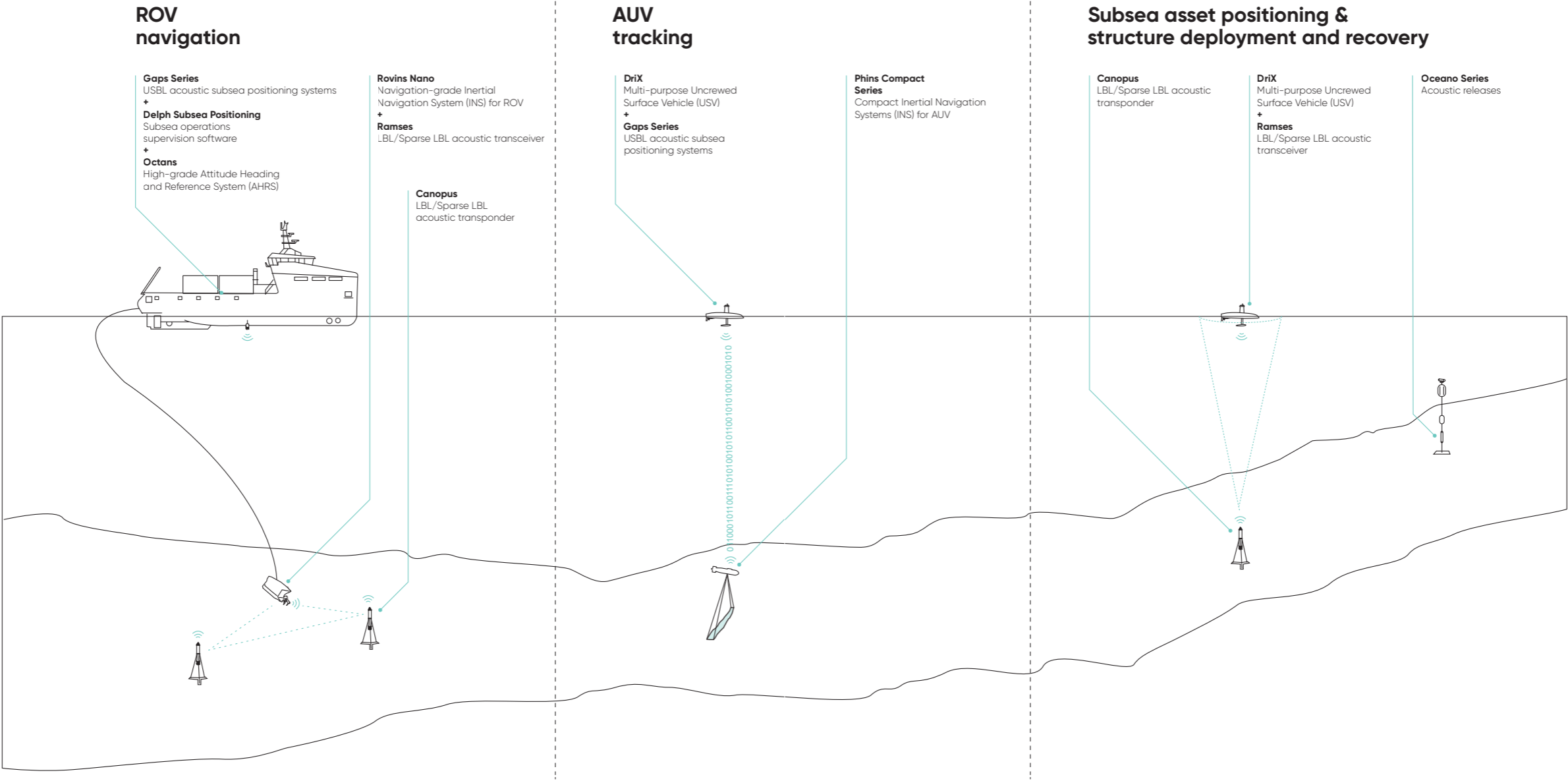


An underwater photograph of a scientific instrument mounted on a tripod frame. The instrument consists of a central vertical assembly with a bright pink cylindrical component. Above this is a black ring and a smaller pink section. The entire assembly is suspended by a chain and a metal ring at the top. The background is a deep blue, and the right side of the image features a diagonal split into a lighter blue section.

exail

**SUBSEA POSITIONING
AND NAVIGATION**

SOLUTIONS FOR SUBSEA POSITIONING AND NAVIGATION



INERTIAL NAVIGATION SYSTEMS

Exail's Inertial Navigation Systems (INS) equip over 80% of the subsea vehicles used in the Energy industry. Based on Exail's Fiber-Optic Gyroscope (FOG) technology, they are robust and maintenance-free systems that offer unrivaled performance. In addition, Exail partners with Doppler Velocity Log (DVL) manufacturers to offer a solution in which users are able to choose the optimum solution for their project without compromising on performance.



Octans Nano / OEM

Octans Subsea

**Rovins Nano /
Phins Compact C3**

**Rovins /
Phins Compact C5**

**Phins Subsea /
Phins Compact C7**

Navigation-grade AHRS

Survey-grade AHRS

Compact
navigation-grade INS

Survey-grade INS

High performance deep-
water survey-grade INS

Heading accuracy (deg seclat)	0.5	0.1	0.1	0.04	0.01
DVL-aided optimal performance in typical conditions (%TD – CEP50)	n/a	n/a	0.04	0.02	0.01
Roll&Pitch accuracy (deg RMS)	0.1	0.01	0.05	0.01	0.01
Weight in water (kg)	5.5 (Octans Nano) 1.6 (OEM)	6.2	5.5 (Rovins Nano) 1.6 (Phins C3)	6.2 (Rovins) 4.7 (Phins C5)	13 (Phins Subsea) 3.5 (Phins C7)
Depth rating (m)	6,000 (Octans Nano)	3,000	6,000 (Rovins Nano)	3,000 (Rovins)	6,000 (Phins Subsea)

USBL SYSTEMS

Gaps Series provides subsea assets absolute location and acoustic communication, from ultra-shallow to deep water depths. Thanks to its embed FOG-based inertial systems, it is ready to use and does not need calibration after installation. Gaps Series can be deployed from any type of vessel, for permanent and opportunity installation. It is compatible with third-party equipment and can be interfaced with all major navigation suites and with DP systems.



Gaps M5

Compact free-of-export USBL acoustic positioning system

Gaps M5 is especially suitable for shallow water operations where it has shown accuracy better than 0.2% up to 995m water depths. Available in free-of-export version and extended range version (Gaps M5-XR), Gaps M5 is a lighter and more compact version of Gaps.

- Easy to install, operate and repair for cost efficiency
- Compatible with DP systems
- Third-party friendly
- Pre-calibrated USBL system
- Available in export free version / extended range
- Design for shallow water and horizontal tracking



Gaps M7

Ultimate performance USBL acoustic positioning system

Combining a portable and truly pre-calibrated USBL head coupled with internal INS and GNSS, Gaps M7 is an integrated solution that makes USBL underwater positioning extremely simple to operate from any vessel of opportunity. It can be used for various applications such as ROV, AUV, gliders, tow fish tracking, and dynamic positioning, from extremely shallow water depths to 4,000 meters.

- Easy to install, operate and repair for cost efficiency
- Compatible with DP systems
- Third-party friendly
- Pre-calibrated USBL system
- Embedded high-grade INS
- From ultra-shallow to deep water operations
- Ultimate performances

Acoustic coverage (Deg)	200	200
Operating range (m)	995m with Gaps M5 4,000m with extended range version Gaps M5-XR	4,000
Positioning accuracy (% slant range)	0.2	0.06
Range accuracy (mm)	20	20
Weight (air/water, kg)	14 / -5	16 / -7

LBL SYSTEMS

Exail's 6,000m depth rated LBL positioning solution comprises the Canopus transponders and Ramses transceivers. This absolute subsea positioning system enables highly accurate and reliable deep-sea operations by providing operators with centimetric positioning accuracy in water depths up to 6,000m.



Ramses LBL/Sparse LBL acoustic transceiver

Ramses is designed for both conventional and sparse-LBL. Tightly coupled with Exail INS, it delivers extreme precision and robustness in challenging acoustic operational environments. Available in medium frequency version compatible with Gaps, Ramses is a key part of Exail inertial-acoustic solutions for subsea positioning.

- Simplified mobilization, for ROVs and AUVs
- LBL navigation accuracy, with superior precision
- Reduced number of required transponders
- Flexible array deployment thanks to SLAM
- Fully operable in existing fields, reducing seabed transponders maintenance and vessel time



Canopus LBL/Sparse LBL acoustic transponder

Used as a reference seabed transponder installed on tracked vehicles, Exail's Canopus LBL transponder contributes to the best underwater positioning solution in terms of accuracy, functionalities, and ease of use. It can be used either in sparse array, full LBL or sparse-LBL mode, with the advantage of reducing the number of transponders. Featuring extremely low power consumption, Canopus is a compact instrument able to provide distance telemetry, underwater communication, sensor measurements and data logging.

- Centimetric positioning accuracy
- Robust underwater acoustic communication up to 9 kbps
- Sparse-LBL subsea positioning with a reduced number of transponders
- Conventional and disruptive calibration techniques
- Unrivalled operating life allowing long deployments
- Open architecture system with third-party compatibility

Depth rating (m)	4,000 (6,000 in option)	4,000 (6,000 in option)
Accuracy (mm)	< 10	< 10
Autonomy (pings at max sound level)	n/a	2,800 000 (alkaline)
Transducer beam shape	Omnidirectional	n/a
Data telemetry	From 500 bps to 3 kbps	From 500 bps to 3 kbps
Data logging (Gb)	32	32

DELPH SUBSEA POSITIONING SOFTWARE

Integrating the full range of Exail subsea systems, Delph Subsea Positioning (DSP) simplifies the planning, simulation, operation and post-processing of subsea positioning tasks. Comprising four core modules, DSP is an easy-to-use yet powerful package enabling even the most complex subsea operations.



LBL Array Planning

- Import and process Sound Velocity profile
- Import DTM
- Integrate CAD drawings
- Drag and drop transponders
- Dynamically calculate visibility map based on topography and ray bending
- Display acoustic line-of-sight between transponders



Navigation Simulation

- Full simulation of INS/DVL performance
- LBL / Sparse-LBL simulation
- Sensor configuration (INS, DVL, USBL, LBL, GNSS...), lever arms, misalignments, & error models
- Environmental configuration (sound velocity, current etc.)
- Define trajectory in vehicle or geographic reference frame
- Simulate trajectory and generate corresponding synthetic sensor data
- Results evaluation in Delph INS



Operations

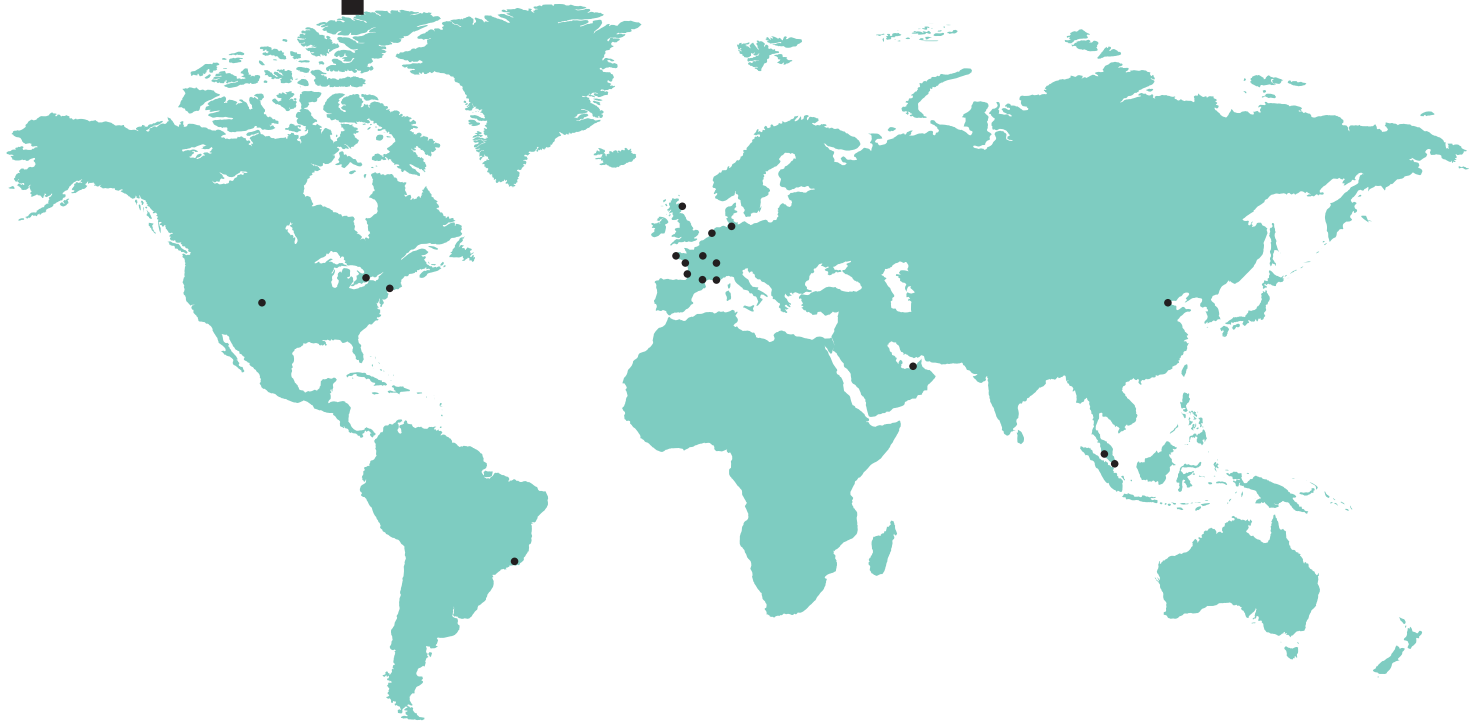
- Manage projects
- Configure attached equipment
- Data logging
- Monitor equipment & operations
- User configurable alarms
- Manage transponder Box-in
- Mutual array calibration
- Generate reports
- Configurable data displays
- Data export
- Third-party interfacing



Post-processing (Delph INS)

- Generate QA/QC reports
- Offline INS/DVL calibration
- Data visualization & inspection via 1D Graph or 2D map
- Customizable map projections
- Enhanced algorithm processing
- Advanced data import & export capabilities
- Real-time data processing with no plug to the INS
- Edit/modify data, add/remove aiding sensors
- Powerful export tools

our global footprint



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