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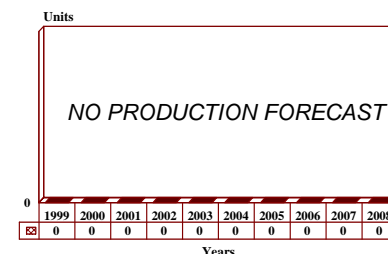
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ARR-78(V) - Archived 01/2000

Outlook

- Production for US Navy P-3C Update III and S-3A Block Upgrade complete
- No publicized contracts for exports since early 1990s
- **Barring news of sales or concrete interest, this report will be archived in 2000**

10 Year Unit Production Forecast
1999-2008



Orientation

Description. Advanced Sonobuoy Communications Link (ASCL).

Sponsor

US Navy

Naval Air Systems Command (NAVAIR)
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USA
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Contractors

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USA
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Status. In service; production presumed complete.

Total Produced. An estimated 333 systems were produced through 1996.

Application. P-3C and S-3B aircraft are the only known platforms, although a variant intended for ASW helicopters was developed.

Price Range. The average of the last two identified contracts, dating from 1991 and 1992, indicate a per-unit price of approximately US\$450,000 (dollars unadjusted for inflation).

Technical Data

Design Features. The ARR-78(V) radio receiving set, also known as the Advanced Sonobuoy Communications Link (ASCL), is designed for the operation and management of anti-submarine sonobuoys by the crew of ASW aircraft. The complete system typically con-

sists of a preamplifier, AM-6875, that weighs 2.1 pounds (0.95 kg); a receiver, R-2033 for the P-3C and R-2066 for the S-3B, weighing 101 pounds (45.9 kg); an indicator control unit, C-1 01 26, weighing 6.6 pounds (3.0 kg); a receiver status indicator, ID-2086,

weighing 4.2 pounds (1.9 kg); and a receiver control, C-1 01 27, weighing 1.3 pounds (0.6 kg).

The receiver features a modular design that includes 20 modules: 16 acoustic processing modules, an Automatic Direction Finding (ADF) module, a clock generator, and a power-supply module, among others. The P-3C application uses two ARR-78(V) receivers in a 32-acoustic-channel expansion configuration known as CHEX.

Operational Characteristics. The ASCL incorporates two features not previously found in sonobuoy signal processors: it is capable of receiving 99 sonobuoy VHF channels, and is the first unit to be fully computer-controlled, using a microprocessor control unit. This

increases the system's capabilities without increasing operator workload. The ADF module also provides direction information without the need of a separate direction-finding system.

The ARR-78(V) system includes an automatic diagnostic feature that permits the system to determine up to 96 percent of all system malfunctions, and to identify the faulty circuit in 99 percent of these instances. The self-test feature can be activated by the aircraft's central computer – the AYK-14 – or commanded manually by the operator. The system can operate at an altitude of up to 30,000 feet (9,144 meters), with a shock tolerance of 15 G. Its temperature range is -40°C to +55°C, and 71°C for 30 minutes.

Variants/Upgrades

ARR-78(V)1. This variant equips P-3C Update III aircraft.

ARR-78(V)2. This variant equips S-3B aircraft.

Helicopter Variant. This version of the ASCL is based on existing production-qualified receiver modules used in the ARR-78(V)1, and two receivers produced for, and installed in, the P-3C and S-3B ASW aircraft. It consists of four 99-channel receiving modules, and significantly expands a helicopter's ASW ability to process present and future advanced sonobuoy signals.

Each receiver channel is easily commanded to any frequency in the current and planned sonobuoy bands. Demodulated outputs are fully compatible with current ASW signal processors, and are easily adaptable to new computer processors. It is capable of simultaneous signal reception from four sonobuoys. The receiver configuration is compatible with all ASW helicopter platforms.

ASCL Plus. This enhancement expands the number of acoustic channels per system from 20 to 40.

Program Review

Background. In October 1977, Hazeltine was awarded US\$994,000 for design and development of the AAR-78, an improved ASCL intended to replace the previous AAR-76. The following year, the US Navy awarded another US\$1.6 million contract for continued fabrication and testing of engineering development models (EDM) of the ASCL systems for P-3C Orion aircraft. The AAR-78 was approved for limited production in December 1983, and the US Navy received the first sets in January 1984.

Under the direction of the House Appropriations Committee, the US Navy was tasked to develop a plan, by the end of July 1988, that would combine all ARR-78 sonobuoy receiver requirements. To achieve this goal, the service was to request sufficient funding to buy out the program at an economical rate of at least five receivers a month beginning in FY90. The US Navy told Congress that ARR-78 receivers had exhibited exceptional reliability, and that production prices had decreased approximately 30 percent over time as delivery rates grew.

S-3B Update. In 1983, Lockheed received a US\$187 million contract to integrate new avionics in the S-3A. The first two modified S-3As, redesignated S-3Bs, were delivered to the Navy in 1985. In 1986, the Navy initiated the S-3A Block Update, Phase I, to bring the remaining 160 S-3A aircraft up to the S-3B configuration. This activity was also known as the Weapon System Improvement Program (WSIP).

Through late 1994, a total of 97 S-3 WSIP conversions were completed. The reduction from the previously planned 160 was due to the transfer of several S-3As to the Navy's ES-3A electronic reconnaissance aircraft conversion program. The last eight S-3B conversions were funded in FY92.

P-3 Update. The US Navy P-3 research and development efforts are carried out primarily under the P-3 Modernization Program (PE#0604221N). This program emphasizes the P-3 Sensor Integration projects (H1152 and H2417), which develop software necessary to integrate advanced sensors into P-3C Update III computer systems. The Update III upgrade installed the

ARR-78(V) into 104 aircraft (two receivers per aircraft) by FY96, ending the ASCL's involvement in the program. Remaining Update III efforts are expected to be completed in 1999.

Funding

Funding was formerly included in the RDT&E Program Element Descriptive Summaries for the S-3B (PE#0604217N, S-3 Weapon System Improvement) and P-3 (PE#0604221N, P-3 Modernization) upgrade programs. However, it no longer figures in these programs.

Recent Contracts

The following are the last two contracts noted for the AAR-78(V):

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Hazeltine	35.6	July 1991 – Exercise of an option to an FFP contract for the procurement of 79 ARR-78(V) Advanced Sonobuoy Communications Link Systems for the P-3 and the S-3 for the US Navy, and one replacement set for Norway. Completion date was Dec 1993. (N00019-86-C- 0256)
Hazeltine	5.1	March 1992 – Modification to FFP contract for the additional procurement of ARR-78(V) Advanced Sonobuoy Communications Link Systems for the US Navy P-3 and S-3, bringing the total contract order to 91 systems. Included in the total contract are eight systems and two replacement sets for South Korea's P-3C, plus the one replacement for Norway. Completion date was Aug 1993. (N00019-86-0256)

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Oct	1977	Design/development contract for ARR-78 awarded
Aug	1982	ARR-78(V) Operational Test and Evaluation (OT&E) completed
Sep	1982	Hazeltine began S-3B feasibility studies
Dec	1983	ARR-78(V) approved for limited production
Jan	1984	First ARR-78(V) sets delivered to US Navy
Mid	1984	Deliveries of new-production Update III Orions began
Sep	1984	First flight of S-3B prototype
Jan	1988	First S-3B conversion kits delivered
Late	1994	S-3 Block Upgrade I conversions completed
FY	1996	Inclusion of ARR-78(V) in P-3 Update III retrofits completed

Worldwide Distribution

The ARR-78(V) is in service with the **US Navy** aboard the S-3B and P-3C Update III aircraft, and with **Norway** and **South Korea** on their P-3C aircraft. Deliveries to **Australia** and **Japan** have also been reported, but these could not be verified and are not included in the production total provided at the beginning of this report.

Forecast Rationale

The P-3C Update III upgrade installed the ARR-78(V) into 104 aircraft (two receivers per aircraft) by FY96. The ARR-78(V) is also carried on the S-3B (one receiver per aircraft), where it was installed as part of the Viking conversion program for existing S-3As by 1994. Originally, the Navy planned to modify roughly 160 S-3A aircraft, but reduced this number to 97 after transferring several aircraft to the ES-3A program.

With the role of the ARR-78 in both upgrade efforts completed, a future production requirement is not foreseen for the unit. The ARR-78 has served the US Navy well, but a combination of factors – including force downsizing and technology advancement – has

reduced the need for new systems. Although a market for additional exports has been a possibility for the Orion upgrade programs of nations such as Australia, no Foreign Military Sales contracts have been confirmed since the early 1990s.

The ARR-78(V) program is expected to be limited to maintenance and repair activities. Retrofits to the ASCL Plus configuration are a possibility, but again, no contract activity has been identified. This report has been reissued to incorporate updated technical information, but will be archived next year (2000) unless substantial new information surfaces.

Ten-Year Outlook

No further production is expected.

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