



# SEMANTIC TS

Specialized in acoustics & oceanography, we use sound to infer aquatic environment : water column, vegetation, bottom nature and topography, sub bottom. We can operate several multi-frequencies acoustic systems to get complementary information about the marine medium.

Data gathered from the various instruments is accurately geo-referenced and time stamped by DGPS RTK/Motion sensor (cm precision) positioning system. This common Space-Time reference basis, easing the data fusion process, significantly improves our knowledge of the marine medium and the performance and reliability of the monitoring process.

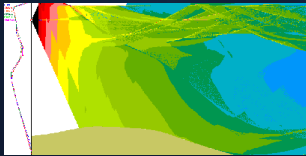
We can design and implement dedicated software to match your specific needs. We can provide service offers, R&D, and Engineering studies linked to the following fields:



## Defense

Anti submarine & naval mine warfare, Operational Oceanography, Naval Systems Engineering, Underwater Acoustics and Signal Processing:

- Direct problem: predicting sound propagation (sonar performances)
- Inverse problem: measuring aquatic environment characteristics (impact of underwater environment on sensors performances)



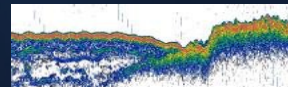
Example Ongoing Project: Bottom Classification method through light single-beam low energy sounders. Applications: shallow water (from boat) or deep sea (embedded on drones)

## Civil & Environment

Sea, Lake, River, Lagoon, Marine Park Reserve, Impact Study, Bathymetry, Cartography, Environmental Monitoring, Luxmeters, Embedded Software for gliders

Multi-sensors data fusion:

- 3D bathymetry providing underwater topography
- Bathymetric micro-rugosity providing information on vegetation
- Side-scan sonar imagery, grey level indicating bottom reflectivity (to deduce its (non) vegetal nature
- Acoustics bottom and surficial sediments classification



- Water column analysis

## Private Infrastructure

Port, Waterway, Offshore, Maritime Works, Infrastructure Building & Monitoring, Measurement and 3D cartography, Vessel Monitoring, Ship's Positioning & Attitude Control. Theoretical studies, specific instrumentation, physical measurements:

- Port bathymetry. Dredging bathymetries. Dredged volume estimation.
- Sedimentary samples. Port inspection diving.
- Monitoring: Ship attitude control, Crane head GPS positioning, Quay and embankment profiles
- Underwater acoustics communication modelling (bottom-surface-ROV-AUV wireless communication)
- Acoustics imagery
- Acoustics impact studies
- Underwater acoustics monitoring

