



SAAB

DOUBLE EAGLE SAROV

THE VEHICLE THAT
DOES IT ALL





VERSATILE UNDERWATER CAPABILITIES



ADVANCED CAPABILITY BELOW THE WAVES

Sophisticated, reliable underwater vehicles are essential for dealing with the threat of mines. As a global leader in maritime technology, Saab's **thinking edge** enables us to develop and produce innovative, effective underwater vehicles that protect your forces.

The robust design, modularity and long-term mission capability of the Double Eagle Sarov make it highly successful in mine countermeasure (MCM) operations. The vehicle is also a cost-effective solution that combines advanced technology with impressive efficiency for a short turnaround time.

With the ability to detect, classify, identify and dispose of mines in one system, the Saab Double Eagle Sarov provides superior means of enhancing national security.

OPERATIONAL CONCEPT

The Double Eagle Sarov is a hybrid system. This means that it can be operated both as a Remotely Operated Vehicle (ROV) and as an Autonomous Underwater Vehicle (AUV). The modularity of the system also allows for extensive re-configuration on deck. These unique features provide the basis for developing entirely new concepts of operations for MCM using a single system.

AUTONOMOUS DETECTION, CLASSIFICATION AND IDENTIFICATION

System configuration: Double Eagle Sarov with Side Scan Sonar (SSS) or Synthetic Aperture Sonar (SAS) and camera.

The system is launched as an AUV, programmed to survey an area of interest. When an object is detected by the sonar software, the vehicle has the ability to re-programme the mission. It will then move to a position where more data can be collected for classification and the camera can be used for gathering information sufficient for identification. The vehicle then re-connects to the original mission and completes the survey. During a survey, the vehicle can be programmed to surface and transmit pre-processed target data to the MCM force for further analysis.

When the survey is complete, the vehicle moves to a pre-determined position for recovery to the designated platform. As and when required, all real-time data can be uploaded for further post-analysis.

MINE DISPOSAL

System configuration: Double Eagle Sarov with mine disposal charge. The vehicle is connected to the ship via a thin fibre optic cable for communication or a thicker tether for power and communication.

When an object has been detected and classified as a Mine Like Object (MLO) by a ship's mine hunting system, e.g. a hull-mounted sonar, Propelled Variable Depth Sonar (PVDS) or offboard system, the Double Eagle Sarov is launched under full control of an onboard operator. The vehicle can then be manually piloted or steered by the autopilot to the vicinity of the MLO. The relocation sonar on the vehicle assists the pilot during this process. When the vehicle is close to the MLO, the pilot manoeuvres it to a position where a positive identification can be made.

Once the target has been confirmed as a mine, the Double Eagle Sarov is moved into the optimal position to release the mine disposal charge of choice. Several weapon alternatives are available.

When the vehicle has returned to the ship and has been recovered, the charge is remotely detonated and the mine is exploded.

VIRTUALLY UNLIMITED ENDURANCE

System configuration: Double Eagle Sarov with tether docking tool. The system is configured with a winch and tether connecting the vehicle to the ship.

It is possible to release and reconnect to the tether under water using a specific docking tool. Once connected to the tether, the vehicle batteries are recharged. While charging, it is still possible to use the vehicle as an ordinary ROV, utilising all sensors and tools. The recharging time is considerably less than the endurance of the batteries. This allows for one Double Eagle Sarov to operate autonomously in the far field of the operational area, and for another vehicle, connected to the tether, to operate nearby. When the endurance of the far field vehicle reaches an end, the two vehicles change places and tasks. This provides virtually unlimited endurance for MCM missions.



COMMUNICATION ANTENNA

Used for Wi-Fi, UHF and GPS communication



MINE RELOCATION SONAR

The multibeam sonar is used to relocate identified objects



NAVIGATION

USBL, MEMS, DVL, INS and speed log for navigation

COMPLETE SYSTEM FOR MULTIPLE MISSIONS

SYSTEM OVERVIEW

The Double Eagle Sarov's modular design and hybrid capability offers a unique level of flexibility for an MCM system. Depending on the requirements, a basic system may be configured for standalone autonomous detection and classification operations using a minimum amount of ship-borne equipment. Alternatively, a fully integrated, flexible, virtually unlimited endurance system can be offered, with the capabilities for detection, classification, identification and disposal within a single system. The scalability of the vehicle also guarantees a system that will grow with future demands.

The standard Double Eagle Sarov system comes with all the controls required to manoeuvre the vehicle during launch and recovery, including a Portable Operator Control Board (POCB). It also uses software with a pilot interface for programming missions, and is ready to run on any windows computer, general purpose console or dedicated MCM console.

A battery charger, cradle or trolley for vehicle stowage and a Launch and Recovery System (LARS) for the vehicle may be provided as and when required. A sea crane on board the ship is used in conjunction with launch and recovery of the vehicle.

Other equipment required for further system configurations are taken from the Double Eagle family of components, such as:

- ▶ Automatic Tension Control (ATC) winch with thin fibre optic cable for communication
- ▶ Automatic Tension Control Forced Cooling (ATC-FC) winch with a thicker tether for power and communication, used for in-water recharging. The cooling of the tether is a prerequisite for high performance operation over long periods
- ▶ Tether Protection System (TPS) and TPS Launcher, which allows the system to be operated without risk of the tether entangling with other underwater ship systems. It also provides additional stability when decoupling the ship's movements from the vehicle
- ▶ Power Converter Unit (PCU) which converts the ship's power to vehicle power. The PCU also includes insulation monitoring with a circuit breaker for safety
- ▶ Navigation and communication equipment specific to customer requirements
- ▶ Sonars and sensors specific to customer specifications
- ▶ Transport container for optimised flexibility

SYSTEM SPECIFICATIONS

| | |
|--------------------------|--|
| LENGTH | 2.9 m |
| WIDTH | 1.3 m |
| HEIGHT | 1 m |
| WEIGHT IN AIR | 540 kg |
| WEIGHT IN WATER | Adjustable, slightly buoyant |
| SPEED | 0-8 knots |
| OPERATIONAL DEPTH | 500 m |
| PAYLOAD | 250 kg |
| VEHICLE CONTROL | 6 Degrees of Freedom, auto depth, auto heading, auto altitude, waypoint steering and autopilot |

| | |
|---------------------------|---|
| NAVIGATION SENSORS | Ultra Short Base Line (USBL), Microelectromechanical Systems (MEMS), Doppler Velocity Log (DVL) and speed log |
| CAMERA | Colour camera Other types of camera available on request |
| TETHER | 1,000 m, 11 mm power and fibre optic or 12 km, 4 mm fibre optic AUV configuration: untethered |

| | |
|---------------------|--|
| POWER SUPPLY | LiPo battery, 12 kWh or power via the tether |
| RANGE | 15 km on batteries Unlimited on power tether |
| ENDURANCE | 10 hours on battery Unlimited on power tether |



SAAB

SAAB DEVELOPS **HIGH TECHNOLOGY**
UNDERWATER SYSTEMS THAT ENABLE
ARMED FORCES TO ENHANCE THEIR
SITUATIONAL AWARENESS, EXTEND
THEIR **OPERATIONAL CAPABILITIES**
AND RESPOND TO **ANY THREAT** – EVEN
IN THE **HARSHEST ENVIRONMENTS**.

www.saabgroup.com

Saab
SE-581 88 Linköping
Sweden
Tel +46 13 18 00 00
Fax +46 13 18 65 31

