Greyshark Series 2

FOXTROT

GREYSHARK™
autonomous underwater vehicle

THE FUTURE OF UNDERWATER RECONNAISSANCE

Todays complex naval environment faces a growing volume of tasks and challenges. These span from reconnaissance and surveillance to the security of underwater areas structures along with other flexible tasks that need attention. Meeting these requirements demands a modern, autonomous and high capable concept as well as a rethinking of underwater defense.

GREYSHARK™ is a state-of-the-art fully autonomous underwater vehicle designed for long-range missions. The outstanding characteristics and performance enable a flexible mission operation with the possibility of interaction in swarms and integration in networks with an unparalleled depth and quality of sensor data and evaluation.

The partnership between EUROATLAS and EvoLogics for *GREYSHARK™* has resulted in the most versatile, multi-mission, high-endurance AUV of its class.

RETHINK UNDERWATER DEFENSE

SUPERIOR CAPABILITIES

ENDURANCE
Highest endurance in its class of up to 16 weeks

SPEED
Fastest AUV in its class with 10+ knots operational speed

RANGE
Longest range in its class with 1,100+ NM at 10 knots (8,000+ NM at 4 knots)

SIGNATURE
Extreme stealth capabilities

MANEUVERABILITY
Ultra low turning radius and capable of vertical dives

AUTONOMY
Intelligent control and real-time advanced adaptive navigation

SWARM
Swarm communication technology for coordinated missions

SENSORS
Most comprehensive state-of-the art sensor suite

AI PROCESSING
Powerful AI and data processing for operational decision making

HANDLING
Versatile launch, recovery and easy transport

THE MOST VERSATILE, MULTI-MISSION, HIGH-ENDURANCE AUV OF ITS CLASS

COMPREHENSIVE TECHNOLOGY SUITE

NAVIGATION

/ Long-Range Inertial Navigation   [FOG-INS]
/ Doppler Velocity Logger   [DVL]
/ EMW-Hardened Satellite Navigtion   [GNSS]
/ Obstacle Avoidance   [OAS]
/ Ultra-Short Baseline   [USBL]

COMMUNICATION

/ External Communication installed in retractable periscope:
   / Tactical Grade Radio
   / Satellite Communication
/ Swarm Communication:
   / Acoustic Modem w/USBL

SENSORS

/ Electromagnetic Sensor Array   [EMSA]
/ Forward Looking Sonar   [FLS]
/ Sound Velocity Sensor   [SVS]
/ Imaging and Laser System   [ILS]
/ Multibeam Echosounder   [MBES]
/ Synthetic Aperture Sonar   [SAS]
/ Hydroacoustic Sensors

AI PROCESSING

/ Automatic Target Recognition   [ATR]
/ Collision / Obstacle Avoidance   [CAS, OAS]
/ Dynamic Mission Adjustments

MULTI-MISSION CAPABILITIES

GREYSHARK™ is adaptable, cost-efficient, and designed for diverse operational needs

CHANNEL / HARBOR / COAST CLEARING   8

/ Active sonar operations to detect, deter, and drive out threats
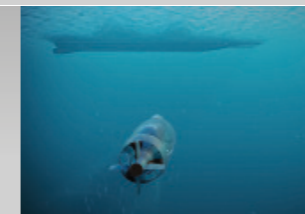
MONITORING OF UNDER-WATER INFRASTRUCTURE   9

/ Inspection and surveillance of pipelines, cables, and subsea assets
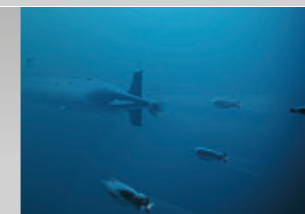
COUNTERMEASURES   10

/ Detection and identification of hostile sensors and effectors

PASSIVE RECONNAISSANCE   11

/ Stealth intelligence gathering on enemy infrastructure and vessel activity

ACTIVE RECONNAISSANCE   11

/ Real-time identification and movement profiling of targets

CHANNEL / HARBOR / COAST CLEARING

To secure transparency, freedom of navigation, and real-time situational awareness in channels, harbors, and coastlines requires a proactive approach

GREYSHARK™ provides continuous, real-time monitoring and active deterrence, supporting maritime security through:

/ Detection and tracking of hostile sensors, effectors, and vehicles
/ Area mapping for operational awareness
/ Identification and monitoring of vessel movements

GREYSHARK™ can escort submarines, frigates, freighters, and tankers or function as an illuminator to expose threats. It also serves as a decoy, drawing attention away from high-value assets.

By reaching difficult or high-risk locations, *GREYSHARK™* enhances survivability and strengthens maritime security in contested environments.
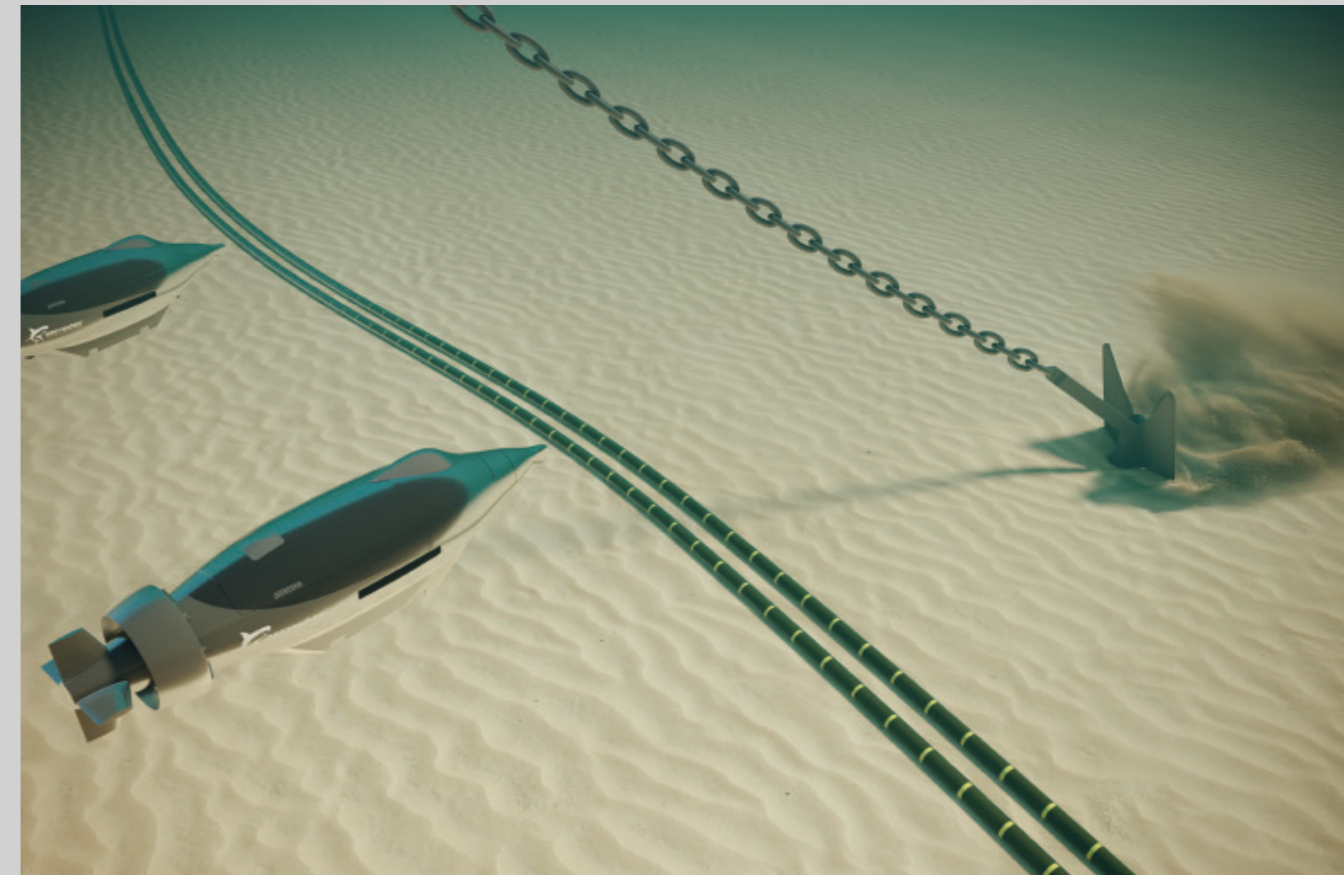
MONITORING OF UNDER-WATER INFRASTRUCTURE

Ensure undersea domain awareness and protection

GREYSHARK™ fills the crucial gap in monitoring underwater infrastructures, such as pipelines, offshore platforms and communication cables observing in an efficient and cost-effective way to protect operational connectivity.

/ Survey infrastructure
/ Early detection of corrosion, damage, suspected sabotage and unauthorized vehicles
/ Ensure integrity of the critical infrastructure
/ Track and deter hostile seabed warfare assets

GREYSHARK™ accesses hard-to-reach areas fast, in harsh deep-sea conditions and reduces the need for divers, remote-controlled or manned vehicles.

COUNTER-MEASURES

Safeguard sea lanes with risk-free and smart surveillance and countermeasures

GREYSHARK™ enables rapid, stealthy and risk-free detection of underwater sensors, effectors and objects. It disrupts enemy detection systems and protects strategic maritime routes:

/ Sensors, effectors and object search
/ Mapping of minefield
/ Transmit live data to operator
/ Object recognition to differentiate decoy mines from real mines
/ Keep track of changes indicating new threats

By operating autonomously for extended periods, *GREYSHARK™* keeps sea lanes open while reducing the risk to human divers and manned vehicles.

PASSIVE RECONNAISSANCE

GREYSHARK™ enables stealth intelligence gathering, operating undetected to monitor and analyze adversary activity:

/ Long-duration surveillance without emitting detectable signals
/ Silent data collection on vessel movements and behaviors
/ Identification and classification of targets
/ Early warning and illicit cargo detection
/ Tracking of hostile objects over extended periods

Military and security forces can monitor adversaries without revealing their own presence, gaining a strategic advantage in contested environments.

ACTIVE RECONNAISSANCE

GREYSHARK™ serves as a low-cost early warning and deterrence system, extending operational reach and securing maritime environments through proactive engagement:

/ Detect and expose the presence and movement of potential threats
/ Real-time object recognition and classification
/ Maintain a persistent operational presence
/ Provide targeting data for interception
/ Track and deter hostile objects

GREYSHARK™ reinforces situational awareness, strengthens response in grey-zone conflicts, and supports tactical decision-making with actionable intelligence.

SUPERIOR DRIVING PERFORMANCE

Enabled by
/ **Pioneering high density liquid hydrogen drive train technology**
/ **Proprietary, highly dynamic design for superior agility**

USER BENEFITS

/ Conduct effective operations, even in strong currents
/ Rapid response and early arrival at target areas
/ Tracking and deterring unauthorized vehicles
/ Sustain multi-week missions with uncompromised performance –
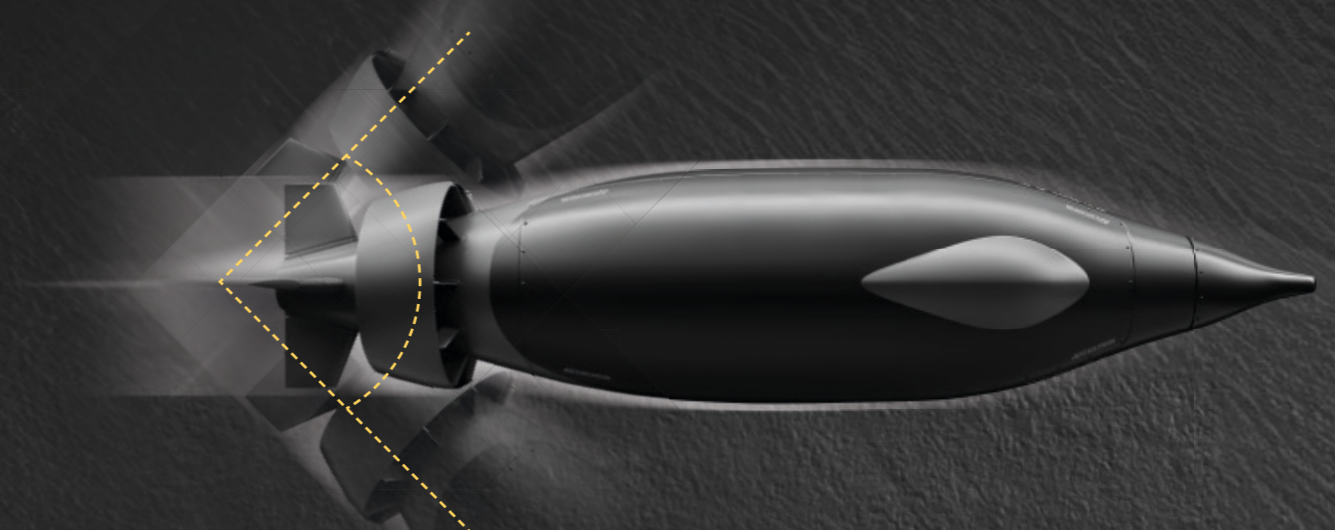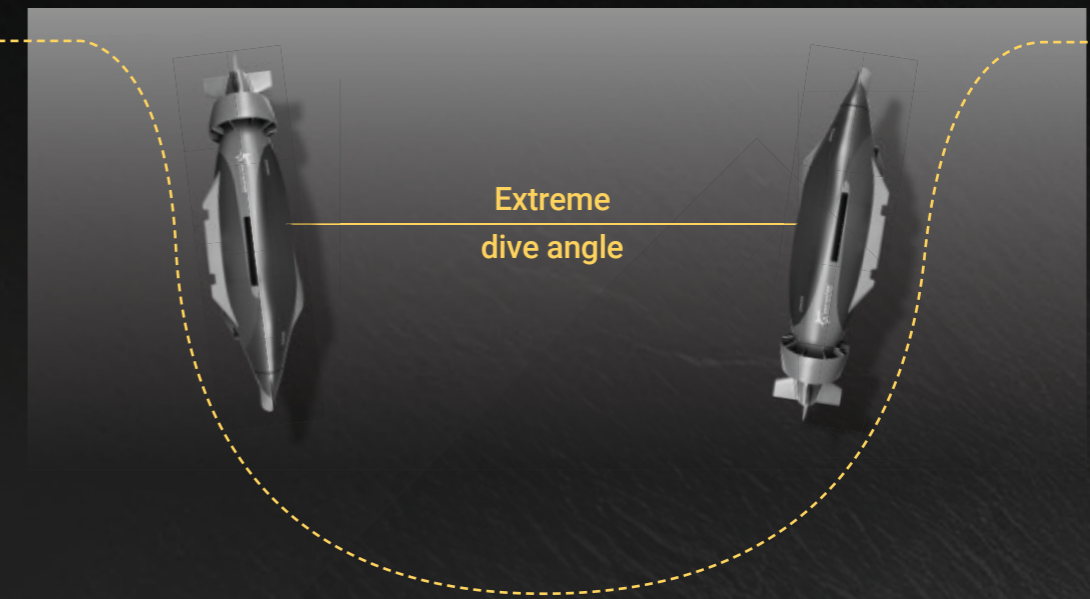 up to 16 weeks of operational endurance
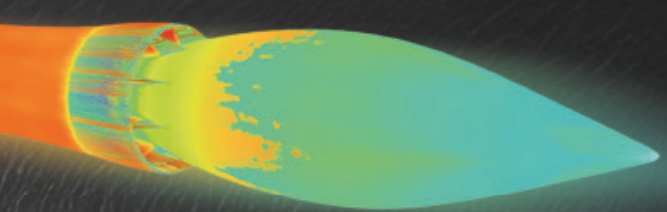
$$F_D = C_D A \; \frac{pV^2}{2}$$

F_D drag force

C_D drag coefficient

A reference area
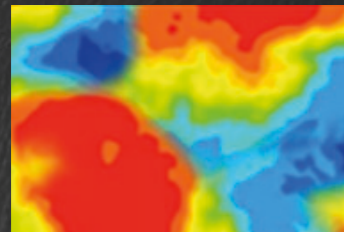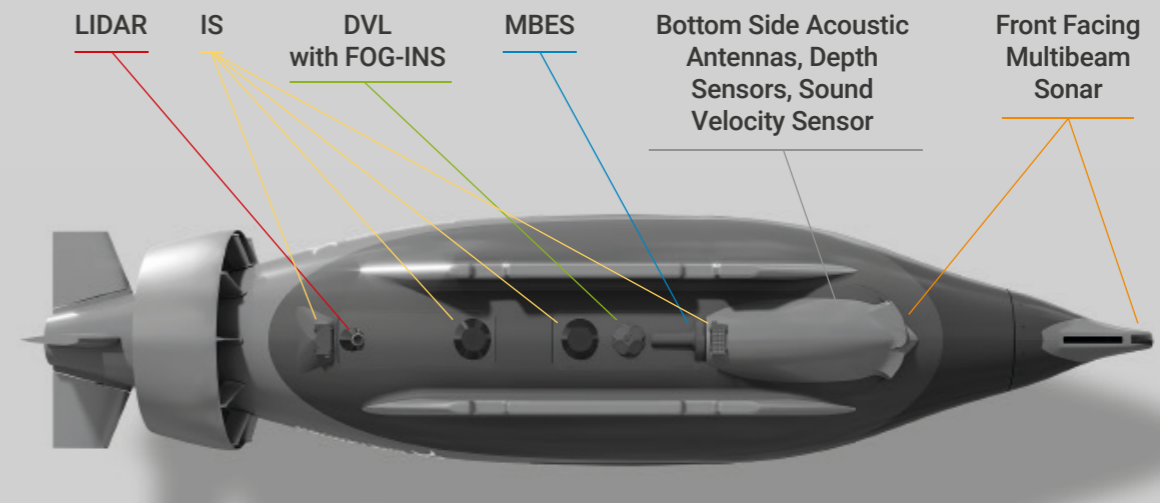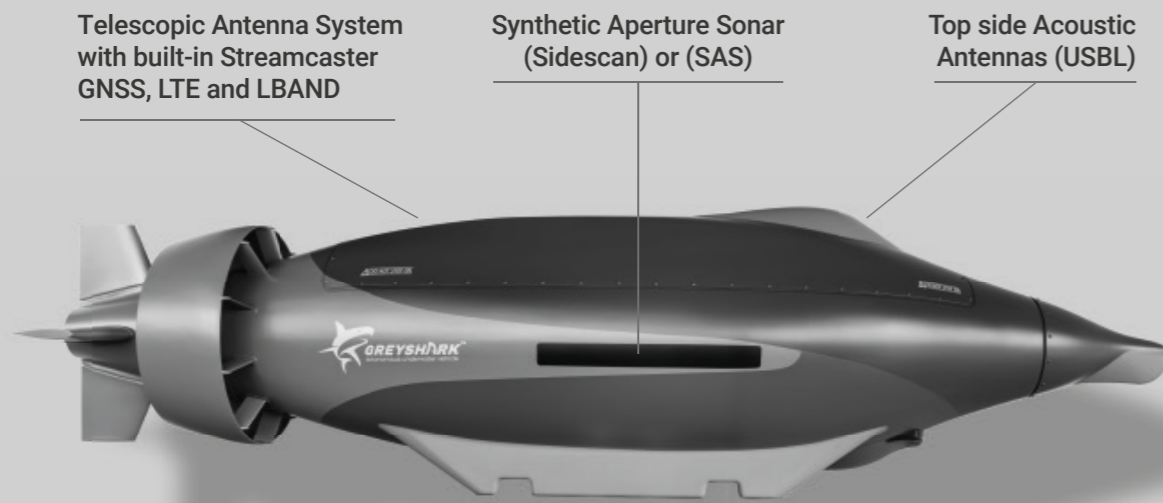
p density of fluid

V^2 flow velocity
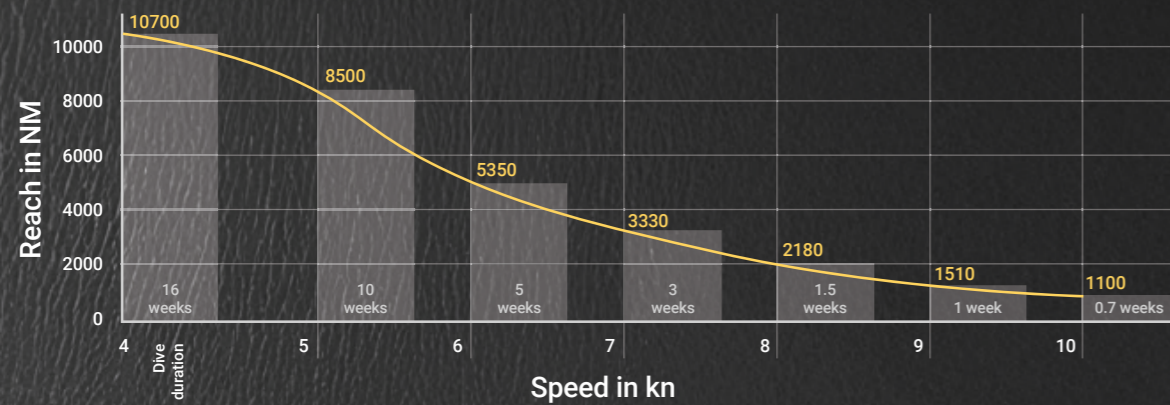
EXCELLENT MANEUVERABILITY

The design of *GREYSHARK™* offers an extreme dive angle which allows a nearly vertical dive with high speed. With the small turning radius, it has an extremely high agility and fluid maneuverability even in confined waters.


Extreme dive angle

SENSORS

Telescopic Antenna System with built-in Streamcaster GNSS, LTE and LBAND

Synthetic Aperture Sonar (Sidescan) or (SAS)

Top side Acoustic Antennas (USBL)

LIDAR　IS　DVL with FOG-INS　MBES　Bottom Side Acoustic Antennas, Depth Sensors, Sound Velocity Sensor　Front Facing Multibeam Sonar

ELECTROMAGNETIC SENSOR ARRAY (EMSA)

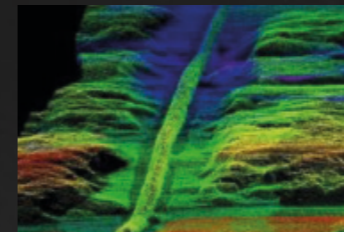Multiple sensor system for detection and measuring electromagnetic fields.
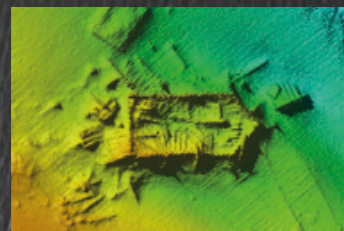
MULTIBEAM SONAR (MBS)

Advanced acoustic transducers array sonar system for providing high-resolution, wide-angle images of underwater environments.

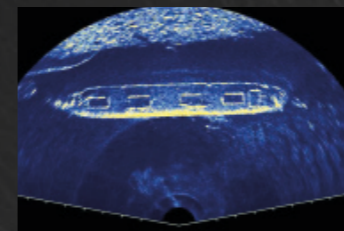## IMAGING SYSTEM (IS)

High resolution multi-spectral underwater camera system with LED cluster.
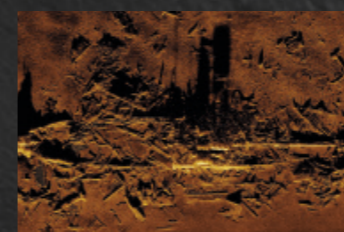
LIGHT DETECTION AND RANGING (LIDAR)

Underwater laser pulse system for 3D mapping with change detection modus.

FRONT FACING MULTIBEAM SONAR (MBES)

For detecting obstacles and collision avoidance.

SYNTHETIC APERTURE SONAR (SAS)

Side-scanning sonar system for ultra high-resolution sonar images.

SENSOR FUSION
AND PROCESSING

DATA COLLECTION   **DATA FUSION**   **DATA PROCESSING**   **ACTIONING**
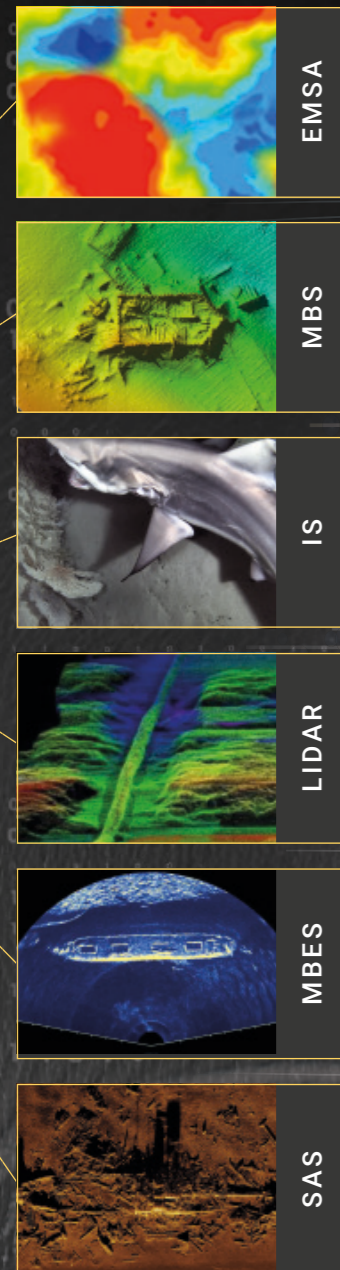
EMSA

MBS

IS

LIDAR

MBES

SAS

IS courtesy CATYX • LIDAR courtesy
basecampaviation.com • MBES courtesy
NORBIT • SAS courtesy KRAKEN Robotics •
MBS Courtesy of EvoLogics
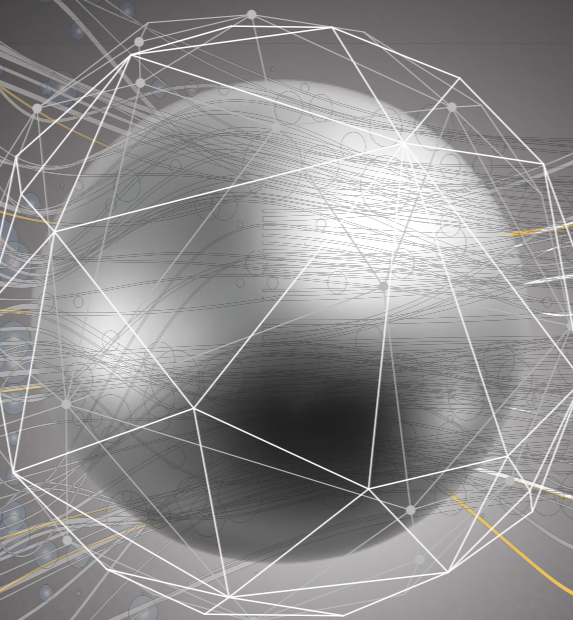
Length: 133.2 m

Height: 18.8 m

Below surface: 520 ft

+

Magnetic Anomaly

Detection: Alloy Steel

Cr 0.80 %, V 0.10 %

+

Position:

00˚ 00'00.0"N

0˚ 00'00.0"E

Bearing 090 degrees

+

Pump-jet-propulsion

4 coolant pumps

Dipping sonar

OPERATOR
ATTENTION
REQUIRED

GREYSHARK

Position:
60˚ 24'42.1"N
3˚ 55'02.5"E
Bearing 090 degrees

Magnetic Anomaly
Detection: Alloy Steel
Cr 0.80 %, V 0.10 %

AUTONOMY

GREYSHARK™ AUV is designed for a high degree of autonomy.

An integrated Artificial Intelligence (AI) module provides real-time, onboard Automatic Target Recognition (ATR) and Collision Avoidance (CAS/OAS) information.

Missions will adjust automatically in accordance with the engagement rules:
/ **Inspect objects of interest more closely**
/ **Avoid certain sea traffic**
/ **Auto-follow a submarine**
/ **Trigger an alert in case of security events**

OPPORTUNITY TO INTERACT

A connection by underwater acoustics, satellite communication or military radio is possible and allows the sending and receiving of information and commands as well as the integration in networks.
Whenever mission-critical events demand it, *GREYSHARK™* will seek human intervention and decision making.

SWARM CAPABILITY

GREYSHARK™ enables interaction in a swarm that is live connected and has a shared situational awareness.
During scanning of an area, the swarm can split tasks among each other and assume different roles. A number of swarm units can keep scouting in a pre-defined search area, while a single unit or more change their missions and inspect and identify objects of interest.

EXTREME STEALTH PROPERTIES

The very low signature enables covert and secret operation from shallow water to deep sea.

SONAR
The less than 800 cm length, flooded and bio shaped hull has a low signature

ELECTROMAGNETICS
The composite hull has a very low detectability

HYDRODYNAMIC SHAPE
Minimal water disturbance

INFRARED
Advanced components minimize infrared emissions to enhance stealth

NOISE
The electric propulsion is designed with a low noise signature to reduce detectability

AUTONOMY
Intelligent features enable extended autonomous use without revealing its own position

EASY HANDLING, DEPLOYMENT AND INTEGRATION

AUV´s are essential tools for underwater missions. Traditional deployment methods can be complex, costly, and restrictive. *GREYSHARK™* user-friendly and customizable deployment options enhance accessibility and ease of use, mission efficiency and reliability.

GREYSHARK™ can be integrated into existing surveillance fleets.

PORT / CONTAINER / DRIVE-OUT RAMPS OF THE CONTAINER

Standardized container solution for transport, deployment and fueling.

© PALFINGER MARINE

PORT / PIER / CRANE

Safe and quick water entry from port or pier with a crane or slip ramp.

© Fassmer GmbH

VESSEL

Reliable deployment from a vessel even in challenging sea conditions. Launching at the scene increases the duration of the operation.

ACCESSORIES AND GLOBAL SHIPPING

To operate *GREYSHARK™* efficiently, it will come with a set of accessories for use and transport.

ACCESSORIES

/ **Control Station**
/ **Surface Radio Station**
/ **Underwater Communication and Tracking Station**
/ **Remote Hand Unit**
/ **Spare Part Set**
/ **Maintenance Package**

CONTAINER

/ **Transport and Deployment Container**
/ **Fueling Station**

SHIPPING

/ **Sea**
/ **Air**
/ **Rail**
/ **Road**

Greyshark Series 2
FOXTROT

TECHNICAL SPECIFICATION

Hull	Biological inspired shape with stream optimized outline
Hull length	7.99 m
Hull diameter	1.8 m
Weight	4.5t
Extra payload	N/A
Drive train	Fuel Cell System
Navigation	Long-Range Inertial Navigationw (FOG-INS)
	Sound Velocity Sensor (SVS)
	Doppler Velocity Logger [DVL]
	EMW-Hardened Satellite Navigtion [GNSS]
	Obstacle Avoidance [OAS]
	Ultra-Short Baseline [USBL]
Communication	External Communication installed in retractable periscope:
	- Tactical Grade Radio
	- Satellite Communication
	Swarm Communication:
	- Acoustic Modem w/USBL
Charging/fueling infrastructure required	Containerized refilling unit with part automatized refueling process

Engine	Non-permanent magnetic electrical ring motor
Propeller	Segmented ring rotor propeller
Diving depth	Step 1: 650m
	Step 2: 4,000m
Endurance	10 kn | 1100 NM | 5 days
	8 kn | 2180 NM | 1.5 weeks
	6 kn | 5.350 NM | 5 weeks
	4 kn | 10.700 NM | 16 weeks
Operating Speed	10kn optimized
Max Speed	>10kn
Sensors	Electromagnetic Sensor Array [EMSA]
	Forward Looking Sonar [FLS]
	Sound Velocity Sensor [SVS]
	Imaging and Laser System [ILS]
	Multibeam Echosounder [MBES]
	Synthetic Aperture Sonar [SAS]
	Hydroacoustic Sensors
Mode of transport	1pc Standard 40ft container for GREYSHARK with winch and transportation
	1pc Standard 40ft container refueling unit
	Standard containerized solution for transport by truck, train, air and sea freight.

PERFECTLY ENGINEERED EFFICENCY

EUROATLAS, located in Bremen, has extensive experience of 60+ years in the submarine sector, providing innovative and reliable solutions for underwater missions worldwide.

Decades of experience in developing high-efficiency and robust power conversion solutions for critical applications results in cutting edge products that withstand extreme environments, ensuring operational reliability.

We have leveraged our experience in developing complex and customized solutions to enable the overall performance of *GREYSHARK™*.

EvoLogics, located in Berlin, brings 25 years of experience in maritime high-tech, underwater robotics, data and positioning networks, sensor arrays, and AI capabilities.
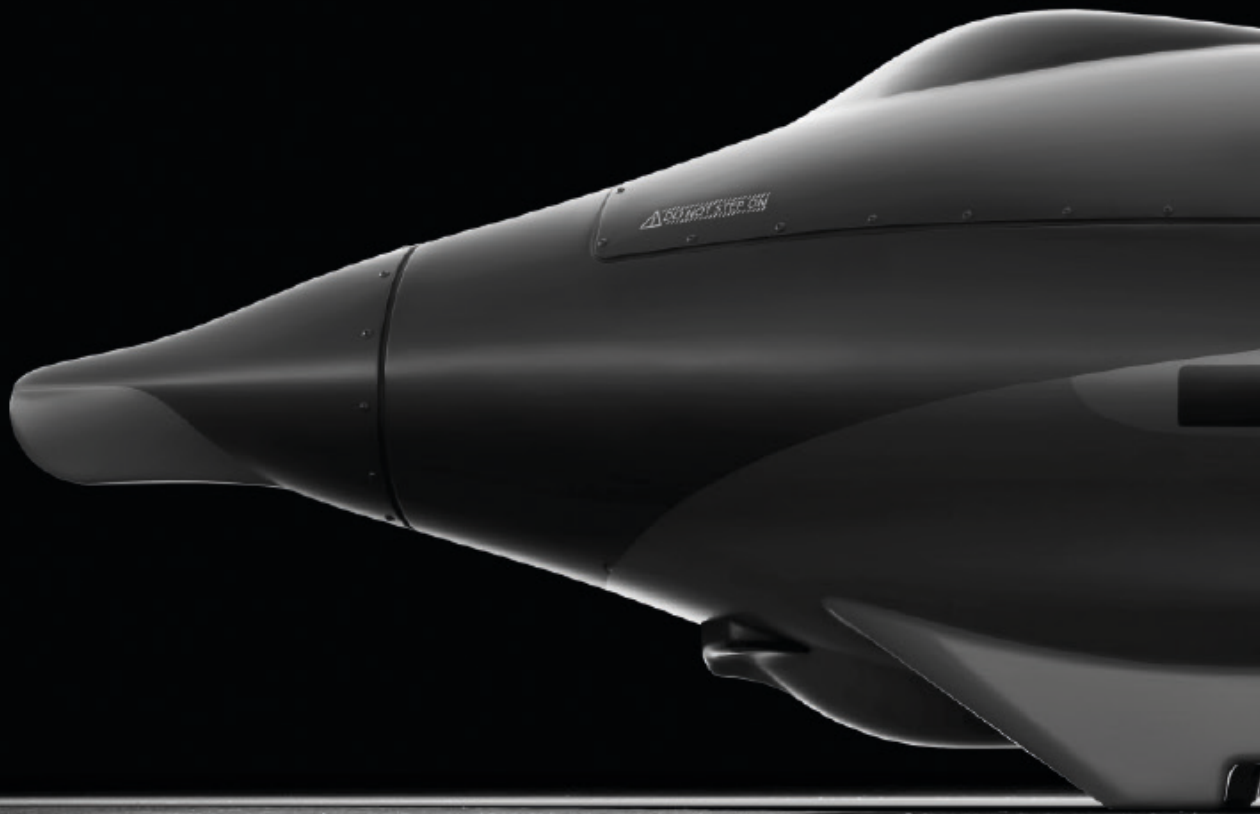
The team ensures autonomous mission controls, onboard edge computing, advanced underwater navigation, precise, accurate data collection, sensor fusion, and AI functionality.

These systems enable enhanced situational awareness and decision-making capabilities for *GREYSHARK™*.

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VERSATILE
MULTI-MISSION
ENDURANCE

EURO ATLAS + Evo Logics