

# ARCHIVED REPORT

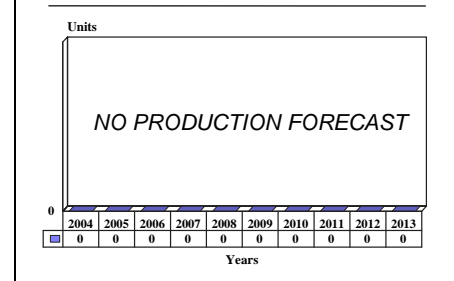
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## SLQ-25A/B (NIXIE) - Archive 7/2005

### Outlook

- Ongoing logistics support, upgrades and enhancement continue
- In use internationally
- Spiral development will lead to the WSQ-11 Tripwire Torpedo Defense System

10 Year Unit Production Forecast  
2004 - 2013



### Orientation

**Description.** Torpedo countermeasures set (noise-maker) for surface warships.

**Sponsor**

U.S. Navy  
 Naval Sea Systems Command (NAVSEA)  
 1333 Isaac Hull Avenue SE  
 Washington Navy Yard, DC 20376  
 USA  
 Tel: +1 202 781 0000  
 Web site: <http://www.navsea.navy.mil>

**Status.** In service, in production, ongoing logistics support.

**Total Produced.** Through 2003, an estimated 555 individual systems and 315 mod kits had been produced.

**Application.** Surface vessel torpedo protection.

**Price Range.** Estimated cost per unit is US\$600,000.

Price is estimated based on an analysis of contracting data and 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.

### Contractors

SenSyTech Inc., <http://www.sensytech.com>, 8419 Terminal Road, Newington, VA 22122-1430 United States,  
 Tel: +1 (703) 550-7000, Fax: +1 (703) 550-0883, Prime

### Technical Data

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
SLQ-25A (MSTRAP)		
Size	182.9 x 63.5 x 55.9 cm	72 x 25 x 22 in
Weight	1,676.4 kg	660 lb
SLQ-25A TAC		
Size	167.6 x 63.5 x 55.9 cm	66 x 25 x 22 in
Weight	386.8 kg	852 lb
Towed Pod (TB-14A)		

	<u>Metric</u>	<u>U.S.</u>
Size	15.24 x 119.4 cm	6 x 47 in
Weight	26.3 kg	58 lb
<b>Dimensions</b> (continued)		
LEAD Rocket Round Mk 12)		
Size	13 x 123.2 cm	5.125 x 48.5 in
Weight	24.9 kg	55 lb
LEAD Mortar Round (Mk 15)		
Size	13 x 119.4 cm	5.125 x 47 in
Weight	21.6 kg	47.5 lb

**Characteristics**

Units/Components	SLQ-25A Towed Acoustic Countermeasure (TAC) Multi-Sensor Torpedo Recognition and Alertment Processor (MSTRAP) Launched Expendable Acoustic Decoy (LEAD)
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**Design Features.** The SLQ-25(V) NIXIE is a towed electro-acoustic device designed to provide surface ships with countermeasures against homing torpedoes. When combined with command/display and information processing systems, the SLQ-25(V) becomes a major component of the Ship Acoustic and Torpedo Countermeasures (SATC) system.

It features a modular design that is digitally controlled, with a digital interface to other shipboard systems. The system can use either copper or fiber-optic connections shipboard, with a fiber-optic connection to the towed decoy. NIXIE detects and classifies torpedo threats, and attempts to counter the acoustic sensor or the seeker head of the torpedo by generating decoy signals that are tailored to attract the attacking torpedo, luring it away from the ship. A complex set of signal emulators can be programmed to emulate the desired acoustic signature.

NIXIE is made up of two towed devices, below-decks electronics cabinets, and control consoles. A typical installation is two winches deploying two NIXIE acoustic projectors via a cable deployed over the ship's transom. A fiber-optic strand is included in the tow cable to interface with the SLQ-25A Towed Array Sensor (TAS). It is controlled via the cable with a modular, digital control system. A single-winch version is available for ships with limited space or weight restrictions. The towed device receives the torpedo's "ping" frequency, amplifies it two or three times, and sends it back to lure the torpedo away.

The TAS detects incoming torpedoes and provides data to the Multi-Sensor Torpedo Recognition and Alertment Processor (MSTRAP). This unit performs the necessary signal processing and controls the decoys in order to detect, classify, and localize torpedoes. It also provides command and control information, target motion analysis, threat evaluation, and tactical advice to the ship's crew. MSTRAP has displays with automatic visual and audio alarms to alert the crew to a threat in

time to deploy countermeasures and perform evasive maneuvers. The MSTRAP combines inputs from hull-mounted sonars, towed arrays, sonobuoys, and the SLQ-25B TAS.

MSTRAP features an open architecture which will facilitate future enhancements, including hardware or software upgrades.

A Launched Expendable Acoustic Decoy (LEAD) can be rocket- or mortar-launched from a standard Mk 36 SRBOC launcher. The decoy performs the same function as the towed countermeasure.

RDT&E efforts are under way to develop a Tripwire Torpedo Defense System (TTDS), which will provide additional sensors for the SLQ-25A and an Anti-Torpedo (ATT) All-Up-Round (AUR) countermeasure.

**Operational Characteristics.** The towed bodies are streamed out behind the ship or launched from a standard decoy launcher. They act to detect and locate torpedoes and other acoustic targets. One towed countermeasure is operated while the other is on standby in case the first is hit by a torpedo and put out of operation. The emitted signal is intended to decoy the torpedo away from the ship, where it will explode harmlessly.

NIXIE simulates a variety of propeller and machinery noises at frequencies and modulations tailored to attract and counter specific torpedo threats. The outputs are designed to match the particular acoustic signatures of the target or create enough non-specific acoustic noise to confuse the seeker. The system provides coverage astern, normally a blind area.

The SLQ-25(V) detects and identifies acoustic sensors such as sonar and acoustic-homing torpedoes. It creates noise signals to jam the sensors, incapacitating the sonar or deflecting the homing torpedo, and alerts the system operator so the ship can take defensive and evasive actions, if needed.

The system operates unmanned except during towed body deployment.



SLQ-25A NIXIE

Source: Frequency Engineering Laboratories

## Variants/Upgrades

An improved NIXIE was fielded under an ongoing development program.

The **Phase I** upgrade added a countermeasures capability. It became operational in FY88. Starting in FY90 it was extended to all NIXIE-equipped ships.

The **Phase II** upgrade added a torpedo detection capability developed by General Electric. In FY95, this phase was expanded to combatants, the combat logistic force, and selected amphibious ships.

SLQ-25B. This upgraded version features improved deceptive countermeasures, a fiber-optic display Local Area Network, a torpedo "alertment" capability, and a towed array sensor.

WSQ-11(V). The Tripwire Torpedo Defense System. The project develops Surface Ship Torpedo Defense

capability using a spiral development approach. Through a process of upgrades to the existing SLQ-25A NIXIE, and design of torpedo detection, classification, and localization processing and an Anti-Torpedo Torpedo (ATT), the WSQ-11(V) system will be developed.

Upgrades to the SLQ-25A are being performed by the original equipment manufacturer. ATT development will be executed by ARL/PSU during preliminary design. A competitive contract will be awarded for the design completion and low-rate initial production (LRIP). The WSQ-11(V) system integration of the Tripwire and ATT subsystems will be competitively awarded following Milestone B. Contract award is planned for FY08.

## Program Review

**Background.** Initial SLQ-25(V) development was completed and the unit approved for service in 1974. It replaced the obsolete T-Mk 6 FANFARE system. The initial evaluation was completed in December 1970, with service approval granted in February 1971. Procurement of 13 systems in FY85 included Foreign Military Sales to Italy and Spain.

In 1988, the Greek Navy finalized the details of procurement for its MEKO 200 frigates to include the SLQ-25(V).

From FY88 through FY91, 421 engineering change kits were procured. An FY90 program called for changes to the towed body and power amplifiers.

In March 1997, the Naval Sea Systems Command published a notice that it planned to award a build-to-

print production contract for the SLQ-25A. A production baseline stepladder quantity of between one and 31 systems and support services, along with four one-year options of approximately 50 systems per option, was anticipated. This procurement included both the U.S. new construction and selected foreign military sales (FMS) for variants of the SLQ-25A.

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

Efforts in FY00 were focused on the development of the Anti-Torpedo Torpedo (ATT) All-Up Round (AUR), Winch and Tow upgrades, and an ATT warhead. The development of tripwire sensors and of a processor for large-deck ships and DDG-51 Flight IIA ships began in FY01.

WSQ-11(V) component Advanced Development began in FY02. Tripwire specifications were released in FY03. In FY04, officials released a Draft ORD and specifications for the WSQ-11(V).

## Funding

	<u>U. S. FUNDING</u>							
	<u>FY03</u>		<u>FY04</u>		<u>FY05 (Req)</u>		<u>FY06 (Req)</u>	
	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>
<b>RDT&amp;E (USN)</b>								
PE#0603506N Surface								
Ship Torpedo Defense	-	13.9	-	44.9	-	46.9	-	47.5

**Note:** This program funds several efforts that involve SLQ-25A NIXIE upgrades as well as development of the WSQ-11(V) Tripwire Torpedo Defense System (TDS) that will incorporate the functionality of the SLQ-25(V). It also includes development of an Anti-Torpedo Torpedo.

All US\$ are in millions.

## Recent Contracts

<u>Contractor</u>	<u>Award (US\$ millions)</u>	<u>Date/Description</u>
Sensytech	8.0	Oct 2002 – Mod to previous contract for the production, test, and delivery of an additional quantity of 14 SLQ-25A torpedo countermeasure transmitting sets and associated FMS spares. To be completed May 2005. (N00024-98-C-6111)

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1970	Evaluation completed
	1971	Initial development completed; system approved for service
	1974	Initial production
	1983	SLQ-36(V) Improved NIXIE program initiated
Dec	1987	First SLQ-25A prototypes
	FY88	Procurement of SLQ-25(V) Engineering Change Kits; first operational units installed
	1988	U.S./U.K. cooperative program announced
	FY90	SLQ-25A improvements expanded to all NIXIE-equipped ships
Mar	1997	Draft RFP for build-to-print production
	2003	SLQ-25A production ends
	2004	SLQ-25A upgrades and enhancements continue
	FY06	WSQ-11(V) contract award for WSQ-11(V)
	FY09	WSQ-11(V) LRIP

## Worldwide Distribution

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Variants of the SLQ-25A have been offered to select foreign nations as authorized by the Technology Transfer Security Assistance Review Board.

**Australia.** A contract issued in 1984 mentions FMS sales of NIXIE to Australia for its FFG-7 class frigates.

**France.** Information regarding which French Navy ships field NIXIE is not available. The French Navy adopted the NIXIE in 1980, and is studying a system for its future ASW destroyers consisting of the NIXIE, an active sonar and anti-torpedo decoys.

**Greece.** Congress was notified in 1988 of a proposed sale of four sets of equipment that included NIXIE for the Greek frigate program. The equipment was for four new MEKO 200 frigates.

**Japan.** A contract awarded in 1986 included FMS sales of NIXIE to Japan. The quantity and application are unknown.

**Portugal.** At least three SLQ-25(V) units were part of a US\$216 million FMS to Portugal. The units were to be installed on three Portuguese MEKO 200 frigates.

**Republic of Korea.** A contract issued in 1984 included NIXIE sales to the RoK under the FMS program, possibly for its Ulsan class frigates.

**Spain.** The *Principe de Asturias* aircraft carrier carries two NIXIEs. The Spanish FFG-7s reportedly carry the NIXIE.

**Turkey.** Carries the SLQ-25(V) on its Perry class guided missile frigates.

**U.S.** The following U.S. Navy ships are *known* to carry the SLQ-25(V); others probably have received the system but are still listed as having the T-Mk 6 in various inventories:

Cruisers: CG-47 Ticonderoga class; CGN-38 Virginia class  
 Destroyers: DDG-51 Arleigh Burke class; DDG-993 Kidd class; DD-963 Spruance class  
 Frigates: FFG-7 Oliver Hazard Perry class  
 Amphibious: LHD-1 Wasp class  
 Oilers: T-AO class

## Forecast Rationale

Although there is significant interest in protecting ships from anti-ship missiles, torpedo defense continues to be important. Third World nations have been procuring advanced anti-ship missiles, making protection from new sea-skimming missile threats a priority that often overshadows new anti-torpedo developments. As the combat arena moves to the littoral environment, open-sea protection/torpedoes becomes less of a focus than the new, developing threat.

The SLQ-25(V) NIXIE has been backfitted to many of the major combatant vessels in the U.S. Fleet. The export market is concentrated in the NATO countries and other allies; but competition and budget constraints are limiting the total FMS units procured.

The United States and the United Kingdom signed a Memorandum of Understanding in October 1988 setting up a cooperative program (under the Nunn Amendment initiative) to develop a new anti-torpedo system for both navies, with matching funds from each nation. The

program addressed counters to wake-homing torpedoes, since they do not use engine noise for targeting in the terminal phase, but rather turbulence generated by the ship's wake.

It is uncertain how many ships transferred to foreign navies had NIXIE transferred with them. U.S. ships use distinctive stern ports for deploying the system, while many other users deploy the system over the side. This makes it impossible to determine if a particular ship carries, or has carried, the system.

Project 0225/2854 develops Tripwire WSQ-11(V) Torpedo Defense System (TDS) which will provide the Tripwire towed sensors and processors to detect threat torpedo and provide launch orders for associated Anti-Torpedo Torpedo (ATT) All-Up-Round (AUR) countermeasure. The WSQ-11(V) TDS will incorporate the functionality of the SLQ-25A (NIXIE) Towed Torpedo Countermeasure. The WSQ-11(V) is planned for installation on large deck ships, i.e. CVN,

amphibious (LHA, LHD, LPD, LSD, AGF, LCC)/Combatant Logistic Forces (AOE), and selected DDG-51 Class ships without towed array.

complex salvo Block III capability is planned for FY13 fleet introduction. The WSQ-11(V) TDS is closely linked with the ONR FNC program (Platform Protection and Littoral ASW) which provides advance technology inserts at key transition points in the WSQ-11(V) schedule.

The WSQ-11(V) is planned for fleet introduction in FY11 with a Block II (simple salvo) capability. A

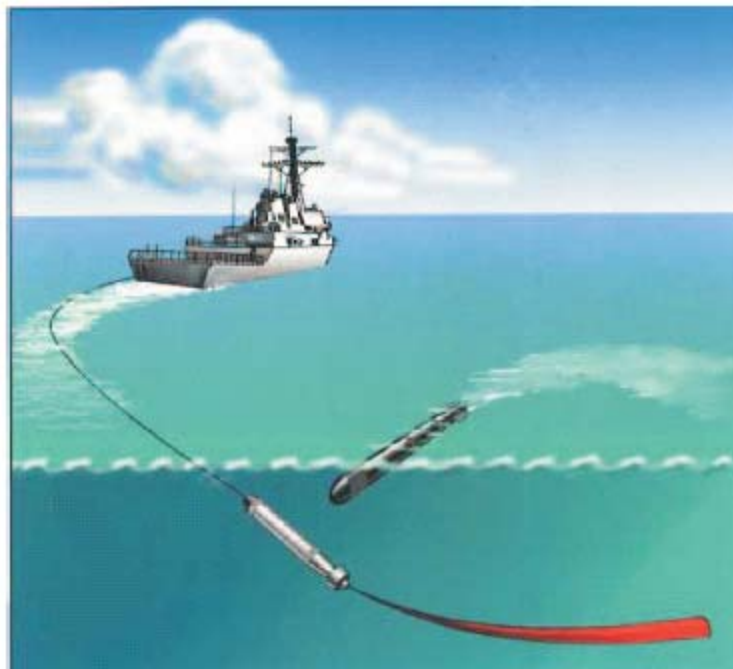
## Ten-Year Outlook

No further production expected.

### Follow-on Program Schedule

	FY03	FY04	FY05	FY06	FY07	FY08	FY09
<b>AN/WSQ-11 System</b>		Draft ORD ▲ WSQ-11 Spec	▲ CDD	MSB ▲ WSQ-11 Prime Contract Award	SD&D Phase ▲ PDR    ▲ DRR ▲ ST-1    ▲ ST-2    ▲ ST-3		LRIP ▲ ST-4    ▲ ST-5
<b>Tripwire</b>	▲ Spec Development	DCL Demo Phase ▲ Demo Contract Award		▲ Demo Trial	EDM Build and Testing (2) ▲ TT-1    ▲ TT-2    ▲ TT-3 Software V 1.0 Complete    Software V 2.0 Complete		(2) LRIP ▲ TT-4    ▲ Software V 3.0 Complete
<b>Anti-Torpedo Torpedo</b>	▲ Spec	ADM Component Build and Testing (8) ▲ CT-1		▲ CT-2    ▲ CT-3	EDM Build and Testing (17) ▲ CT-4    ▲ CT-5    ▲ CT-6		LRIP ▲ CT-7

Source: U.S. Navy



Torpedo Protection Concept

Source: SensyTech