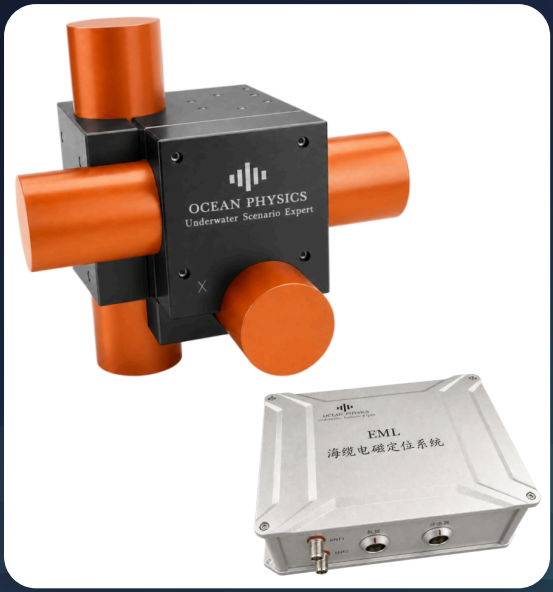
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EML-3X

Subsea EM Locator System

Three-Axis Electromagnetic
Subsea Cable Locator

System Overview

The EML-3X is a three-axis electromagnetic subsea cable locator developed in-house by Ocean Physics, for tracking, positioning and burial-depth estimation of submarine cables in shallow coastal waters, harbours, navigation channels and nearshore areas. The system is built around a **three-axis orthogonal low-frequency EM probe**, working with an acquisition and processing unit with built-in dual-antenna GNSS RTK and the CableDetect software suite. **The vessel runs perpendicular crossings over the cable route; detection, positioning and deliverables are produced in a single pass.**

Two survey modes are supported. For energised cables, **50 Hz passive detection** works directly from the cable's own load current — no shutdown and no signal source required. For de-energised or not-yet-commissioned cables, a low-frequency tracking signal (33 Hz typical) is injected at the shore end for **active detection**.

Applications

- Route surveys and O&M inspection of energised offshore wind export and power cables (no shutdown)
- Post-lay route verification and engineering acceptance of newly installed cables
- Active-signal tracking and precise positioning of de-energised or uncommissioned cables
- Investigation of cable breaks and anomalous sections
- Cable position confirmation and burial-depth estimation ahead of repair operations
- Detection and avoidance of existing cables and pipelines in offshore geotechnical surveys
- Combined acoustic-magnetic multi-modal survey with sub-bottom profilers

Key Features

- **Three-axis orthogonal sensing**

  The X/Y/Z orthogonal probe records all three magnetic-field components simultaneously during cable crossings. CableDetect supports waveform review and cable-position confirmation.

- **Energised cables surveyed without shutdown**
  50 Hz passive mode works directly from the load current of the cable itself, so routine inspection never interrupts supply; switch to 33 Hz active mode for de-energised or uncommissioned cables.

- **Positioning and heading in a single unit**
  Built-in dual-antenna GNSS RTK delivers centimetre-level position and true heading with no external INS required; third-party GNSS / INS / single-beam echo sounder can be fed in over NMEA-0183.

- **From survey line to deliverable in one software loop**
  CableDetect covers real-time navigation, waveform monitoring, automatic candidate analysis, manual confirmation, burial-depth estimation and export; CAD base maps and planned lines import directly, and RAW data supports offline reprocessing.

Ocean Physics Technology Ltd.
ADD: 2007, Ziguang Tower, Financial 7th Street, Wuxi, China
Web: www.oceanphysicstech.com
Email: sales@oceanphysics.cn

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Technical Specifications

Category	Parameter	Specification
Detection Mode	Passive	50 / 60 Hz power frequency (energised cable, no shutdown)
	Active	20–60 Hz (33 Hz typical, shore-end signal injection)
Three-Axis Probe	Type	Three-axis orthogonal low-frequency EM probe (in-house)
	Dimensions	340 mm × 90 mm per axis, three axes in one assembly
	Weight	20 kg
	Mounting	Over-the-side pole mount (surface operation)
Positioning & Heading	GNSS	Built-in dual-antenna RTK (cm-level position + true heading)
	External Input	Third-party GNSS / INS / single-beam echo sounder (NMEA-0183)
Acquisition Unit	Dimensions	210 mm × 155 mm × 85 mm
	Weight	approx. 3 kg
	Protection / Operating Temp.	IP67; ⩽ 80 ˚C
	Cable	10 m standard, custom lengths available
	Power	19–24 V DC, 5 A
	Interface	Gigabit Ethernet
Software	Operating System	Windows 10 / 11 (64-bit)
	CRS / Projection	WGS84, CGCS2000; UTM, Gauss-Krüger
Operation	Recommended Speed	4–6 kn (crossing angle 75–90˚)

System Composition & Options

Standard configuration: three-axis orthogonal EM probe · acquisition and processing unit with built-in dual-antenna GNSS RTK · CableDetect acquisition and processing software · over-the-side mounting bracket and cable.

Options and extensions: custom cable length to suit the vessel; third-party GNSS / INS / single-beam echo sounder input over NMEA-0183; combine with GeoScope series sub-bottom profilers for acoustic-magnetic multi-modal survey.

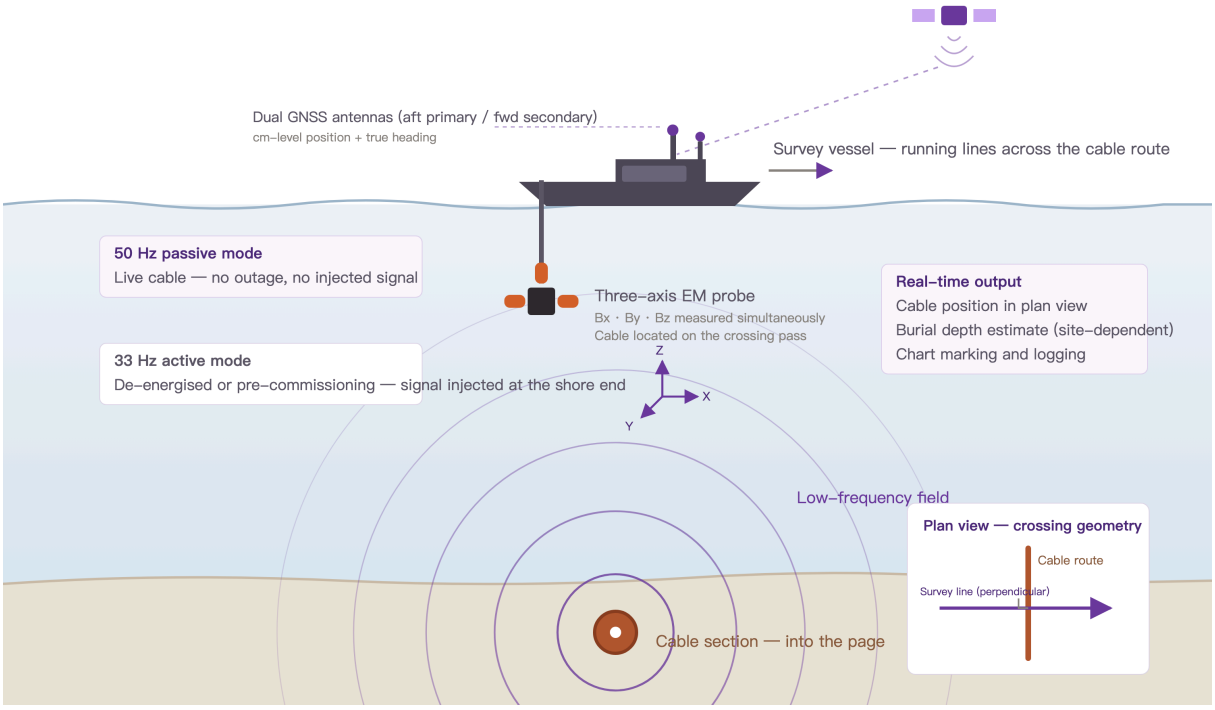
Deliverables: cable plan coordinates and burial-depth estimates, cable marks and vessel track on the electronic chart; CAD base maps and planned lines import directly, and RAW data supports offline reprocessing and reciprocal-run comparison.

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Ocean Physics Technology Ltd.
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Web: www.oceanphysicstech.com
Email: sales@oceanphysics.cn

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Operating Principle



Field Results



CableDetect playback: XYZ three-axis and Bz/Bh components compared at 50 Hz with cable-crossing feature points marked (left) · cable position marked on the electronic chart with burial-depth estimate (right)

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