THE COMMON SEA MINE

The sea mine is a self-contained explosive device denying a vessel its passage through the sea. Mines are deposited and left to wait until triggered by approaching ships.

A mine's flexibility and cost-effectiveness, in addition to its low production and laying costs makes it an attractive weapon to all forces. Removing mines is a dangerous task, requiring time and great skill.

The remains of World War II naval minefields still exist, with many mines remaining potentially active over long periods of time.

ENTER THE SAM 3 MINESWEEPING USV

Full scale 525 kg TNT mine explosion test on a SAM 3

SAM 3's hulls are made of heavy duty rubber tubes with several air-filled compartments. These absorb large amounts of energy and soften the kick-off velocity to on board equipment and machinery. A wide hull base with plenty of buoyancy reduces the risks of capsizing.

SAAB

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SAAB

SAM 3

THE UNMANNED SURFACE VEHICLE FOR MINESWEEPING

SAM 3
MINESWEEPING USV

Today's minesweeping operations are based on the accurate imitation of both the magnetic and acoustic signatures of target ships, whether they are extremely low, like a degaussed MCM vessel, or large, such as with big commercial vessels.

Saab is a world leader in naval systems. We have built up a proven history of delivering platforms as well as integrated systems and sub-systems for the entire maritime domain. Our ***thinking edge*** enables us to break new ground and develop technically advanced, independent solutions to meet today's challenges.

SAM, the minesweeping Unmanned Surface Vehicle (USV) has proven its ability to effectively clear infested waters, with 13 units operated by 4 navies around the world. The SAM 3 is the third generation of the effective USV, and has a number of enhanced features.

MAIN FEATURES

- Unmanned, remote or autonomous control
- Keeps ships and crews outside of mine danger areas
- Highly suited for minesweeping operations in confined waters, such as ports, archipelagos, and narrow shipping corridors
- Easily shipped by land, sea or air in a 40 ft container
- Programmable sweep signature output against 'smart' mines
- Unmanned technology delivers onsite persistence operations in depths of 3–60+ m (10–200+ ft)
- Superb shock resilience to close proximity mine detonations
- High redundancy and sustainability

THE USV

CONSTRUCTION

- Almost all structures are made of nonferrous, nonmagnetic, noncorrosive composite carbon fibre or GRP materials
- Inflatable RIB-Collar type floats, each with individual air chambers that absorb high shock loads
- The deckhouses are resiliently mounted to the vehicle's main frame

CATAMARAN DESIGN

- Excellent seakeeping and agile manoeuvring characteristics
- High payload
- Less platform pitch and roll movement delivers steadier distribution of signatures
- Increased area for the deckcoil deliveres steadier minesweeping signatures
- Wide beam counteracts explosion-induced capsizing
- Minimised impact to engines and MCM equipment housed in the twin deckhouses. The spray dome generated by underwater explosions easily passes through the meshed platform floor

TRANSPORT

- Storage and transport in a ubiquitous open-top 40 ft ISO container
- Transport with civilian/military means, as well as airlifting, ensures reaction time is minimal
- Mounted/dismounted within 24 hours for rapid deployment, independent of distance
- Fast launching from a support ship or with a 14 ton crane

MODULARITY

- Highly flexible customising of components
- Easily installed equipment upgrades
- Simplified maintenance, fast replacement of damaged equipment

MINESWEEPING WITH SAM 3

SYSTEMS

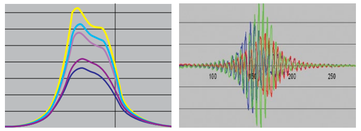
- Magnetic and acoustic minesweeping
- Platform integrated magnetic sweep gear – two axis electromagnetic signature effectors (coils)
- Clip-on acoustic sweep gear – towed acoustic generator (for example, Thales AAG or similar)
- Optional electric (UEP/ELFE) sweep gear (electrodes)

COMMAND & CONTROL (C2)

- C2 options:
  1. SAM 3 standalone C2 system in a PC laptop, with radio and portable antenna
  2. Integrated into an external on board C2 system, such as an MCMV or other C2 container module
- Mission planning, execution and evaluation
- After mission planning data is transferred to SAM 3's on-board system, its mission is conducted in a remote controlled or semiautonomous mode
- Tracks, turnarounds etc. are followed in full synchronization with the signature generation system

SIGNATURE CONTROL

- Choice of constant or variable/programmable sweep signature outputs
- Flexibility to sweep in both Target Setting Mode (TSM) or Mine Setting Mode (MSM)



Sweep signature flexibility – TSM (left), MSM (right)

- Unique capability to simulate TSM with authentically simulated signatures
- Unique capability to simulate MSM with known mine trigger parameters
- Magnitude and shape tuning of both magnetic and acoustic signatures
- Correct levels, variation and duration for a specific target vessel type, size and speed
- Synchronisation of magnetic and acoustic signature output
- Ripple effect for degaussing simulation
- Simulation of multiple passes for mines with ship counting device
- Multi-SAM mission for signature extension
- Deperming functionality to minimise magnetic remanence

TECHNICAL SPECIFICATIONS

SAM 3	
LENGTH OVERALL	14.4 m
BEAM	6.7 m
DRAUGHT (PROPELLERS)	1.2 m
DRAUGHT (ACOUSTIC GENERATOR)	3.8 m
DISPLACEMENT	14 tonnes
SPEED (TRANSIT)	10 knots
SPEED (SWEEPING)	8 knots
POWER/PROPULSION (DIESEL)	2 x 140 kW

Up to four SAM 3 drones working in formation can interact in a multi-SAM-mission mode to generate realistic signatures corresponding to targeted ship types and sizes.

Graphic user interface showing the tracks that SAM 3 automatically sweeps, superimposed over electronic sea charts. After all relevant mine threat parameters have been analysed by the SAM 3 Mission Management System (MMS), a Mission Definition File (MDF) is then created.

SAM 3 is easily readied for new deployment. Dismantled into modules, it is quickly containerised, loaded into a road trailer or prepared for air transport. The image shows how the deck houses are lifted into a 40 ft container. SAM 3 can be relocated to deal with arising mine threats at short notice.