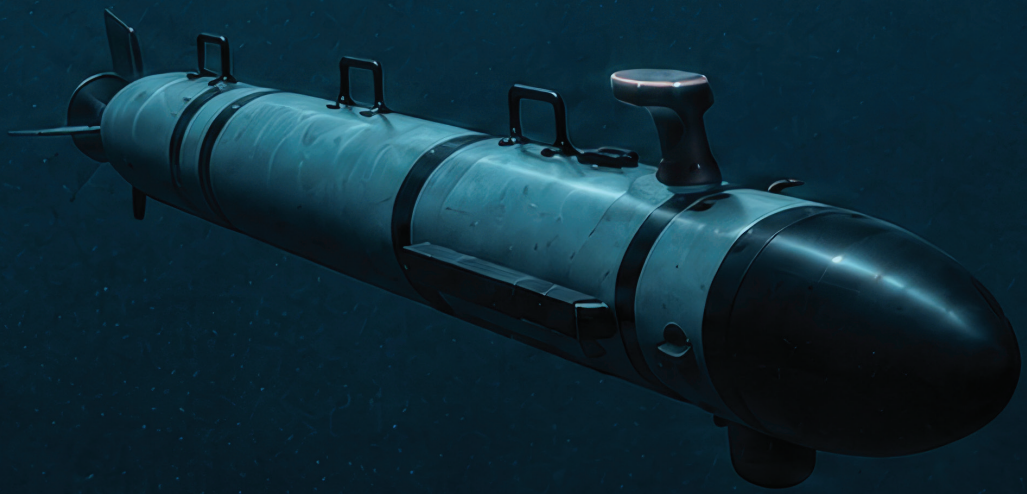
UUV NAVIGATION & POSITIONING



exail



Exail, a trusted partner for critical underwater operations

Trusted by over 50 navies worldwide, Exail empowers naval forces to navigate, communicate and coordinate with confidence across the underwater domain.

The growing role of autonomous systems is transforming the way naval forces operate beneath the surface. As missions become longer, more complex and increasingly collaborative, success depends on the ability to maintain accurate navigation, reliable communications and continuous situational awareness in the underwater domain. Through a unique combination of Fiber Optic Gyroscope technology, acoustic positioning and underwater communication solutions, Exail provides the foundations for resilient command and control, coordinated multi-asset operations and mission success in the most demanding subsea environments.

AUTONOMOUS NAVIGATION

STRATEGIC-GRADE NAVIGATION FOR XL-UUVS & OCEANIC PLATFORMS

Marins Series INS

UP TO 1NM 360H



Marins M1



Marins M3/M5

Oceanic long-endurance
Delivers ultra-low drift for extended missions, maintaining navigation integrity across deep-ocean operations without external updates.

Resilience in extremes
Solid-state architecture withstands severe shock, vibration, and harsh underwater operating conditions.

Covert & passive operation
Silent FOG technology with no acoustic or electromagnetic emissions supports stealth operations in contested environments.

Flexible platform integration
Scalable architecture adapts to pressure hulls and custom vehicle designs with minimal integration effort.

HIGH-PERFORMANCE NAVIGATION FOR MAN-PORTABLE & MEDIUM UUVS

Phins Compact Series,
Rovins 9-DVL & Phins Subsea INS



Phins Compact C3



Phins 9 Compact



Phins Compact C7



Rovins 9-DVL



Phins Subsea



DVL

Tactical route precision
Achieves better than 0.01% TD accuracy with DVL aiding, enabling highly precise track-following for MCM and ISR missions.

SWaP-C optimized endurance
High-performance navigation to 6,000 m depth in an ultra-compact, lightweight design for easy integration on constrained subsea platforms.

Rapid tactical readiness
Fast-aligning gyroscopes enable rapid deployment without external aiding or lengthy warm-up.

Seamless integration
Pre-calibrated sensor alignment minimizes commissioning effort and integration risks while ensuring optimal navigation performance.

UNDERSEA DOMINANCE
THROUGH PRECISION NAVIGATION & POSITIONING FOR NEXT-GENERATION UUVS

As UUVs become integral to naval operations, maintaining awareness and control below the surface is a critical operational challenge. Exail combines inertial navigation, acoustic positioning and underwater communication technologies to enable trusted navigation, resilient connectivity and coordinated mission execution across the underwater battlespace.

PERSISTENT UNDERWATER OPERATIONS

Modern UUV missions demand endurance, discretion and operational persistence. Exail's ultra-low drift inertial navigation systems enable vehicles to remain submerged for extended periods while maintaining the positioning accuracy required for precise mission execution.

UNDERWATER FORCE COORDINATION

From coordinated UUV swarms to manned-unmanned teaming with submarines and surface vessels, mission success depends on a shared understanding of position underwater. Exail combines inertial navigation, acoustic positioning and communications to enable collaborative operations, target localization, mission data exchange and synchronized execution in contested environments.

TACTICAL APPLICATION DOMAINS

MINE COUNTERMEASURES (MCM)

Precise navigation for seabed mapping, target relocation and mine neutralization.

ISR & COVERT RECONNAISSANCE

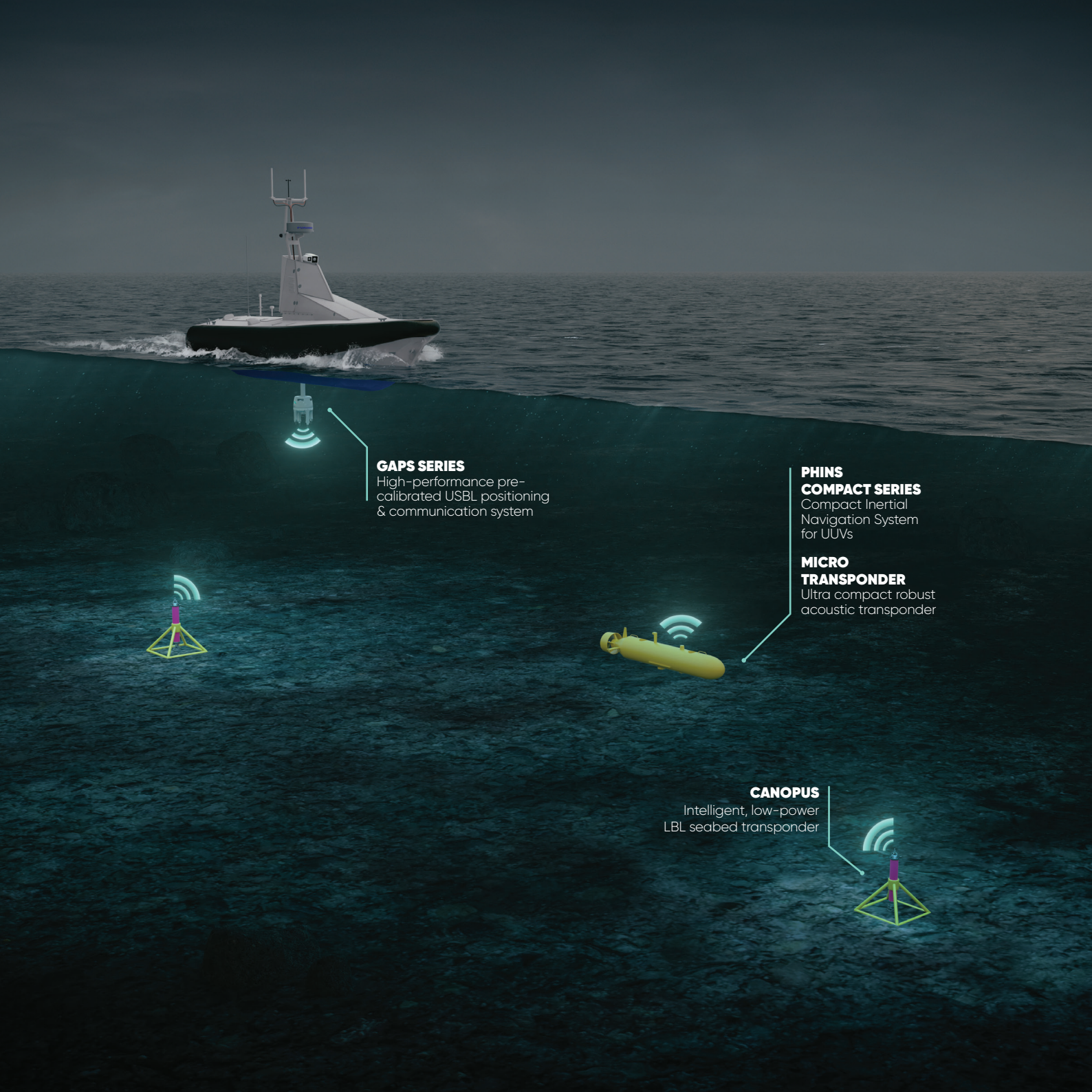
Low-signature navigation for intelligence gathering and surveillance in contested waters.

SEABED WARFARE & INFRASTRUCTURE PROTECTION

Accurate positioning for monitoring and protecting critical underwater infrastructure.

ANTI-SUBMARINE WARFARE (ASW)

Coordinated positioning and communications across distributed UUV and sensor networks.


GAPS SERIES
High-performance pre-calibrated USBL positioning & communication system
PHINS COMPACT SERIES
Compact Inertial Navigation System for UUVs
MICRO TRANSPONDER
Ultra compact robust acoustic transponder
CANOPUS
Intelligent, low-power LBL seabed transponder

POSITIONING & ACOMMS

ALL-IN-ONE USBL POSITIONING & SECURE ACOUSTIC TELEMETRY

Gaps Series USBL systems



Gaps M7



Micro Transponder

Secure acoustic telemetry
Reliable exchange of vehicle status, sensor data and mission updates throughout underwater operations.

Designed for constrained platforms
Compact acoustic modem and transponder enabling command, control and data exchange across all classes of UUVs.

Multi-asset communications network
Simultaneously tracks and communicates with multiple UUVs and subsea assets, enabling coordinated MUM-T missions.

Reliable UUV tracking
200° acoustic coverage maintains UUV tracking across a wide operating sector, including challenging shallow and coastal environments.

DEEP-SEA HIGH-PRECISION POSITIONING & SEABED NETWORKS

Canopus transponder and Ramses transceiver



Canopus



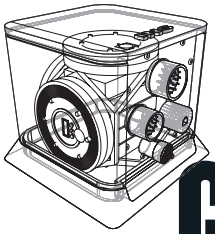
Ramses

Range-aided navigation
Delivers sub-meter to centimeter positioning down to 4,000 m depth using full or sparse LBL, providing acoustic range updates that actively eliminate INS drift.

Persistent underwater surveillance
Ultra-low-power subsea transponders support long-term seabed surveillance, underwater infrastructure protection and seabed warfare operations.

Underwater networked operations
Enables secure exchange of mission data, status reports and retasking commands between UUVs, seabed assets and surface operators.

Streamlined mission suite
Integrated Delph SP software simplifies mission planning, live tracking and post-mission analysis.



WHY CHOOSE FIBER OPTIC GYROSCOPES?

1

Proven underwater reliability

Solid-state FOG technology with no moving parts delivers long-term stability and maintenance-free operation, even in the harshest underwater environments.

2

Precision navigation beneath the surface

Continuous high-performance inertial navigation with better than 0.01% TD accuracy, supporting precise underwater operations from coastal waters to the deep ocean.

3

Ready for extended deployments

Low drift performance preserves navigation accuracy over long durations, reducing dependence on external updates and supporting extended autonomous operations.

4

Trusted for critical naval missions

Trusted by over 50 navies worldwide, Exail FOG technology benefits from decades of operational experience across demanding underwater and maritime environments.

COVERING THE FULL UUV SPECTRUM
from portable systems to XL-UUVs

	 Phins Compact C3	 Phins 9 Compact	 Phins Compact C7	 Rovins 9-DVL	 Phins Subsea	 Marins M1*	 Marins M3/M5*
Heading accuracy (seclat RMS)	0.10°	0.04°	0.10°	0.05°	0.025°	0.01°	0.01°
Roll & Pitch accuracy (RMS)	0.05°	0.01°	0.01°	0.01°	0.01°	0.01°	0.01°
Position accuracy aiding, without GNSS (TRMS)	0.20 %TD	0.10 %TD	0.05 %TD	0.1 %TD	0.05 %TD		
DVL-aided optimal performance in typical conditions (CEP 50)	0.04 %TD	0.02 %TD	0.01 %TD	0.02 %TD	0.01 %TD		
Position accuracy aiding, without GNSS (TRMS)						≤ 1NM/3h	≤ 1NM/24h

Products subject to arms export regulations