DEEPOCEAN

REACH SUBSEA

Uncrewed Surface Vessels

Reach Remote and **USV Challenger**

MOP - Marine Operasjoner i Praksis

Oslo, 21. april 2026

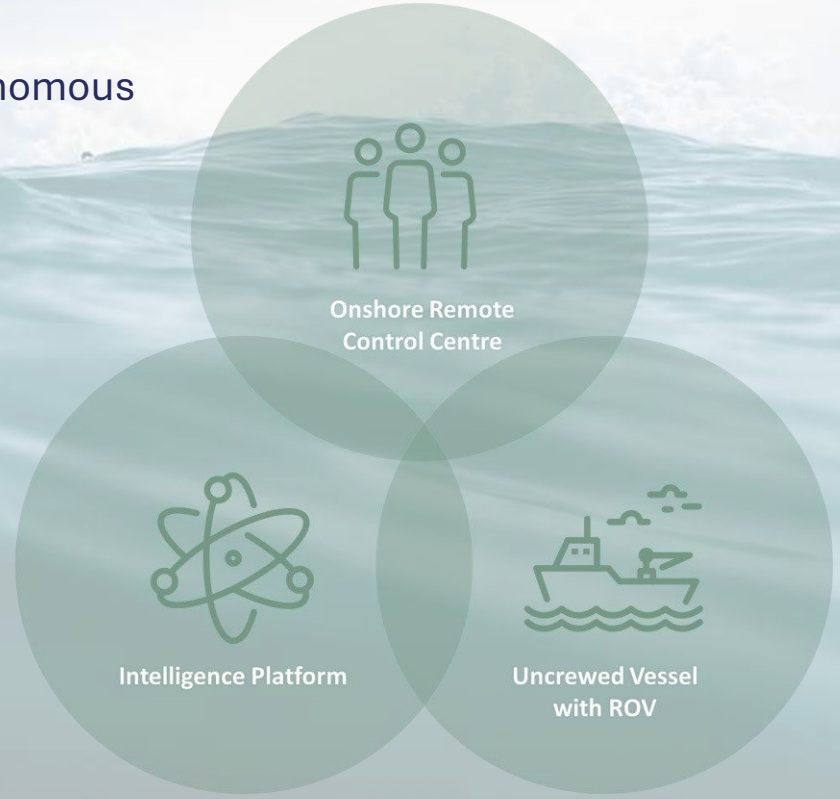
Uncrewed Vessels for Subsea Work

Reach Remote

USV Challenger

Similarities

- Approval and ROC
  - IMO MASS Degree 3 – remotely operated, no crew onboard – not autonomous
  - Third party technology evaluation by DNV
  - Approved by Norwegian Maritime Authority, Norwegian flag
  - Continuous human-in-the-loop control from purpose built Onshore Remote Operation Center (ROC)
- Vessel, ROV and ROC
  - Up to 30 days endurance for offshore operations
  - Steel offshore vessels (24m)
  - Battery-Hybrid Diesel-Electric power train
  - Dynamic station keeping capability (non-DP2)
  - Electric work-class ROVs using proven, existing tooling
- Communication
  - Redundant satellite and GSM communication platform
  - Real-time data sharing platform



Differences

Reach Remote

- No bridge or accommodation onboard
- Unmanned from day 1.
- Support Vessel used in test period
- Moonpool ROV launch
- Twin keel / skegs
- TMS for ROV free flying purposes
- Tool garages for IMR capacities

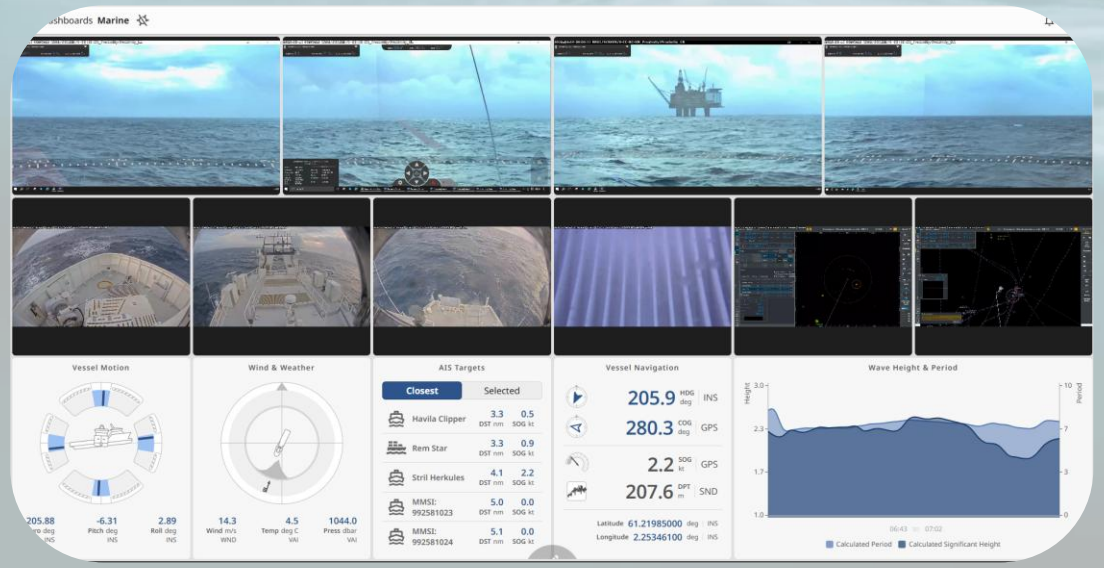
USV Challenger

- Bridge and day-time accommodation for test period and future technology development
- Over stern ROV launch and recovery
- Can be adapted for use with other systems
- Gyrostabiliser for reducing vessel movement
- Integration of > 25 different suppliers into one remote system
- No TMS - increased survey speed

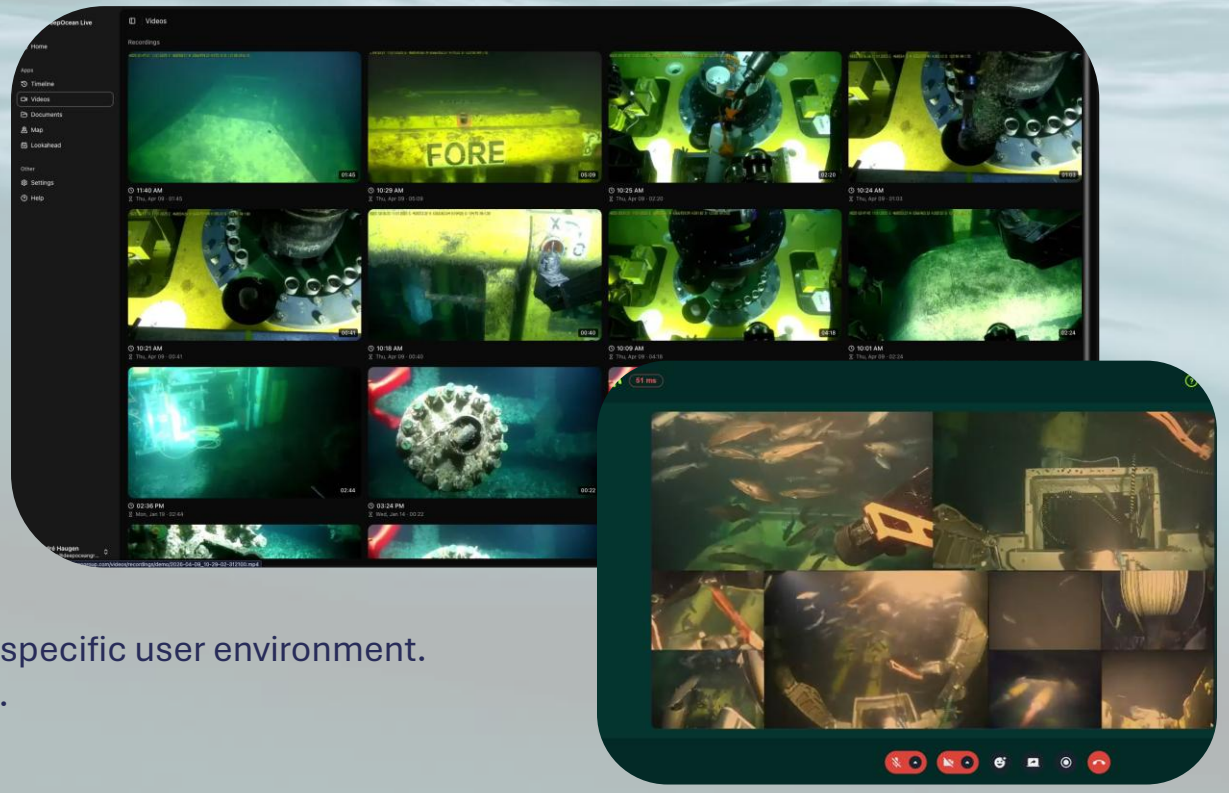
Situational Awareness Systems

Collaborative systems enabling flexible interaction

Reach Horizon



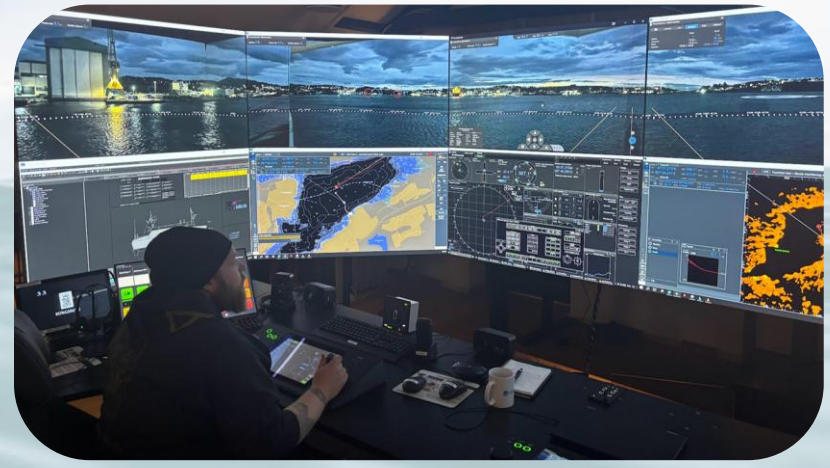
DeepOcean Live / Remota Access



Versatile web-based service portal with customized mission specific user environment.
Live data & video feeds, encrypted.

USV vs Conventional - ROC operators experience

- Same tasks and systems – operational feel largely unchanged
- Quiet operation – no vibration, no seasickness
- Onshore-based crew:
  - Home every day, closer to family
  - Part of both maritime profession and local community
- Reduced crew size:
  - Lower stress levels
  - More efficient use of key roles (e.g. Engine Attendant)
- No maintenance of safety equipment
- New operational requirements:
  - Increased planning (people, port calls, maintenance)
  - Higher focus on connectivity and communications
- Navigation close to shore:
  - Greater reliance on Radar and ECDIS
  - Visual navigation differs from conventional vessels



Approaching quay – mooring – mobilisation

- To / From quayside in DP or manual mode
- Manual mooring with quay-side personnel.
- No gangway onboard
- ISPS area with 24/7 CCTV surveillance
- Restricted onboard access – Work Permit required
- Vessel locked when not in use
- ROV preparation onboard or on quayside
- Flexible mobilisation:
  - Containerised spread (workshop, HSE, spare parts)
  - Light “car & carry” spread for short pit-stops

Reach Remote 2

Transit and operation in field

- Multiple transit modes:
  autopilot, track control and manual
- Pre-defined routes with waypoints
- Safe operations supported by
  - Radar, ECDIS and Proximity View
  - Gyro-stabilised camera cluster for enhanced situational awareness
  - Binocular functionality
- Robust bridge organisation:
  - Continuous bridge watch
  - Two persons on bridge during critical operations
  - Structured work–rest regime
- Designed for offshore performance:
  - Stable operations in Hs up to 5–6 m
  - Typical vessel motion 5–10°
  - Not sensitive to strong wind
  - Occasional green water on deck in heavy seas

Reach Remote 1 in operation

Safety zone operations

- Approval required from each installation owner
- Comprehensive risk management:
  - HAZID / HAZOP
  - Collision Impact Risk Assessment (by installation owner)
  - Safe Job Analysis (SJA) prior to operation
  - Pre-entry checklist completed before zone entry
- Operational safeguards:
  - Verified HIPAP stability
  - Increased sensor search sectors
  - Daytime operations only
  - Power limited to 45% (closed bus)
  - Continuous drift-off capability
  - Defined minimum stand-off distance (e.g. 150 m)

Reach Remote 1 at Gullfaks C, 10.03.26

Port facilities

- Adequate water depth (up to 5.5m / 8m for ROV operations)
- Favourable with >20 m test depth in close vicinity
- Flexible mooring and lifting / docking
- ISPS-compliant with security and CCTV
- Shore power (400 V) and fuel available
- Sheltered location from wind, current and waves
- Onshore facilities (break room, bathroom, accommodation)
- Competent personnel available

Connectivity platform

- Redundant carriers (Duo-VSAT, Duo/Triple LEO, GSM/5G, Iridium)
- Intelligent routing to ensure high operability
- Cyber Secure protocols (IEC 62443, IACS UR E26 & E27, DNV Cybersecure (Essential)
- Zero Trust Adoption - no user, device, system, or network connection is automatically trusted (GSA)
- Resilient systems to protect towards GPS/GNSS spoofing

- Bandwidth use ROV = 5-8 Mbs
- Bandwidth use Marine Control = 8-12 Mbs
- Experienced latency for ROV pilots = 120-200 ms (Latency limit for ROV operations = 1s)

Operational experiences

- Pipeline Inspection
- Cable Inspection
- Seabed Mapping
- Subsea Inspection
- Environmental Surveys
- Reservoir Modelling
- Various IMR operations
  - Torque Tool Operation
  - Gas Sampling
  - CP measurement
  - Soil Sampling
  - ROV dredging

equinor

AkerBP

GASSCO

vår energi

Harbour Energy

Woodside Energy

TotalEnergies

Thank you!

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