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Please visit us at our booth at the Hydrographic show this week!

FieldSens Underwater Utility Mapping

REMOTE POSITION SENSING

Regardless of orientation or relative position to the pipeline or cable, FieldSens continuously provides estimates of offset, depth, and impressed AC current.

SURVEY GRADE GEOPOSITIONING

FieldSens integrates seamlessly with customer-supplied survey-grade GNSS equipment, applying measured offsets to the utility from the on-board GNSS antenna.

DEPTH OF COVER

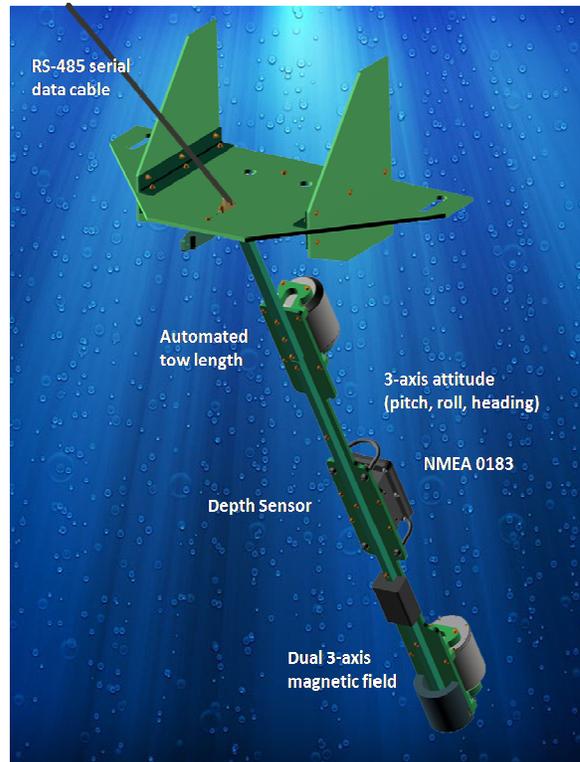
In combination with the vessel's echo sounder, the difference between bottom depth and utility depth can provide depth of cover measurements, with each value accompanied by a confidence interval.

WIRELESS INTEGRATION

FieldSens relies on Bluetooth and IEEE 802.15.4 wireless technology to integrate GPS, depth sounder, and tow cable length measurements.

ACTIVE OR PASSIVE

A variety of FieldSens transmitter options exist for Active locating, and both Passive AC and rectified Cathodic Protection based signals can be optionally traced.



Seawater and field distortions are accommodated in the real-time processing. The method eliminates the need to bring the instrument to specific points related to the utility cable or pipe in order to validate position. Legacy instruments must find the "peak" or "null" in the signal in order to confirm target position. FieldSens need only be in the approximate vicinity to calculate position, and an error bound on every position estimate. Error information has long been used in the surveying community to qualify relative accuracies of measurement equipment. Now this is available to the utility locating professionals.



In rivers, estuaries, bays, and lakes,

deploying an ROV or AUV for cable and pipeline repair and maintenance is more expensive than hiring divers to perform the work. Depending on the purpose of such maintenance activities, the FieldSens Underwater Utility Mapping System can aid existing diver operations in these environments by precisely identifying the target utility. For depth of cover and utility mapping projects, FieldSens can reduce or eliminate the need to use divers with its patented remote sensing method.

FieldSens is available in two models: **Towed** and **Fixed-Mount**, and in two lengths depending on the application. On a vessel with a non-ferrous hull, the fixed-mount version performs the same job as the towed rig when the target utility is in water only a few meters deep. The depressor wing is not used, enhancing accuracy of the fixed system since there is no positioning error of the FieldSens rig relative to the vessel.

Accurate utility infrastructure geopositioning

leads to long term cost savings, since an electronic record is available when needed for repair and maintenance of the line. Offshore wind farms result in new installations of undersea power cables, and the ever-increasing demand for high speed data is also driving increased undersea fiber optic cable installation. FieldSens brings a less obtrusive method of maintaining accurate positioning information, whether the project is for periodic maintenance or as a result of damage.

Depth of Cover projects for either pipelines or cables are facilitated by FieldSens software, which wirelessly integrates measurements of the seafloor bottom depth from the vessel's depth sounder with the 3-d utility geoposition. For deeper cable and pipeline mapping projects in large bays or on the continental shelf, utilities are often buried for protection. The depressor wing is used to bring the FieldSens rig near the bottom to optimize signal strength. This makes it possible to tow the rig over or along the cable while obtaining an accurate estimate of position. Previously divers have been required to bring the instrumentation very near the utility to determine location.

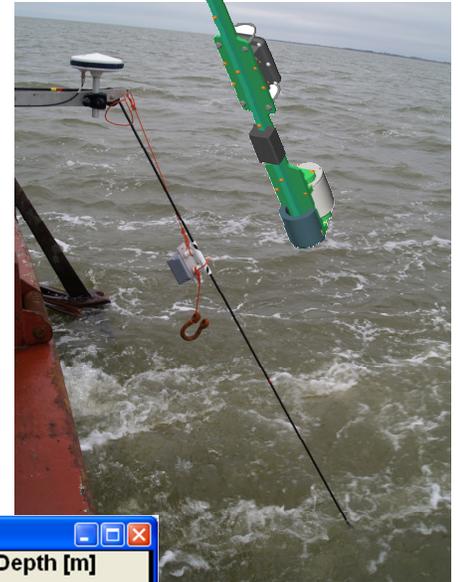
FieldSens Key Benefits

Traditional Utility Locate

- External waterproof 1-axis antenna piloted by divers
- Must be oriented correctly to determine peak/null
- Either remote display on the boat, or a local diver display
- Complex diver positioning problem, especially in current
- 2-way voice communication
- Point measurements only
- Manual Translation to GIS
- Costly and must be repeated for new locate requests

FieldSens Utility Mapping

- Remote 3-d sensing of utility line
- No requirement to find peak/null
- All controls and navigation are from the vessel by the pilot
- Automatic GPS offsets from the antenna to tow pulley and rig
- Automatic, continuous line location in water up to 50m deep
- Pinpointing and Depth of Cover by moving FieldSens across the utility
- Expected error at each position
- Variety of GNSS hardware solutions based on user need



GIS ARCHIVAL

FieldSens continuously archives all measurements, allowing post analysis and review, with subsequent GIS export of position and depth information.

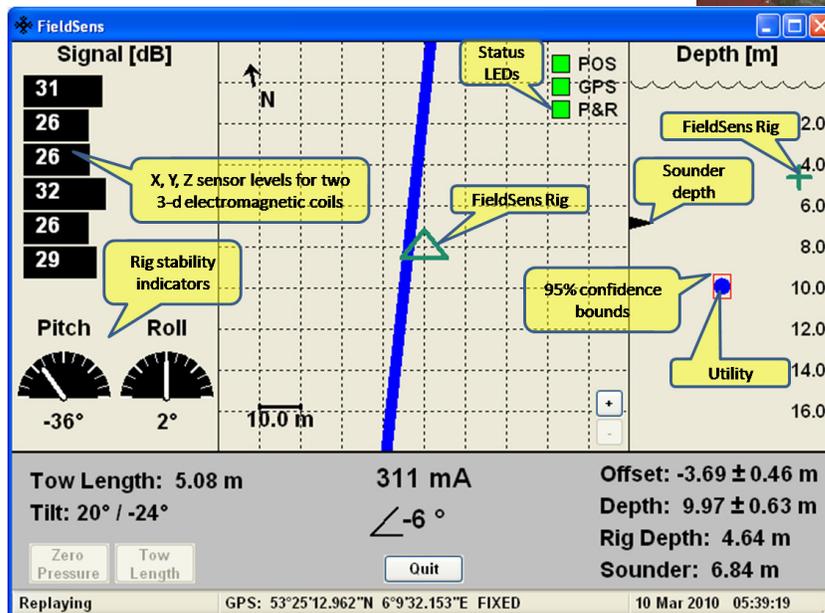
RETURN ON INVESTMENT

FieldSens can be deployed and used by two operators, including the vessel's pilot, who uses the console interface to steer the boat either in the direction of the utility (to capture a full 3-axis profile), or across the cable or pipeline (to capture distinct positions). In either case, the volume and quality of position data is far greater than is practically obtained using existing methods.

TURNKEY OR OEM

For most users, FieldSens can be deployed as a turnkey application, including integration with many marine GNSS systems. OEM versions of the system can be provided for custom applications. Please contact Optimal Ranging.

FieldSens technology is based on US patents 7057383 (and foreign equivalents), 7356421, and several pending applications.



Specifications	
Maximum Seabed Depth	50 meters (with depressor wing) 10 meters (rig-only system mounted to vessel)
Maximum Towing Speed	2 meters / sec (4 knots, following or crossing)
Maximum Current Speed	4 meters / sec (8 knots, crossing mode) ¹
Operating Frequency	98, 128, 512, 640 Hz (Active), 100Hz, 120Hz (CP)
Detection Sensitivity	1 mA/meter (128 Hz), 250 µA/meter (640 Hz)
Depth Range (from rig to utility)	10 meters (long frame), 6 meters (short frame)
Pitch, Roll, Heading	±0.2 degrees (pitch/roll), ±2 degrees (heading)
Depth / Offset Accuracy (2-σ)	5 cm + 10% of radial distance to rig (or as reported)
Geographic Accuracy (3-d)	GPS 1-σ accuracy + 3% × offset of GPS antenna to tow pulley + 3% × length of tow cable (N/A for rig-only)

When winds or currents are moderate, FieldSens can be towed along the path of the utility in "following" mode. Otherwise, transverse crossings result in single-point fixes, which can be connected together to form a profile or map. This mode is preferred when there are strong currents or winds that interfere with the vessel's ability to hold a course in the direction of the cable, e.g., in a river environment.

SERVICES AVAILABLE

- Technical Support
- Vessel Installation
- Software Customization
- Application Support
- On-site Training
- Custom GPS Integration



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