



Communications and Security

What is a SmartBuoy?

The core SmartBuoy network is part of the UK eutrophication monitoring programme. SmartBuoy technology is used in a number of sectors including government, offshore wind, nuclear new build, and Research Council projects.

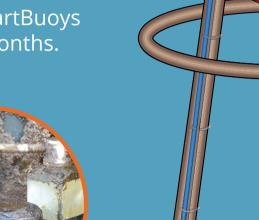
How are they deployed?

The SmartBuoy Team based at Lowestoft deploy and recover the SmartBuoys using R/V Cefas Endeavour. In the past, SmartBuoys would have to be serviced on a monthly basis due to marine conditions fouling the sensors. Now, wipers have been added to keep the sensors clean in-situ, allowing SmartBuoys to remain at sea for up to three months.





Cefas water sampler: collects in-situ samples into EVA bags spiked with an appropriate preservative. These EVA bags are then recovered and analysed at the lab for nutrients and phytoplankton species. CAS LOWEST OFT, ENGLAND



Light

Satellite telemetry

Radar reflector

Cefas Mooring Locator

PAR sensor (photosynthetically active radiation): a quantum sensor which measures the amount of radiation available to plankton for photosynthesis. placed at variable depths in the water column these sensors allow the calculation of photic depth.

Depth: 0m

In-situ nutrient analyser

Cefas data logger: sensors can be integrated to measure a range of parameters including dissolved oxygen, chlorophyll fluorescence and turbidity.

Integrated conductivity

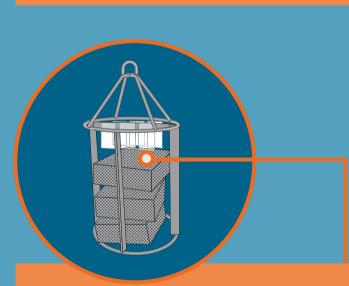
and temperature sensor

applications The frame of the SmartBuoy has plenty of room to customise the equipment it

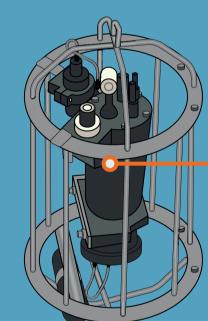
Additional

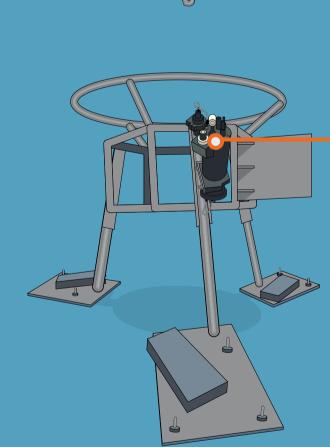


Settling plates can be added to the underside of the SmartBuoy to determine which invasive non-native species are present.



Mussel cages and passive sampler strips can be added to measure the contaminants present, an indicator of the health status of the sea.





In addition, the Cefas data logger and suite of sensors can be mounted on a range of platforms or placed at varying points in the water column depending on the research design.

Depth: 50m

This configuration can also be deployed in a tethered frame on the mooring line at chosen depths in the water column. This can also be used for water column profiling.

Depth: Sea floor

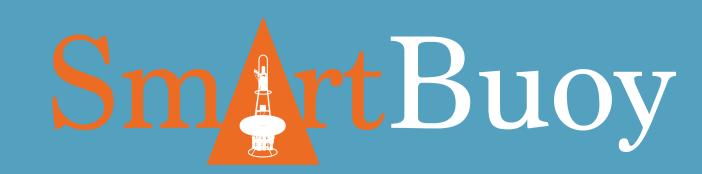
The same suite of sensors can be placed on a lander on the sea floor - typically waves, currents, turbidity, salinity, temperature and water depth are measured for the offshore renewables industry.









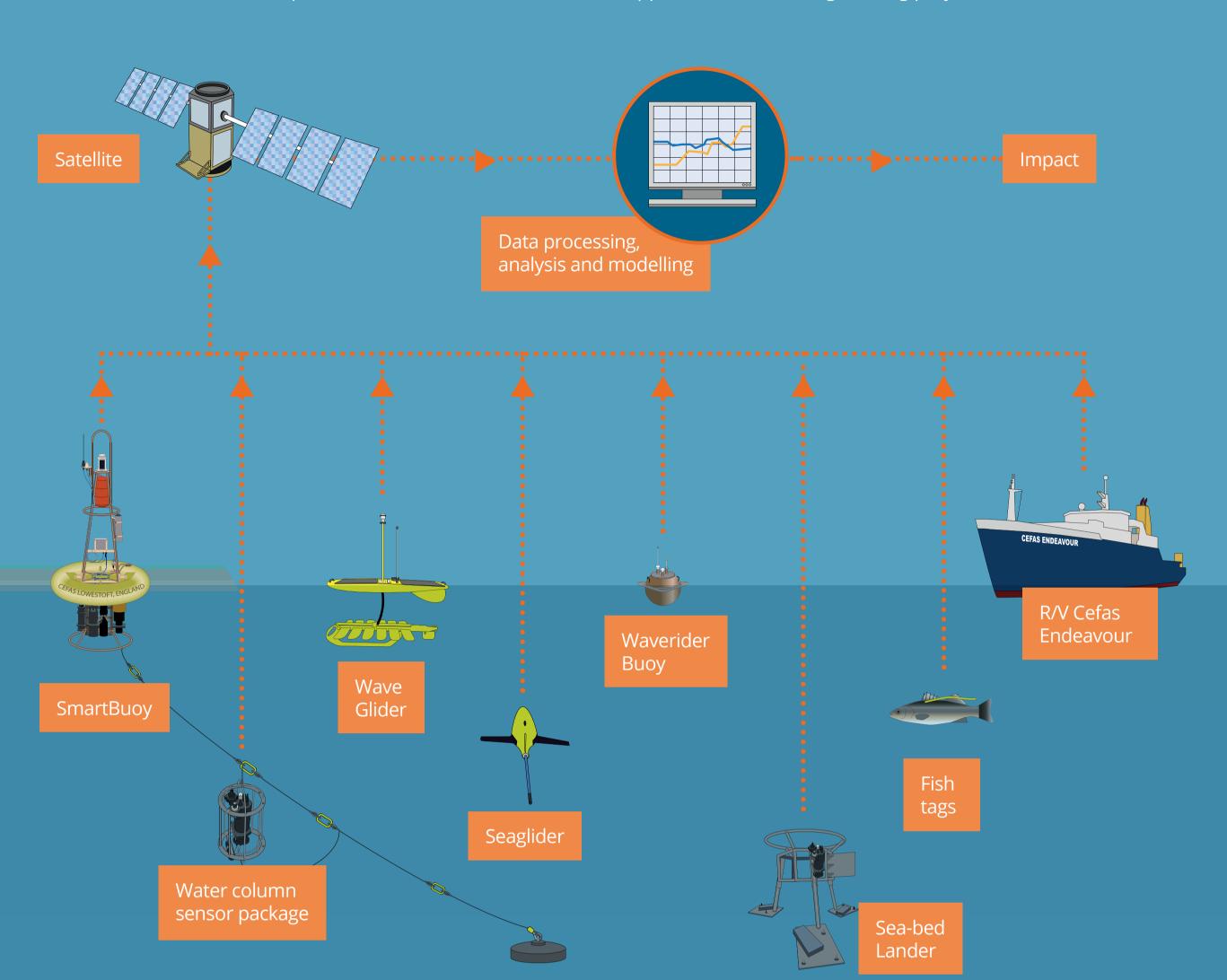




The Cefas Integrated Observatory

Cefas operates a coordinated network of observations in the marine environment with integrated data management and web based data analysis tools. The observatory is designed to provide data and enable scientific research for a range of applications including

- · make assessments of aquatic environmental status
- · flood forecasting
- · understanding coastal processes
- · contaminant fate and transport
- · coastal protection
- · model validation
- · ground truthing of satellite products
- · support for offshore engineering projects



How has this data been used?

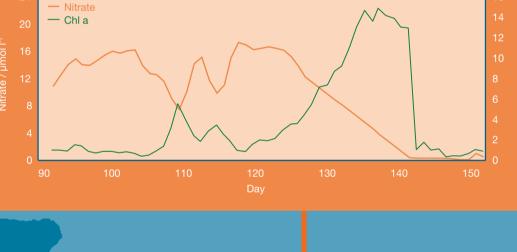
SmartBuoys have been used to contribute to OSPAR and the Charting Progress 2 assessments; contributed to the defence of infraction proceedings under the Urban Waste Water Treatment Directive; provided validation of ecosystem models and remote sensing products; been used in targeted process studies; for studying dredge disposal and, studying sediment transport.

As of March 2015, SmartBuoy data has been included in over

40 peer-reviewed research papers.

into the marine environment. Nitrate can be seen to decrease rapidly as chlorophyll increases during the spring bloom. This data (from 2000) was collected as part of a collaborative study between NERC funded scientists at UEA and Defra funded scientists at Cefas into the transport of nitrogen from UK rivers across the North Sea, informing policy on trans-boundary pollution. This collaboration is ongoing and continues to deliver insight into nutrient transport issues in the North Sea.

This data from the East Anglian Plume mooring highlights the capacity of SmartBuoy to deliver high temporal resolution insight



Our Smartbuoys and Landers

Our Collaborators

institutions throughout Europe

This map shows the many

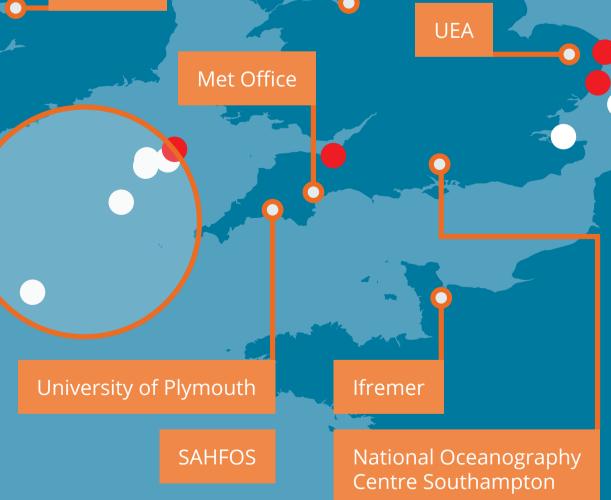
collaborating with Cefas.

PLATFORM LOCATION

Active

Historic

The main aim of the NERC Shelf Sea Biogeochemistry Research Programme is to improve understanding of nutrient and carbon cycling within the shelf seas and of their overall role in global biogeochemical cycles. The programme uses a combination of in-situ moorings and wider spatial cruises.



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