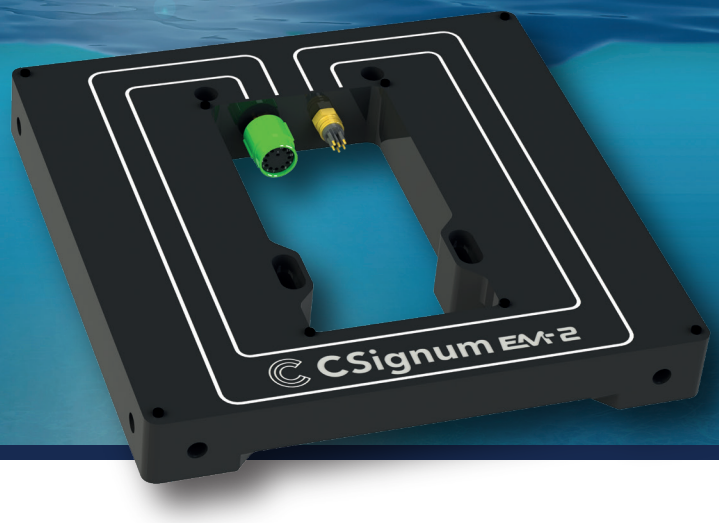
CSignum

EM-2

EM-2, wireless communications through the surface



Omni-directional antenna
Low power listening mode

Increased data rates
Networking capability

External battery pack
Increased range

WHAT IS THE CSIGNUM EM-2?

A wireless communication link that overcomes the limitations of acoustic, optical and cabled underwater communications, to transmit data reliably through the water-air barrier, from beneath the surface to shore or riverbank including through ice or from an underground location to the topside, in real time.

Only EM-2 technology uses electromagnetic fields to carry data, without the use of cables, from beneath the surface to topside devices which can be mounted on the shore or on piles, buoys, or structures such as wind turbines or bridges and positioned above, on, or below the water.

WHAT DOES IT DO?

Transmission from sensor to shore

The splash zone and shallow water environments, some of the most adverse conditions for subsea comms. It pairs with underwater sensing systems to transmit your data wirelessly from below water to a topside base station.

The EM-2 is agnostic and is therefore compatible with all sensing systems that use industry-standard data interfaces.

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WHY EM-2?

Wireless-signalling using electromagnetic fields

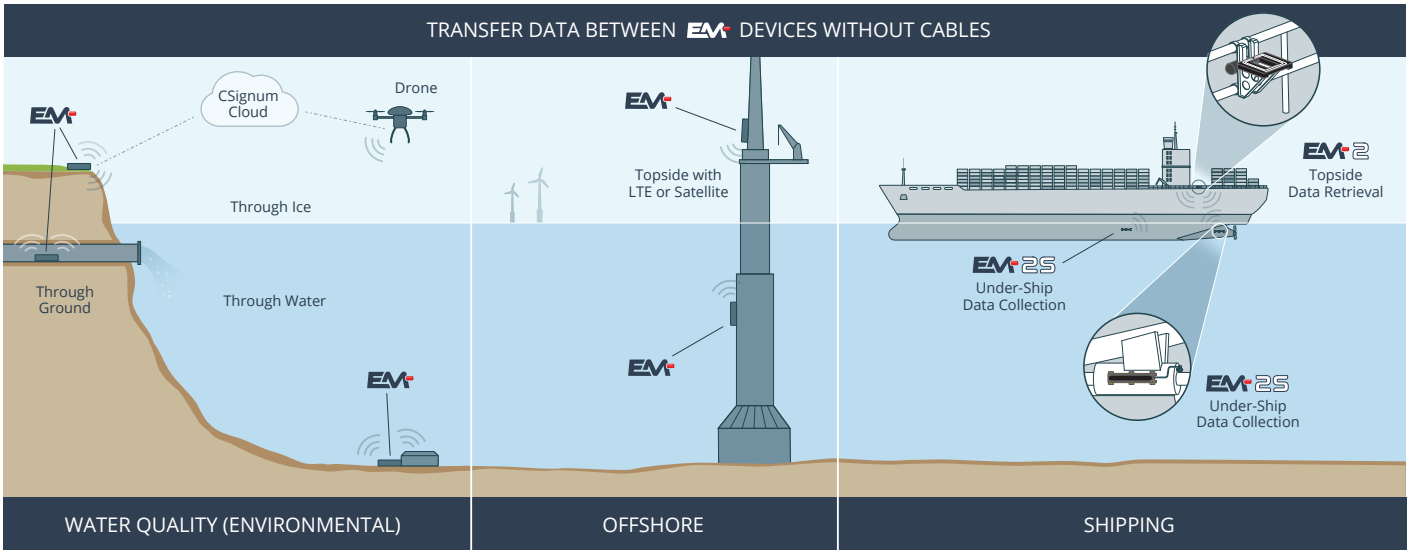
Traditional methods of underwater to above-water transmission all have problems, including:

- Cables becoming snagged or failing due to repeated stresses from wave motion – expensive to repair or replace
- Acoustic signals not able to pass through the water-air barrier, and being degraded in turbid or choppy water
- Optical solutions affected by biofouling, and becoming degraded in ambient light and turbid or choppy waters.

The EM-2 provides the **only** reliable wireless data transmission across the water-air barrier, bringing added flexibility for deploying sensors at underwater monitoring points.

BENEFITS

- Performance unaffected by biofouling, turbidity or environmental noise in the water column
- Easily installed and integrated with various sensor packs, such as multiparameter sonde and ADCP
- No adverse effects on aquatic life
- Bidirectional point-to-point communication available today; multi-point connectivity and relay capability coming soon.



TECHNICAL OVERVIEW

Wireless Communications Data Rate	400bps
Wireless Range	Up to 100m with EM fields, 2km with acoustic gateway*
Depth Rating	100m (328ft)
Ambient Operating Temp	-25°C to +55°C (-13°F to 131°F)
Dimensions	400x400x50mm (15.7x15.7x3.7 in)
Weight	9kg (20lbs)
Data Interfaces	RS232 and RS485
Configuration Method	Graphical User Interface and ASCII commands
Power Input Connector	6-way Male Subconn (MCBH6M)
Battery	External Lithium rechargeable 97Wh, 200Wh, 300Wh and 700Wh options
Input Voltage	17 to 25V
Transmit Mode Power Consumption	Up to 23W
Receive Mode Power Consumption	< 70mW
Ultra-low Power Receive Mode (duty cycled)	< 5mW
External Sensor Interface	12-way Female Subconn (MCBH12F)
External Sensor Power Out	12V @1A (12W)
Receive Antenna	Omni-directional, for fixed and mobile deployments
Operating Modes	Low power, always on Receive. Ultra-low power, duty cycled receive. RTC wake - wake on serial data
Certification	CE, FCC, RSS, WEEE, ROHS, REACH

* Wireless communications range is dependent on water or air path.

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APPLICATIONS

- Internet of Underwater Things (IoUT)
- Under Ship & Propulsion Monitoring
- Offshore Environmental & Structural Monitoring
- Underground Data Monitoring
- AUV/ASV Data Harvesting
- Inland & Coastal Environmental Monitoring
- Defence & Security

PRODUCT PERFORMANCE

Transfers data using EM fields at distances up to 170m (558ft), extendable to 230m (755ft) with an external antenna, and 2km (1.25miles) with an acoustic gateway option, enabling the successful deployment and operation of underwater monitoring devices in a wide range of salt-water and fresh-water scenarios.

The CSignum electromagnetic field based communications method can also be used to communicate underground, enabling effective data transmission through a variety of layers, including through water and ice or buried structures, such as submerged tunnels or storm drains.

CSignum technology has the unique capabilities to maintain data rates and range through mixed media scenarios.

FUTURE PLANS

The EM-2 is only the beginning

CSignum continues to push the boundaries of underwater and underground data transmission with plans to enhance range, data rate and battery life while providing cellular backhaul and CSignum Cloud data analytical services.