

SEA EXPLORER

ALSEAMAR

offshore survey services



GENERAL PRINCIPLE

The SEAEXPLORER is an autonomous underwater multi-sensor platform dedicated to collecting data profiles in the water column, up to 1,000 meters depth, with very large spatio-temporal coverage (weeks to months on one single battery charge and without supervising vessel). Driven by changes in buoyancy, the vehicle silently glides following the path requested by the pilot and collecting physical, chemical, biological and/or acoustic data, depending of sensor configuration to answer customer challenges.

A user-friendly software suite allows constant supervision, data quality control and mission control from any place in the world. The SEAEXPLORER regularly surfaces to send ashore its GPS position, collected data and receive new mission commands via Iridium telemetry. The SEAEXPLORER glider is a very cost-effective solution for data collection: it requires no supervising boat at surface during its missions, reducing the need of vessel with high daily costs.

KEY BENEFITS

- 3-D Data Acquisition at Sea (Thousand of Square Kilometers)
- Multipurpose Solution - Easily Interchangeable Payloads
- Cost Effective Data Acquisition Device - Up to 2 Months Autonomy Without Need of Supporting Boat
- Flexible Trajectory – Piloting from Onshore
- Lower HSE risk than alternative Solution
- Carbon-free and Silent Vehicle – No Propeller
- Easily Deployable worldwide



DATASHEETS

- Natural seep hunting survey
- Plug and abandonment monitoring
- Monitoring mammal movements
- Oceanographic research & monitoring
- Carbon capture and storage monitoring
- Acoustic environmental monitoring

SPECIFICATIONS

Body size (D x L)	0.25 m x 2 m + 1 m foldable antenna
Wingspan	56.5 cm Wingless design
Weight	59 kg in air
Depth Rating	1,000 m
Speed	Nominal 0.5 knot / Maximum 1 knot
Battery	Rechargeable Li-ion
Communications	GPS / Satellite (Iridium) / Radio
Navigation Mode	Survey / Virtual mooring / Drifting / Bottoming
Safety	Autonomous drop-weight, Stroke light and Argos



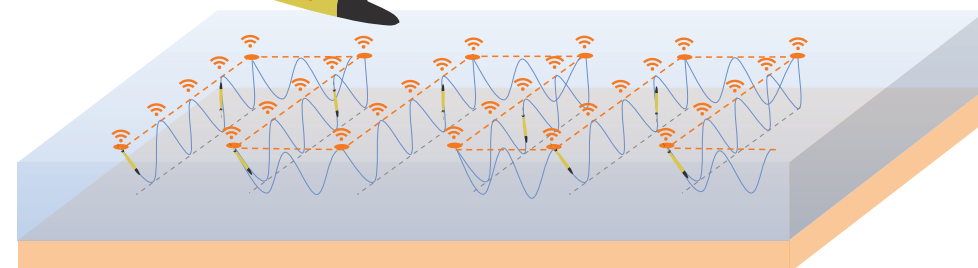
Navigation commands and sciences data



Supervising and Piloting Station (SPS)

Range (Endurance)

- 1,700 km
- 110 days
- Endurance largely depends on sensors, sampling strategy and mission environment.





The activities of ALSEAMAR company are focused on the following markets: Naval Defence, Offshore Oil&Gas and Maritime Sciences. The organisation is based on three departments: Buoyancy Materials,



Underwater Products, Services. ALSEAMAR is aimed at designing and manufacturing its own and innovative complex underwater products and at delivering new services based on its intense internal technical knowledge.

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MONITORING MAMMAL MOVEMENTS

with SEAEXPLORER –
Autonomous Underwater Gliders



innovation & services at sea

MULTICHANNEL ACOUSTIC SURVEY

Loud sounds emitted during offshore industrial activities can impact marine mammals, including physical / physiological effects, behavioral disturbances and indirect effects associated with altered prey availability. The regulations generally prescribe monitoring of marine mammals before and / or during these activities in order to put in place mitigation measures that minimize potential acoustic impacts.

APPLICATIONS

Detect, identify, locate mammals and track their movements for weeks around the area of interest.

FEATURES AND BENEFITS

- Up to 4 weeks of continuous survey
- Independent of weather condition or visibility.
- Cost effective survey
- No environmental footprint
- Autonomous – Easy deployment
- Decrease HSE risk
- Near real time data transmission & mission management

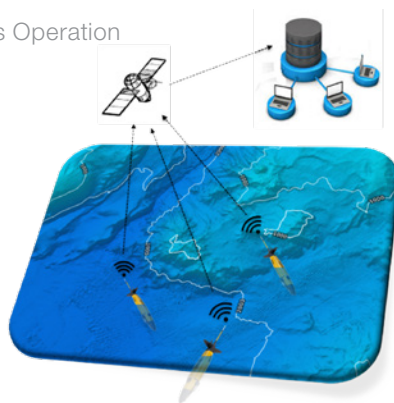
SERVICES PROVIDED TO CLIENTS

- Survey mission design
- Logistic of SeaExplorer operation
- Survey management and piloting
- Data processing, analysis with Taylor-made algorithm
- On-demand sensor integration

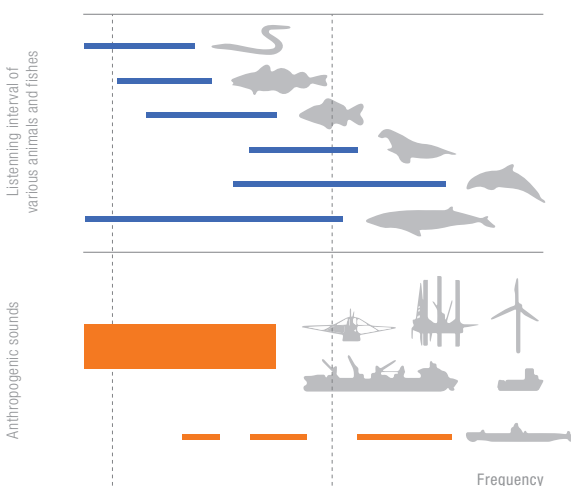
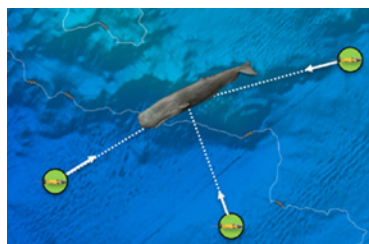
DATA COLLECTED & ANALYSED

- Underwater sound
- Sound velocity profiles
- Current Profile

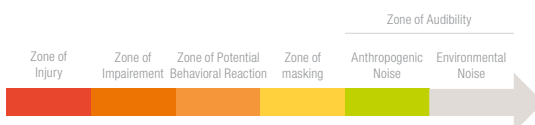
Multi-Gliders Operation



Triangulation



Anthropogenic sounds compared to communication of cetaceans and fishes. *Source: Slabbekoorn and al. (2010)*



Scale of risks of impacts of noise on marine fauna. *Source: Quiet-Oceans*

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NATURAL SEEP HUNTING SURVEY

with SEAEXPLORER –
Autonomous Underwater Gliders



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DE-RISKING OFFSHORE EXPLORATION

Natural seeps migrating in the water column through the seabed from deep reservoirs provide valuable information and help to de-risk petroleum systems on early stages of frontier exploration programs.

APPLICATIONS

- In situ data to validate the interest of offshore seismic acquisition in a remote area
- Optimize seismic acquisition program – focus only on the most interesting parts of the block for 3D seismic coverage
- Detect additional seeps which are not creating oil surface slick
- Environmental follow up during the entire life of a project.

FEATURES AND BENEFITS

- Fast and easy to mobilize on site
- Cost effective survey
- No environmental footprint
- Autonomous – Decrease HSE risk
- Dissolved chemicals compounds detection
- Bubbles / droplets detection by acoustic
- Near real time data transmission & mission management

SERVICES PROVIDED TO CLIENTS

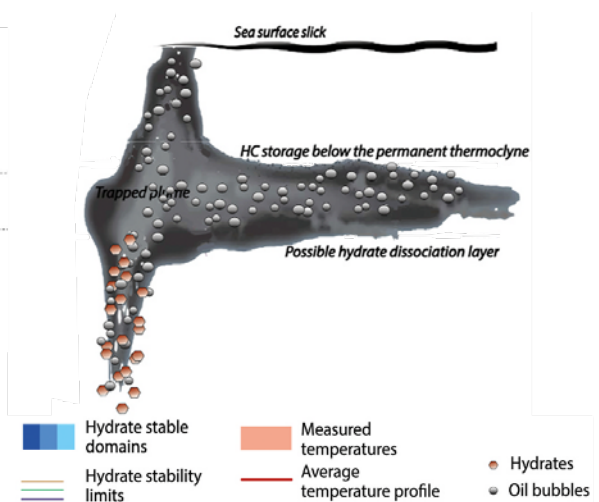
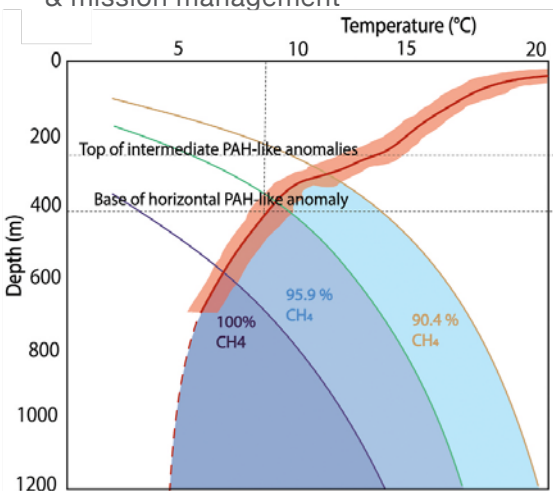
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- Survey management and piloting
- Data processing, analysis with Taylor-made algorithm
- On-demand sensor integration

DATA COLLECTED & ANALYSED

- Methane concentration
- Oil Proxys (PAH)
- Bubbles detection
- Salinity – Temperature – Pressure
- Turbidity – Dissolved Organic Matter
- Currents



Easy Logistic



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ExxonMobil

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OCEANOGRAPHIC RESEARCH & MONITORING

with SEAEXPLORER –
Autonomous Underwater Gliders



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SCIENCE

Due to the fact that oceanic processes are dynamic, complex and occur on multiple spatio-temporal scales, they are not always detectable from satellites, research vessels or fixed measurements. The SEAEXPLORER is an autonomous, unmanned underwater vehicle that can be fitted with a wide variety of sensors for ocean science. During its dive, the glider acquires a set of data simultaneously on the entire water column between 0 to 1,000m depth. This information creates a more complete picture of what is happening in the ocean, as well as trends scientists might not otherwise be able to detect

APPLICATIONS

- Ocean Health and ecosystem
- Meso / sub-meso scales processes
- Boundary Currents
- Storm
- Water Mass Transformation

FEATURES AND BENEFITS

- Sustained 3D monitoring of a regional area
- The observation of ocean state variables at a high density in time and space
- Surface to deep profiles in extreme conditions (e.g. hurricanes)
- Sustained observations in the

polar/isolated regions

- Fast deployment and real-time navigation enabling delivery of vital information for environmental disaster management

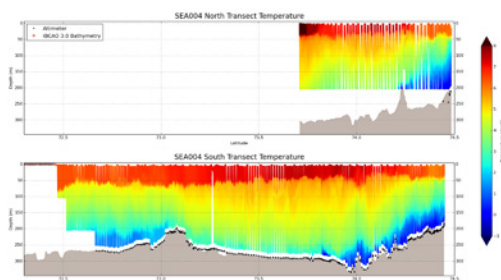
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- Survey mission design
- Logistic of SEAEXPLORER operation
- Survey management and piloting
- Data processing, analysis with Taylor-made algorithm
- Data transmission to GDAC

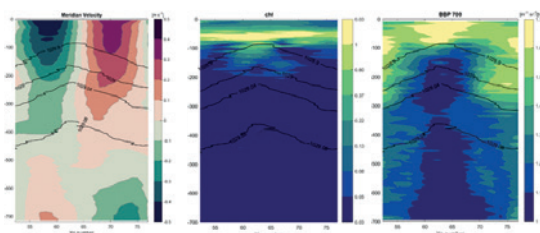
DATA COLLECTED & ANALYSED

- Current Profile
- Salinity - Temperature - Pressure
- Dissolved oxygen – Chlorophyll Fluorescence
- Turbidity - Dissolved Organic Matter Fluorescence
- Acoustic recording
- pCO₂ concentration
- Nutriments
- On-demand integration

All those data are analyzed and correlated to each other by our experts team to provide the most relevant information.



Barent Sea Measurements



Physical-biogeochemical interactions in a cyclonic-like structure

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PLUG AND ABANDONMENT MONITORING

with SEAEXPLORER –
Autonomous Underwater Gliders



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GLOBAL ENVIRONMENTAL VISION

Hydrocarbons are naturally present in the water column, which makes it challenging to detect leaks and assess their impacts. The SEAEXPLORER capabilities provide valuable information to perform environmental baseline studies prior to P&A activities, as well as monitor any potential leak after the abandonment of wells.

APPLICATIONS

- Obtain a global environmental vision of the situation prior the entire P&A operation
- Operation improvement: detect if a part of the P&A operation is the main source of contamination
- Cost effective long term monitoring after abandonment

FEATURES AND BENEFITS

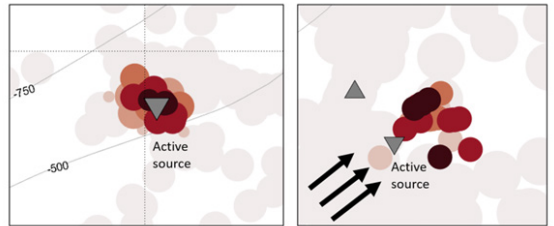
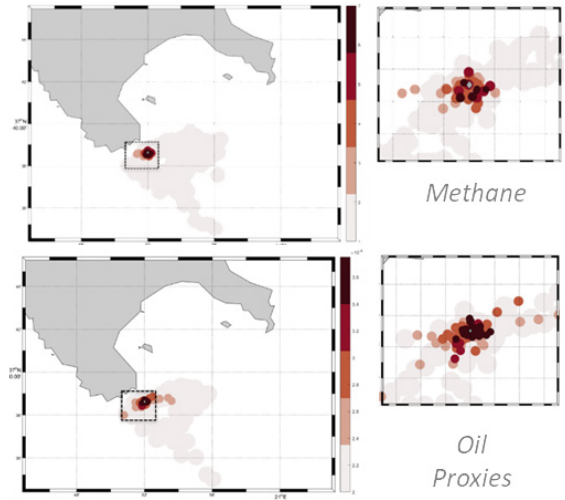
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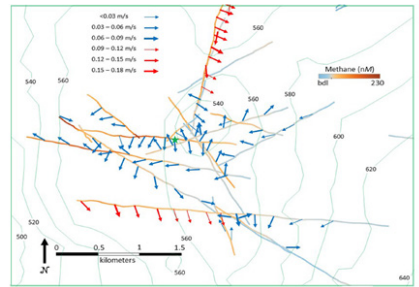
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Meurer et al., (2021) – ExxonMobil – GoM Mud Volcano



Deployment from any size boat

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