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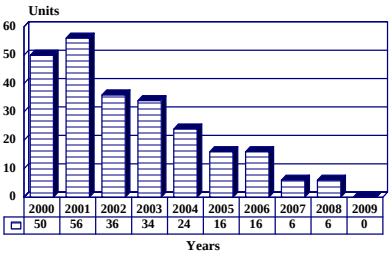
SRBOC (Mk 36) - Archived 7/2001

Outlook

- Standard US Navy decoy launcher
- Significant focus on expendable enhancements and improvements
- Remove and replace action could eventually extend to the entire US Fleet



Orientation

Description. Ship chaff and flare launcher (Super Rapid Blooming Offboard Countermeasures – SRBOC).

Sponsor

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China National Machinery Import and Export Corp (Machimpex)
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Japan Maritime Self-Defense Force
Japan Defense Agency
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Ministerie van Defensie
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Chief of Naval Operations
South Korea Navy
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South Korea

Spanish Ministry of Defense
Ministerio de Marina
Madrid, Spain

Taiwan Ministry of Defense
Chinese Navy (Chung-Kuo Hai Chen)
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Contractors

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Status. In service; in production; ongoing logistics support.

Total Produced. Through 1999, an estimated 848 systems had been produced.

Application. Surface ships.

Price Range. Estimated cost of a two-launcher system is US$500,000; a four-battery system, US$800,000. This excludes the cost of expendables.

Cost/price is estimated based on an analysis of contracting data, other available cost information, and a comparison with equivalent items. It represents the best-guess price of a typical system. Individual acquisitions may vary, depending on program factors.

Technical Data

	Metric	US
Dimensions		
Barrel Diameter:	130 mm	5.1 in
Characteristics		
Units:	Launcher Power Supply Launcher Control (Bridge) Launcher Control (Master) Ready Service Lockers (35 rounds)	
Expendables:	Super Chaffstar (rf) Super Hiram III (IR) Super Hiram IV (IR) Super Gemini (rf/IR) NATO Sea Gnat (rf/IR) NULKA (with modified launcher) Active ECM payload on hovering rocket	

Design Features. SRBOC is an expendable counter-measure launcher designed for surface ships. Typical configuration is two Mk 36 launchers for ships of less than 500 feet in length (double that for larger vessels), installed to point out from either side of the ship. The system includes control and power systems, with both launcher and load configurations tailored to provide the maximum protection for a specific vessel type.

The deck-mounted launcher features six launch tubes, arranged in pairs set at elevation angles of 45^{o} and 60^{o}, respectively. Electromagnetic induction firing circuits set off a squib in the expendable cartridge, igniting a charge which propels the chaff cartridge or flare into the air.

A Master Launcher Control provides both manual firing circuits and status indicators and is typically located in the Combat Control Center. A Bridge Launcher Control provides auxiliary firing circuits and status indicators for the bridge.

The Power Supply system provides the firing power (DC) for the firing circuits, and includes a standby battery and trickle charger for backup and emergency operation. Ready Service Lockers store up to 35 expendable cartridges adjacent to the launchers.

Operational Characteristics. SRBOC launches chaff or flares to decoy attacking missiles away from the protected ship. Chaff can clutter search and tracking radars, interfering with detection, tracking and lock-on. SRBOC can launch a variety of chaff cartridges and flares. Loads include Super Chaffstar, Super Hiram III, Super Hiram IV infrared cartridges, Super Gemini Hybrid RF/IR cartridges and the Super LOROC (Long-Range Offboard Chaff) rocker-launched decoy. The Super LOROC can deploy chaff up to 1.32 nautical miles (2.5 km) from the ship.

The chaff deployed by SRBOC forms a cloud at just under 1,000 feet altitude, which confuses or degrades fire-control radars and active missile seeker heads. The attacking radar seeker tends to identify a point in the chaff cloud rather than the ship as the target center, drawing the warhead away from the vessel. Small ships, such as frigates, can sometimes be protected with one or two cartridges. Larger ships need more, with the cartridges launched in salvo fashion to create a sufficiently large and properly shaped decoy to protect the ship.

The infrared countermeasures are flares which, when launched, float under a parachute. The high-intensity infrared (IR) source presents the missile's seeker head

with a larger heat source than the ship, decoying heat-seeking missiles away from the ship. Most detonate based on the decoying signal rather than impact, and the vessel is therefore protected from the weapon.

NATO Sea Gnat Mk 214 and Mk 216 rocket decoy rounds can be launched from SRBOC. This is a joint US, UK, German, Norwegian and Danish program active in the international market. NATO Sea Gnat is not interchangeable with the other SRBOC rounds, but it does use the same launcher. The US/Australian NULKA hovering active decoy is being designed to use a modified SRBOC launcher.

Variants/Upgrades

ALEX (Automatic Launching of Expendables). This is an automatic system which integrates with a ship's combat control system. It can be used in place of the SRBOC Launcher Controls, allowing a ship's electronic warfare system to control the launch of chaff or flares. ALEX can operate in fully automatic, semi-automatic or manual modes.

The Mk 36 launcher can be interfaced with other electronic warfare control systems, including the Royal Navy DLA and DLH decoy systems.

Program Review

Background. Chaff was developed as a disruptive decoy shortly after the birth of radar itself. It was used extensively throughout the European theater during World War II, dispensing bundles of "rope" from aircraft, which proved very effective against the radars of the day.

One of the first identified surface uses of chaff to protect naval ships was during the Operation Overlord invasion of Europe, D-Day, June 6, 1944. Electronic warfare development after World War II concentrated on preventing or disrupting detection by search and warning radar sensors, with chaff a significant player in airborne countermeasures. Electronic surveillance and electronic jamming were the key naval techniques developed.

Anti-ship missiles, especially self-guided ones, have made it necessary to find ways to apply the decoy concept to ships. Chaff can present multiple targets to a targeting radar, diluting the attack. This can be very effective during operations in the already cluttered radar environment of the littoral. Once a missile is on the way, chaff and decoys tend to be the most effective protection technique; a crew can time the launch of the decoy(s) to achieve optimal deception.

The launcher is the simplest part of the system. Its purpose is to shoot the decoy away from the ship in a predetermined direction at the proper time. Development has focused on improving the types of expendable payloads, chaff, flare or active emitter to decoy increasingly sophisticated missile seekers. Other changes have focused on improvements to the control system, particularly integrating the chaff/decoy launch system into a ship's combat control system.

In early 1999, plans were announced to sell three Perry class guided missile frigates to the Turkish government. EW equipment to be transferred with the ships includes the Mk 36 SRBOC, SLQ-25(V), and SLQ-32(V).

Funding

Funding is from operations & maintenance or ship construction accounts.

Recent Contracts

No recent DoD contracts over US$5 million have been recorded.

Timetable

N/A

Worldwide Distribution

Identified users are: **Australia**, **China**, **Japan**, the **Netherlands**, **South Korea**, **Spain**, **Taiwan**, the **UK** and the **United States**.

Forecast Rationale

Decoy dispensers that fire chaff clouds to lure inbound anti-ship missiles away from their target have three distinct modes of operation. Firing at long range, the launcher provides an inbound missile with multiple targets to dilute the effectiveness of the attack, helping the ship's point defense systems better deal with the attack. At intermediate range, the chaff clouds draw the missile guidance system away from the ship. As a last-ditch effort, the chaff clouds can be used for centroid seduction, in which they are used to distort the ship's return so that the apparent centroid is moved up and away from the real centroid. Since the seeker in an anti-ship missile generally homes in on the center of the target's return, this method causes the missile to pass above or astern of the ship.

Expendable decoys can be launched by mortars or by rocket. Mortars, such as SRBOC, are compact but inherently short range and have to be strong to withstand the impact of firing. The weight penalties of a mortar solution tend to be severe, and include a robust launcher and strengthening of the ship's superstructure around the firing point.

Conventional chaff has become less effective and therefore less used as missiles become more and more intelligent. Long-range chaff decoys can be countered by an MTI (Moving Target Indicator) in the missile guidance system. The chaff clouds move more slowly than the ship, and the movement is likely to follow a different pattern. Modern radar homing seekers take advantage of these differences to distinguish chaff clouds from the genuine targets.

Since 1982, the speed of inbound missiles has increased significantly and created a great challenge to using chaff as a protection measure. Hypersonic sea-skimming anti-ship missiles can cover the intercept zone from horizon to target in 6 to 12 seconds, ruling out chaff as an effective defense.

The SRBOC, and similar decoy systems, are often the only protection available. And even when more sophisticated protection can be fielded, chaff and flares provide vital backup protection. With the system deployed in large numbers around the world, the market for new equipment, support, improved countermeasures and better control will remain viable for some time.

Nearly all decoy launchers, including SRBOC, offer infrared decoy flares as an alternative payload, while laser obscurant thermal smoke rounds are becoming common. These smoke rounds, originally developed for armored fighting vehicles, may become important as a counter to laser-guided and optronic missiles.

The sophistication of missile seeker heads is forcing decoy operators to adopt active expendable jammers – lightweight disposable signal sources carried in a decoy round and kept airborne for a period of several minutes by a parachute or hovering rocket.

The chaff used in decoy rounds has changed radically over the years. The aluminum foil once used has been replaced by metalized glass fibers which are lighter, feature enhanced bloom time, and remain airborne longer. More can be packaged into smaller rounds.

US Ship Self-Defense improvement efforts are funded by programs which emphasize improvement to a ship's capability against anti-ship missiles. They address sensors, command and control, data processing and weapons improvements. Improvements to chaff, flares and especially active decoys continue to be actively sought.

Reasons for seeking a replacement are top-weight issues. The weight of the launchers is complicated by the mortar-based design, which transfers a high firing load to the superstructure, creating structural stresses and a requirement for heavy bracing. It is also noted that no new Mk 36 munitions have been produced for 15 years. The decoy loads are reaching the end of their design shelf life, creating safety concerns.

The Navy has been conducting a Foreign Weapons Evaluation to find a replacement. One candidate is Super Barricade, the non-US standard. But this is a 120 mm instead of 130 mm system. It could be re-chambered, and the system has been mentioned by name in discussions about the planned effort. The Navy could pay to have Super Barricade re-chambered, which could result in the revised system being sold on the international market.

The forecast projects currently identified production to meet known ship construction both in the US and on the international scene. The new Sea Gnat decoy and the growing variety of expendable offboard active jammers,

all of which require large-bore (130 mm) launchers, will emphasize the value of the SRBOC launcher to export customers. The prestige of adopting a system used by both the Royal Navy and the US Navy is also significant and likely to be beneficial. The current trend in the international market is for significantly larger and more capable ships than were produced during the 1970s and 1980s. This should also reinforce the position of SRBOC and any replacement.

US production in the future will be primarily to support construction of the DDG-51 Arleigh Burke class destroyers and LPD-17 amphibious ships. The requirement for LHD-1 and CVN-76 ships is limited. Foreign Military Sales (FMS) production will support KDX, Kongo, Takao construction, with limited production for Principe de Asturias, Project 052 and Project F25T construction. It is too early to make significant changes based on the initial plans for a replacement, but this does reflect the beginning of an eventual phase-out of the system.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Designation	**Application**	**Thru 99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**Total 00-09**
SRBOC (MK 36)	SURFACE SHIPS (FMS)	308	34	34	28	24	16	10	10	6	6	0	168
SRBOC (MK 36)	SURFACE SHIPS (USN)	540	16	22	8	10	8	6	6	0	0	0	76
Total Production		848	50	56	36	34	24	16	16	6	6	0	244