



1ST LINE DEFENCE

Case Study

East coast of Scotland



Challenge

In November 2023, 1st Line Defence were commissioned to undertake an offshore Non-intrusive (Aerial/Drone) Magnetometer Survey to locate four 1000-1500kg anchors off the East coast of Scotland.

Due to the size of the targets and 4m water depth, an unmanned aerial / drone survey was the quickest and most cost-effective way to locate the four anchors. The client also requested a photogrammetry and LIDAR survey of the landward side of the project area.

Process

Investigating UXO contamination was not a part of our clients brief and therefore no UXO Risk Assessment was required before the survey commenced.

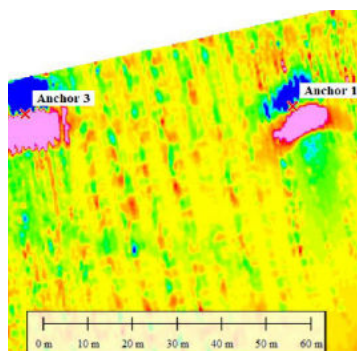
Stage 1 – Non-intrusive (Aerial/Drone) Magnetometer Survey

As the targets were ferrous in nature, a specialist ultra-portable magnetometer survey kit attached to an unmanned aerial vehicle (Aerial/Drone) was utilised.

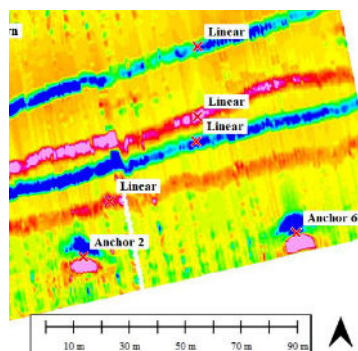
The aerial / drone survey flight path was pre-programmed to cover the area of interest, with flying lines set at 2.5m intervals – and a survey speed of 8-10m/s. The drone was set to fly 2m above sea level and utilised specialist radar based terrain following equipment, due to flying above water.

The data was processed to remove background noise, and all anomalies that modelled >10nT (nanoteslas) were manually selected and measured.

Following data processing / interpretation, the survey data clearly showed the locations of all four anchors – as well as four linear features and a fifth (non UXO-related) anomaly. The client requested the geographic coordinates of the four anchors so that they could be relocated in future.



False colour map showing two of the anomalies in the northern section of the area of interest.



Southern section of the area of interest showing the other two anchors, four linear features and a fifth anomaly.

Case Study Overview

Location

East coast of Scotland

Industry

Land Management

Project Duration

November 2023

Services

Non-intrusive (Aerial/Drone) Magnetometer Survey

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Process (cont.)

Additional Services

Photogrammetry/LIDAR Survey

Whilst completing the Non-intrusive (Aerial/Drone) UXO Survey, the client requested a Photogrammetry/LIDAR survey of the landward project area in order to create a 3D model. For maximum accuracy, a DJI M300 drone with Zenmuse L1 and P1 sensors was deployed.

L1 sensors were utilised to capture 3D information directly using lasers, and time of flight to measure distances. P1 sensors (photogrammetry) takes pictures and identifies common points between them, undertaking triangulation to generate depth information to create a 3D model.

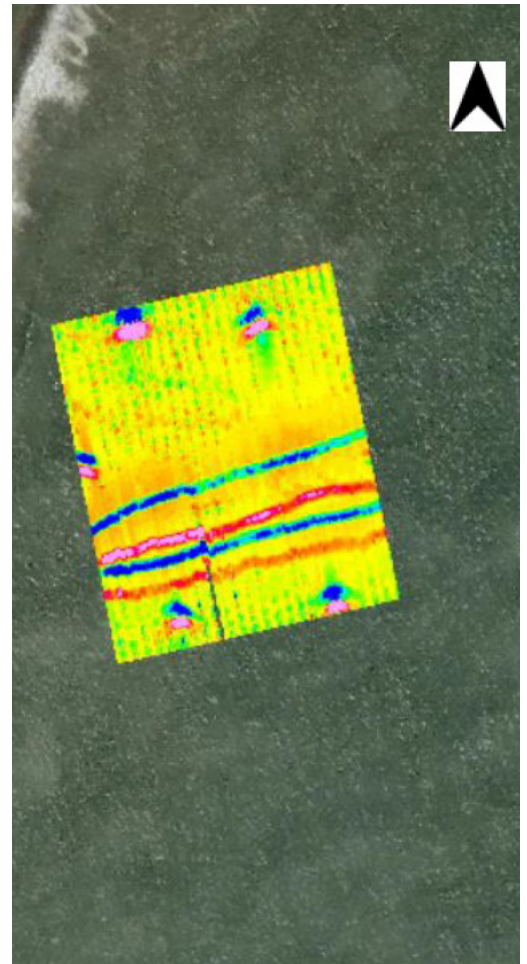
This survey enabled the client to have a full 3D image render of the entire site area, see example below.

Outcome

Following the surveys and data processing, the client was satisfied with the end results and the project was completed on-schedule.



Image showing the results of the Photogrammetry / Lidar survey data.



Aerial / Drone magnetometer survey results overlaid on to Google Earth.



Aerial / Drone fitted with L1 camera payload.

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