



# FUGRO GEOWING

**Fugro has designed and developed the Geowing - a fixed gradiometer frame attached to a Remotely Operated Towed Vehicle (ROTV), which enables magnetic objects to be detected through detailed surveys of the seabed.**

Fugro has developed a fixed gradiometer wing in combination with the EIVA Scanfish Katria to provide a fixed-frame gradiometer solution: the Geowing. This approach provides a unique and dynamic solution to high-resolution gradiometer surveys coupled with advanced processing and determination of three-axis gradient data.

The Geowing can be coupled with a high-resolution seismic system, to offer high-level object detection surveys, including for the purposes of detecting LMBs.

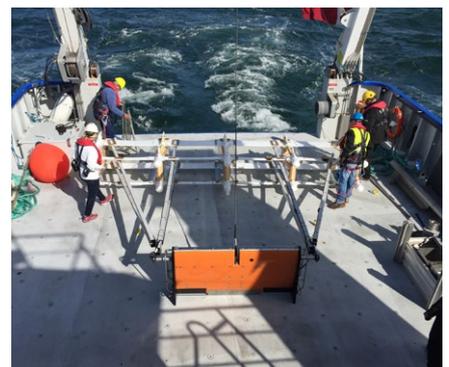
## **SURVEY METHODOLOGY**

The Geowing fixed gradiometer frame is 5 metre wide and mounted on the Scanfish Katria. The ability of the Scanfish to track the seabed and keep in-line reduces to a minimum the number of horizontal and vertical infill lines.

The Geowing has been specially designed to collect high resolution magnetic data. The two-row configuration of the Geowing allows the data to be analysed as gradiometer. This offers several advantages over conventional magnetometer surveys.



*Geowing system*

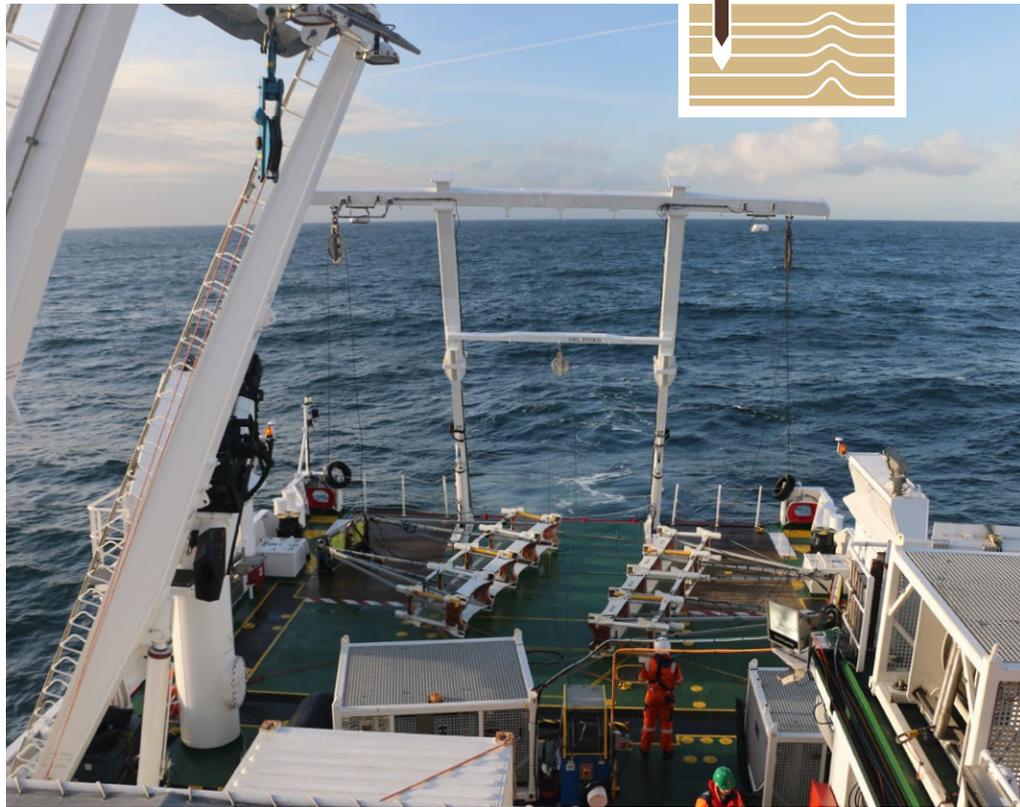


*Geowing on backdeck*



Fugro has developed advanced processing techniques for use with the Geowing gradiometer setup. A gradiometer system differs from a magnetometer system as it allows the geophysicist to calculate the X, Y and Z gradients manually rather than using algorithms which automatically compute these gradients based on several assumptions. This manual approach allows us to minimise background noise and reduce the number of false positives.

The Geowing has now covered over 3,000 line-kilometres conducting high resolution UXO surveys in the European sector. This system can be deployed in a dual fish configuration from Fugro survey vessels doubling the swath covered in one pass. It has been particularly noted for its work on LMB mine projects. This aluminium WWII mine causes issues in European waters due to its very low magnetic signature.



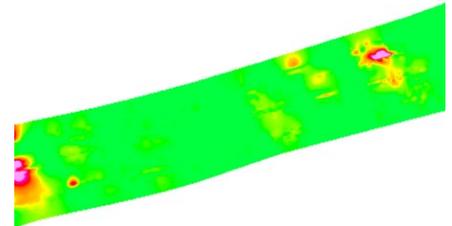
Launch of the Geowing system

## THE SYSTEM

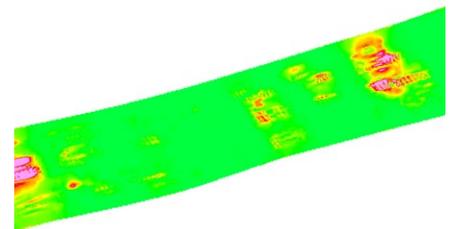
Depth of object detection depends on the type of object we are looking to detect. In essence, the Geowing can detect anything with a ferrous content, provided the correct line spacing and altitude above the object is used. For this we use desktop studies carried out by consultants to determine UXO risk, type and ferrous weight. Once this is known, then the survey parameters are set. The Geowing's capabilities lie in its ability to accurately track flight over the seabed at a set altitude. The reduced distance from objects improves the magnetic signature from ferrous objects and the number and arrangement of magnetometers within the 5 metre wing allows for a greater resolution from a smaller area.

## KEY POINTS

- Gradiometer frame mounted on a Remotely Operated Towed Vehicle (ROTV)
- Equipped with five caesium vapour magnetometers (G-882) with fixed sensor separation
- Seabed tracking accurate to 0.2 m – maintains optimal altitude
- Safe and controlled deployment
- Reduces the requirement for infill (and operation time)
- Real-time measurement of the vertical and transverse gradient
- Minimises the effect of underlying geology and motion noise
- Reduces false positives and reducing the requirement for further investigation



TFAS GRAD = Data processed real-time gradients (Analytic Signal)



TFAS RES = Data processed as single-axis magnetometer (Analytical Signal)