



## Finding Sub-sea Remnants of War

- Locating UXO below the sea bottom is a difficult and expensive problem. In 2017, Gap EOD developed the **UltraTEM Marine** system to improve efficiency of target detection for dredging operations and offshore construction projects, as well as for marine cable tracking.
- **UltraTEM Marine** offers deeper detection and higher resolution than other geophysical technologies. It is also able to detect aluminium objects, which are invisible to magnetometers.
- **UltraTEM Marine** has proven its value in open sea and more noisy and cluttered inner harbours.
- The combination of the latest technology with custom software from Black Tusk Geophysics has improved object discrimination and drastically lowered the number of required excavations.

## Capabilities and Performance

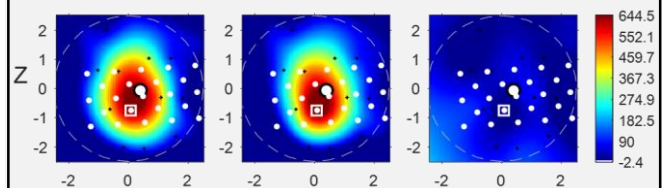
- Distinguish closely spaced targets.
- Accurate details on object position & depth.
- Detect aluminium objects & mines.
- Confidently separate items of concern from clutter.



## UltraTEM Marine Components

- Five transmitters ensure multiple independent looks of each target.
- A series of three-component EM sensors (receivers) allow for high spatial resolution and optimal target characterization.
- The system can be housed in a towed vessel or on a remotely operated vehicle (ROV).

*On-board processing of data produces dig targets in near real-time. Below is the anomaly of a SC-500 German bomb below the seabed (Left: observed data. Middle: inversion result. Right: residual).*





## Technical Specifications

<b>Dimensions Array (L x W)</b>	6.0 x 7.5 m
<b>Dimensions Electronics Box (L x W x H)</b>	841 x 425 x 218 mm
<b>Depth Rating</b>	70 m
<b>Data Acquisition Software</b>	BTField by Black Tusk Geophysics

<b>Weight</b>	410 kg
<b>Number of Electronics Boxes</b>	1 x Transmit 1 x Receive
<b>Positioning</b>	Customizable for Vessel Configuration BTField Real-Time or Post Processing
<b>Data Analysis Software</b>	

## Transmitter Technical Specifications

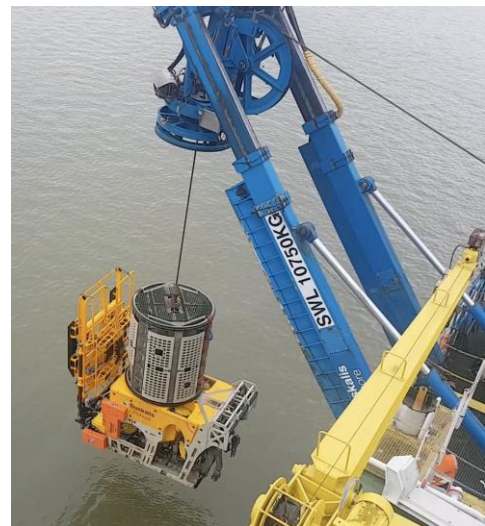
<b>Transmitter</b>	EODTx50-5
<b>Power Supply</b>	90 - 240 V
<b>Powerline Frequency</b>	50 or 60 Hz
<b>Transmitter Frequency</b>	25 or 30 Hz
<b>Transmitter Duty Cycle</b>	50%

<b>Number of Transmitter Loops</b>	5
<b>Transmitter Loop Dimensions</b>	1.8 x 1.8 m
<b>Loop Wire</b>	2.5 mm <sup>2</sup> Copper wire
<b>Transmitter Current (max.)</b>	50 Amps
<b>Detection Capabilities</b>	LMB Mine to 3.5 m burial depth

## Receiver Technical Specifications

<b>Receiver Coils (3-component)</b>	19
<b>Coil Effective Area</b>	104.5 m <sup>2</sup>
<b>Receiver Noise Level @ 1 ms</b>	757.25 nV
<b>Receiver Dynamic Range @ 1 ms</b>	122 dB
<b>Output Signal Range</b>	± 9626.74 μT/s
<b>Coil Noise Level @ 1 ms</b>	0.060134 μT/s

<b>System Noise @ 1000 Hz</b>	< 4 nT/VHz
<b>Receiver Sampling Frequency</b>	800 kHz
<b>Output Decays</b>	5 per second 45 log-spaced time-channels
<b>Samples per Decay</b>	
<b>Decay Range</b>	0.05 to 10 ms



UltraTEM Marine system as configured for Boskalis and marketed as the SubTEM-ROV