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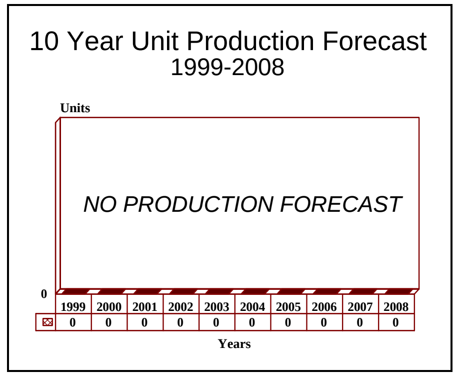
SLQ-32(V) - Archived 10/2000

Outlook

- In operational service, ongoing logistics support
- Navy developing the replacement AIEWS system (SLY-2)
- Factory restorations of current systems under way



Orientation

Description. Shipboard electronic warfare system.

Sponsor

US Navy
Space & Naval Warfare Systems Command (SPAWAR)
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Contractors

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(software)

Status. In service, in production, ongoing support.

Total Produced. An estimated 408 SLQ-32(V) and 80 SIDEKICK systems were produced.

Application. The system and variants are designed for use on nearly all US surface combat ships and major auxiliaries.

SLQ-32(V)1:
Knox class frigates, smaller auxiliary ships. Many will be upgraded to (V)2

SLQ-32(V)2:
Guided-missile destroyers, guided-missile frigates, Spruance-class destroyers

SLQ-32(V)3:
Some destroyers (DDG-51), cruisers, battleships, large vessels

SLQ-32(V)4:
Aircraft carriers

SLQ-32(V)5 (SIDEKICK):
Upgrades a (V)2 to basic (V)3 active ECM (jamming) capability by adding an ECM transmitter. Will be retrofitted or installed on select ships

Price Range

SLQ-32(V)1:	US$335,000
SLQ-32(V)2:	US$600,000
SLQ-32(V)3:	US$5.4 million (est)

SLQ-32(V)4:	US$7.2 million (est)
SIDEKICK:	US$1.2 million (est)

Technical Data

	Metric	US
Dimensions		
Antenna Weights:		
SLQ-32(V)1	708 kg	1,560 lb
SLQ-32(V)2	1,090 kg	2,400 lb
SLQ-32(V)3	2,270 kg	5,000 lb
Characteristics		
Frequency:		
SLQ-32(V)1	5 - 20 GHz	
SLQ-32(V)2/3/4	250 MHz - 20 GHz (receive)	
	5 - 20 GHz (jamming)	
Coverage:	360°	
Probability of Intercept:	100%	

Design Features. The SLQ-32(V) modular electronic warfare suite is the Navy standard electronic countermeasures (ECM) for more than 20 classes of ships. It was designed to provide surveillance, warning, and countermeasures against complex multiple missile attacks. The system grew out of the Navy's Design-To-Price Electronic Warfare Suite (DTPEWS).

Raytheon developed the SLQ-32(V) through independent R&D. The multibeam system uses Rotman dielectric lens arrays to form electronically scanable fan beams that can rapidly detect and locate signals and concentrate jamming power on sources identified as hostile. The system generates signals to decoy hostile systems into a false determination of the carrying ship's location. It protects the ship by initiating the use of chaff and/or decoys along with the jamming signals.

All SLQ-32(V) variants use a UYK-19(V) computer and interface with the Loral-Hycor Super Rapid Bloom Offboard Chaff launcher. A "SIDEKICK" jamming package could be added to the SLQ-32(V)2 to upgrade that system's capability to nearly that of the SLQ-32(V)3. The upgraded system becomes the SLQ-32(V)5.

There are four basic versions of the SLQ-32(V). The following highlights the design features of each, of one other variant, and of two integrations:

<u>SLQ-32(V)1</u>. This suite is designed to detect in-band signals at all azimuths and provide threat warning, identification, and direction finding of incoming radar-guided anti-ship missiles. The system generates an alert signal calling attention to the potential threat and interfaces with the Mk 36 SRBOC chaff rocket system. This variant's receivers operate wide-open in both frequency and angle. The complete suite is made up of two antenna assemblies, each of which has two Band 3 direction-finding receiver arrays and lenses that each cover 90°. A Band-3 semi-omni antenna that covers 180° is mounted on each antenna assembly. The (V)1 uses a semi-omni antenna working in parallel with the multibeam antenna and DF receivers to pick out the strongest pulse, and then feeds it to the instantaneous frequency measurement (IFM) receiver.

A presorter (special-purpose digital processor) contains a direction/frequency correlator and digital tracking units. The direction/frequency correlator organizes coarse frequency information from an IFM receiver and amplitude information from a direction finding receiver (DFR). A pulse descriptor word is formed by the addition of time-of-arrival information, sorted by frequency and angle cell, and stored in the emitter file memory section of the digital tracking unit.

Should three or more pulses with this angle and frequency signature be received within a programmable time interval (up to 32 milliseconds), the digital tracking unit tells the computer that a new emitter has appeared. The computer then has the digital tracking unit generate enough additional pulses to allow further in-depth analyses.

Using these data, the processor computes the pulse repetition frequency (PRF), scan type, period, and frequency. These parameters are usually enough to characterize an emitter. The identification process is completed by the comparison of those signal characteristics observed and those friendly and hostile emitter characteristics that are stored in a library within the computer memory. If necessary, the computer then initiates appropriate alert signals and other action.

SLQ-32(V)2. This variant has an increased capability through the addition of two receiving subsystems, making early warning as well as identification and direction finding on targeting radars possible. Each of the port and starboard antenna assemblies has two more Band 2 DF receivers, arrays, and lenses (each covering 90^o), with a Band 2 semi-omni antenna (covering 180^o) being added to each assembly.

Two pairs of small Band 1 spiral antennas are yard-arm-mounted (port and starboard) to provide 360^o coverage. The UYK-19(V) computer is the same as that in the (V)1, with the exception of extra electronics to handle more threat signals and additional memory capacity.

SLQ-32(V)3. The (V)3 is much the same as the (V)2 but has two more racks of EW hardware to provide an active electronic countermeasures capability. The racks include eight high-voltage power supplies for the traveling wave tubes (TWTs), a digital switching unit, a transponder, and a techniques generator. The computer's memory capacity was increased from 64K to 80K.

To accommodate Band-3 transmitter antennas (one pair in each assembly), the outboard antenna assemblies are expanded and given hydraulic roll-stabilization. The SLQ-32(V)3 detects and identifies emitters transmission in the 250 MHz to 20 GHz range, and jams hostile Band-3 emitters.

Beam-forming lens arrays and semi-omni-directional antennas drive crystal video receivers and instantaneous frequency measurement receivers, respectively. Angle and amplitude samples are sent in digital format to the Direction/Frequency Correlator (DFC).

Frequency samples are also sent to the DFC, where they are compared to, and matched with, known threat samples. Operationally, the Band-2 and -3 receiving system has a probability of intercept of nearly 100 percent.

A digital tracking unit (DTU) compares each new pulse with a frequency/angle matrix corresponding to the current emitter activity being tracked. The DTU updates the UYK-19(V) central processor with changes in the radar environment, such as changes in emitter angle (movement), the appearance of a new emitter (new signal), or the disappearance of a previous emitter (turn-off, cessation or neutralization of previous threat).

The SLQ-32(V) can jam multiple Band-3 threats simultaneously using repeater and/or transponder techniques. A Command Generator Unit produces the required countermeasures waveforms and modulation types. The transmitter emits powerful jamming signals through a Rotman lens array similar to that used for Band-3 receiving. ECM support is provided through the integration of the MK-36 Decoy Launching System.

Raytheon's UYQ-31(V)1 Display and Control Console (DCC) is the SLQ-32(V) operator's panel. It is controlled by a 16-bit microcomputer and consists of an 80-column by 36-row cathode ray tube (CRT), alphanumeric keyboard, alert lamps, and Decoy Launching Controls.

The active ECM action can operate either semi-automatically (operator initiating action) or under automatic computer control (the system begins countermeasures upon identification of a hostile threat).

SLQ-32(V)4. This variant was developed for installation on aircraft carriers. The basic system is the same as the (V)3 variant, with fiber optic interfaces added to accommodate the large physical distance between units.

SLQ-32(V)5 SIDEKICK. This jamming add-on was developed for ships carrying the SLQ-32(V)1 or (V)2 ESM variants. It adds a high-gain Rotman lens array and transmitting units with low-power miniature TWTs to installed systems. The software is a modified version of the SLQ-32(V)3 program and interfaces with the (V)1 or (V)2 combat direction system software.

The design allows for multiple threat engagement and has proven effective against both anti-ship missiles and targeting radars. It was designed to complement other onboard defensive systems.

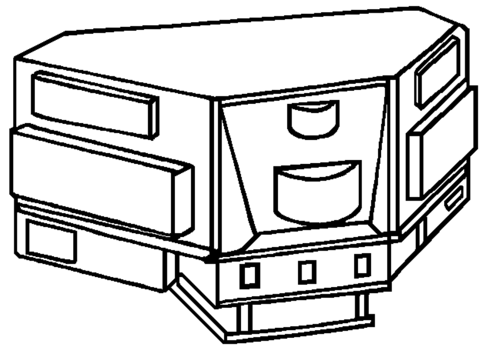
Super RBOC Integration. The MK-36 Super Rapid Bloom Off-Board Chaff (Super RBOC) system can be semi-automatically or manually controlled by the SLQ-32(V) operator at the DCC. It provides the operator with recommendations on launch timing and launcher selection, based on variables such as ship speed and course, as well as wind direction and velocity. The SLQ-32(V) can be linked, where appropriate, to the Hiram infrared decoy and the Gemini chaff and infrared decoy dispensers.

NULKA Integration. The SLQ-32(V) integrates with the joint US/Australian NULKA offboard hovering decoy rocket carrying an ECM payload. NULKA will also be able to accept inputs from the ship's combat control system.

Operational Characteristics. The "Design Features" discussion identifies most of the operational distinctions between the SLQ-32(V) variants. General operational characteristics that are applicable to all variants include:

- Computerized processing and control provide rapid response in dense signal environments, especially during a missile attack.

- Automation reduces operator workload and aids maintenance.
- The processor-based system can be reprogrammed to meet changes in the threat environment.
- The system can initiate either decoy/chaff deployment or active jamming based on analysis of the detected threat.
- The operator console displays both friendly and hostile frequencies picked up by the system.



SLQ-32 (V)3

Source: Forecast International

Variants/Upgrades

SLQ-32(V)1. Provides warning, identification and direction finding on incoming radar-guided missiles. It can be interfaced with chaff launchers.

SLQ-32(V)2. Provides warning, identification and direction finding of incoming radar-guided missiles as well as early warning identification and direction finding of radars associated with missile targeting and launch. It covers a wider frequency range than the (V)1.

SLQ-32(V)3. Provides warning, identification and direction finding of incoming radar-guided missiles, as well as early warning identification and direction finding of radars associated with missile targeting and launch. The (V)3 has an active jamming capability.

SLQ-32(V)4. A variant developed for aircraft carriers to replace the SLQ-17A. It is essentially the same as the SLQ-32(V)3, with modifications to accommodate the physical separation of units on the larger platform.

SLQ-32(V)5. The "SIDEKICK" modification adds a jamming capability to the SLQ-32(V)2.

SLQ-32A(V). Three general upgrade efforts took place in FY93/FY94. They are now directly related to the overall Ship Self-Defense improvement effort. The enhancements are:

- Upgraded general system capabilities
- Improved software
- Decoy and defensive integration (DDI)

In FY94, these improvement efforts were funded and controlled under PE#0604755N, Ship Self-Defense, Project U0954. The Shipboard EW Improvements Program major efforts are:

Advanced Capability (ADCAP) – Improves Active Countermeasure capability. This is an upgrade effort which will counter-targeting ECM capability to keep pace with the anticipated threat. It increases the number of simultaneous engagements possible and adds pulse-on-noise and program power attenuation features.

SLQ-32(V) Phase E – Improves threat detection capability.

DECM/Decoy Integration (DDI) – Integrates the Mk-36 Decoy Launching System with the SLQ-32A(V) Shipboard Electronic Countermeasures System.

ECP 206 - Band 3 ESM Improvements. This is for Band 3 electronic support measures (ESM) Subsystem Improvements. The Navy planned to procure 10 upgrades each year from FY93 through FY96 and 19 upgrades in FY97.

Digital Processing Unit Upgrades. This is an upgrade to the system's main computer. The Navy planned to procure 22 upgrades each year in FY93 and FY94.

ECP 469/470 - RDC Improvements. The Rapid Development Improvement (ECP 469/470) would correct electro-magnetic interference (EMI) problems from other emitter and sea reflections. The Navy procured 16 upgrades in FY93 and 10 in FY94.

A total of 300 engineering change proposals have been issued on the system since its inception. The SLQ-32(V) has been fitted with processor, software, and architecture upgrades implementing newer technology and designs. This has improved system processing power and adapted it to higher order software languages, as well as Ethernet and SafeNet 2 LAN capabilities. The latter changes were planned for developmental and operational testing in FY96, followed by a Milestone III decision in the second quarter.

The Japanese **NOLQ-1** electronic warfare system is very similar to the SLQ-32(V)3.

Program Review

Background. The Design-to-Price EW (DTPEWS) concept began in 1973 with briefings-to-industry to about 75 interested potential bidders. The Navy issued 48 bid packages, evaluated 12 meaningful responses, and funded six design studies.

In late 1974, the Navy narrowed the competition to two systems: Hughes Aircraft's SLQ-31(V) and Raytheon Electromagnetic Systems Division's SLQ-32(V). Prototypes were developed and tested over a three-year period, and in early 1977 both firms submitted cost proposals on various production quantities of DTPEWS. In February 1977, the Navy awarded the contract to Raytheon. The initial production contract called for production of 284 systems at US$180 million over a four-year period. In December 1977, Raytheon was awarded an increase to the original SLQ-32(V) contract.

In FY87, Navy RDT&E concentrated on upgrade developments, including an aircraft carrier variant and advanced capability models. The Navy resolved some electro-magnetic interference problems with the system and initiated development of an infrared measurement capability.

FY88 activities included factory acceptance testing of the SLQ-32(V)4 aircraft carrier variant and FOT&E of Low-Band over-the-horizon detection improvements to deployed systems. Continued upgrade development included completion of the Advanced Capability (ADCAP) Critical Design Review, and a block upgrade program plan was defined.

In FY89, counter-targeting and EMI improvements completed OT&E, and developmental contracts for some upgrades were awarded. DECM/Decoy Integration was tested at sea. OT&E of the CV/CVN variant was completed, and improvement activities started.

The FY90 program focused on qualifying a second-source supplier, continuing development of the aircraft carrier variant, and development and testing of a variety of upgrades to the basic systems. Plans called for completing factory acceptance of the ADCAP system and continued integration of the SLQ-32(V)4 improvements. The Navy also began a concept study of the Advanced Integrated EW System (AIEWS) follow-on to the SLQ-32(V). The new system was given the nomenclature SLY-2(V).

During FY91, the Navy completed integrating improvements to the SLQ-32(V)4 and conducted tests of the ADCAP SLQ-32(V). Plans included testing of a non-developmental Shipboard Lightweight EW System (SLEWS) to extend electronic warfare protection to vessels too small to receive the full SLQ-32(V). This program was terminated on January 6, 1992, however, before any contract action was taken.

FY92 saw the award of full-scale engineering development contracts for SLQ-32(V) Phase E threat detection improvements. The Navy also conducted a System requirement Review.

In FY93, the Navy conducted the Phase E full-scale engineering development Preliminary Design Review at a cost of US$6.3 million. Engineers concluded ADCAP (active countermeasures) FSED and conducted field tests of the improvements (US$3.7 million). The improved system would be known as the SLQ-32A(V).

In FY94, the Navy consolidated ongoing and planned programmatic efforts related to Ship Self Defense (SSD). The consolidation would facilitate effective planning and management of these efforts, exploiting the synergistic relationship inherent in each. Projects would be directed by a single program manager.

Program personnel conducted a Phase E Critical Design Review and factory tests (US$8.5 million). They also conducted ADCAP/DDI developmental and operational testing (DT/OT) at a cost of US$3.2 million. The Program Office restructured the AIEWS Phase I to include SLQ-32(V) Phase E (US$2.5 million). US$1.8 million was budgeted for AIEWS concept exploration and definition studies.

In the FY93/94 time frame, the Navy was driven by operational need and Congressional prompting to better organize and focus its surface electronic warfare efforts.

As a result, two major Program elements combined most of the activity aimed at providing better defenses for the surface Fleet. The program element covering the SLQ-32(V) was:

PE#06043775N, Ship Self-Defense: This program element became effective in FY94 and consolidated ongoing and planned programmatic efforts related to Ship Self-Defense (SSD). The consolidation was planned to facilitate effective planning and management of these efforts, exploiting the synergistic relationship inherent in each. The included projects would be directed by a single program manager in the Program Executive Office for Theater Air Defense.

FY95 plans were to complete ADCAP and complete Milestone III (US$1.8 million). From FY96 on, SSD activities were to focus on AIEWS and the Outlaw Bandit programs.

In January 1997, the Navy awarded Raytheon a contract to restore and upgrade the initial seven of an eventual 30 systems that had been removed from decommissioned ships. These units would be put into "like new" condition, including an upgrade to the baseline configuration, and installed on guided missile destroyers under construction. Both Raytheon and the Naval Surface Warfare Center would do the restoration.

In a July 1997 *Commerce Business Daily*, the Navy announced plans to negotiate a firm fixed-price contract with Raytheon for the restoration of five SLQ-32(V)2 countermeasure sets, with options for an additional four systems.

GAO Report (GAO/NSIAD-93-272). Congressional attention to the SLQ-32(V) intensified in 1993. There were complaints that the system, in spite of extensive upgrade expenditures, did not perform properly. In July 1993, the House Appropriations Defense Subcommittee urged the Secretary of Defense to consider terminating the program. The FY94 Defense Authorization Act pressured the Navy to improve its ship self-defense programs and systems.

The House Armed Services Committee was concerned about the program as well. On August 19, 1993, the General Accounting Office (GAO) published a report responding to the HASC concerns.

An unclassified version of a classified report stated, "Pursuant to a congressional request, GAO reviewed the capability of the Navy's SLQ-32(V) shipboard electronic countermeasures system."

The GAO found that:

- The Navy approved production of the SLQ-32(V) system before correcting problems disclosed in the system's initial operational tests and verifying the system's satisfactory performance.
- The Navy deployed the defective SLQ-32(V) system while it was trying to correct its deficiencies.
- The Navy was unable to maintain and support the system because it did not know which system configuration was on which ship.
- The Navy planned to acquire additional units and modifications although it had not adequately tested the system's performance.
- The Department of Defense lacked adequate internal controls over the Navy's acquisition process and had failed to verify that systematic problems had been corrected.
- The DoD relied on incomplete and inaccurate data that claimed the system was effective and suitable for deployment.

The GAO's recommendation to the Secretary of Defense was that he should impose adequate controls over the Navy's acquisition process to ensure that the SLQ-32(V) performed effectively before more systems are procured.

The GAO went on to note that through FY95, the Navy would have spent nearly US$ 2.2 billion on the SLQ-32(V) program. The report claimed that initial operational testing in 1976 showed the system to be seriously flawed, but production was begun regardless.

The specific deficiencies noted were classified. But the report said that the Navy test agency concluded that the SLQ-32(V) was effective in increasing the ability of Navy ships to defeat threat missiles. In 1977, the Navy approved production without correcting existing deficiencies so it could use available production funds and avoid a program delay. With DoD approval, the Navy awarded a four-year contract with the stipulation that production would be limited to six systems a month, pending successful completion of operational testing.

A series of tests between 1979 and 1982 showed that modifications expected to solve the SLQ-32(V)'s problems had not been successful. Nevertheless, the Navy approved full-rate production in November 1983. By then, 320 systems had been procured, 73 percent of the planned quantity through FY92.

The GAO concluded that as a result of procuring the SLQ-32(V) before demonstrating that its performance was satisfactory, the Navy equipped its ships with deficient systems and continued to develop and install modifications without properly testing them. Over the years, according to the GAO report, the Navy made over 4,200 modifications to the SLQ-32(V) at a cost of over US$1.3 billion, and had bought 15 SLQ-32(V)4 systems for aircraft carriers (13 for shipboard and two for land-based testing). The report went on to say that the Navy lost track of which configuration was installed on which ship, causing operational, logistic, and maintenance problems.

In 1977, when the SLQ-32(V) was classified as a major defense acquisition program, it became subject to DoD oversight. In 1983, the DoD had relinquished control of the effort to the Navy and never followed up to determine if reported problems had been corrected and exercised no further control over the system's acquisition.

Funding

US FUNDING

	FY98		FY99		FY00(Req)		FY01(Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
Procurement (USN)								
SLQ-32(V)	-	1.9	-	1.5	-	1.9	-	-

All US$ are in millions.

Recent Contracts

(Contracts over US$5 million.)

Contractor	Award ($ millions)	Date/Description
Raytheon	9.9	Jan 1997 – FFP contract for the restoration and upgrade of the FY97/98 SLQ-32(V)2 EW equipment for various US Naval ships. To be completed by Jan 2002. (N00024-98-C-5431)

Timetable

Month	Year	Major Development
Jan	1973	Development initiated
	1976	Initial operational testing
Feb	1977	Production approved, Raytheon initial production contract awarded
	1979	First systems installed on ships
	1979	Follow-on operational testing begun
	1982	Follow-on operational testing completed
	1983	Full-rate production approved
Oct	1987	First SIDEKICK upgrade delivered
	1988	Hughes selected as the second-source contractor for SLQ-32(V)
Sep	1988	First SLQ-32(V)4 delivered
	FY91	Operational testing of SLQ-32(V)4
	FY92	At-sea DDI testing of SLQ-32(V)3, upgrade development for SLQ-32A(V)
	FY93	ADCAP production award, AIEWS Mission Need Statement approved
Dec	1993	Lot 15 production award (possibly last)
1Q	FY94	Phase E CDR
	FY95	AIEWS Milestone I
2Q	FY95	ADCAP Milestone III
Jun	1997	SLY-2(V) AIEWS EMD award
Jan	1998	Contract to upgrade an initial seven SLQ-32(V)2 units removed from

Month	Year	Major Development
		decommissioned ships
3Q	FY01	LRIP of SLY-2(V) AIEWS
Jan	2002	Initial restorations/grades complete

Worldwide Distribution

The SLQ-32(V) is in widespread use with the **US Navy** and has limited international application. The following navies are known to field the system.

Australia. Three Perth class destroyers and six FFG-7 frigates carry SLQ-32(V)2s.
Egypt. Egypt announced plans to acquire two Knox class frigates equipped with the SLQ-32(V)2 and would consider a SIDEKICK upgrade.
Saudi Arabia. Four Badr class corvettes and nine Al Saddiq class missile fast attack craft equipped with SLQ-32(V)1s.
Taiwan. The SLQ-32(V)5 selected for the six Kwang Hua I/PFG-2 Batch I-class frigates being constructed.
Turkey. Three Perry class and eight Knox class frigates acquired. All would carry operational SLQ-32(V)2 systems, the Knox class ships having been outfitted with SIDEKICK.
United States. The **SLQ-32(V)1** equips the following ships: Austin class and Raleigh class amphibious transport docks; Whidbey Island and Anchorage class dock landing ships; Charleston class amphibious cargo ships; Kilauea class ammunition ship; Suribachi/Nitro class (not all have the system) ammunition ships; Mars class combat stores ships; Cimarron class oilers.

The **SLQ-32(V)2** equips the following ships:

Kidd class guided missile destroyer, Adams class guided missile destroyers, Spruance class destroyers, Perry class frigates, Knox class frigates, converted Raleigh class command ships, converted Austin class command ships.

The US Coast Guard will be fielding the system onboard its Hamilton/Hero class high-endurance cutters and has already equipped its famous Cutter class of medium-endurance cutters with the system.

The **SLQ-32(V)3** equips the following ships: Iowa class battleships; Virginia class guided missile cruisers; California class guided missile cruisers; Truxton class guided missile cruisers; Long Beach class guided missile cruisers; Bainbridge class guided missile cruisers; Ticonderoga class guided missile cruisers; Belknap class guided missile cruisers; Leahy class guided missile cruisers; Coontz class guided missile destroyers; Arleigh Burke class guided missile destroyers; Blue Ridge class amphibious command ships; Wasp class amphibious assault ships; Tarawa-class amphibious assault ships; Iwo Jima class amphibious assault ships; Sacramento class fast combat support ships; Supply class fast combat support ships; Wichita class replenishment oilers.

The **SLQ-32(V)4** is fielded onboard all active-service aircraft carriers.

Forecast Rationale

The SLQ-32(V) has been the standard EW system for the US surface Navy and is in limited international use. It saw combat action, primarily in the Persian Gulf. Several areas where change was needed were identified during that mission, some of which were shown to be weaknesses in earlier operational testing.

The low mounting of the antenna above the sea surface severely limits the signal's horizon, reducing the range at which the system detects incoming missiles, as well as hindering the ability of the system to detect longer range emission sources. During more than one attack during the Persian Gulf War, British EW equipment detected incoming missiles before the US SLQ-32(V) did.

The Royal Navy mounts its antennas high up on ship's masts, giving a better operational envelope than the SLQ-32(V), and therefore a few more precious seconds of attack warning. British warnings probably saved some US ships from hits by Iraqi anti-ship missiles. In addition, the SLQ-32(V) does not provide coverage straight above the ship, creating a cone of vulnerability for missiles which can home in straight down from high altitude.

Another significant problem was interference between the SLQ-32(V) and other systems on the ship. In some cases, officers have said that portions of the ECM system would have to be shut down while certain communications equipment was used. Engineering Change Proposals 469/470, the Rapid Development Program (RDP), was developed to specifically solve this problem.

The stand-alone nature of the SLQ-32(V) was a disadvantage until recently. It was not fully integrated with the overall ship command system, but this problem is being overcome by software upgrades. The Navy's new philosophy is to more fully integrate a ship's defensive systems, moving to the British concept where you "fight the whole ship," i.e., use all of the systems together so each part of the combat system complements and supports the others.

Criticism of the SLQ-32(V) on Capitol Hill and the resulting GAO report was not baseless, but critics may not have fully grasped all of the implications of their allegations and the impact of some recommendations. Some of the complaints were politically motivated, and electronic warfare systems, since the airborne self-protection jammer (ASPJ), have been favorite targets of opportunity for Congressional cuts. Operational concepts that are not readily grasped can be easily criticized.

The SLQ-32(V) is far from perfect. There are many design and employment problems, but it has been neither practical nor possible for the Navy to terminate the program, and broad-scale replacement is not possible for obvious cost and operational reasons. Combining self-defense under a common management structure, giving it priority, and supporting the effort was a major step in the right direction. Integrating a ship's systems together to operate as a unified whole shows much-needed change in tactical philosophy.

Every major ship in the US Navy must have some type of protective system. Ships considered too small for the SLQ-32(V) were to receive the Shipboard Lightweight EW System (SLEWS) being developed, but the Navy canceled that program before releasing Requests for Proposals to industry, citing a lack of funding as the primary cause. By the mid-1990s, concept development of a follow-on system, called the AIEWS (Advanced Integrated Electronic Warfare System), had begun. There was a period of uncertainty about exactly what the new system would be, with upgrades to the SLQ-32(V) being considered as the start of the effort.

The Navy finally committed itself to a plan of action. Fiscal considerations were major drivers in deciding that the best way to mount the next-generation EW system was to stop putting money into the SLQ-32(V). The Navy felt the return would be better if those funds were used to accelerate AIEWS development, combining planned phases and bringing the new capability to the Fleet one or two years earlier than originally expected.

The Navy is developing an operational requirement concept for future ships. A standard that will serve Navy needs well into the next century is being developed for introduction on the next generation of surface combatants. Naval stealth technology calls for a totally new approach to EW at sea, just as low observability is changing the way EW is used with stealthy aircraft. AIEWS will have to be specifically designed to meet the needs of the stealthy Navy of the future.

The SLQ-32(V) in its various forms is used throughout the US Fleet and in select FMS navies, supporting a major spare parts, repair activity, and upgrade program through the life of the system well into the next century. By restoring and upgrading systems that are removed from ships which are decommissioned, the need for future production is eliminated; even these will be to equip the Fleet's newest surface ship, the Arleigh Burke class destroyer.

The SLY-2(V) AIEWS may build on some existing SLQ-32(V) technology, hardware, and software, with significant improvements realized from being able to use the latest hardware and software technology. It will also benefit from being a unified design, not affected by the problem of non-standard configurations across the Fleet.

Competition from the international electronic warfare equipment industry will impact FMS procurement, especially based on SLQ-32(V) performance in the Persian Gulf. The following forecast is based on known or expected new system production.

Not all of the SLQ-32(V) systems that will be installed until the SLY-2(V) is fielded are new production. The Navy is rebuilding many systems removed from decommissioned ships, putting them in like-new condition.

Ten-Year Outlook

No further production expected.

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