



ATLAS SeaFox – ROV for Identification and Mine Disposal

SeaFox
Mine Warfare System



... a sound decision

 **ATLAS ELEKTRONIK**

SeaFox Mine Disposal System



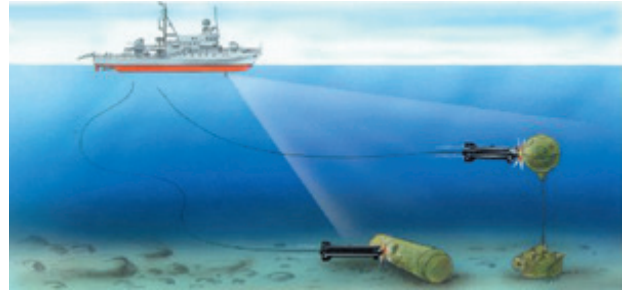
The SeaFox system is a mine disposal system based on the most advanced concept using the Expendable Mine Disposal Vehicle principle (EMDV).

Small, unmanned underwater drones are used for direct disposal of historical and most modern mine types; identical, reusable vehicles (without charge) are used for inspection, identification and training purposes.

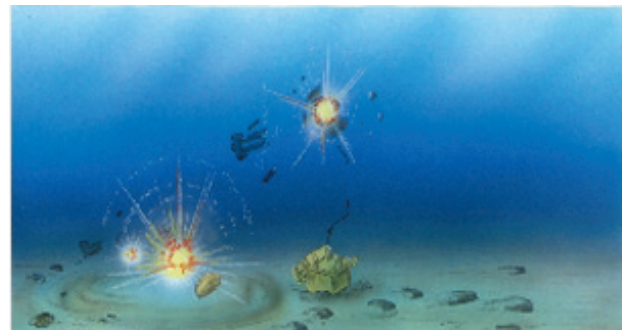
The system is effective against long and short tethered mines, proud ground mines and floating mines.



Easy handling due to small size: length 1.3 m, weight approx. 40 kg



Short mission time (typ. < 15 min) due to direct automated approach



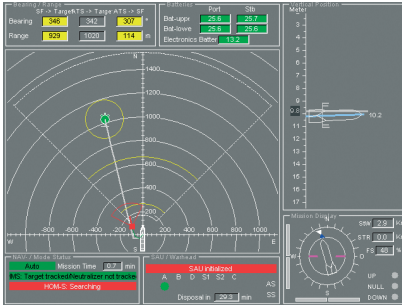
Mine disposal in situ with SeaFox's shaped charge

The SeaFox system mainly comprises a console, a launcher and the SeaFox vehicles. The system can be delivered as a stand-alone or a fully integrated version.

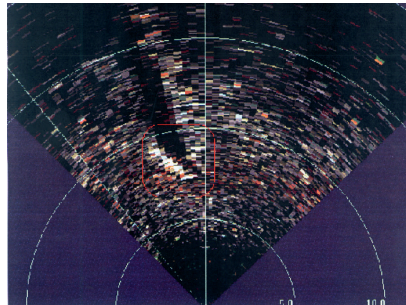
In case of stand-alone the console contains all electronics, software, displays and operating elements to guide the vehicle automatically or manually towards the target and to relocate, identify and destroy it. In the fully integrated version, a Multi Function Console or any existing console can be used.

The two different vehicles ensure quick disposal of mines during operation with the combat vehicle (SeaFox C) as well as cost-saving identification with the reusable identification version (SeaFox I).

The communication between the console and the SeaFox vehicle's sensors, such as high frequency relocation sonar, echo sounder and CCTV camera, is implemented via a thin fibre optic cable. The four independent, reversible motors plus one hover thruster ensure high manoeuvrability and exact positioning for firing the shaped charge.



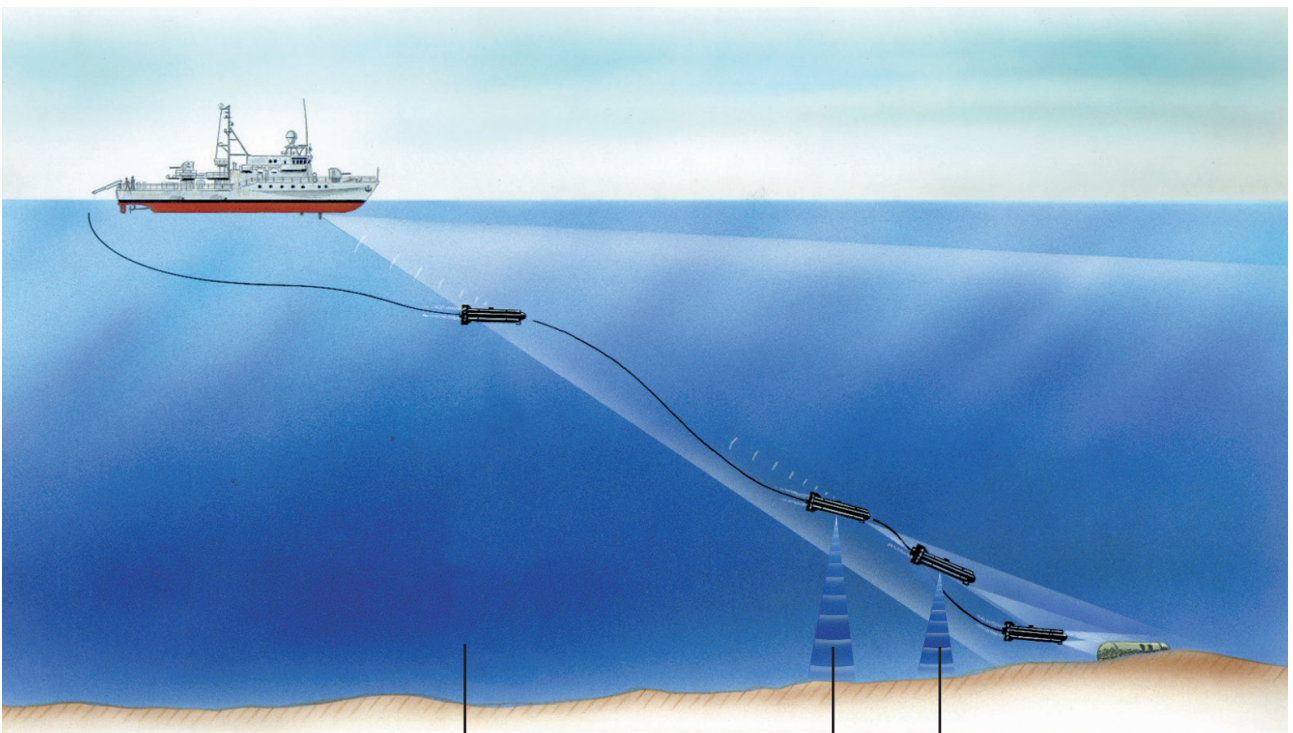
Tactical Display



Ground mine detected by SeaFox sonar



CCTV image of MLO allows clear identification



Mission Profile

Waypoint 1

Waypoint 2

Waypoint 3

Run Out

SeaFox on programmed course towards MCMV sonar or underwater positioning system coverage sector.

Transit

SeaFox tracked by MCMV sonar or underwater positioning system. Guided to a point downstream of mine.

Target Position Approach

SeaFox on pursuit course to mine relocation with own sonar.

Final Target Approach

Homing using SeaFox sonar. Identification by CCTV. Manual or impact firing.

SeaFox Delivers

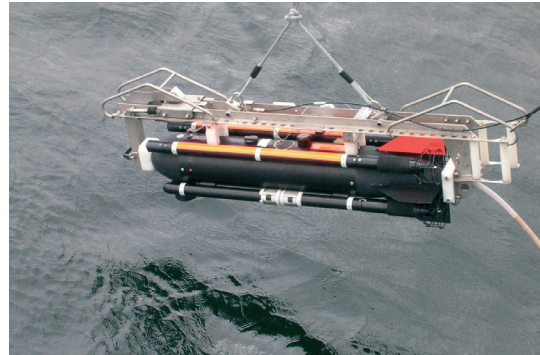
- Rapid Disposal** Expendable SeaFox vehicle considerably reduces mission time compared to other systems. Typically SeaFox achieves mine disposal four times faster than recoverable ROV methods.
- Effective Neutralisation** Shaped charge warhead destroys all known mine types including those containing insensitive explosives, mainly by sympathetic detonation.
- Precision** Positive identification via high resolution sonar and optical sensors, accurate positioning using 4 propellers and 1 thruster.
- Reliable Mission Success** Shaped charge warhead achieves reliable mine destruction against all known mine types. Unintentional mine detonation constitutes mission success. SeaFox can approach mine without restriction.
- Low Shipfitting Impact** Minimal storage requirements because of small size and low explosive content. Control from stand-alone operator console or integrated into existing MCMV displays.
- Low Life Cycle Cost** Low Life Cycle Cost due to “wooden round” concept of the combat vehicle and low maintenance effort for the reusable inspection vehicle.
- Qualification** Fully qualified by German Navy and other NATO authorities.
- In Service** SeaFox system is in service with 10 Navies on more than 70 platforms.



Main Components



SeaFox aboard a German minehunter



Crane-based launcher



Control console (example)



Modulare Mobile Control Unit

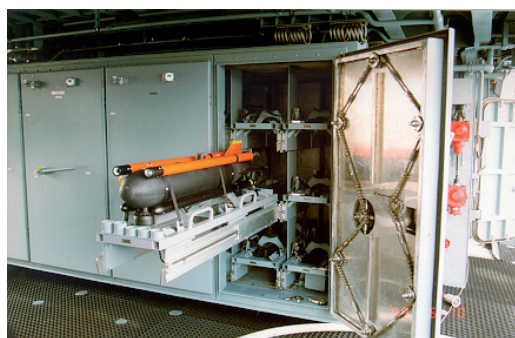
Thin fibre optic cable



SeaFox C Combat vehicle



SeaFox I Inspection and Training vehicle, fully reusable



Weapon storage (example)

Technical Specification

Operational

Mine Types: ground mine, short tethered mine, long tethered mine, drifting mines

Location: sea bed, sea volume, sea surface

Sea State: up to 5

Operation depth: 0 m down to 300 m

SeaFox C Vehicle

Length: approx. 1300 mm

Diameter: approx. 200 mm body /390 mm across fins

Weight in air: approx. 40 kg

Slightly negative bouyant

Propulsion

4 horizontal propellers and 1 vertical thruster (battery powered, reversible)

Max Speed: > 5 knots

Min Speed: full automatic hover capability

Range: > 1200 m depending on current and acoustic conditions

Guidance and Control

Auto/manual guidance system for waypoint navigation and homing.

Guidance calculation in control console.

Attitude sensors in vehicle.

Relocation Sonar

High frequency scanning active sonar with adjustable resolution.

360° scan, selectable

Echo Sounder

Allows SeaFox operation close to sea bed.

CCTV Camera

Real time CCTV imaging system.

High intensity searchlight illumination.

Communications

Optical Fibre cable to shipboard equipment (up to 3000 m length).

Warhead

Fully qualified shaped charge and SAU (Safety and Arming Unit). NEM 1.5 kg

Demonstrated effectiveness against insensitive explosives.

Magnetic Signature

Meets signature requirements for MCMV equipment.

SeaFox vehicle signature at mine not applicable - unintentional mine triggering is rated as mission success.

SeaFox I Vehicle

Dimensions as SeaFox C, slightly positive boyant.

Training and mine identification version of SeaFox vehicle, recoverable and reusable.

No warhead, rechargeable batteries, reusable cable, no expendable parts.

Control Console (stand-alone)

Mission control by single operator.

Flat panel displays.

Mission display - position data

Sonar display - homing

CCTV image - identification

Operator input by panel

Data Interface to MCMV

SeaFox Server

To enable use of existing MCMV consoles.

Launcher

Crane-based system.

Portable Control Unit

Provides guidance from manoeuvre deck during SeaFox I recovery.

Recovery Net

Optional

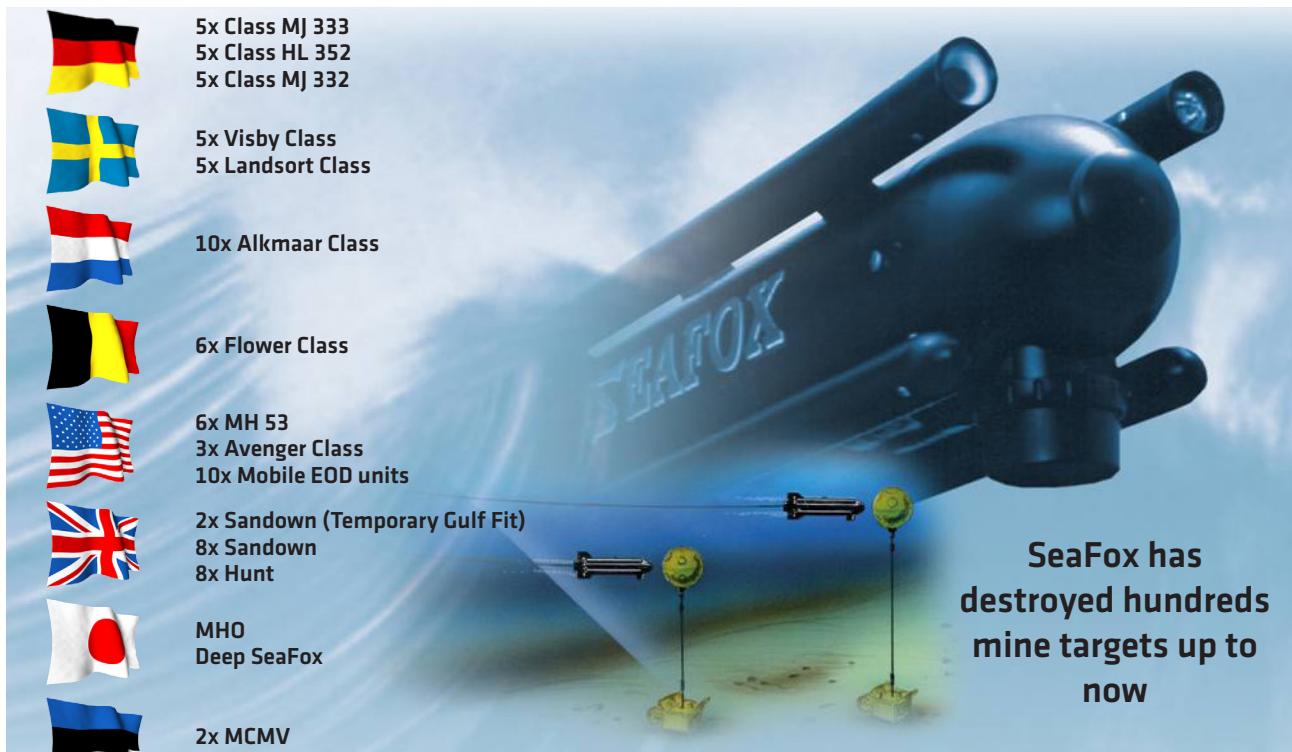
Supports SeaFox I recovery

Main Accessories












Battery charger, Acoustic Tracking System MIPS

EOD Tool COBRA

References

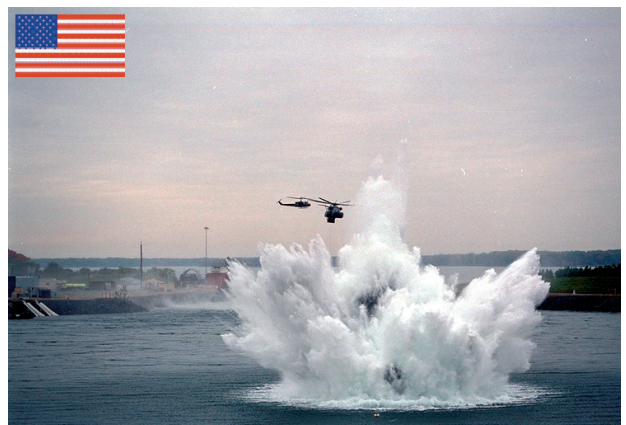


SeaFox has destroyed hundreds of mine targets up to now

	5x Class MJ 333 5x Class HL 352 5x Class MJ 332
	5x Visby Class 5x Landsort Class
	10x Alkmaar Class
	6x Flower Class
	6x MH 53 3x Avenger Class 10x Mobile EOD units
	2x Sandown (Temporary Gulf Fit) 8x Sandown 8x Hunt
	MHO Deep SeaFox
	2x MCMV
	3x Katanpää Class
	2x AL Hasbah Class
	2x Lat Ya Class 1x Mobile EOD units

SeaFox

- Fully qualified and certified
- Twelve years of reckonable service
- Demonstrated its effectiveness against conventional and insensitive explosives on many occasions
- Combat-proven



US Navy: AMNS Program
Airborne Mine Neutralisation System
Integration into helicopter

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