted to shallow waters. Mounted on a small-sized stainless-steel structure, the cameras are controlled by an external PAMS electronic unit, providing a larger span of settings and user-dependent modularity to control when and how frequently each image are collected. A lighting system is designed to provide powerful beams of light when cameras are turned on. The system is standalone, powered by external batteries to sustain weeks of deployment. An independent live-view module cabled to a PC on the deck, and based on components found in commercial ROVs such as raspberry Pi camera module interfaced to Fathom-X board, is used during descent of the lander for navigation purposes to obtain sharp real-time footage, necessary to guide the deck operator for the PAMS landing at the seafloor with corals. No need for extra costly ROV to operate PAMS. The PAMS software uses a machine learning model for coral image analysis and shortly, the coral status classification is based on the recognition of 3 coral categories; “polyp extended”, “1/2 extended” and “retracted”; each associated with a probability of accuracy, providing an instantaneous physiological status of the coral.

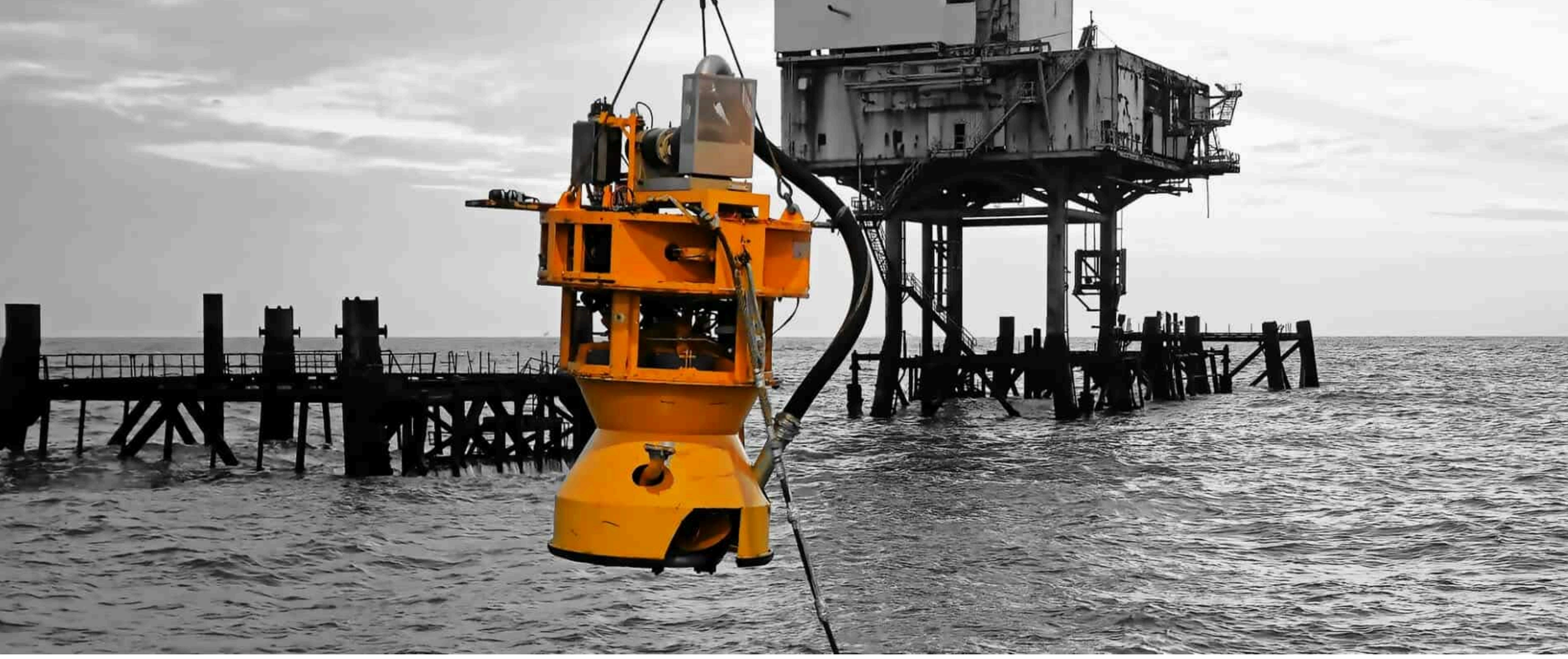
For friendly interface with the user, PAMS dashboard uses an open-source data visualization platform (Grafana) to display the coral images before and after ML treatment. Time-series panels show how coral status and the model’s probability of accuracy change over time, for a selection of corals from the imagery. This helps users track trends, spot anomalies, and assess the reliability of the predictions, from which decision can be made. Users can filter coral data by site, camera, coral, and status, and navigate through different timestamps to investigate specific events or periods.

PAMS is not yet at a final stage of development and there are several custom options that can be added. However, PAMS is now listed by DNV as a coral monitoring solution in relevant guidelines. In fact, PAMS is today one of the few technology solutions that is based on true coral biology response and potentially can be used to support risk evaluation for deep-sea coral impact. The proof-of-concept of this new device was made possible through several industrial projects and the full prototyping funded by the research council of Norway under their commercialization project program.

Thierry Baussant,
Chief Scientist, NORCE

OPERATIONAL DOMAINS

Engineering precision across offshore environments.



Securing Energy Infrastructure

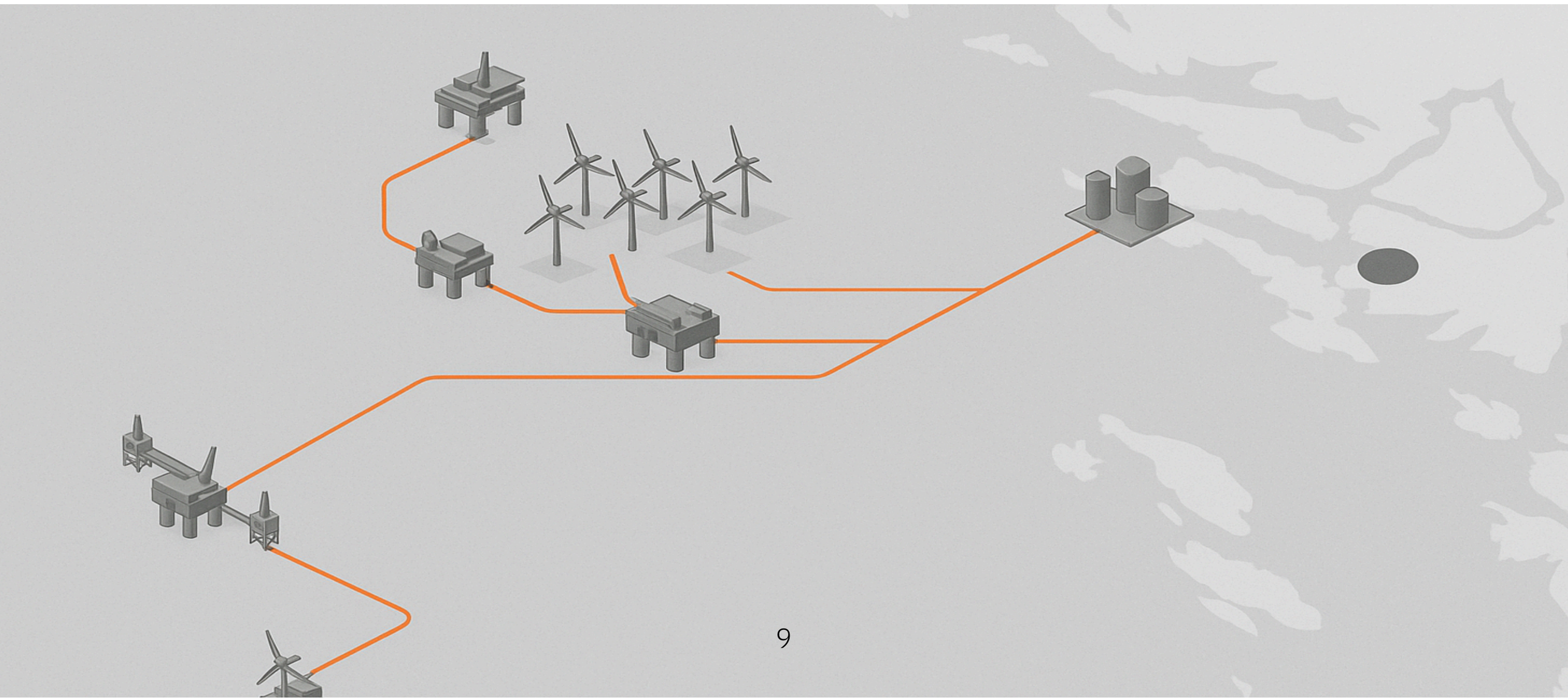
Precision trenching and stable burial for subsea cables and pipelines.

Beneath the Grid

Cables and pipelines keep societies running, but the seabed is rarely flat. Even small irregularities can cause free spans, buckling, and strain. Over time, shifting sediments or poor backfill can compromise integrity and shorten asset lifespan.

Engineered for Stability

Deep C delivers stability where it matters most. The Controlled Flow Excavator (CFE) ensures precision trenching and solid backfill, while the ROV Trenching Skid offers compact flexibility. Together, they keep subsea infrastructure safe, stable, and efficient — even under demanding seabed conditions.



Foundations That Endure

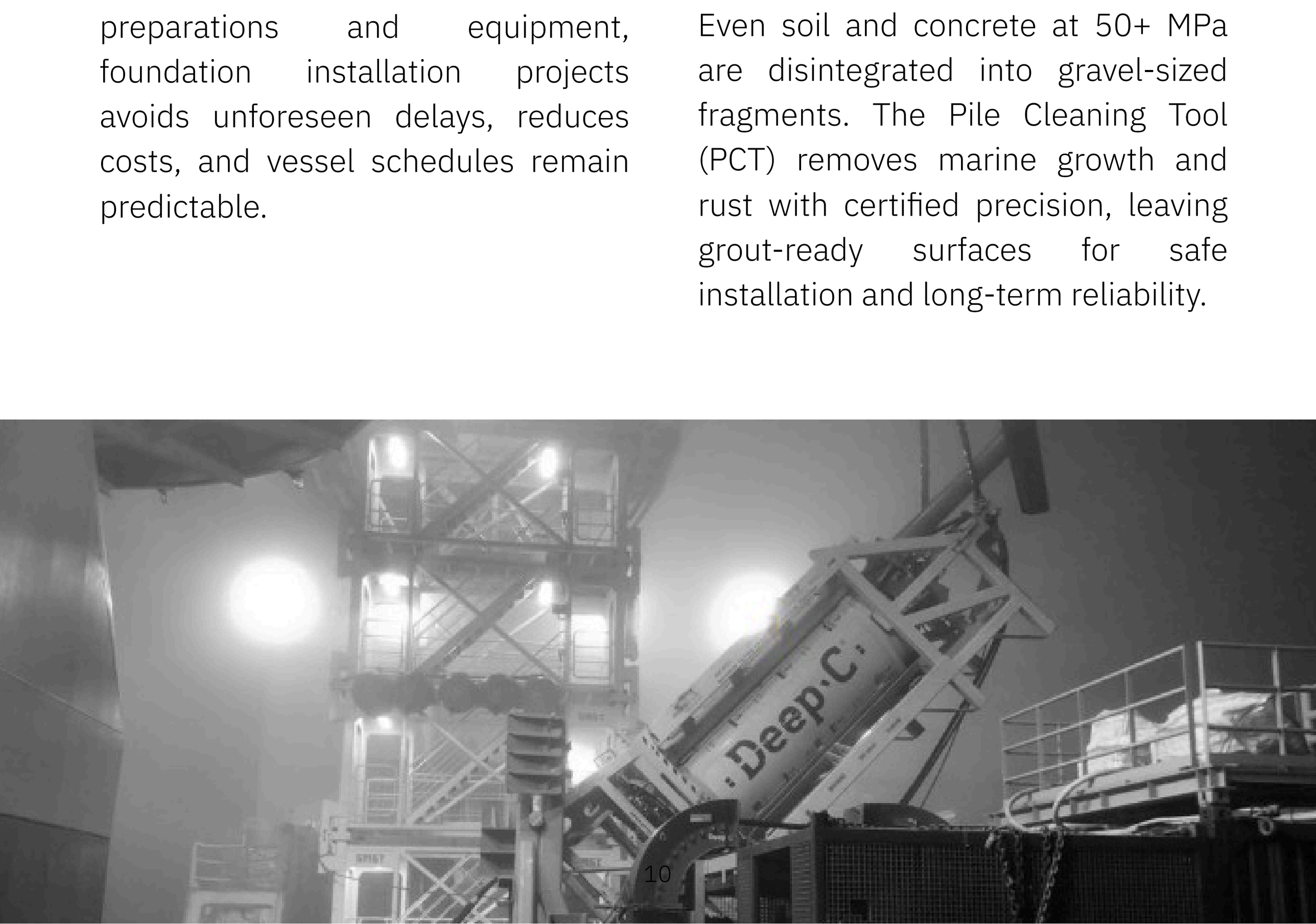
When pile preparation meets the toughest conditions.

Where Strength Meets Resistance

Offshore piles face tough conditions: hard and compacted soil, rust, and marine growth. With proper preparations and equipment, foundation installation projects avoids unforeseen delays, reduces costs, and vessel schedules remain predictable.

Prepared For The Unexpected

The Soil Plug Removal Tool (SPRT) operates independent of crane and uses patented water-based jetting. Even soil and concrete at 50+ MPa are disintegrated into gravel-sized fragments. The Pile Cleaning Tool (PCT) removes marine growth and rust with certified precision, leaving grout-ready surfaces for safe installation and long-term reliability.



Mastering Every Seabed

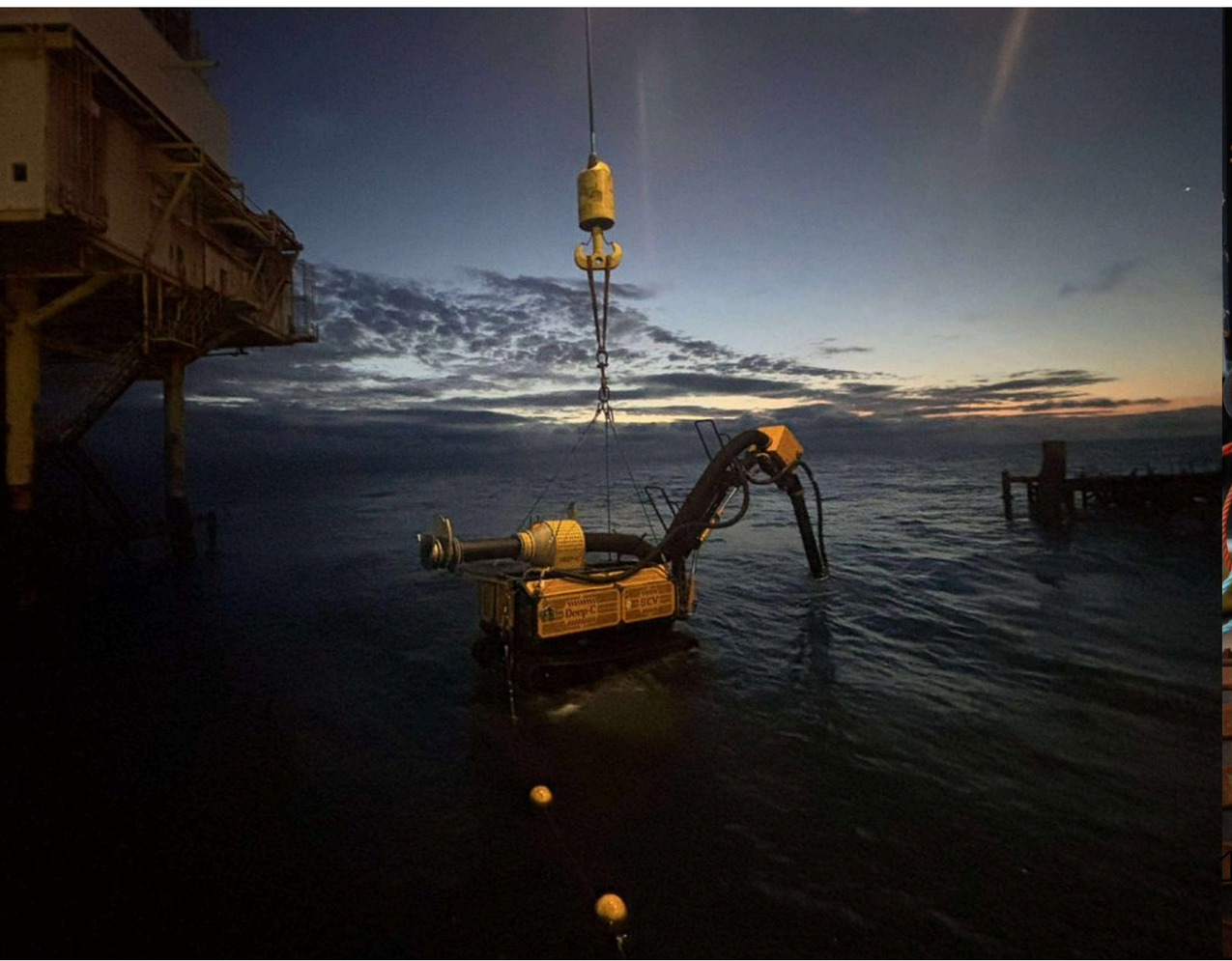
The harsh realities beneath offshore projects.

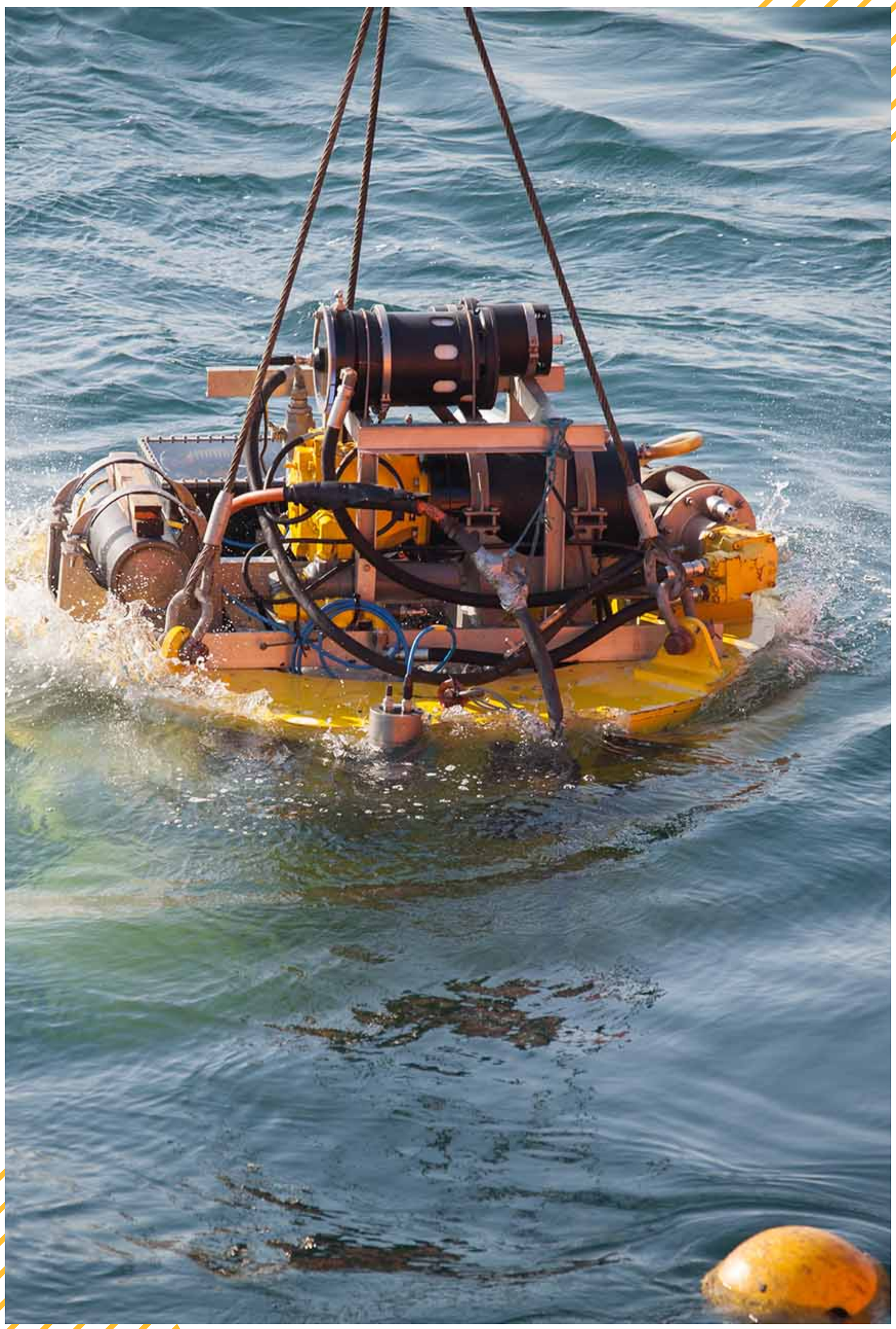
Seabed Conditions

Seabeds are rarely soft and predictable. Rocks, high shear strength, unstable sediments, and shifting pressures challenge both equipment and operators. Left unmanaged, these conditions can block paths, slow excavation, increase costs, and compromise safety.

Our Engineered Approach

Deep C offers a fleet of subsea vehicles built for any seabed. The SCV and SUV handle demanding excavation and intervention. The ROV Dredgers clears mixed soils, while the Heavy Duty Subsea Dredgers takes on large volumes and coarse material. And when boulders block the way, Boulder Grabs removes them safely and efficiently.

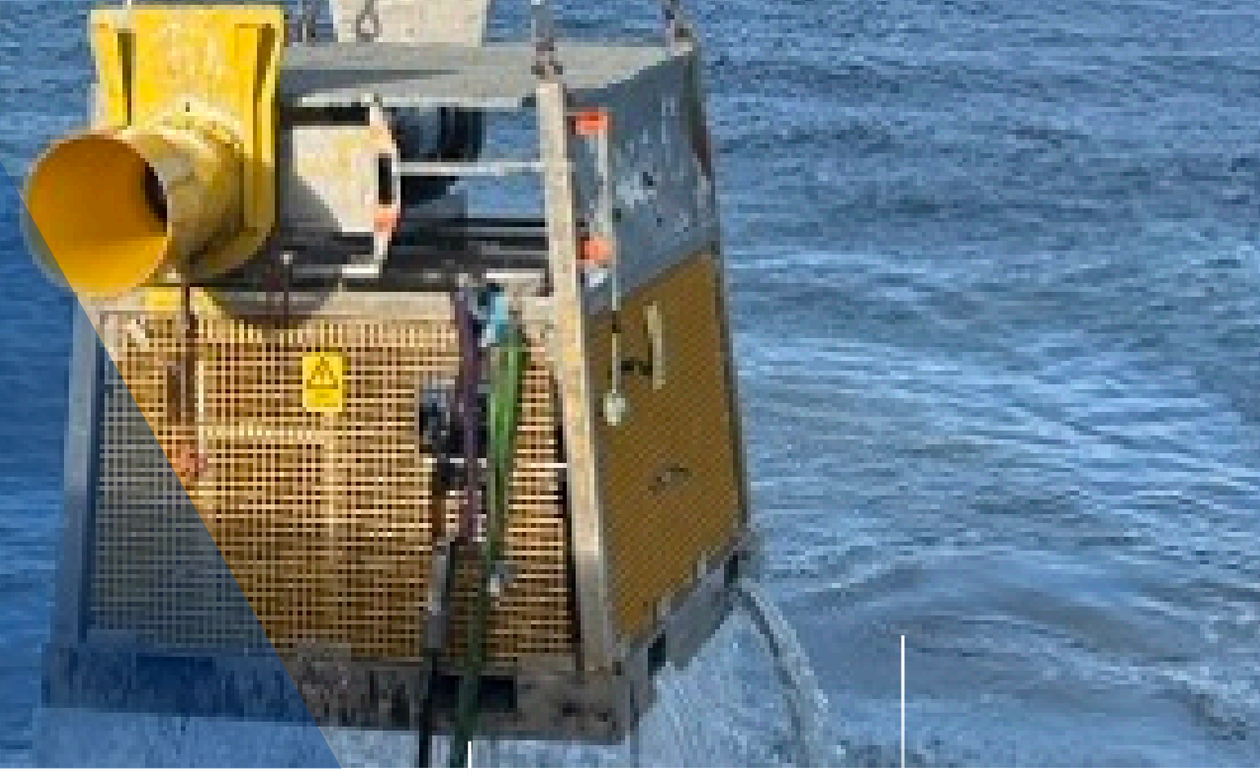




CASE STUDIES

Precision Excavation for Subsea Scanning

How Deep C delivered a scan-ready excavation under low-visibility clay conditions



Project Overview

In August 2024, Deep C supported a subsea excavation in the North Sea to enable pipeline scanning. The objective was to create a precise excavation under and around the pipe. It had to be large enough to accommodate washing clamps and scanning tools. The work took place in soft clay and silt conditions that severely reduced visibility during jetting. Careful schedule discipline and plume control were essential to avoid delays further down the line.

The Deep C Solution

Deep C deployed a crane-hung Suction Head paired with a 14” Subsea Dredge spread and introduced an integrated jetting system mounted directly on the inlet. This configuration broke up cohesive clay immediately ahead of suction, improving material uptake and reducing re-deposition under the pipe.

To manage visibility, operations were carefully paced to allow plumes to clear between passes in line with prevailing currents. Tool routing and hose management were optimized to reach directly beneath the pipeline despite tight geometry, ensuring a safe and effective excavation process.

Results

The excavation was completed successfully and provided the required clearance for scanning, including safe access beneath the pipeline. By combining the suction head with an integrated jetting system, the team was able to overcome challenging clay conditions and maintain control throughout the operation. The approach ensured that visibility management was handled effectively, and the excavation was delivered to specification without disruption to the overall schedule. The client received a scan-ready pipeline section prepared in line with their requirements, demonstrating Deep C’s ability to adapt equipment and methods to complex seabed conditions.

Baltic Pipeline Repair

How Deep C enabled safe and timely repair of the Baltic Connector pipeline

Project Overview

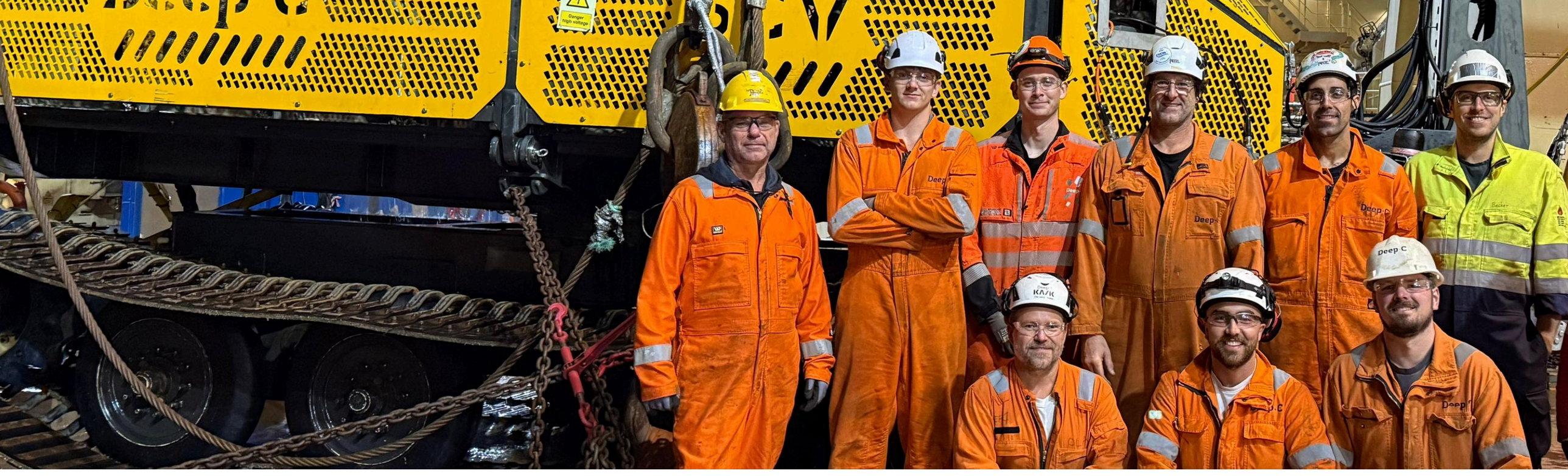
In early 2024, Deep C supported the emergency repair of the Baltic Connector subsea pipeline after it suffered damage at 60–70 metres water depth in the Gulf of Finland. The incident created an urgent need to expose and cut the pipeline so that a new spool piece could be installed. For the client, time was critical: safe and timely repair was essential to restore integrity and minimize disruption.

The Deep C Solution

Deep C delivered a compact subsea dredging and cutting spread designed to perform under cold, brackish water conditions and within strict deck space limitations. The dredging system enabled efficient clearance of multiple locations along a 3.3 km stretch of pipeline without interfering with parallel deck operations.

To secure precise cuts on the 20” concrete-coated pipeline, Deep C deployed diamond wire saw technology that had been pre-tested on identical pipe geometry to guarantee offshore reliability. With ROV-assisted alignment and contingency tooling in place, the operation was executed with accuracy and control.

When extreme cold briefly affected the dredge pump during startup, Deep C’s crew implemented a rapid winterization measure, restoring full functionality in less than an hour and ensuring the schedule remained intact.



Water depth
~60–70 m

Pipeline
20” diameter

Scope
3.3 km stretch
7 precision cuts

Operation time
~12 hours subsea execution

Soil condition
Soft clay & pre-lay rock crossings

Results

The subsea operation was completed in approximately 12 hours at ~70 m water depth. All cuts were delivered according to specification, with pipeline ends successfully repositioned and prepared for the new spool. Despite the freezing incident, no time was lost on the overall schedule.

Key success factors included compact dredging systems that minimized deck footprint and the precision of the diamond wire saw, which had been validated prior to deployment. The client expressed satisfaction with the safe and efficient execution, and the lessons learned have already informed Deep C’s procedures for winterization in brackish water.

PRODUCT PORTFOLIO

Beneath the surface lies everything we build for. Every tool tells a story of precision and purpose. The seabed is truly unpredictable. That's why we design for it.

Audun Lie Dahl, COO

Services

Tool pool

Controlled Flow Excavator (CFE)

Precision trenching. Maximum control. Minimal environmental impact.

The CFE is Deep C's next-generation mass-flow excavator, engineered for controlled trenching and seabed excavation. Its hydrodynamic nozzles delivers high flow capacity while maintaining visibility and preventing over-fluidization of the seabed — ensuring accuracy even in challenging soils.

Flow	Trenching Depth	Operating Depth	Power
Up to 5.0 m^3/s	4.0 m	2000 m	Electric, 190 + 95 kW

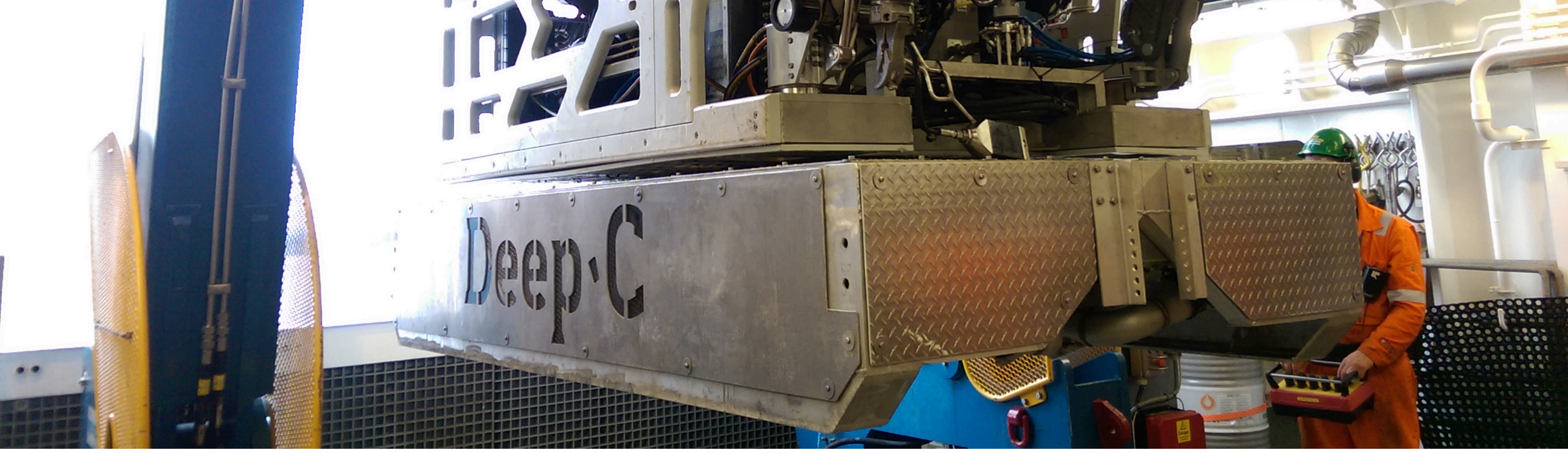
Applications

- Cable and pipeline burial
- Seabed profiling and rock dump removal
- Trenching and clay cutting
- Free span correction

Deployment & Operation

The CFE is deployed directly from a crane wire — no guide wires or complex rigging required. A dedicated pedestal ensures safe handling during launch, landing, and storage. Heading and thrust can be controlled manually via joystick or in automatic mode for precise positioning, even in low visibility or strong current.

Learn more



ROV Trenching Skid

Compact precision for cable and pipeline burial.

The ROV Trenching Skid is a compact trenching system designed for umbilicals and cable installation. Powered directly from the ROV's hydraulic supply, it requires no deck space, no additional crew, and minimal mobilization time. The adjustable ROV interface fits a wide range of work-class ROVs, making it a versatile solution for trenching in confined or remote locations.

Power Supply
From host ROV hydraulics

Trenching Depth
1.7 m

Interface
Adjustable WROV frame

Mobilization
Rapid setup
no deck gear

Applications

- Umbilicals
- Fiber optic & seismic cables
- Shallow trenching and backfill
- Rapid mobilization

Deployment & Operation

Mounted directly beneath the ROV for trenching, burial, and backfill. Fully operated from ROV control system with visual feedback. Compact design allows access to tight subsea areas.

Learn more

Soil Plug Removal Tool (SPRT)

Efficient, precise, and predictable pile preparation.

The patented Deep C® SPRT combines powerful jetting, suction, and cleaning in one compact system. Designed for soil plug removal and internal pile cleaning, it operates without crane dependency or ROV intervention — saving deck space and reducing offshore time. With over 2,000 piles completed worldwide, it's recognized as the most efficient and field-proven pile dredging solution in the industry.

Jetting & Suction
Complete soil plug removal

Operation
Independent of crane & ROV

Control
Topside-operated via umbilical

360° Jetting System
Full coverage for fluidization & cleaning

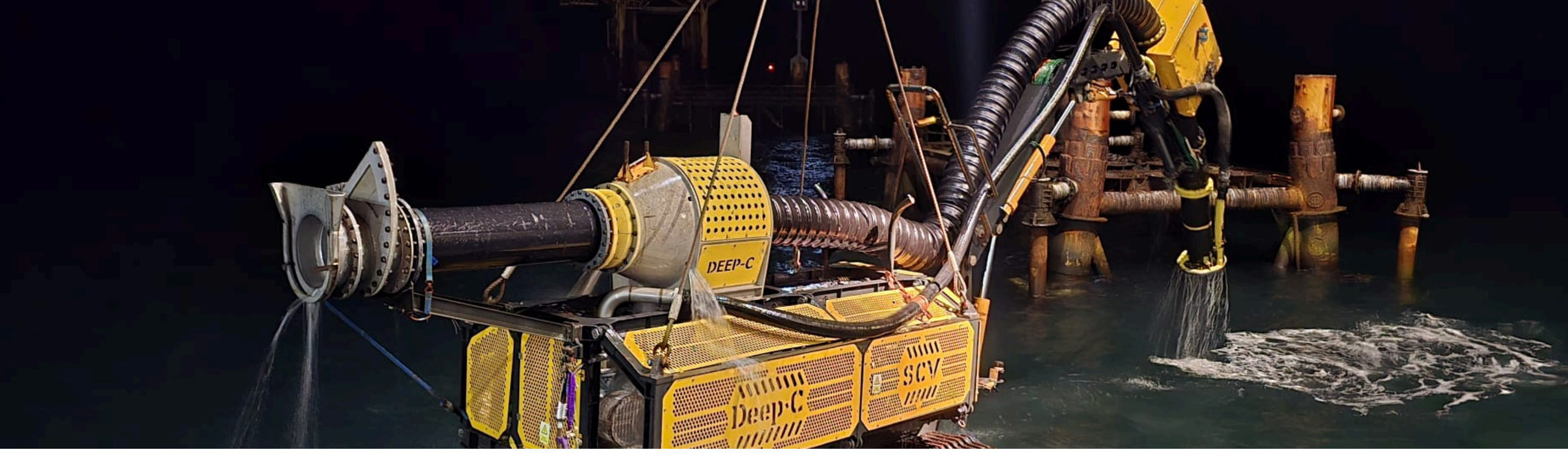
Applications

- Soil plug removal
- Internal pile cleaning and inspection
- Relief drilling support
- Grout-ready surface preparation

Deployment & Operation

Launched in a dedicated LRF frame that doubles as a transport unit. Lands directly on top of the pile for fully remote operations. Efficient dredging and cleaning in cohesive or hard sediments.

Learn more



Subsea Construction Vehicle (SCV)

Heavy-duty precision for subsea construction and intervention.

The Deep C® SCV is a heavy-duty tracked vehicle engineered for remote seabed operations. Equipped with a 20” unrestricted dredging system and a long-reach manipulator, it provides stability, power, and flexibility for demanding offshore tasks. Its tracked mobility and high-capacity excavation make it ideal for rock removal, decommissioning, and other heavy construction work.

Power	Tractive Speed	Operating Depth	Turret Rotation
Up to 490 kW electric	0-6 km/h	2000 m	360°

Applications

- Dredging and excavation
- Subsea construction and intervention
- Trenching, cutting, and inspection
- Heavy-duty tooling operations
- UXO clearance
- Decommissioning

Deployment & Operation

Deployed from vessel crane or moonpool. Operated remotely with precision control for stable positioning. Tracks provide mobility and control across uneven terrain.

Learn more

Subsea Utility Vehicle (SUV)

Tracked stability for demanding seabed operations.

The SUV is a remotely operated tracked vehicle built for excavation, cutting, and decommissioning. It combines high power with low ground pressure, allowing controlled movement and precise tool handling on any seabed.

Power
Up to 490 kW electric

Tractive Speed
0-6 km/h

Operating Depth
2000 m

Turret Rotation
360°

Applications

- Rock dump removal
- Dredging and excavation trenching
- Decommissioning and cutting
- Tooling operations
- Heavy-duty interventions

Deployment & Operation

Deployed from vessel crane or moonpool. Operated remotely with precision control for stable positioning. Tracks provide mobility and control across uneven terrain.

Learn more

Heavy Duty Subsea Dredge

High-capacity excavation for demanding seabed conditions.

The Heavy Duty Subsea Dredge is a powerful stand-alone dredging system designed for large-volume excavation and clearance. It delivers high flow rates with precise control, enabling safe removal of rock dumps, clay, and coarse sediments in deep and shallow waters.

Flow
Up to 16” unrestricted

System Power
Up to 285 kW

Dredge Power
95 kW (optional twin pumps available)

Integrated HPU
Up to 190 kW subsea unit

Applications

- Seabed profiling and rock dump removal
- Cable and pipeline deburial
- Clay cutting
- Sediment clearance
- Free span correction

Deployment & Operation

Operated from vessel crane or moonpool. Compact frame for efficient handling and recovery. Integrated subsea HPU provides full control of dredging and jetting functions.

Learn more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UTILIZE VESSELS
UTILIZE DECK SPACE

Deckplanner

When every square meter counts, precision and flexibility are key.

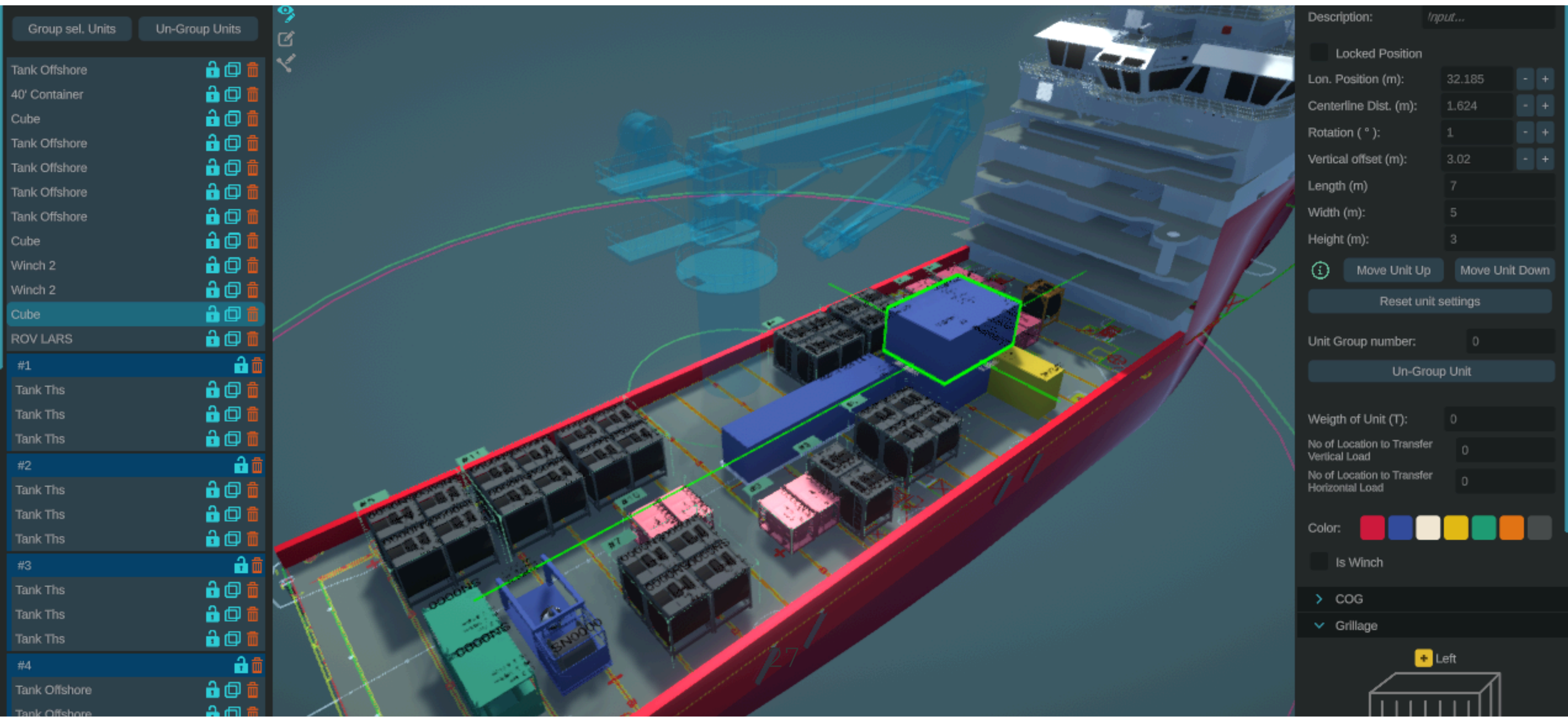
Deckplanner is a digital platform that transforms vessel mobilization from cluttered spreadsheets to fully interactive 3D layouts. In collaboration with Deep C, Deckplanner enables rapid, on-demand mobilization on almost any offshore vessel without long lead times or dedicated charters.

With integrated seafastening verification, real-time load calculations, and instant scenario visualization, project teams can plan, verify, and mobilize faster with fewer revisions and greater confidence.

Used across offshore energy operations, Deckplanner helps operators maximize the value of their existing vessel fleet, reduce idle time, and ensure full compliance with DNV and Eurocode standards all through an intuitive, collaborative interface.

Key advantages

- Rapid mobilization
- Faster layout planning
- Reduced interface risk
- Real-time collaboration



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