



# SURS

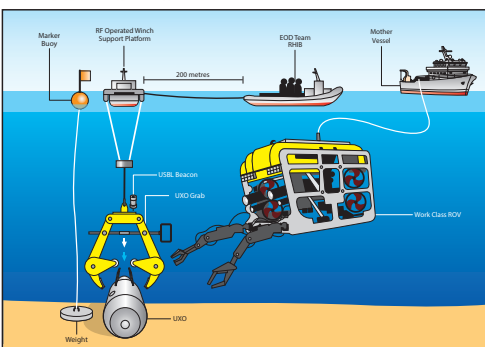
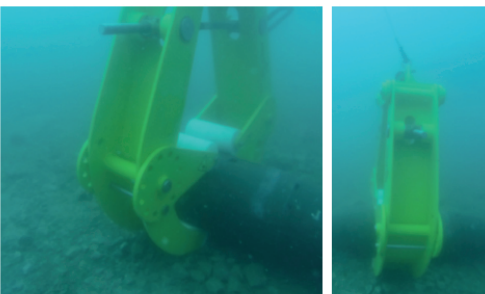
SUB-SEA UXO RELOCATION SYSTEM

## Features

- UXO Clamp features a four points-of-contact mechanical clamp, which can be pre-set, prior to deployment.

## Applications

- Will form a positive attachment to any threat spectrum ballistic or cylindrical shaped UXO.



UXOceans' SURS can be employed when relocation is either preferred or rendering safe unexploded ordnance (UXO) in-situ is otherwise impractical. This might be due to regulatory, environmental protection, or archaeological preservation reasons. It could also be due to the presence of fragile local infrastructure, such as cables, pipelines, foundations, or similar structures, which could be damaged or destroyed by UXO render-safe actions. Additionally, this approach can be applicable when several small Net Explosive Quantity (NEQ) munitions are closely positioned. The SURS requirement can pertain to either a single large NEQ UXO or a basket/container holding smaller UXOs.

The system comprises of a non-motorised Surface Support Platform (SSP) equipped with a specially designed, remotely operated Radio Frequency (RF) winch and mechanical UXO Clamp. It is positioned over the UXO from the primary Remote Operated Vehicle Support Vessel (ROVSV) or Diving Support Vessel (DSV) using a Rigid-hulled Inflatable Boat (RhIB) or Fast Rescue Craft (FRC). The Clamp is situated over the UXO by a Work Class ROV (WROV) or, in shallow water, by qualified and SURS-trained divers. A team of three, including 1 Explosive Ordnance Disposal (EOD) supervisor and 2 EOD Engineers/RF winch operators, is required to operate SURS. Support staff includes a RhIB coxswain and ROVSV/DSV crews.

An Ultra Short Baseline (USBL) transponder beacon is positioned on the SURS system. This facilitates tracking of its progress and relocating both the SURS and the UXO. Utilising a USBL beacon on the SURS system and guided by the survey desk on the ROVSV, the SSP will be positioned and moored directly above the UXO, at which point the WROV pilot can guide the SURS Clamp directly over the target UXO.

The SURS Clamp can then be remotely lowered over the UXO. Once in position and with the Clamp system straddling the UXO, the WROV or Diver can accurately position it at the predetermined centre of mass of the UXO.



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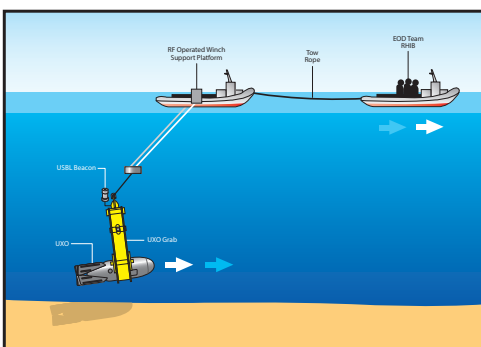
## Weather and Daylight

The relocation should occur during daylight hours and favourable weather conditions. Careful planning is crucial to secure a suitable weather window for the entire operation.

## UXO Classification and Risk Assessment

Before a confirmed UXO relocation operation can begin, the EOD Supervisor (EOD Sup) must positively identify the UXO and classify it wherever possible, by but not limited to the following categories: country of origin, type, fusing and method of function, nature of fill, exact dimensions, and centre of mass.

The EOD Sup must also conduct a risk assessment to determine if the munition is safe-to-move or if it should be destroyed in situ. The risk assessment must consider prospective damage to frangible local infrastructure (such as foundations, pipelines, cables or the like), if the UXO functioned in its as found location, without having emplaced appropriate protective works, in advance.



## Phase 1: SURS Deployment

- Deploy SSP and pre-configured SURS system.
- Position at designated stand-off downwind/tide from UXO.
- Lower SURS system to verify water depth.
- Hoist SURS system 5 meters above UXO expected depth.

## Phase 2: SURS Lock-On

- EOD Sup confirms Clamp position.
- WROV or Divers secure Clamp around UXO's circumference at CoM.
- Confirmation by ROV pilot or Dive Sup and EOD Sup.
- WROV / DSV departs from location.

## Phase 3: Remote Pre Lift

- WROV at safe distance or on vessel's deck.
- RF winch operator in RHIB/FRC tensions recovery line.
- Weight taken up by SSP.
- WROV or Divers recovered, ROVSV / DSV stands off.
- Safety distance adjusted based on UXO NEQ.

## Phase 4: Remote Lift

- EOD Sup clears non-engaged vessels from area.
- EODE (EOD Engineer) manoeuvres FRC towards SSP.
- FRC attaches towing hawser to SSP, disconnects moorings.
- RF winch lifts UXO to predetermined depth.
- Depth typically 5m greater than intended reposition location.

## Phase 5: Remote Towing

- Towing begins with UXO suspended in SURS system.
- Shortest, unobstructed route used when possible.
- FRC Coxswain maintains steady speed.
- FRC guided by ROVSV or DSV Nav plot and USBL beacon.
- Pre-laid mooring line and clump weight for tethering.

## Phase 6: UXO Reposition

- FRC tows SSP to required position.
- EOD Sup directs RF winch to lower UXO.
- Weight off when UXO reaches seabed.
- RHIB/FRC maintains standoff position.
- UXO observed for 30min before ROVSV / DSV moves.
- WROV / Diver returns, loosens Clamp from UXO.
- Confirmation by ROV Pilot Dive Sup and EOD Sup.
- EOD Sup assesses UXO's new position.
- RHIB/FRC drifts off, RF winch recovers Clamp.
- SSP with SURS towed back to ROVSV or DSV