

innovation & services at sea



### **SEAEXPLORER Glider**

MARINE MAMMALS AND OTHER

ACOUSTIC APPLICATIONS

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NOVEMBER 2017

Gliders vs. Other Underwater Vehicles:



• How Does a Glider Work (1/2):

### Thrust provided by buoyancy variation

- Vehicle heavy: It glides down following a slope
- Vehicle buoyant: It glides up to the surface following a slope





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• How Does a Glider Work (2/2):

### Pitch & Roll set by displacing an internal moving mass

- Pitch: moving mass positioned at rear / front, SEAEXPLORER pitch up / down
- Roll: moving mass positioned on port / starboard





### **Benefits of Using Gliders for Ocean Exploration:**

- Autonomous Vehicles
- Water Column Profiling
- Persistent Data Collection
- Near Real Time Observation
- Large Scale Survey (Fleets)
- Long Term Monitoring
- Remote Area

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- Cost Effectiveness
- Variety of Sensors

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# II – SEAEXPLORER Glider

#### **Please check the following explanatory videos:**

- The SeaExplorer Glider: <u>https://youtu.be/L4xHD5y6DU4</u>
- Department of Fisheries & Oceans Canada Glider Program: <u>https://youtu.be/7loPwOiX-1c</u>
- Barents Sea Mission (Arctic Circle): <u>https://youtu.be/aSLnCtEf\_Hw</u>



### A proven technology: DOUBLE WORLD RECORD (Sept/Nov 2013):

- DISTANCE: > 1200 km
- DURATION: 60 days

for an Unmanned Underwater Vehicle powered by RECHARGEABLE BATTERIES





#### **Underwater Acoustic: Alseamar (ACSA) historic core business**

- Sampling Rate: 48 kHz, 96 kHz or 192 kHz
- Bandwidth: 10 Hz to 65 kHz (others upon request)
- 24 bits A/D converter
- Applications:
  - ✓ Marine Mammals Assessment
  - ✓ Sonar Ping Detection
  - ✓ Marine Traffic Monitoring
  - ✓ Habitats Health Status
  - ✓ Human Noise Mapping
  - ✓ …
  - Environmental Baseline Study (EBS)







#### **Mission Example: Marine Mammals Assessment/Detection**

Acoustic Estimation of Whales size:

The Inter-Pulse Interval (IPI) of the Sperm-Whales vocalization enables the estimate of their size: 11,85m & 13,54m





Source: www.cetaces.org

 Dolphin Chirps: (6-9 kHz)







### New Exclusive & Innovative Navigation Mode: Seafloor Landing → The "Bottoming" Feature

- Applications:
  - ✓ Seabed Acoustic Charaterization
  - ✓ Hypoxia (Oxygen Depletion)
  - ✓ ADCP Data
  - ✓ …





### **Passive Acoustic Monitoring using the Bottoming Feature:**

- Missions funded by the French Water Agency to tackle MSFD challenges:
  - Acoustic Mapping of the Anthropogenic Pollution (Marseille Bay): Impact of the Human Activities/Noise on Artificial Reefs
  - ✓ Seabed Acoustic Characterization in La Ciotat Bay: Evolution of the Habitats Health Status



→ Reports available online: <u>www.medtrix.fr</u>









Mapping underwater noise with a SeaExplorer glider at a basin level C. Gervaise et al., Grenoble Univ.





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