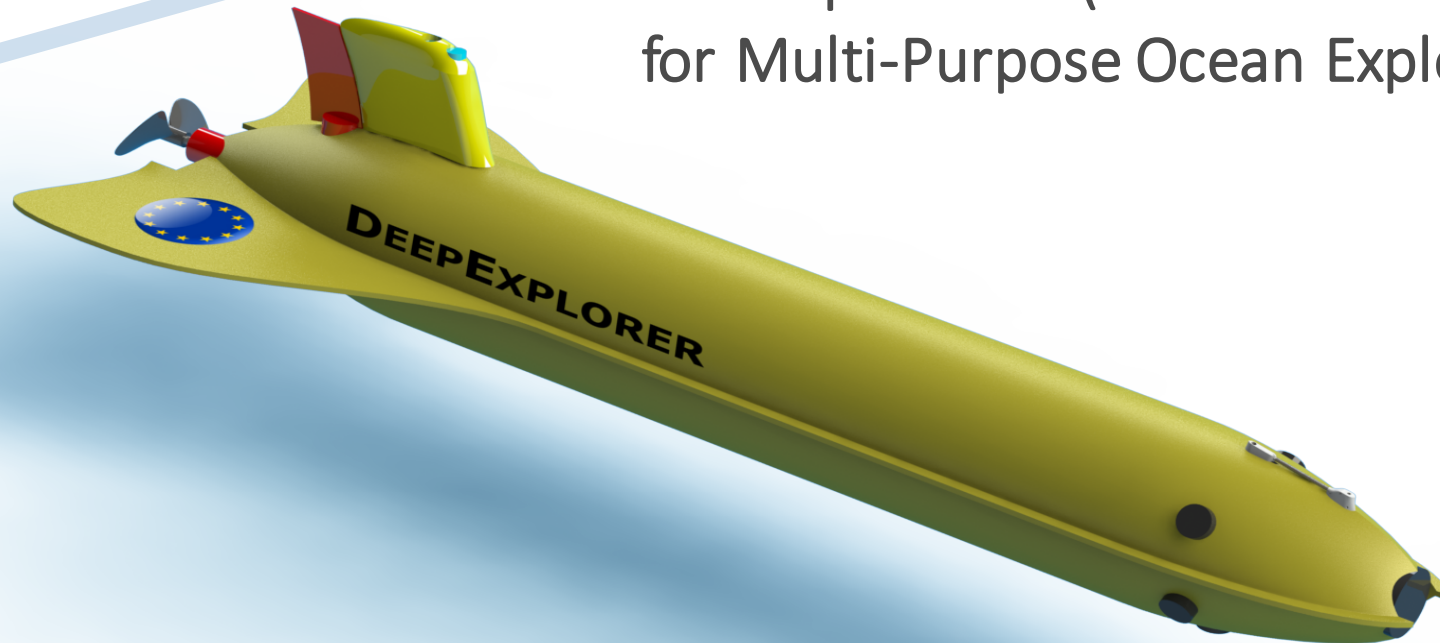




BRIDGES

BRINGING TOGETHER RESEARCH AND INDUSTRY FOR
THE DEVELOPMENT OF GLIDER ENVIRONMENTAL SERVICES

Challenging Development of Ultra-Deep Gliders (2400m and 5000m) for Multi-Purpose Ocean Exploration



This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 635359

Michael Field (ARMINES)

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OI 2016 / Oceans of Tomorrow, London, 16/03/16

Ultra-Deep Gliders for Multi-Purpose Exploration

What is BRIDGES?



- 7.8M€
- 4 Years(2015-2019)
- 19 Partners



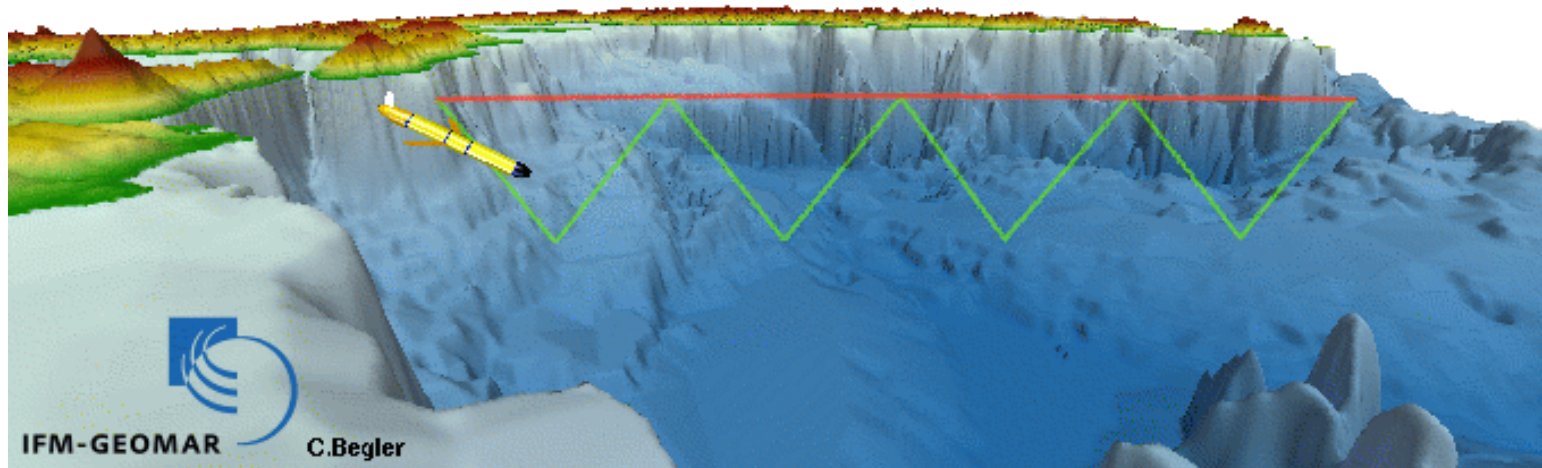
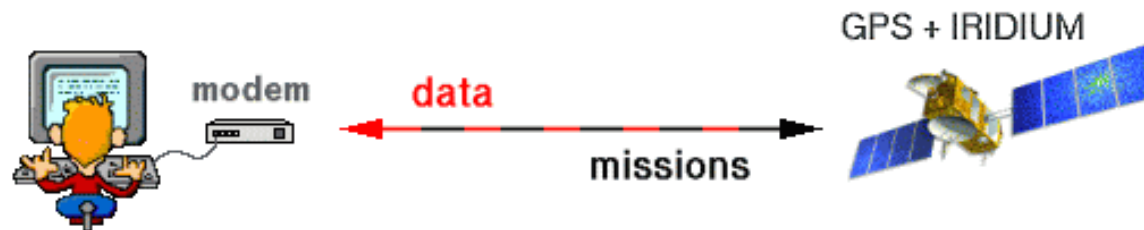
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OI 2016 / Oceans of Tomorrow, London, 16/03/16

- 2 deep-sea multi-mission gliders:
 - DEEP EXPLORER (2400M)
 - ULTRA-DEEP EXPLORER (5000M)



A QUICK RECAP...

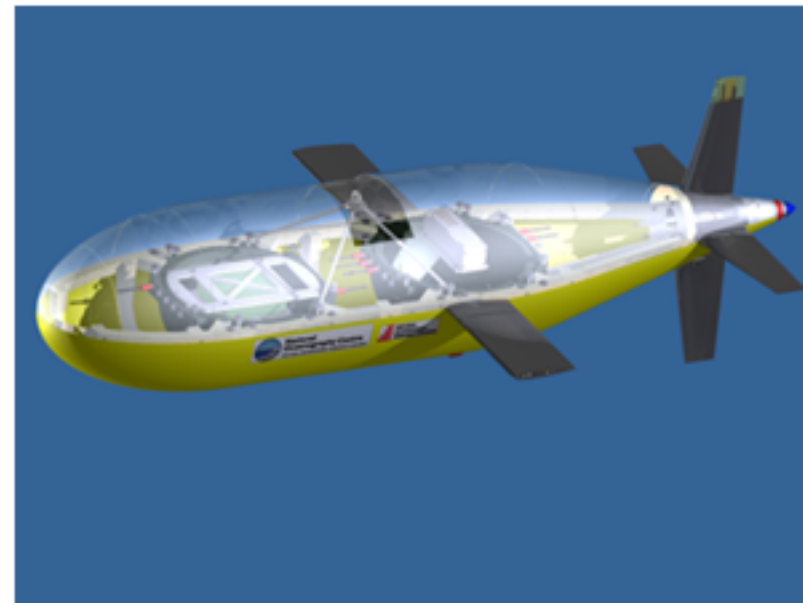


BUILDING ON PROVEN TECHNOLOGY...



← SEAEXPLORER glider
from ALSEAMAR

Deep AUTOSUB-LR →
from NERC



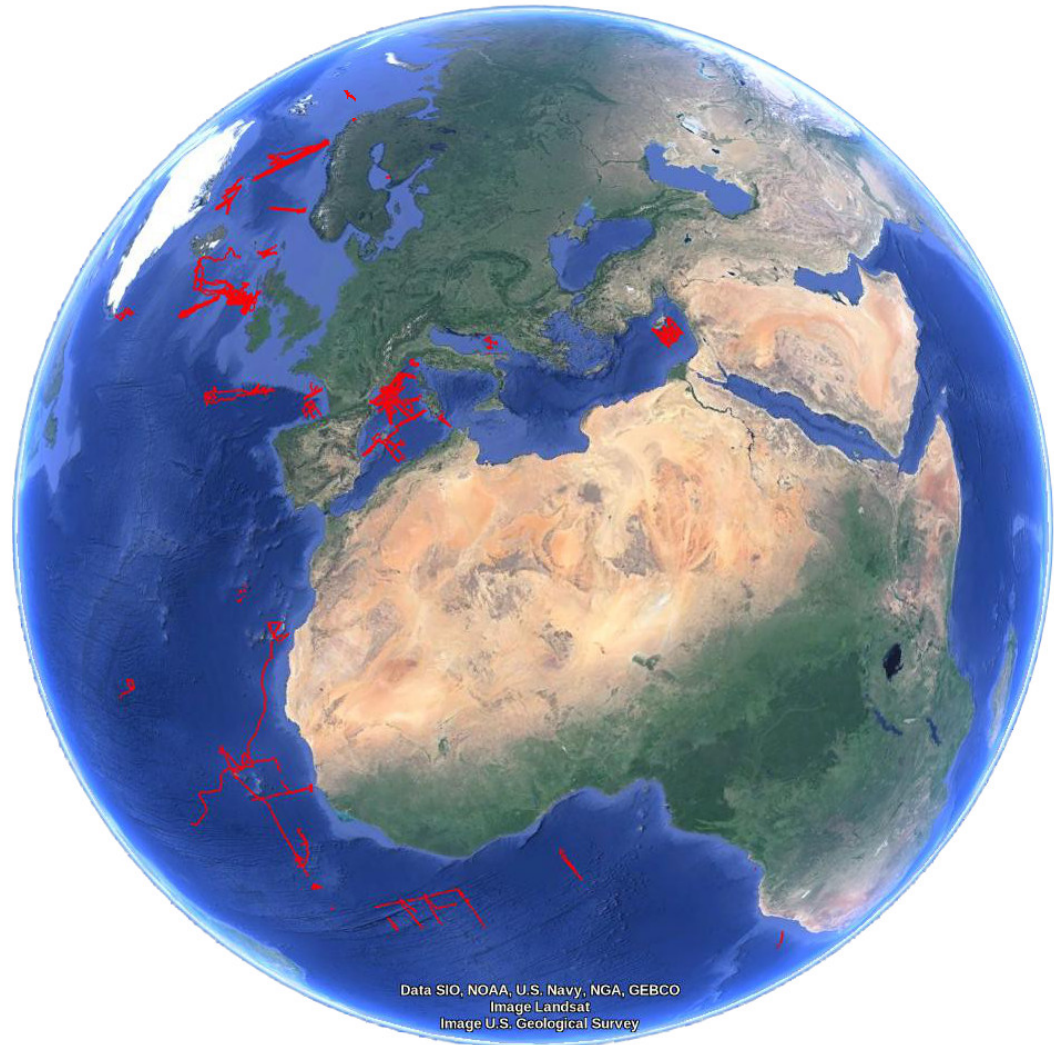
BUILDING ON 10+ YEARS GLIDER ACTIVITY...

- **FP7 GROOM**

<http://www.groom-fp7.eu>

- **EGO Network** →
(COST Action ES0904)

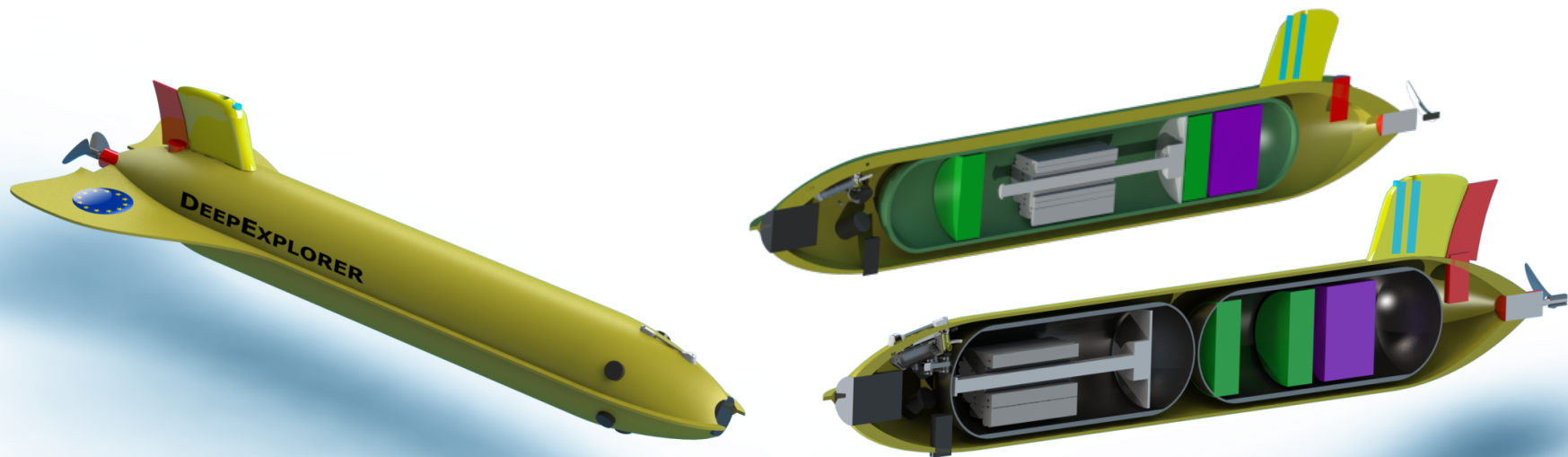
www.ego-network.org



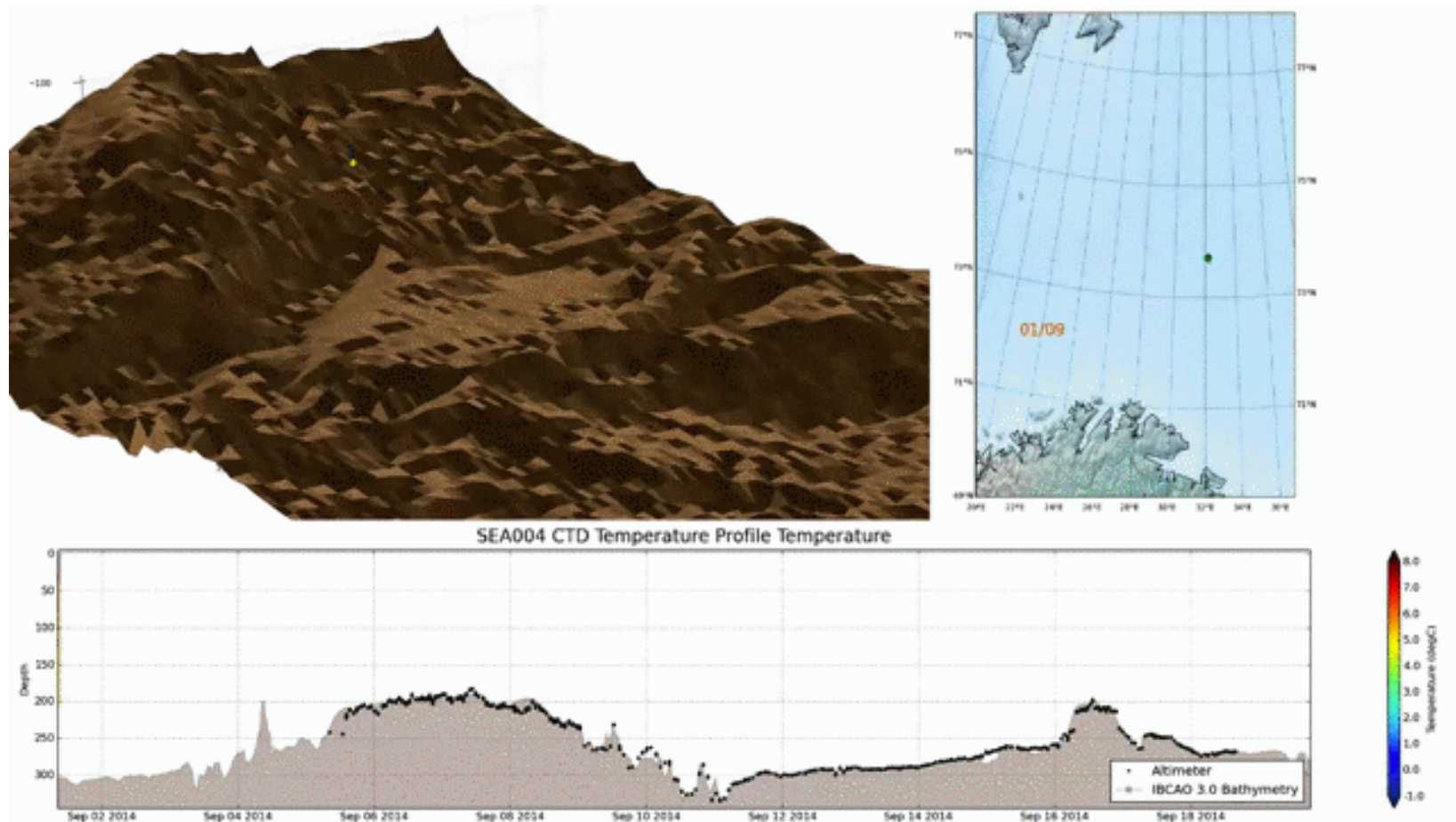
Ultra-Deep Gliders for Multi-Purpose Exploration

The Ultra-Deep Glider Platforms

- From 1000M → 5000M
- Increased Sensor Payload Power (~6x)
- Hybrid Propulsion Mode



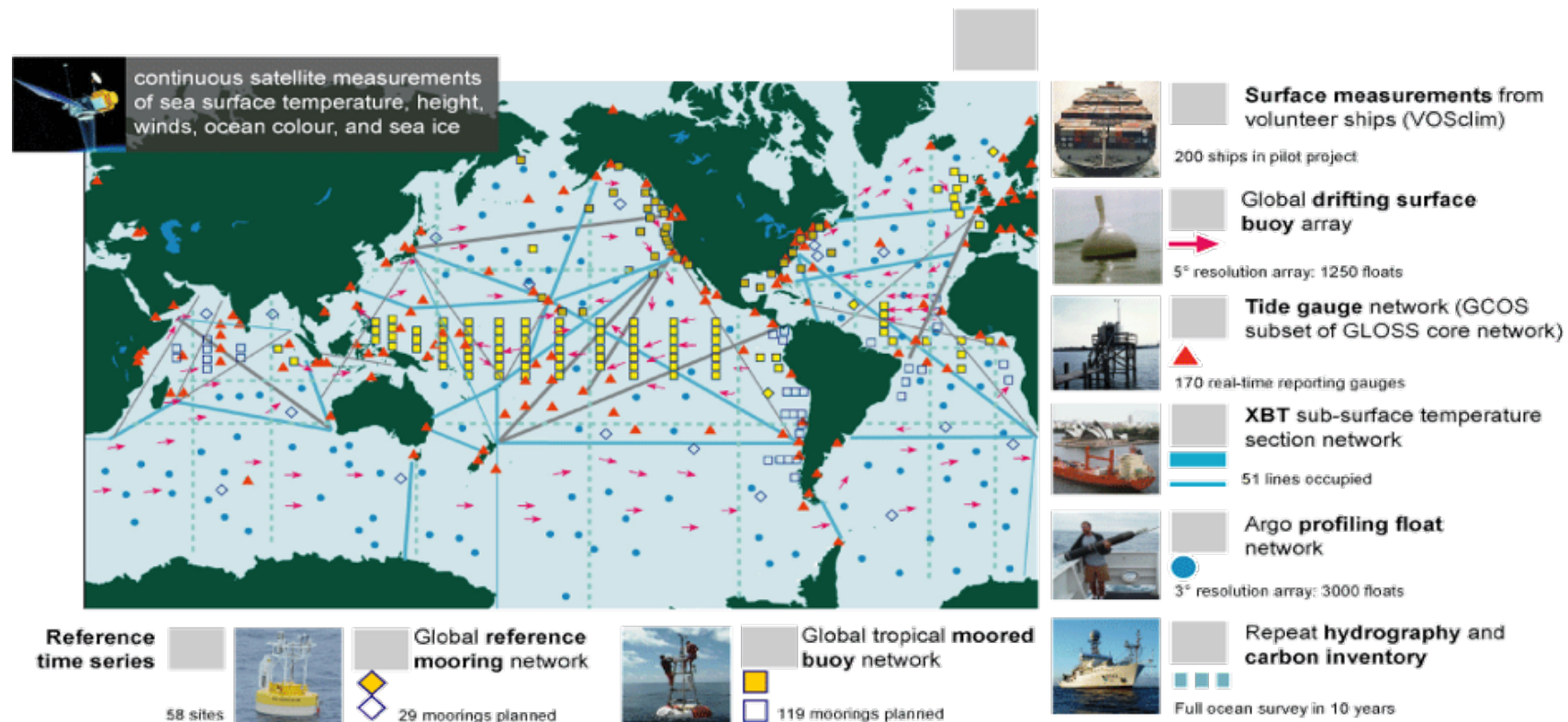
■ Marine Science



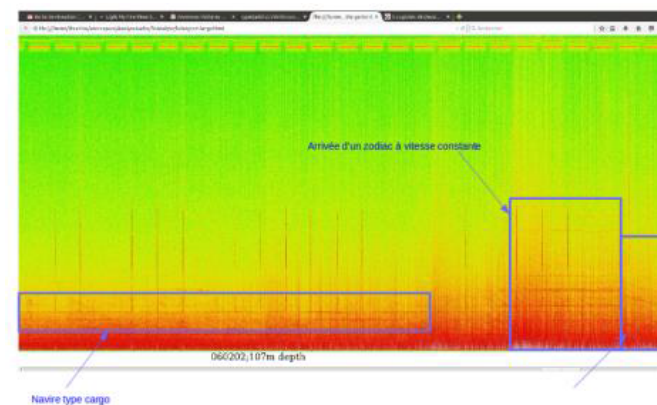
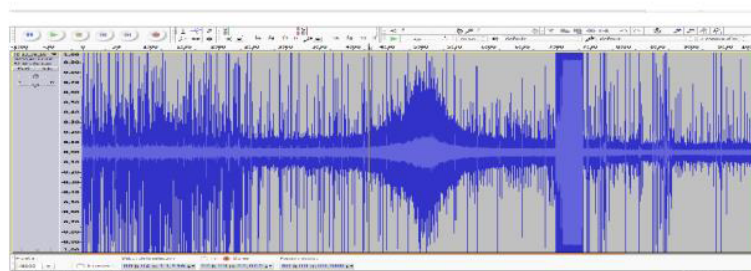
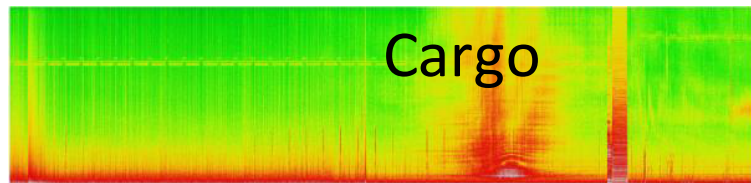
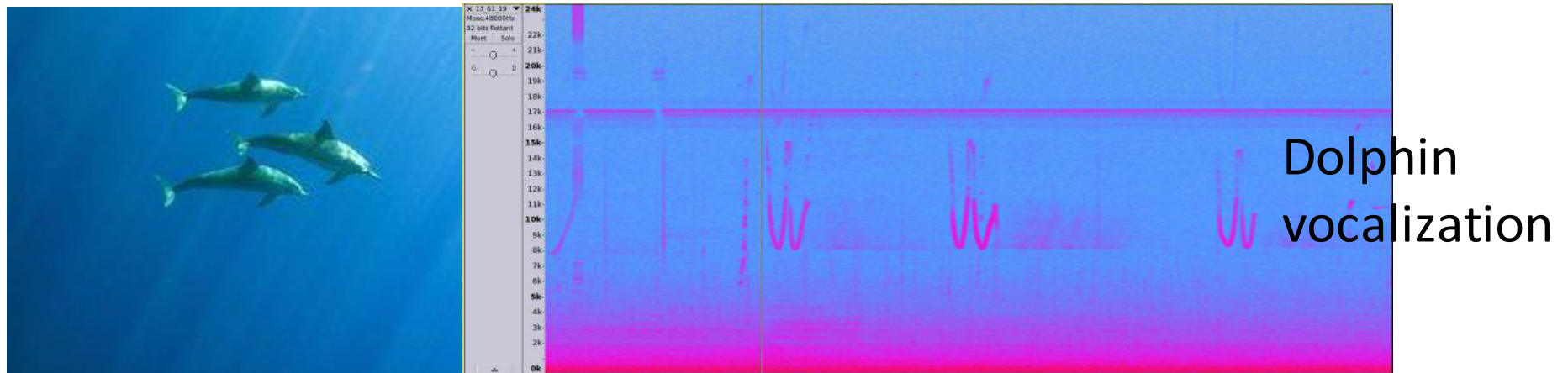
Ultra-Deep Gliders for Multi-Purpose Exploration

Market Applications

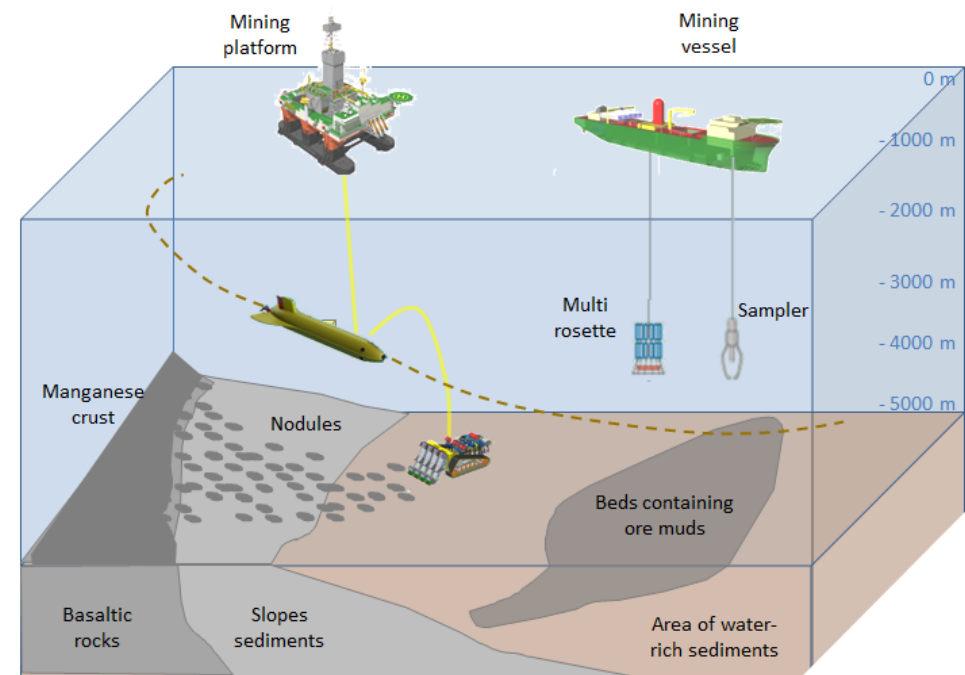
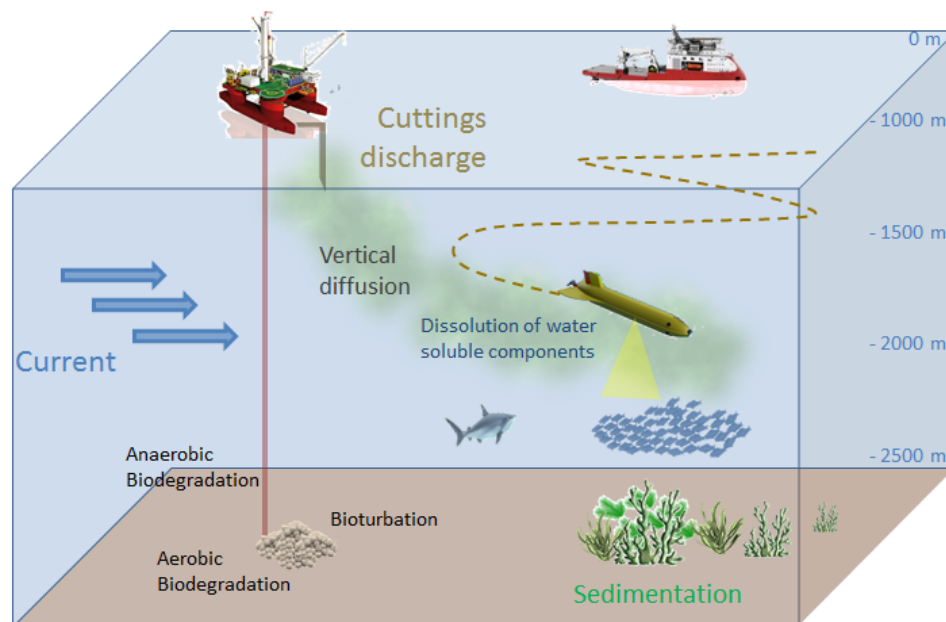
- Long-Term Monitoring Programmes (MSFD)
- Intergration with Observing Systems (GOOS)



- Living Resources



- Offshore Industry (O&G, Sea Mining, Renewables)



4 Novel Sensor Packages:

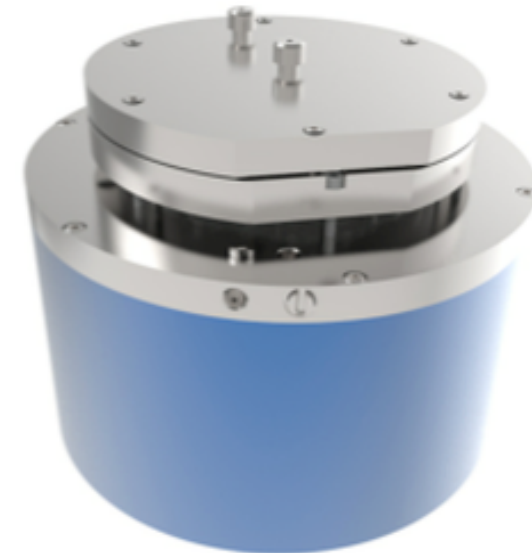
Mini Water
Sampler

OCTOPUS
Imaging

NOC
Lab-On- Chip

Sea-Bed
Acoustics

- Miniaturized Water Sampler
- 100mL samples



4 Novel Sensor Packages:

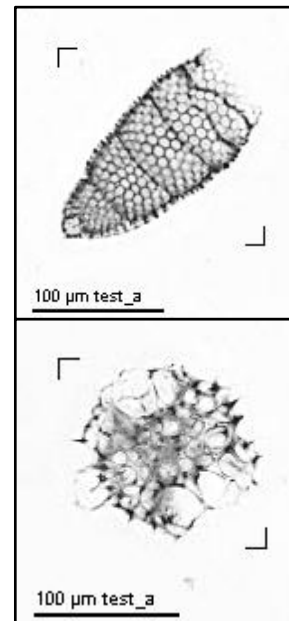
Mini Water
Sampler

OCTOPUS
Imaging

NOC
Lab-On- Chip

Sea-Bed
Acoustics

- OCTOPUS Imaging by Hydroptic/UPMC
- Image capture of micro organisms and micro particle/bubbles



4 Novel Sensor Packages:

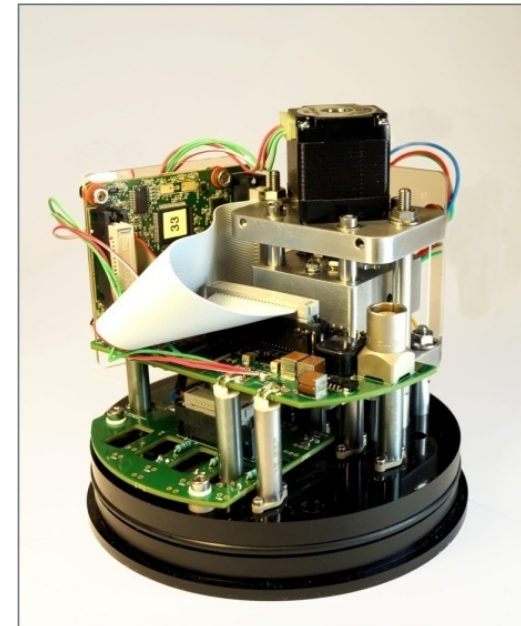
Mini Water
Sampler

OCTOPUS
Imaging

NOC
Lab-On- Chip

Sea-Bed
Acoustics

- Developed by NOC
- In-situ sensing and analysis of:
 - Nitrate
 - Phosphate
 - Ammonia
 - Silicate



4 Novel Sensor Packages:

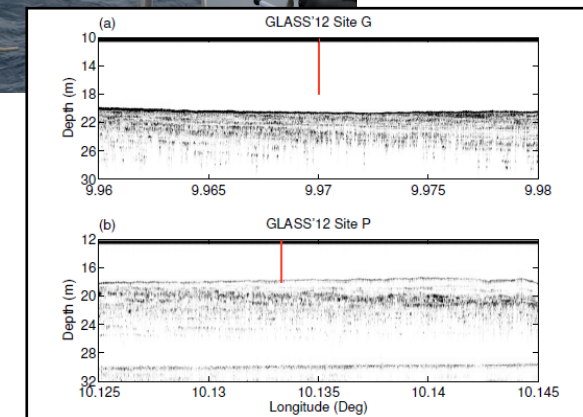
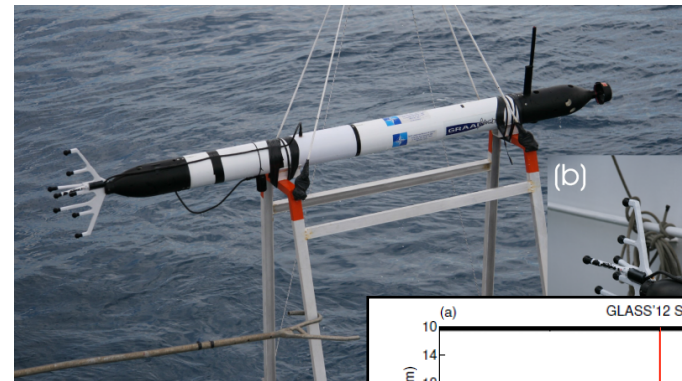
Mini Water
Sampler

OCTOPUS
Imaging

NOC
Lab-On- Chip

Sea-Bed
Acoustics

- Active acoustics for sea-bed properties
- Penetration up to 10m



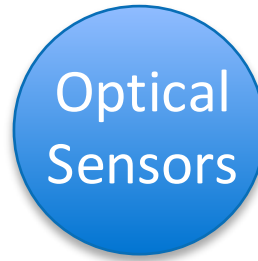
Building and Validating Glider-Ready Payloads:



Temperature
Depth
Salinity



Oxygen



Biology
Turbulence
Hydrocarbons
Methane



Acoustics

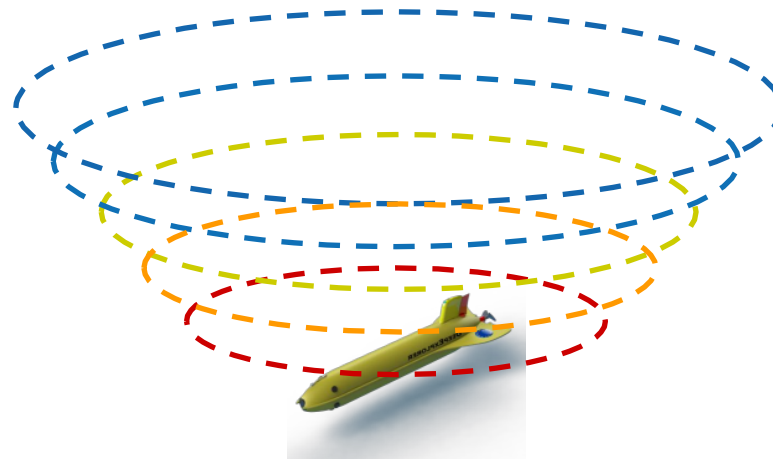


Current



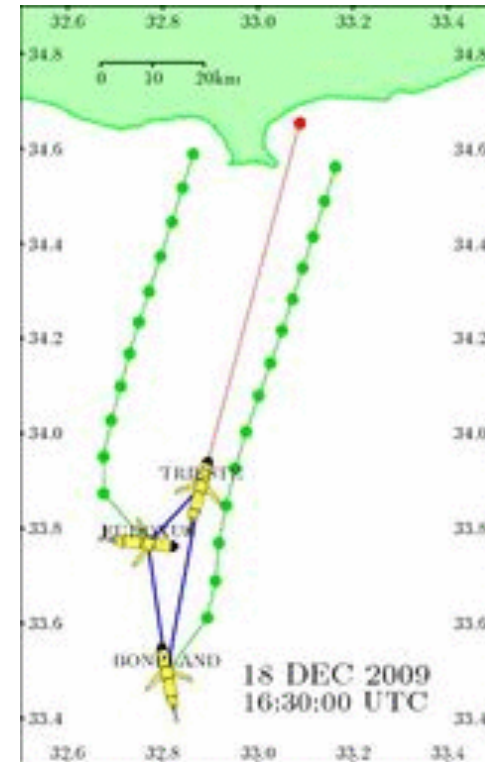
Onboard Intelligence

- One dive/ascent to 5000m = ~24hrs
- Adapting behaviour and operation needed based on glider state and local sensing



Glider and Fleet Management

- Glider flight optimized based on local observations and forecasts (weather, currents, shipping)
- Fleet Management
 - Formations, Grids
 - Tracking



Coming soon...



- Keep up to date with BRIDGES!
 - www.bridges-h2020.eu + Newsletter
 - Twitter [@BRIDGESh2020](https://twitter.com/BRIDGESh2020)



Thank you for your attention!



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