

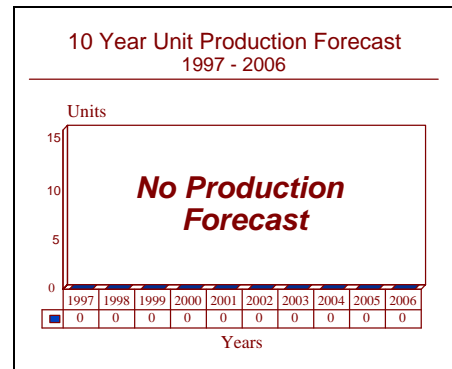
# ARCHIVED REPORT

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## SSQ-77(V) - Archived 11/98

### Outlook

- Hughes acquired Magnavox in December 1995
- Last known contract ended in 1995
- No further production expected due to large inventory stockpile
- This report will be archived next year, 1998



### Orientation

**Description.** The SSQ-77(V) VLAD (Vertical Line Array DIFAR) is a passive tactical search and surveillance sonobuoy.

#### Sponsor

US Navy  
Naval Air Systems Command  
Arlington, Virginia (VA) USA  
(Program Manager)

#### Contractors

Hughes Aircraft Co  
Hughes Defense Communications  
(formerly Magnavox Electronic Systems Co)  
1313 Production Road  
Fort Wayne, Indiana (IN) 46808  
USA  
Tel: +1 219 429 6000  
Telex: 023 2695  
(Prime Contractor Production)

#### Sparton Corp

Electronics Division  
PO Box 788  
Deleon Springs, Florida (FL) 32130  
USA  
Tel: +1 904 985 4631  
Fax: +1 904 985 5036  
(Prime Contractor Production)

Hermes Electronics Ltd  
40 Atlantics Street  
Dartmouth, Nova Scotia  
Canada  
Tel: +1 902 466 7491  
(Second Source)

**Status.** The SSQ-77A and SSQ-77B are both in service but no longer believed to be in production.

**Total Produced.** It is estimated that 199,595 SSQ-77B sonobuoys have been produced and delivered by the end of 1995. No additional SSQ-77A units are believed to have been manufactured since that date.

**Platform.** P-3C Orion, S-3A/B Viking ASW aircraft; SH-2 Sea Sprite LAMPS I, SH-3 Sea King, SH-60B Seahawk LAMPS III, SH-60F ASW helicopters.

**Application.** To improve the detection and tracking capability for the Directional Frequency and Recording (DIFAR) system in a noisy, high-traffic environment.

**Price Range.** The price is estimated to be between US\$650 and US\$700 per unit (in FY92 US dollars based on contract cost averaging).

## Technical Data

### Physical Characteristics

Type:	
DIFAR with VLA Omni	
SSQ-77A Weight:	23 lb (10.4 kg)
SSQ-77B Weight:	25 lb (11.3 kg)
Sonobuoy Launch Container Compatible:	LAU-126/A
Launch Altitude:	0 to 3,000 ft
Launch Speed:	0-370 knots

### Engineering Data

Transmitter Power Output:	1 Watt Minimum
Operating Frequency:	99 Selectable Channels (136.000 to 173.5 MHz)
Transmitter Frequency Stability:	+/- 25 KHz
Frequency Modulation:	0 to 105 KHz Deviation
Multiplexed Composite Consisting of:	
Beam Formed Omni	Direct Summation
Directional Data (two channels)	Suppressed Carrier Quadrature Modulated on Subcarriers
Frequency Reference Pilot	Direct Summation
Phased Reference Pilot	Direct Summation
Harmonic Distortion	10 Percent Maximum
Modulation Asymmetry	20 Percent at 75 KHz Deviation
Operating Life:	Selectable 1, 4, or 8 Hours
Hydrophone:	Multi-Channel (Piezoelectric Ceramic)
Shelf Life:	5 Years in Sealed Container
Unpacked Storage Life:	90 Days (Minimum)
Selections	
Life and RF Channel:	Electronic Function Select

The SSQ-77 VLAD is a passive, tactical search and surveillance sonobuoy designed to improve detection and tracking capability for the DIFAR system in a noisy, high-traffic environment. The SSQ-77 uses a vertical line array of omni-directional hydrophones in place of the single omni-directional hydrophone used in the standard DIFAR unit. A directional DIFAR hydrophone mounted at the array phase center provides target bearing data. The signal format of the SSQ-77 sonobuoy is identical to that for the SSQ-53 and is compatible with the AQA-7 processor and the Sparton TD-1135/A demultiplexer/processor/display. All beam-forming functions are accomplished within the sonobuoy, with provisions for sea noise equalization and omni-directional phase tracking.

The SSQ-77 may be dropped from an aircraft at airspeeds of 0 to 380 knots and at altitudes up to 3,000 feet. A parachute slows the descent. An internal micro-processor selects the desired RF channel and sonobuoy life span. An LED display in the aircraft verifies these settings. Lithium batteries are activated upon entry into the water. These detonate a squib, causing gas filled cylinders to inflate the sonobuoy flotation bag and begin deployment. This provides a pressure force, releasing a plate in the top of the sonobuoy, causing the parachute to be jettisoned, and the surface assembly to rise and separate from the sonobuoy housing. The sonobuoy housing then descends and separates from the subsurface assembly at the operating depth. Though the depth is classified, it has been speculated that it operates at a depth of 1,000 feet.

## Variants/Upgrades

The latest version, SSQ-77B, has several improvements over its predecessor including multiple-depth settings, horizontal and vertical beam selection, and an increased

number of omnidirectional hydrophones in the vertical line array. All the most recent contracts have been for either modification kits or the new B version.

## Program Review

**Background.** The Navy received US\$4.8 million in FY76 for the procurement of nearly 2,000 Service Test Models (STMs) of the SSQ-77 for OPEVAL in FY78. Service approval was to have been granted by the end of FY78, with the first production procurement expected in FY79 (US\$7.3 million for 4,000 units). The Navy asked six electronic firms for bids on two Dwarf sonobuoy procurements in the SSQ-77 and SSQ-79 configurations. The six companies were Hazeltine, Hermes Electronics, Magnavox, Raytheon, Sanders Associates and Sparton Electronics.

Sparton won a US\$45,000 miniaturization study award, over Magnavox and Hazeltine. The other three companies did not make a bid. The SSQ-77 started OPEVAL (operational evaluation) in FY79. In FY80, Hazeltine was awarded a US\$3.5 million fixed-price contract to produce 615 SSQ-77s. The House Appropriations Committee recommended the deletion of FY81 procurement funding for the SSQ-77 VLAD sonobuoy. Because of past reliability problems, contract and delivery delays, and first article acceptance testing not being completed until late FY81, the Committee believed that no further production contracts should be given. It also believed that competitive bidding would result in a more rapid lowering of costs for the SSQ-77.

Through FY81, Hazeltine received US\$16.7 million for SSQ-77 development and production. Between FY82 and FY84, Hazeltine received a total of US\$4.1 million

for 1,610 SSQ-77s; Magnavox, US\$44.8 million for 40,090 SSQ-77s; and Sparton, US\$61.4 million for 87,664 units. Hazeltine gave its SSQ-77 production contract to Sippican Ocean Systems in FY84, saying that continued SSQ-77 production no longer fit its business strategy. The Navy received US\$60.2 million for 98,800 sonobuoys in FY87. The FY87 budget request postulated a request for US\$70.3 million for 81,200 sonobuoys in FY88, but the FY88/FY89 budget request showed a large drop. The service asked for and received US\$33.4 million for 51,600 SSQ-77s in FY88 and planned to ask for US\$24.5 million for 34,800 sonobuoys in FY89. The major drop was due to an excess inventory from previous years and a need to cut the budget.

The market for the SSQ-77 picked up in the early 1990 with the introduction of the SSQ-77B version. Both Magnavox and Sparton did well with contracts as prime contractors. Hermes Electronics Ltd, of Nova Scotia, Canada became a second source. The total number of SSQ-77B sonobuoys procured from July 1991 through June 1995 (the completion date of the last known contract) is approximately 199,595 units.

Hughes acquires Magnavox. In December 1995, Hughes Aircraft Co. Acquired Magnavox Electronic Systems Co in order to add breath and depth to Hughes' position in the defense electronics market. Magnavox was in turn renamed Hughes Defense Communications.

## Funding

The last known production run was completed by the end of 1995. No further procurement is expected.

## Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Sparton	7.8	Jul 1991 — Modification of 13,815 SSQ-77B sonobuoys (N00163-90-C-0140)
Sparton	30.5	Mar 1992 — FFP to provide 44,904 SSQ-77B sonobuoys (N00163-92-C-0077)
Magnavox	28.1	Mar 1992 — FFP to provide 40,234 SSQ-77B sonobuoys (N00163-92-C-0078)
Magnavox	24.2	Mar 1993 — FFP to provide 62,470 SSQ-77B sonobuoys (N00163-92-C-0087)
Magnavox	9.9	Mar 1993 — FFP to provide 26,478 SSQ-77B sonobuoys (N00163-92-C-0089)
Magnavox	5.6	Jul 1993 — FFP mod for 11,694 SSQ-77B sonobuoys (N00163-93-C-0087)

## Timetable

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FY77	Design work performed
FY78	First production contract awarded
	Navy solicited bids on dual-procurement Dwarf sonobuoys
FY81	Initial production bids awarded to Hazeltine, Magnavox and Sparton
FY90	SSQ-77B entered production
1995	Last ordered production completed

## Worldwide Distribution

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The **US Navy** is the only know user of the SSQ-77A/Bs.

## Forecast Rationale

The SSQ-77B Vertical Line Array DIFAR (VLAD) sonobuoy is currently in operational service with the US Navy. Production from the last known contract ended in 1995. No additional orders have been announced. Budget documents for FY95 showed funding requests for procurement stretching out into the late 1990s, but budget documents from FY96 onward no longer list the SSQ-77B. The last year funded appears to have been FY93.

Although the SSQ-77B is an efficient, inexpensive, and expendable sonobuoy, the US Navy has an extremely large inventory, nearly 200,000 of them. Even with a somewhat limited shelf-life, the Navy probably figures it has more than enough to meet its needs. Besides, the Navy has several other types of sonobuoys still in production that it can draw from should there be an emergency. Also, the reduction in fleet size alone has already increased the number of sonobuoys available per ship to a more than generous number.

Still, it does come as a bit of a surprise that the Navy did not even maintain a minimum procurement throughout the years to at least keep the assembly line open for this rather inexpensive product. Whether used or not, sonobuoy batteries have a limited life-span. The last round of SSQ-77B procurements were all made within a few years of each other, which means they will all be going bad within a short time of one another with the risk of leaving a void in the sonobuoy inventory.

There has been no announcement of any further production contracts SSQ-77(V) being awarded. With the large inventory the US Navy has of various existing sonobuoys in addition to the SSQ-77B, it is now unlikely that there will be further procurement of this sonobuoy unless some conflict flares and the Navy needs to restock.

## Ten-Year Outlook

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Production has been completed. No further production is foreseen at this time; this report will be archived next year, 1998.

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