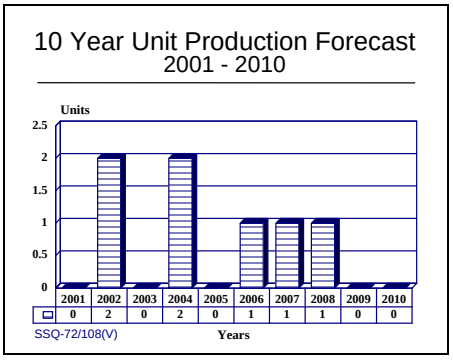
SSQ-72/108(V) (OUTBOARD/OUTBOARD II) - Archived 7/2002

Outlook

- US procurement complete, Royal Navy upgrades continue
- Cooperative OUTBOARD Logistics Update (COBLU) production awarded
- Ongoing logistics support for units in Fleet throughout forecast period



Orientation

Description. This is a signal intercept and direction-finding system for selected surface ships.

Sponsor

US Navy

Space & Naval Warfare Systems (SPAWAR)

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Arlington, Virginia (VA) 22245-5200

USA

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Web site: http://www.spawar.navy.mil

Contractors

BAE Systems – North America

Information and Electronic Warfare Systems

(formerly Sanders, a Lockheed Martin Co)

95 Canal Street

Nashua, New Hampshire (NH) 06060

USA

Tel: +1 603 885 4321

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Web site: http://www.baesystems.com

(prime)

Southwest Research Institute

6220 Culebra Road

San Antonio, Texas (TX) 78238

USA

Tel: +1 210 684 5111

Fax: +1 210 522 3859

Web site: http://www.sri.com

(antenna subsystem)

Shrewsbury Technology Ltd

Part of Cray Electronics, UK

(UK license engineering of SSQ-108(V)2)

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

Total Produced. Through 2000, an estimated 81 SSQ-72/108(V) units had been produced.

Application. The system provides over-the-horizon (OTH) detection and identification capability to surface ships for use in targeting. Used on 30 different warship classes and some shore installations.

Price Range. US$3.2 million (estimated).

Technical Data

Design Features. The SSQ-72(V) OUTBOARD system is composed of an SRD-19(V) Antenna Group plus the SLR-16(V) HF SIGINT receiver. The AS-3112/ SRD-19(V) antennas cover three bands in the VHF range, using 24 deck-edge antennas in three groups of eight (LF/MF-HF). These antennas are electronically switched in sequence to form receiving beams. An Adcock VHF D/F array is mounted in three tiers on the ship's masthead. This array includes a wide-open directional aperture and a wide-band target acquisition reference system. The SLR-16(V) HF SIGINT receiver automatically scans signals from the SRD-19(V) array, selectively analyzing frequencies of interest. The system has a Local Monitoring Station for added operational control.

The Phase 2 program added an SLR-23(V) J-band Intercept Receiver and SYQ-8(V) for target identification. Ships carrying the SSQ-72(V) can be linked together to other ships in their battle groups, as well as to shore stations. This system can be used in Network Centric Operations in a battle group.

The SSQ-108(V) OUTBOARD I/II supersedes the SSQ-72(V) in some uses and operates in parallel with the SRS-1 Combat DF System. It was designed to provide real-time, over-the-horizon, passive detection.

The SSQ-108(V)1 OUTBOARD I is made up of an SRD-19A Direction Finding Set plus the SLR-16A and HF SIGINT receiver, the OK-324/SYQ System Supervisor Station, a Local Monitoring Station, and tactical communications components.

The SSQ-108(V)2 OUTBOARD II includes an SLR-23(V) automated narrow band acquisition system and a modified OK-324/SYQ. The SLR-16A, SLR-23(V), and Local Monitoring Station detect and identify signals, with the SLR-23(V) providing direction finding (DF) accurate enough to use for targeting. The System Supervisor Station interfaces with the onboard command system as well as offboard command and communications nets. Offboard systems could be other OUTBOARDS or shore DF systems.

The SSQ-72(V) operates using two-point ranging. The deck-edge antennas measure the ground wave component of an intercepted signal, while the masthead antennas measure the sky wave. Computations are based on time-of-arrival comparisons.

The SSQ-108(V)2 measures the angle of sky wave arrival by determining the phase difference between the received signals. It generates a one-point range determination and is capable of over-the-horizon targeting of Harpoon anti-ship missiles.

Reports indicate that the Russian Navy carries an equivalent of the SSQ-72(V)2, the KLASSIK OUTBOARD, NATO code-name COIN STACK.

Operational Characteristics. The SSQ-72/108(V) OUTBOARD shipboard intercept and direction-finding system provides the US and Royal navies with the ability to collect technical and tactical intelligence data from distant targets. It permits a fleet commander to gather information on force dispositions and intentions.

The system provides an improved surface ship signal exploitation capability that can be integrated with the ship's Combat Information Center command net as well as other ships' OUTBOARD systems or the shore-based HF/DF BULLSEYE net. In the Royal Navy, the system data links to the light carrier in a task force.

The system was installed on selected guided missile frigates, destroyers and cruisers; plans were to deploy two systems per carrier battle group. These ships provide data for the entire group. They are linked to each other and interconnect with shore installations via satellite. The Royal Navy uses OUTBOARD as a strategic rather than tactical system by enhancing its interface with the ship's integrated command system.

Variants/Upgrades

SSQ-72(V)1. Made up of SLR-16(V), SRD-19(V), and Local Monitoring Station.

SSQ-72(V)2. Adds the SLR-23(V) and SYQ-8(V).

SSQ-108(V)1. This is a US Navy design and includes the SLR-16A, SRD-19A, Local Monitoring Station,

OK-324/SYQ, and tactical communications components.

SSQ-108(V)2. Was developed and funded by the Royal Navy and adds the SLR-23(V) and an OK-324/SYQ modification kit.

COBLU (Cooperative OUTBOARD Logistics Update). This upgrade to the SSQ-108(V) OUTBOARD system features advanced methods of detecting, sorting, and tracking hostile emitters. Officials expect COBLU to possibly develop into a common core system using modular/LAN concepts and non-developmental add-ons from other programs, such as the SRS-1A Combat DF and the Joint Maritime Command Information System. It is planned for all DDG-51 Arleigh Burke class destroyers and selected Royal Navy ships.

Program Review

Background. The OUTBOARD system was developed in the early 1970s under a contract for multiyear procurement for two systems per carrier battle group. Twenty-four systems were ordered for guided missile cruisers and destroyers, with six additional for backup.

The Royal Navy developed a plan to install the system on 40 of its destroyers and frigates. Installations began in the early 1990s, with approximately six retrofits or new installations per year planned. The SSQ-108(V)2 was to be backfit to the light carriers and carried on all Type 22 and Type 23 frigates. In 1993, plans to install the system on LPH and LPD ships were dropped for budgetary reasons.

In August 1995, (then) Sanders received an initial US$26 million contract from the US Navy for the engineering and manufacturing development (EMD) phase of a cooperative US/UK logistics upgrade program for the SSQ-108(V) OUTBOARD system. The company would provide EMD models over two years, with additional options for low-rate initial production (LRIP) to be exercised over three years. The total contract was roughly valued at US$67 million. Work would be performed in both the US and UK.

The upgrade would make it possible to handle existing and future threats with a logistically sustainable design. With the new emphasis on the littoral, users recognized a need to upgrade the system and make it possible to adapt rapidly to a changing environment and operational requirements. The upgrade capitalized on commercial off-the-shelf and non-developmental items technologies to develop an open architecture for the SSQ-108(V). This established better commonality with other fleet systems and modernized the operation of the system.

Tests and an operational assessment of the upgraded system were conducted in 1996 aboard both British and US ships. This evaluation was called the Cooperative OUTBOARD Logistics Update (COBLU), and led to delivery of the engineering and development model and six LRIP systems.

In January 1996, Applied Signal Technology was awarded a subcontract worth about US$3.1 million to participate in the upgrade. Applied Signal Technology was to provide three subsystems, a Model 1209C audio subsystem and two other specialized subsystems.

In an August 1998 *Commerce Business Daily*, the Navy announced it would procure engineering and technical support for a variety of Tactical Cryptographic Systems, including the SSQ-108(V), for both the US and Royal navies. The contract would include one base year and four option periods of one year each.

A *Commerce Business Daily* posting in October 1999 announced that the government intended to solicit and negotiate with Southwest Research Institute only for the technical and engineering support services required by the Space and Naval Warfare Systems Center. These services would provide life-cycle support for certain Tactical Cryptologic Systems (TCS), including the OUTBOARD system. The contractor would provide support for those systems installed on US Navy and UK Royal Navy ships.

The support would cover technical assistance, systems engineering, integrated logistics support, documentation, software engineering, calibration/recalibration, configuration management, installation support, equipment restoration/overhaul/repair, and research and development. The contract would be a cost-plus-fixed-fee type with a base year and four one-year options.

In June 2000, the US Navy awarded a contract for full-rate production of the Cooperative OUTBOARD Logistics Update (COBLU) systems. BAE Systems will provide up to 35 COBLU systems, as well as spares, installation, and training support. Deliveries for the base-year award will begin in late 2001. Additional options for the balance could be awarded each year until 2005. A US$26 million EMD award was made in August 1995, with a five-unit LRIP addition awarded in May 1999. OPEVAL was completed in December 1999, resulting in a Milestone III decision.

Funding

Funding is from Operations & Maintenance accounts.

Recent Contracts

No recent contracts over $5 million recorded.

Timetable

Month	Year	Major Development
Early	1970	Development begun
	1989	SSQ-72(V) US production complete
Aug	1995	COBLU EMD contract
May	1999	COBLU LRIP
Dec	1999	COBLU OPEVAL
Jun	2000	COBLU Milestone III, production contract
	2002	Planned completion of Royal Navy SSQ-108(V)2 installations
	2005	Final COBLU system deliveries

Worldwide Distribution

The SSQ-72/108(V) is restricted to NATO countries only.

Germany. Three AGIs carry the system.

Greece. One known system.

Italy. Two systems, unconfirmed.

Netherlands. Two systems on ELINT ships.

Norway. Installed on the Norwegian AGI *Marjata*.

Spain. One system, unconfirmed.

Turkey. One known system.

United Kingdom. The SSQ-108(V)2 is installed on the Royal Navy's six Type 22 Batch 2 frigates, all three aircraft carriers and some of the Type 23 and Type 22 Batch 3 frigates. The next group of installations will be on the Type 42 Batch 3 frigates. Many of these ships have below-decks units only.

United States. Carries an estimated six SSQ-72(V)2 and 27 SSQ-108(V)2 units.

Forecast Rationale

Because anti-ship missiles can successfully attack from beyond the horizon, there is a critical need for an OTH intercept and targeting capability. Although there are space-based sensors for over-the-horizon reconnais-

sance, satellites are not always available where needed, when needed. Carrier battle groups and other surface combat groups must carry their own capability. The SSQ-72/108(V) and its upgrades offer one way of meeting this need.

The COBLU upgrade capitalized on advances in technology, especially COTS and NDI developments, to improve the operation and supportability of the system, as well as enhance the ability to upgrade OUTBOARDs as needed. It is important to be able to capitalize on the latest in hardware and software as it becomes available.

Future developments will be incorporated into an overall combat system rather than focused on a single replacement for the SSQ-72(V). The Cooperative Engagement Capability (CEC) program is an example of being able to achieve more capability without adding new sensors to the Fleet.

The Royal Navy is aggressively upgrading its surface combatants with the system. Although a limited number of SSQ-72(V)s were installed on a few ships as an interim fit, SSQ-108(V)2s are used on Type 22, Batch II frigates. Plans are for installation on Royal Navy frigates and destroyers as well as air defense frigates.

Some users, especially of the SSQ-72(V), installed the below-decks processing hardware without the antennas. Information is data-linked to the ship for processing. This fits with the developing network-centric offensive tactics, which use inputs from throughout a battle group, fusing them and sharing the results with all ships in the group. Targets detected by one or more ships can be fired on by a ship that has not detected the threat with its own sensors, a tactic based on the CEC. Although CEC is primarily dependent on radar data in this initial version, all available sensors, including OUTBOARD, will become important players in the network-centric approach to naval combat.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level				Speculative		
Designation	**Application**	**Thru 00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**Total 01-10**
SSQ-72/108(V)	SELECT SURFACE SHIPS (ROYAL NAVY)	30	0	2	0	2	0	1	1	1	0	0	7
SSQ-72/108(V)	Prior Prod'n:	51	0	0	0	0	0	0	0	0	0	0	0
Total Production		81	0	2	0	2	0	1	1	1	0	0	7