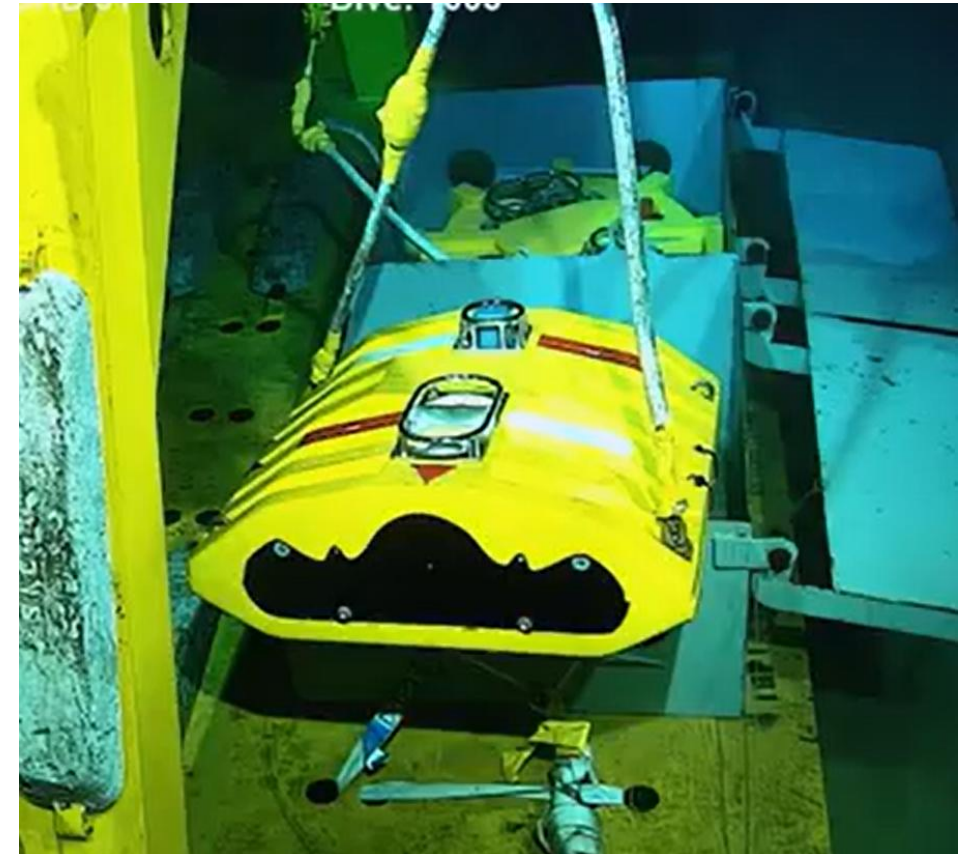


Better, More Frequent and Lower Cost Reservoir Monitoring with OD OBN

The Carbon Storage MMV Technology Showcase

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Projects Director
Sonardyne International Ltd
8th June 2026



- Record full-azimuth surveys to improve imaging and monitoring in complex environments
- Seabed coupled geophones record high fidelity shear waves. Hydrophone records and sound waves
- Oven-controlled clocks typically used to keep highly accurate track of sample timing ($\pm 1\text{ms}$)
- High cost (dual or triple ROV vessels + source vessels, huge inventory of equipment, lots of people)
- Infrequent reservoir monitoring due to cost/regulation/logistics so difficult to keep track of changes, more uncertainty, especially when processes like WAG are used
- Reduced 4D sensitivity due to changing environmental conditions coupled with node placement inaccuracies between surveys



Permanent Reservoir Monitoring Systems

- Fibre optic cables and sensors
- Gold standard data, fixed/buried sensors, high inline density, but often sparse crossline density to save cost
- Hugely expensive to produce and deploy
- Difficult to retrofit in greenfield and brownfields. High seabed impact
- Questionable longevity/difficult and costly to replace if broken
- Inflexible: Can't be moved or altered once deployed

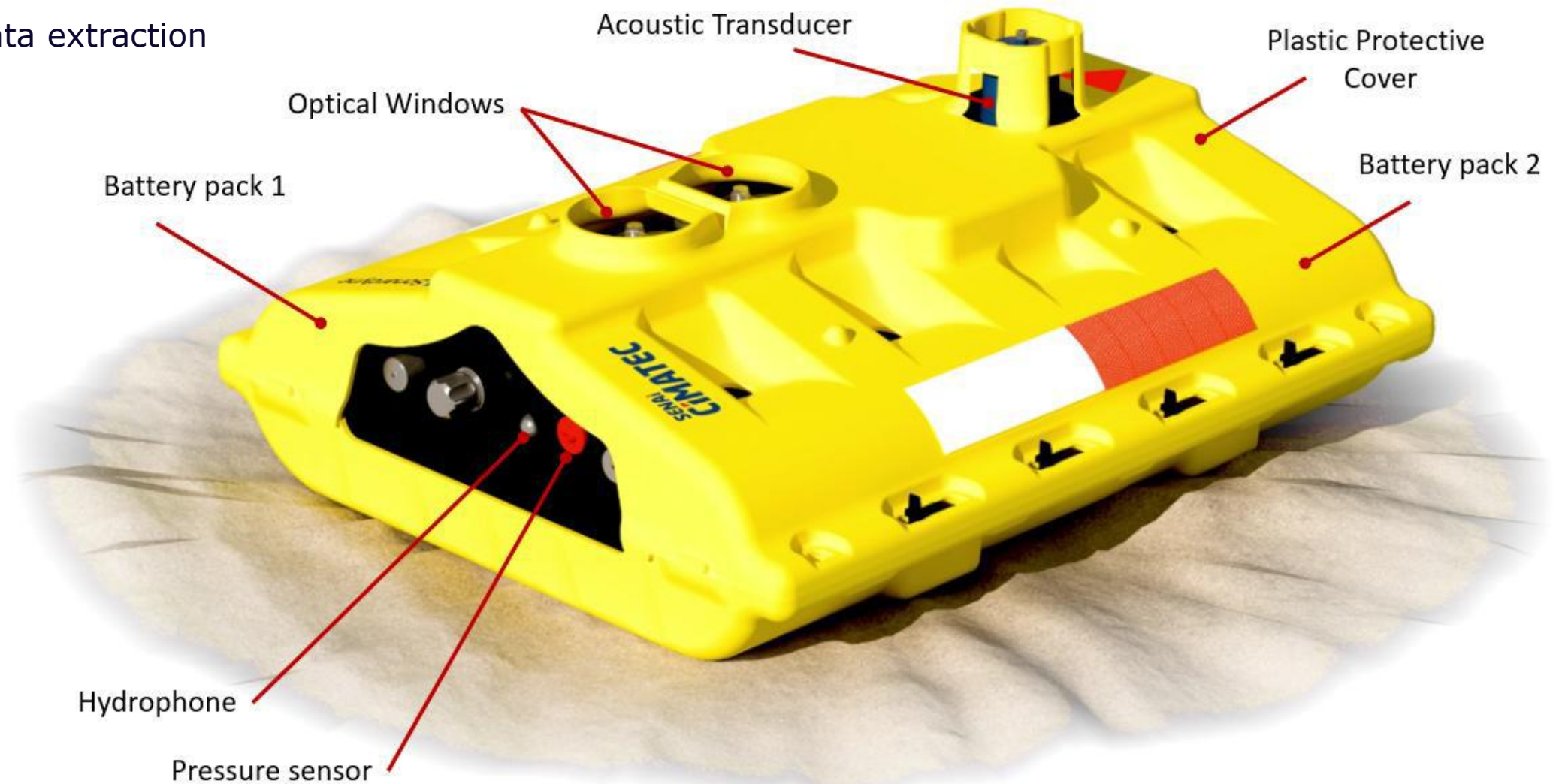


TGS OptoSeis 'optical PRM' – Deployed at Jubarte



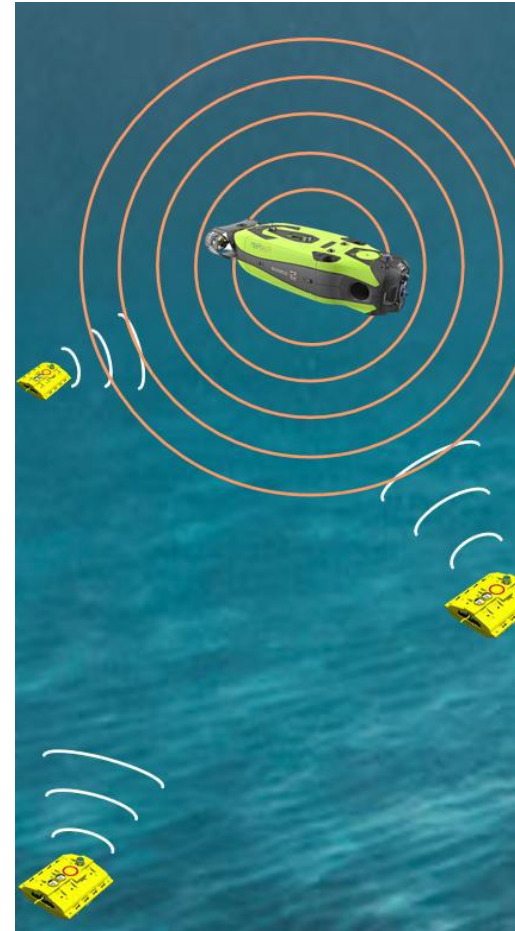
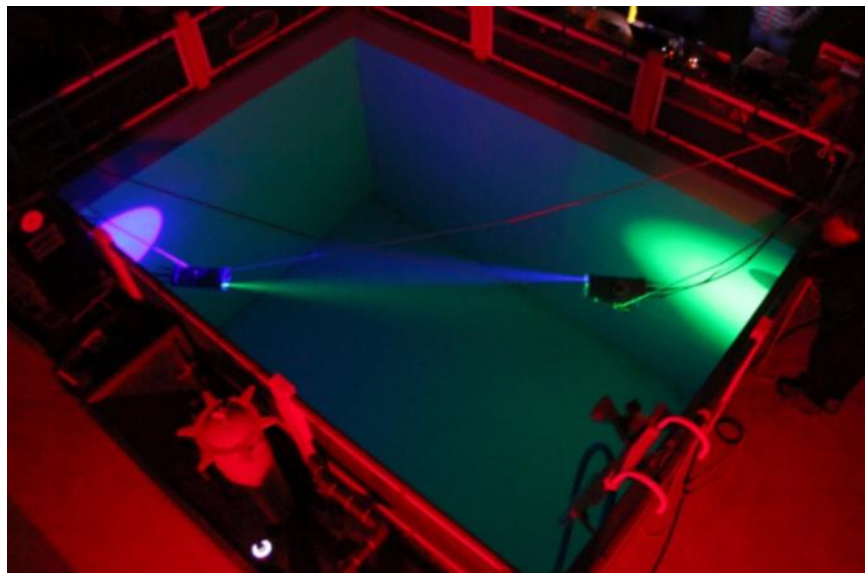
Geospace 'electrical' PRM – Deployed at Equinor Snorre and Grane fields

- 5-year seabed life
- 500 days of 4-component recording endurance
- Acoustic communications for recording control, position and clock offset/drift measurements
- Optical communications for 4C data extraction
- Seabed subsidence measurement



How OD OBN works?

- Node deployed on seabed for up to 5 years
- 4C recording activated 'on demand' using acoustic communications
- Clock drifts and offsets are measured acoustically by a surface vessel.
- Offset data is used to correct for clock drift in post processing. Accurate to $\pm 1\text{ms}$.
- 4C data is extracted to an AUV or ROV using short range optical communications. Each day of data takes around 8s to extract.
- Node also continuously measures seabed subsidence using integral pressure sensors



Why 5 years?

- Frequent monitoring useful at the start of production Start-up new wells, adjust injection profiles, evaluate reservoir connectivity, calibrate models
- PRM at BC-10: surveys every year in first 4 years, then after field was understood monitors conducted every 3 years



HDG: 140.78°

C-INNOVATION

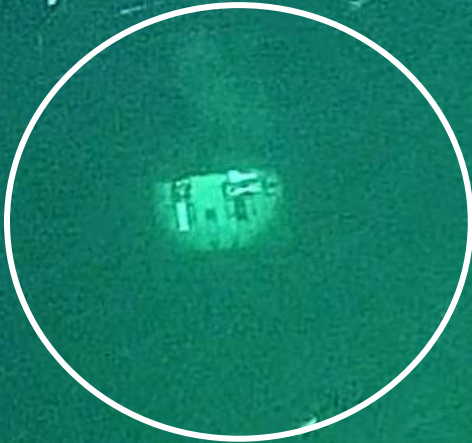
ISLAND ENFORCER

2023-01-24 09:27:49



UHD 51

Dive: 902



On Demand Ocean Bottom Node

E: 422199.68

N: 7662311.58

© Sonardyne International | Commercial in Confidence

Saipem Flat Fish TP#14

CP: 0mV

DEPTH: 1747.60

ALT: 3.90

- **Great Data:** Permanent deployment. Perfect receiver repeatability lowers 4D noise and accelerates processing
- **Frequent Monitoring:** Provides enhanced 4D certainty = better reservoir management.
- **Versatile:** Can be deployed, moved and replaced with ease.
- **Resilient:** To individual node failures. Doesn't comprise cables.
- **HSSE Advantages:** Lower emissions and reduced human offshore exposure.
- **Retrofittable:** At greenfield and brownfield sites. Non-intrusive.
- **Low Cost:** Compared with permanent cables and conventional node surveys.



OD OBN Production Plant in CIMATEC Park (Bahia, Brazil)

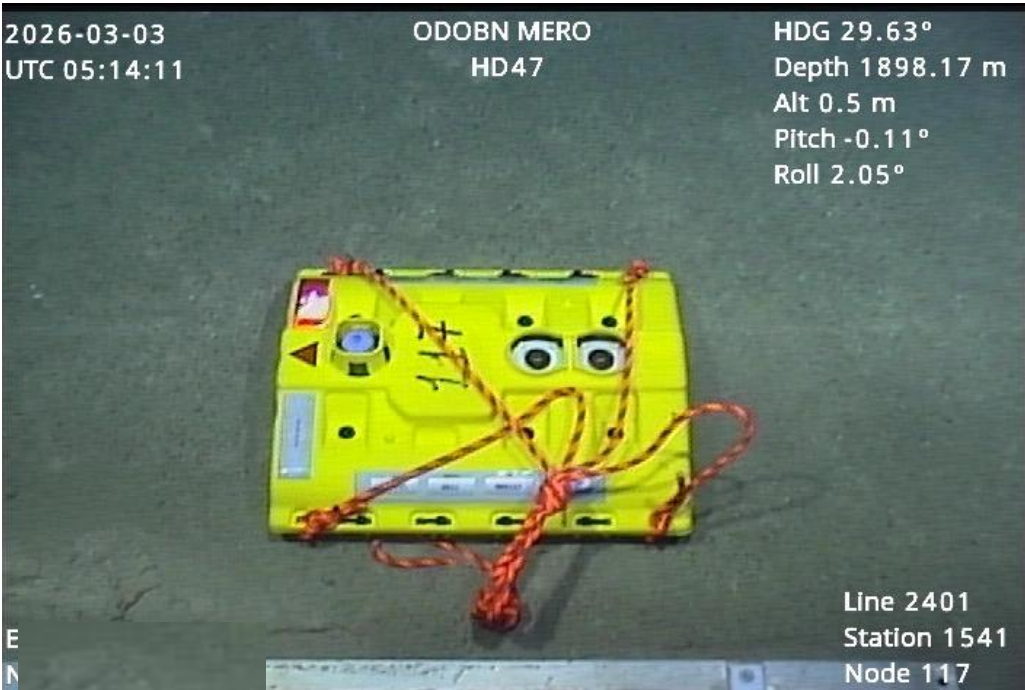
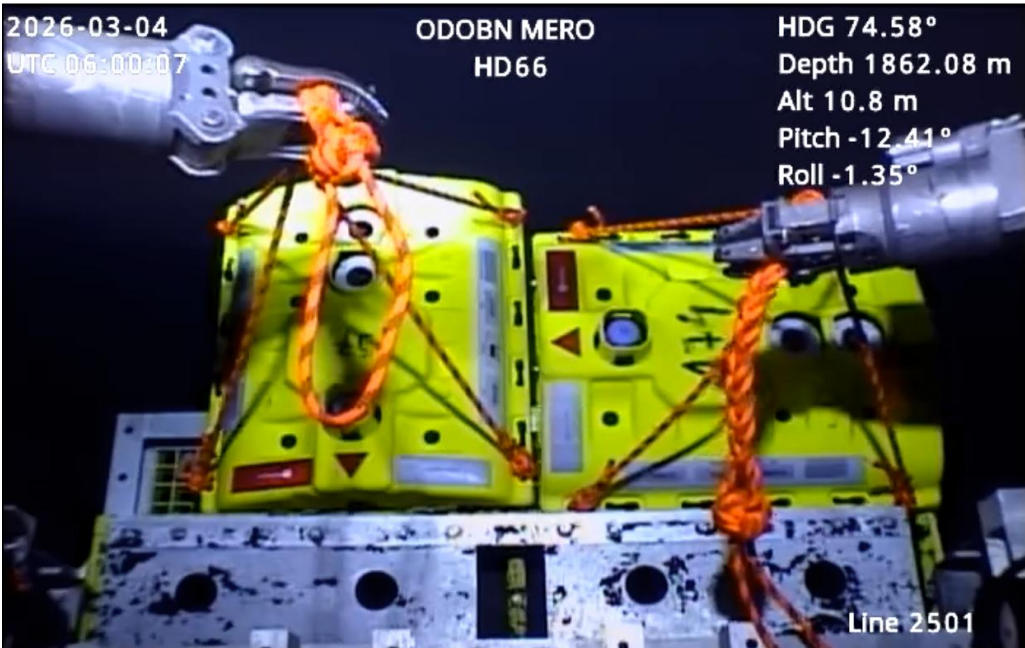


- 660 Nodes being produced in new purpose-built factory.
- 84 of these are deployed at the Mero 4 field offshore Brazil



- 84 OD OBN units installed (March 2026)
- 84 commercial nodes installed for validation (April 2026) plus 27 overlapping
- OD OBN units activated and recording seismic (May 2026)
- Survey continues until July/August, then data harvesting
- Seismic processing and interpretation later in 2026
- Next monitor in 2027, with potential additional OD OBN units installed (not confirmed)

Mero 4 Field Test Deployment – March 2026



- A new permanent seismic node has been developed that offers versatility, adaptability, resiliency and flexibility
- The system is currently undergoing qualification tests at Mero 4
- New version of OD OBN will soon provide 8-year seabed life and 800-day recording endurance
- The purpose-built factory has an estimated capacity of 1,200 units per year
- Commercial production of OD OBN will start on completion of qualification tests



This work was carried out in association with R&D projects registered as ANP 21268-8, 22777-7, 22890-8, 22944-3, 22946-8, 23662-0, and 24265-1, sponsored by Shell Brasil and Petrobras under the ANP R&D levy as “Compromisso de Investimentos com Pesquisa e Desenvolvimento.”



We would also like to thank the Petrobras Geophysical Operations, Saipem, and PXGEO teams for their valuable contributions to the field tests.

