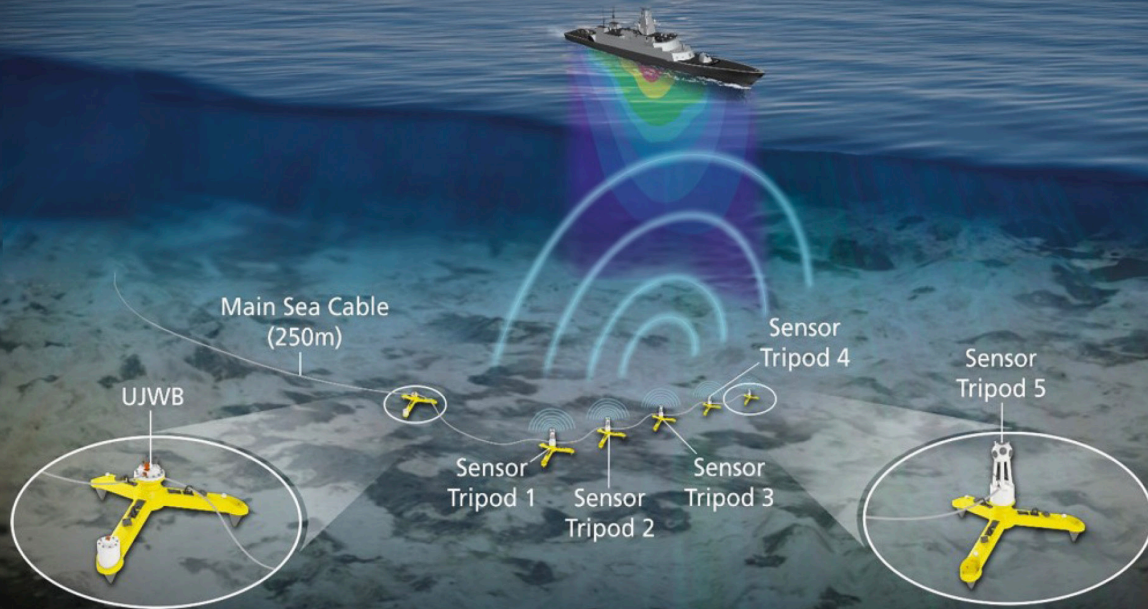


Electric Field Measurement & Detection



Key features

- High accuracy sensors
 - High stability Ag/AgCl electrodes
 - Low noise electronics
 - Spherical housing for additional gain
 - S Mechanical design with raised sphere
 - offers reduced signature distortion and low susceptibility to motion noise.
- Highly reliable
 - Proven long term deployment
 - Built in Test (BIT) electrodes
 - Stable in high tidal flow
 - Compact size for easy deployment
- Ease of control and acquisition
 - Ethernet interface option allows integration into underwater LAN
- TRANSMAG software
 - Acquires Ethernet data
 - Controls BIT electrodes
 - Display of signatures in real-time
 - Modelling of static and ELFE data

Overview

Ultra offer the EFS1 and MUWS16E underwater sensors for ranging and detection applications in harbour entrances and maritime choke points. The sensors provide the same high sensitivity and exceptional performance benefiting from Ultra's market leading low noise AgAgCl electrodes.

The MUWS16E is fitted with additional tilt sensors, pressure sensor and a magnetometer for automatic heading alignment. Sensors are available with analogue or digital Ethernet outputs. For systems with Ethernet output, Ultra's software offers data acquisition, BIT electrode control as well as electric field modelling and analysis software.

Ultra's high performance, low noise electrode equipment for ranging and maritime surveillance applications.

Ultra's EFS1 and MUWS16 electric field sensor design benefits from silver-silver chloride electrodes which provide low noise and low drift.

A non-polarisable electrode material is chosen (i.e. a chloride) as opposed to inert polarisable electrodes whose output will vary (e.g. carbon) which will result in a sensor optimised for low noise measurements.

The magnitudes of the offset voltage and drift are made extremely small with the correct choice of electrode chemistry and electrode construction.

Operation Performance Summary

Optimum physical electrode design results in minimised noise. As a result the spacing of each electrode pair can be reduced to 25cm and achieve a noise level less than 10nV/m/root Hz at 1Hz. The Ultra sensors utilise a 25cm diameter spherical housing.

The spherical design provides optimum sensor performance. The housing is designed using boundary element analysis allowing any distortion arising from the housing or support structures to be minimised.

The MUWS16 sensor and associated mount is mechanically designed using finite element methods to function optimally in water flows of up to 5 knots and to reduce any noise that could be introduced via vibration affects. The sensor structure has been proven in-service long term in sites with 9m tidal range.

All Ultra's sensors are calibrated in a tank with a uniform linear electric field to ensure sensor performance is fully verified.



Performance

	Electric	Pressure
	Static	
Full Scale	+/-10mV/ m or +/- 50mV/ m(in 3 orthogonal axes: x, y, z)	750kPa
Bandwidth (-3dB)	DC-3kHz	3kHzDC to 10HzNoise
Noise	$\leq 10 \text{ nV/m} / \sqrt{\text{Hz}}$ at 1Hz	
Typical software processing options	AC channel up to +/-1mV/m: 0.5Hz to 3kHz after digital filtering on shore	

