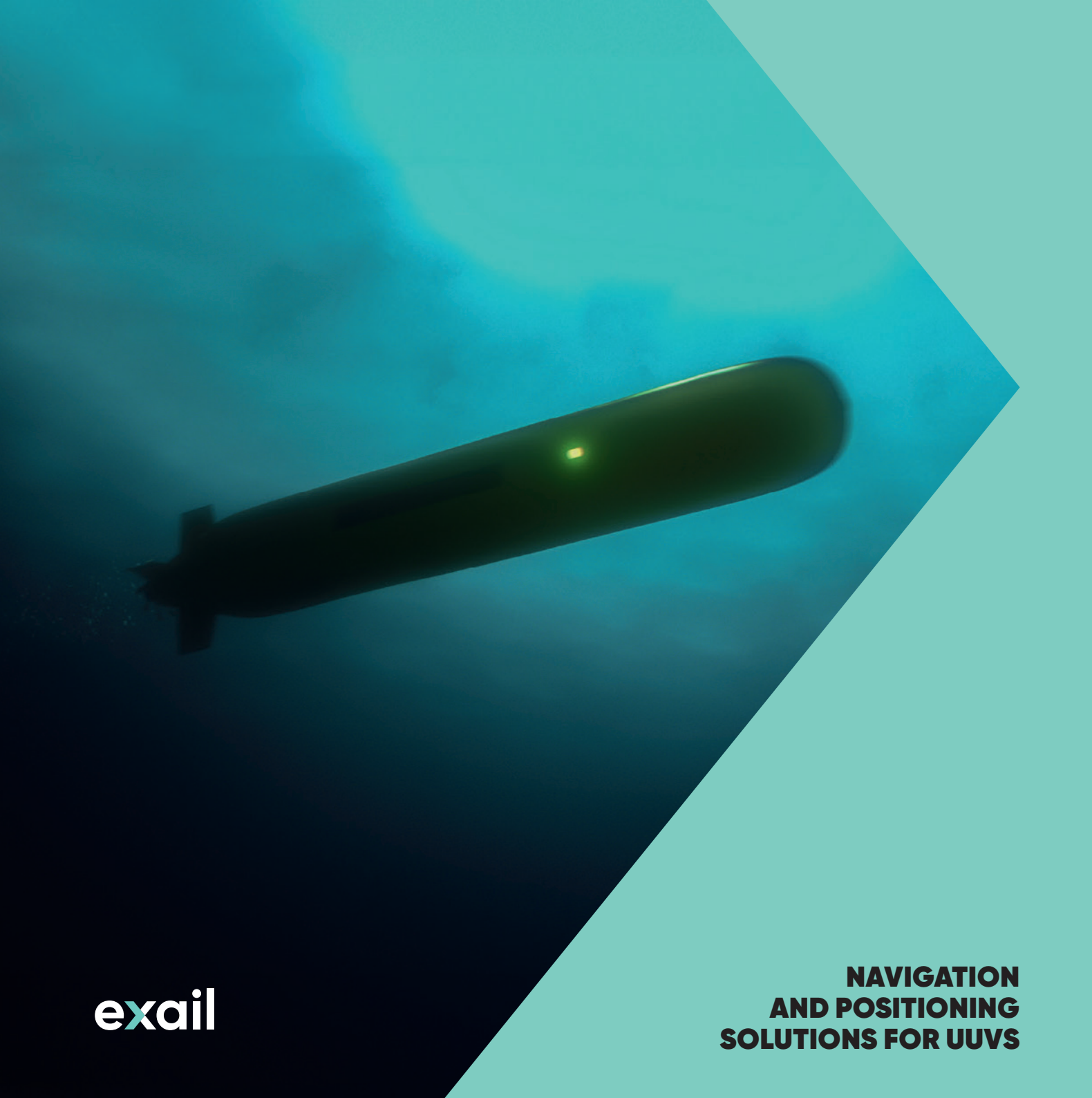




exail

**NAVIGATION
AND POSITIONING
SOLUTIONS FOR UUVS**

Equipping
80%
of UUVs worldwide

EXAIL, A TRUSTED PARTNER FOR CHALLENGING UNDERWATER NAVIGATION

In modern naval defense, Unmanned Underwater Vehicles (UUVs) play a crucial role, where precise navigation and secure positioning are essential for mission success. Exail leads in providing cutting-edge navigation systems designed for the most demanding maritime environments. Powered by Fiber Optic Gyroscope (FOG) technology, Exail's inertial navigation systems deliver high accuracy even in GNSS-denied conditions, meeting the precision needs of critical defense missions.

With expertise in USBL and LBL positioning, Exail enables real-time tracking, secure communication, and pinpoint positioning, allowing UUVs to efficiently perform vital tasks such as reconnaissance, anti-submarine warfare, and mine countermeasures.

Trusted by leading defense manufacturers and navies worldwide, Exail equips 80% of UUVs, ensuring naval forces are prepared to address the complex challenges of modern underwater warfare.

exail at a glance

80

YEARS OF
EXPERIENCE

320+

MILLION EUROS
OF TURNOVER

80%

OF TURNOVER
ACHIEVED ABROAD

1850+

EMPLOYEES

80

COUNTRIES SERVED
WORLDWIDE

20%

OF TURNOVER
REINVESTED
EACH YEAR IN R&D

80%

OF UUVs EQUIPPED
WORLDWIDE

6000 m

WATER DEPTH
OPERATIONS

24/7

TECHNICAL
SUPPORT

POWERING UUV MISSIONS WITH COMPREHENSIVE NAVIGATION AND POSITIONING SOLUTIONS

Exail provides fully integrated navigation and positioning solutions for UUVs, ensuring exceptional accuracy and reliability in naval operations. By combining inertial navigation with USBL and LBL technologies, Exail enhances real-time navigation, tracking, communication, and long-range positioning. Both USBL and LBL systems work to recalibrate the Inertial Navigation System (INS), with Doppler Velocity Log (DVL) refining velocity and position data, enabling UUVs to execute complex naval defense missions, with high efficiency.

Autonomous navigation

Phins Compact Series
Compact Inertial Navigation Systems for UUVs
+
DVL

Subsea assets USBL positioning and tracking

MTBx2-OEM
Acoustic transponder

Gaps Series
USBL acoustic systems for subsea assets and divers tracking

USBL aided navigation

Phins Compact Series
Compact Inertial Navigation Systems for UUVs
+
DVL

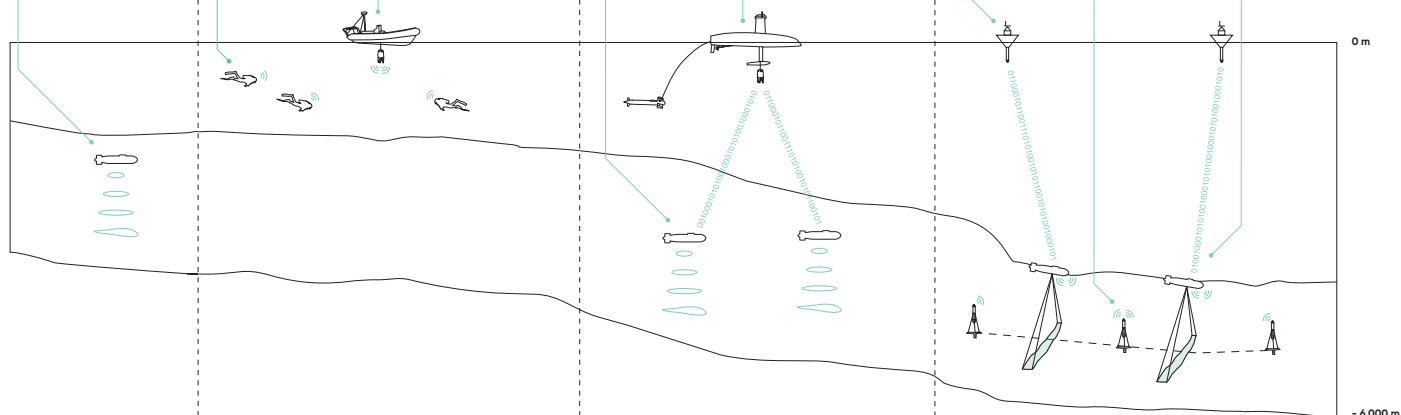
DriX Series
Multi-purpose Uncrewed Surface Vehicle
+
Gaps Series
USBL acoustic positioning systems for UUV tracking and communication

LBL aided navigation

MTB02
Acoustic transponder for subsea communication

Canopus
LBL and sparse LBL acoustic transponder

Phins Compact Series
Compact Inertial Navigation Systems for UUVs
+
Ramses
Sparse LBL acoustic transceiver
+
DVL



COMPACT AND HIGH-PERFORMANCE INERTIAL NAVIGATION SYSTEMS



Superior navigation performance

Exail Phins Compact Series INS provide pinpoint accuracy for critical naval missions, achieving navigation precision of up to 0.01% of the traveled distance. When paired with a DVL, the system's capabilities are enhanced, making it ideal for complex underwater operations.

Unmatched reliability in harsh environments

Designed for extreme environments, Phins Compact Series performs reliably in scenarios where GNSS signals are unavailable or compromised by jamming or spoofing. This resilience is vital for naval forces in high-threat zones or during electronic warfare.

- **Uninterrupted navigation** without satellite reliance.
- **Operational integrity** in contested or disrupted environments.

Easy integration for fast deployment

Compact and plug-and-play, Phins Compact Series integrates easily into diverse UUV platforms, saving time and resources in deployment, while maintaining flexibility for various naval missions.

Enhanced stealth capabilities

Phins Compact Series operates with minimal acoustic output, making them ideal for covert operations, reducing the risk of detection in sensitive naval missions.

Power efficiency for extended missions

Exail's power-saving navigation systems extend mission endurance, allowing longer operational times without sacrificing performance, ideal for extended naval deployments.



Phins Compact C3



Phins 9 Compact



Phins Compact C7

Weight (kg)	1.6	1.2	3.8
Consumption (W)	< 12	< 12	< 15
Heading (deg secant latitude RMS)	0.10	0.04	0.01
Roll & Pitch (deg RMS)	0.05	0.01	0.01
DVL-aided straight line performance (%TD (CEP 50))	0.20	0.10	0.05
DVL-aided optimal performances in typical conditions (%TD (CEP 50))	0.04	0.02	0.01
Acceleration dynamic range (g)	±5	±30	±30

USBL SUBSEA ASSET POSITIONING AND TRACKING

All-in-one positioning and communication

Gaps Series USBL systems deliver accurate positioning and communication in a single, mission-ready system. With an embedded INS, it ensures reliable UUV tracking even in GNSS-denied environments, critical for defense operations requiring consistent navigation and situational awareness.

Quick deployment for dynamic operations

Designed for operational flexibility, Gaps Series comes pre-calibrated and ready for immediate deployment from any vessel. This capability is crucial for fast-paced naval missions.

			
	Gaps M3	Gaps M5	Gaps M7
Acoustic coverage (°)	> 200	> 200	> 200
Accuracy (%SR (CEP 50))	Up to 0.10	Up to 0.20	Up to 0.06
Range (m)	Up to 4,000	Up to 4,000	Up to 7,000
Heading (deg seclat)	n/a	0.1	0.01
Weight (kg)	12	14	17

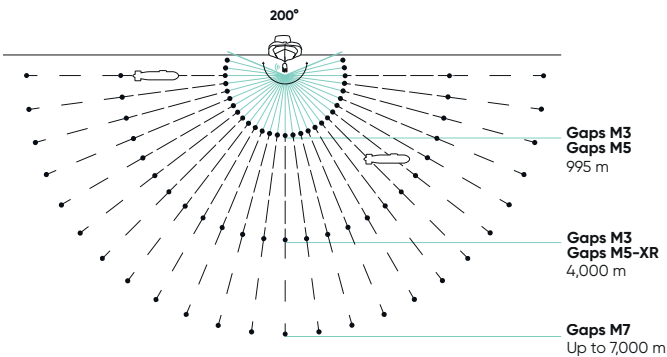
Optimized for shallow water missions

Optimized for coastal defense and shallow-water operations, Gaps Series features a 200° wide acoustic aperture, providing accurate horizontal tracking over long distances.

- True horizontal tracking
- Ideal for missions in shallow water such as mine countermeasures (MCM)

Multi-asset tracking for complex missions

Gaps Series simultaneously tracks multiple subsea assets (UUVs, towed sonars and divers), which is critical for coordinated defense missions such as multi-unit MCM, reconnaissance, and synchronized underwater operations.



LBL UUV POSITIONING



High precision positioning for extended, deep-sea operations

- In full LBL mode, Exail LBL positioning systems deliver **centimeter-level accuracy**, for reliable trajectory tracking over long distances.
- In sparse LBL mode, **sub-meter accuracy is achieved with fewer transponders**, reducing setup complexity.
- Paired with an INS, Exail LBL systems offer **enhanced precision through data redundancy**, ideal for deep-water navigation with centimeter-level accuracy. OEM packages ensure seamless integration into existing UUVs for maximum flexibility.

Extended endurance for long deployments

Exail LBL systems provide up to 2.8 million pings on alkaline batteries, ensuring long autonomy for multi-day missions and minimizing maintenance for sustained naval operations.

	 Ramses	 Canopus
Depth rating (m)	4,000 (6,000 in option)	4,000 (6,000 in option)
Accuracy (mm)	< 10	< 10
Autonomy (pings)	n/a	2,800,000
Transducer beam shape	Omnidirectionnal	n/a
Data telemetry (bps)	From 500 to 3000	From 500 to 3000
Data logging (Gb)	32	32

Real-time communication

With data telemetry and modem communication, Exail LBL systems enable real-time tracking and data transmission between transponders and UUVs. This capability ensures mission oversight and adjustments, meeting the stringent demands of naval operations for precise control in dynamic environments.

Streamlined mission management with advanced software

Exail's intuitive Delph Subsea Positioning (Delph SP) software simplifies mission planning, execution, and post-processing for naval operations. It streamlines trajectory tracking, simulation, and data analysis, providing operators with the tools to efficiently manage and optimize complex naval missions.



Delph SP software enhances naval operations by improving accuracy and efficiency in subsea positioning with real-time visibility, acoustic analysis, and automated reporting.

**serving
50+ navies
around
the world**

