

# **Oil and Gas**



The National Oceanography Centre (NOC) works extensively with oil and gas companies on both an individual and collective basis – bringing innovative science, data modelling and technologies to industry for the benefit of government, business and the public. Outcomes can help enhance competitive advantage, maximise investment and reduce operational costs during exploration, production and decommissioning.

Relevant NOC Science and Technology capabilities include:

- Unique expertise in developing and operating **Marine Autonomous Systems** in challenging, hazardous and deep-sea environments
- Advanced and novel techniques for the **identification of Deep-Water Geohazards**, seismic disturbance and sediment flows, and their risks to seafloor infrastructure
  - AUV seafloor mapping using visual and acoustic systems
  - Instrumented seafloor observatories for baseline monitoring
- Core sampling
- High resolution seismology
- Measurement of sediment flow velocity and sediment concentration
- Sediment bed-load concentration monitoring via electrical resistivity sensors
- **Fluid Flow Detection** and Characterisation – geophysical and geochemical quantification of Arctic seafloor methane hydrates, including seafloor methane vent detection and monitoring.

- **Multi-disciplinary Survey Techniques** for marine environment and route characterisation across all seafloor environments (Arctic, canyons, hydrothermal vents, carbonate mounds, and ultra-deep water) for chemical, physical and ecological characterisation of seafloor systems.
- World class **Metocean Modelling**, including predictive tools, intervention modelling technologies and high-resolution global datasets, for oil spill risk, response and impact assessment and the 3D modelling of UK coastal waters and bespoke unstructured-grid modelling of hydrodynamics, using Finite Volume Community Ocean Model (FVCOM)
- Provision and interpretation of ocean physics analysis and forecast products, including velocities, temperature, salinity and sea levels
- Harmonic analysis of tides and currents, combined with tidal modelling and prediction software, to compute the ideal timing for a sea passage and preferred navigation routes
- Technical **Environmental Monitoring and Mapping** capabilities including novel sensors for detection and means of data-collection which can be used to monitor infrastructure and for seafloor/subsurface mapping.

The NOC develops autonomous and robotic platforms, and new systems for their deployment for industry applications such as efficient post-lay surveys. We use high resolution 2D and 3D seismic methods for quantitative assessment of shallow sub-seabed geotechnical properties and fluid migration pathways, and have rock physics expertise for improved quantitative geophysical characterisation and monitoring of hydrocarbon reservoirs. We are able to derive geomechanical and geotechnical properties from high resolution seismic data through inverse geophysical modelling – providing information suitable for well site hazard screening, foundation selection and site-wide geotechnical characterisation.

