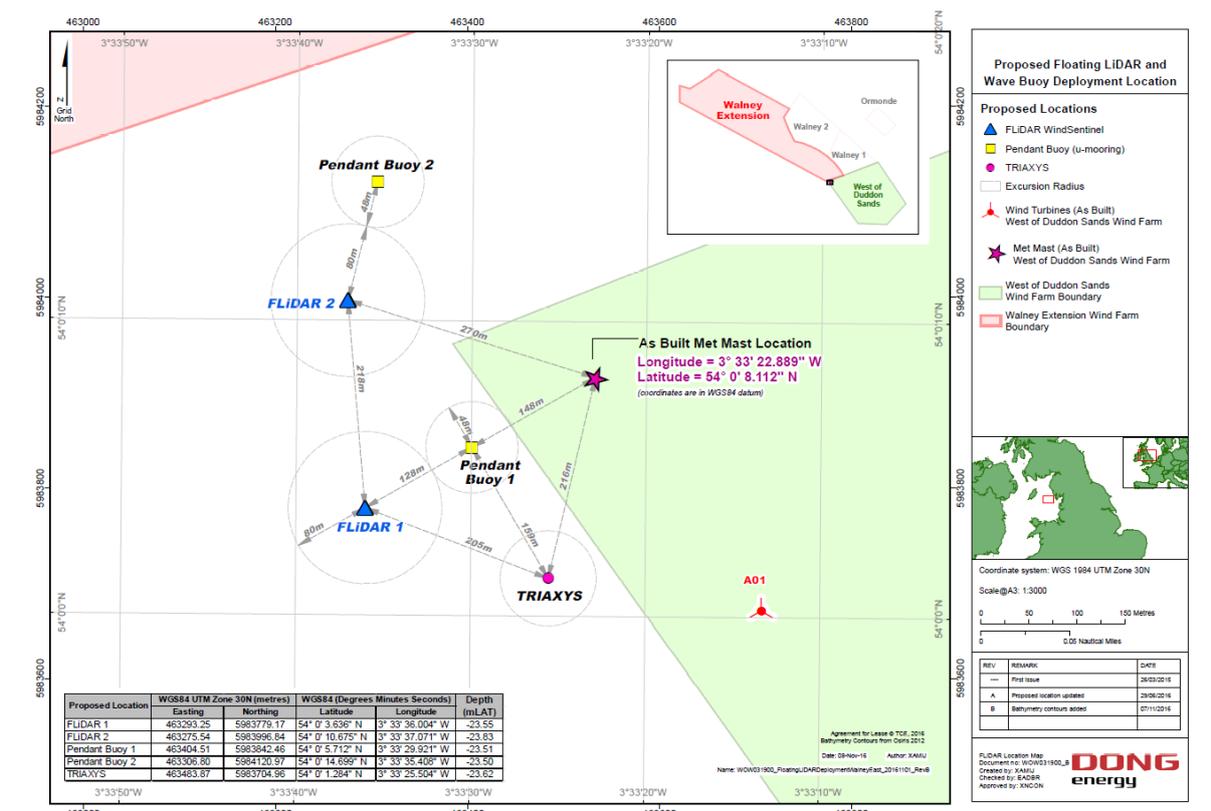


Deployment of 2 Floating LiDARs and 1 Wave Buoy



The purpose of deploying these systems is to carry out validation test against the established West of Duddon Sands Met Mast.

Specifications

Floating LiDAR Buoys

Seabed: The mooring system for each floating LiDARs will consist of a U shaped chain mooring with 2 cast iron sinkers of approx. 4T weights and approx. 80m of mooring chain with various shackles and swivels. Some of the chain will lie on the seabed, the proportion of chain on the seabed will be dependent and drift and tide.

Surface: Each buoy will have a surface pendant marker denoting the position of the 2nd 4T seabed sinker weight. Each buoy is equipped with meteorological instrumentation to measure wind speed and direction and consists of:

Size: 6m (L) x 3.1m (W) x 9m (H)

Height above waterline: 4m

Buoy weight: 7 Ton

Drift radius: 80m

Colour: Signal Yellow

Navigational equipment: The floating LiDAR and pendant buoys will each be fitted with the following navigational equipment:

- Navigational light
 - Colour: Yellow
 - Range: 5nm

- Pattern: Fl (5) Y 20s light character; the duration of a flash together with the duration of an eclipse within this group will not be less than 2 seconds.
- Radar reflector and/or Marine cross painted in yellow
- AIS (floating LiDAR only)

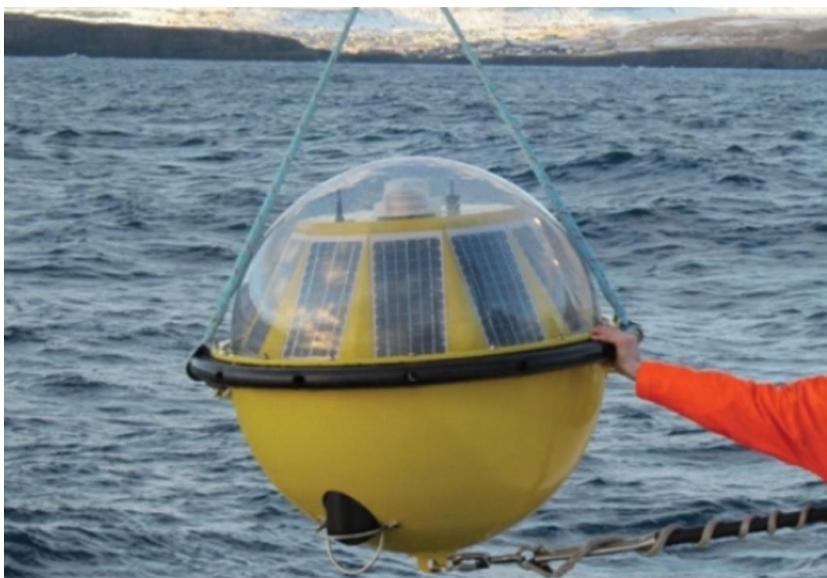


AXYS Floating LiDAR Buoy

Wave Buoy

Seabed:

Mooring: The mooring connection to the buoy is made with a 12mm stainless steel swivel. Ultrahigh molecular weight polyethylene line (UHMWPE) is used for the mooring line and the mooring is anchored to the ground using up to 600kg of heavy chain.



Surface:

Diameter: 1.1m

Weight: 230kg

Nav. Light: Amber LED. Pattern: Fl (5) Y 20s light character; the duration of a flash together with the duration of an eclipse within this group will not be less than 2 seconds with 3 miles visibility.

Radar Reflector

Power Supply Solar Panels: 10x6W

Drift Radius 48m

Method Statement

- The system is comprised of 2 AXYS Floating LiDAR buoys and 1 wave buoy
- The floating LiDAR systems will be commissioned at Ramsden Dock, Barrow-in Furness, Cumbria in the week preceding the proposed deployment.
- The 2 vessels used will be standard Multicats such as the Torch (IMO 8891041) and Green Isle (IMO 9707962) however this will depend on vessel availability at the time.
- During vessel mobilisation for deployment, the sinker will be attached to the mooring and both components will be lifted onto the back deck of the vessel. The floating LiDAR will be lifted into the water and secured to the vessel's towing equipment in port.
- The deployment is planned to occur in one day weather permitting.
- The vessel will tow the floating LiDAR buoy to site. At the deployment location, the sinker weight will be lowered to the seabed by lowering the mooring chain through the vessel winch. Once the sinker has rested on the seabed, the Floating LiDAR buoy will be reeled in on the towing equipment, the towing equipment disconnected from the buoy and the mooring chain attached to the buoy. Deployment will be completed once the buoy is released.
- The systems will be recovered as follows:
 - Secure the towing equipment to the Floating LiDAR
 - Disconnect the mooring chain from the Floating LiDAR
 - Lift the mooring chain and sinker using the winch and recover to the back deck
 - Return to Ramsden Dock with the Floating LiDAR in tow
 - Recovery operations will be planned on consecutive days weather permitting
- In the case of the Wave buoy the equipment will be transported to site on the vessel deck and the sinker chain and mooring deployed in position and the Wave buoy attached to the end of the mooring, the Wave buoy will then be released into the water.

Task Name	Approximate Schedule	Comments
Deployment of 2 Floating LiDARs & 1 wave buoy	11th August 2017	Date might vary depending on weather conditions and availability
Calibration and testing of 2 Floating LiDARs & 1 wave buoy	2 months	The buoys will be monitored remotely using GPRS and satellite communications as available
Recovery of 2 FLiDARs & 1 wave buoy	11th October 2017	Date might vary depending on weather conditions and deployment date