SAFELANE®
GLOBAL

Combining Survey Data to Improve UXO Characterisation

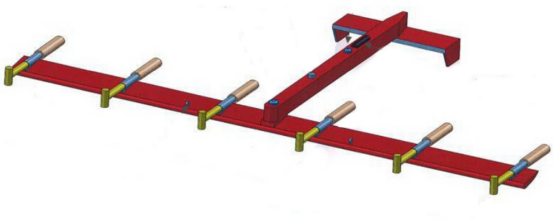
Abstract

Most ordnance has significant ferrous content that produces a detectable magnetic signature.

Based on previous research and practical experience, we know the magnetic signature of an item of ordnance best approximates to that from a point magnetic dipole. The magnetic field produced by a point dipole decays as the cube root of the distance. For magnetic gradient measurements, the decay in amplitude is proportional to one over distance to the power of four. The greater the size (mass) of the item of ordnance, the larger the dipole moment and associated magnetic field.

To deal with this limitation, SafeLane Global has developed unexploded ordnance (UXO) risk management processes using multiple datasets. By utilising this combination of datasets, SafeLane can dramatically reduce the number of false targets identified during survey operations and advise on any further action required.

This allows SafeLane to provide UXO "ALARP" clearance – or clearance or risk to as low as reasonably practicable for our clients.



A: SafeLane Wing

Aims

The aim of this study is to present innovative methods and to demonstrate SafeLane's growth in knowledge. The development of non-intrusive survey methods helps our clients receive high resolution results combined with cutting-edge recommendations.

Adapative Methods

SafeLane (formally BACTEC) has assisted in the development of marine fixed wing arrays. This gradiometer development, when used in combination with acoustic side scan sonar (SSS), allows for the collection of data over specified survey areas.

The collection of 3D seismic data allows for this correlation and reduction in false positives in areas of high noise and ferrous contamination. In combination, all datasets provide a full surface to subsurface survey deliverable with high positional accuracy.

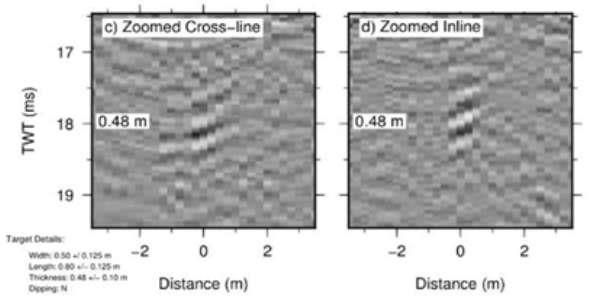
Gradiometer Fixed Frame Development:

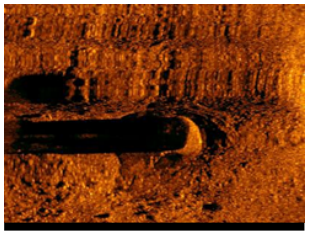
- Use of multiple magnetometers allowing the difference of sensors to remove any consistent background noise contamination.
- Surface tracking with 3 dimensional gradients.
- Added stability and flight controls.

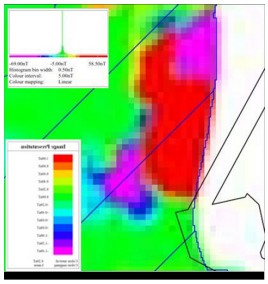
Results

After survey results are analysed the datasets are cross-correlated from the following information: Position[1], Dimensions[2] and Depth[3] of burial. These results are correlated to see possible matches with in known boundaries and scope. With this method we can better differentiate between potential UXO (pUXO) from debris, natural forming geology and background noise. The data examples show a potential UXO found within a magnetically noisy area due for piling operations.

The contact shown in result data images were observable in the operational survey lines running N-S and S-N. The magnetic data collected above shows a large ferrous interference causing unreliable results and identification. Using the acoustic sonar and sub bottom results the target was identified with positional and dimensional decimetre accuracy as potential UXO/



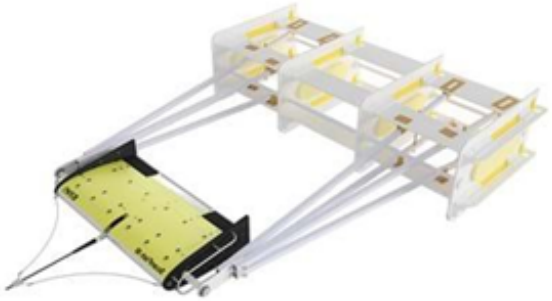




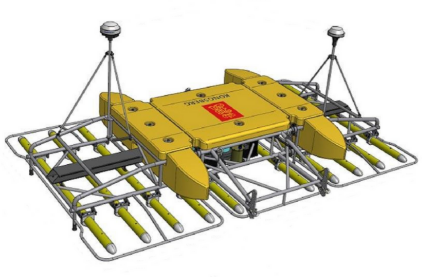
Conclusion

By combining and analysing multiple datasets, SafeLane's non-intrusive survey methodology:

- Reduces the number of pUXO using innovative techniques;
- Does not require a large vessel or equipment mobilisation;
- Can be used on both shallow and deep-water projects;
- The correlation of multiple datasets increases the accuracy of characterisation which intern reduces the number of potential UXO targets that need intrusive investigation.
- SafeLane can provide a 70 percent reduction on average in number of potential UXO.



B: VIA ROTV with Mag Array



C: SANDS 3D Seismic Array