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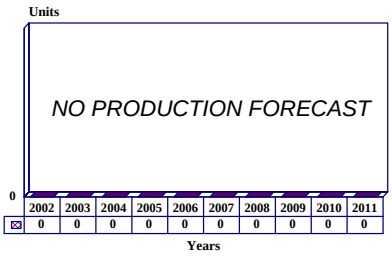
UYS-1(V) - Archived 04/2003

Outlook

- Last production unit delivered in 1996
- Enhanced Modular Signal Processor (EMSP) has begun replacing the UYS-1
- Barring any further activity, this report will be archived in the near future

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. The UYS-1(V) was the US Navy's standard advanced signal processor (ASP).

Sponsor

US Navy
Naval Sea Systems Command
Washington, DC
USA

Naval Air Systems Command
Washington, DC
USA

Contractors

Lockheed Martin Corp
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(Prime: development/production)

Raytheon Co
600 2nd Street NE
Hopkins, Minnesota (MN) 55343
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Tel: +1 612 931 6000
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Web site: www.raytheon.com
(Second-source producer of the UYS-1(V) high-volume modules)

Licensees. A manufacturing license agreement (MLA) between Lockheed Martin and NEC Corporation-Tokyo was reached in 1989. MLA permits the licensed production of the UYS-1 and USQ-78 acoustic processing suite in Japan. This license is valid through 2004.

Status. In service.

Total Produced. About 1,895 systems had been produced through the end of 2001.

Application. Various surface ship and submarine applications, as well as some anti-submarine warfare (ASW) aircraft.

Price Range. Approximately US$500,000 to US$600,000 per unit (in FY93 US dollars based on contract cost averaging).

Technical Data

Characteristics

Power requirements	1,300 watts
Raw throughput (million OPS/sec)	60 MOPS
Sonobuoy capacity (DIFAR)	5
Reliability (predicted MTBF)	1,000 hr
Computing precision	16-bit fixed point
Programmability	Assembly language
Technology	Small-scale IC 64 kilobit mem ICs
Unique card type	31

Design Features. The UYS-1(V) is the US Navy's first standard acoustic signal processor and can handle analog or digital sensor inputs at a 20-million-operations-per-second computational speed. The six main elements of the UYS-1(V) include: a 32-bit special-purpose arithmetic processor, a 32-bit general-purpose computer control processor, input/output channels, a bulk storage module with 1,024K 32-bit words in 128K increments, a storage controller, and an input signal conditioner or high-speed port.

Originally designed under the code name Proteus, the UYS-1(V) has, according to US Navy sources, three times the computer memory capacity of older systems.

The entire system utilizes three modules to analyze, process and display data. The P-3C application uses all three modules, while the LAMPS Mk III helicopter and surface vessels integrate the ASP with a standard airborne computer (AYK-14) or tactical computer (UYK-20), respectively. The UYS-1(V) is also being used in conjunction with the primary sonar system for attack submarines, the BQQ-5(V).

In applications such as the BSY-1(V) submarine combat system and the SURTASS (Surveillance Towed Array Sonar), three UYS-1s are combined to form the TRIASP configuration.

Operational Characteristics. The US Navy has fielded the UYS-1(V) Proteus Single Advanced Signal Processor (SASP) in order to enhance its ability to detect submarines and analyze signals collected by a variety of Acoustic 778 sensors. For aircraft operations, the UYS-1(V) uses signals from sonobuoys. Surface vessels and submarines use an array of towed or hull-mounted acoustic sensors integrated with the ASP.

Variants/Upgrades

Lockheed Martin Federal Systems (formerly Loral Federal Systems which was originally IBM Federal Systems) has offered a wide variety of upgraded versions of the UYS-1, including the SEM-B. The SEM-B was a potential contender for replacing at least part of the UYS-2 enhanced modular signal processor (EMSP) requirement, but the US Navy has not taken Lockheed Martin up on any of the variants. The SEM-B UYS-1 that Lockheed Martin was offering was said to be available in two versions: one that included a Very High Speed Integrated Circuit (VHSIC) in the input signal conditioner and one that used four VHSIC processing engines instead of the regular two conventional engines.

Program Review

Background. The UYS-1(V), was designed in the mid-1970s, and has been the US Navy's standard signal processor for over 10 years.

Early in 1978, Lockheed began development of Update III, aimed at improving the P-3C's anti-submarine warfare (ASW) capabilities. This model incorporated an Advanced Sonobuoy Communications Link (ASCL), an Adaptive Controlled Phased Array (ACPA) and the UYS-1(V). By combining these items, the new model had reception of up to 99 different radio frequencies, as opposed to the previous system which was capable of receiving only 31 frequencies.

Lockheed finished its evaluation and flight tests of the P-3C aircraft equipped with the Update III system in 1983, and deliveries of production-standard Update P-3Cs began in 1984.

By 1985, the US Navy had started a phased modification of the 160 S-3A Vikings to S-3Bs. Under

the conversion, performed by Lockheed Corp under a contract totaling nearly US$20 million, an improved avionics suite was installed, including the UYS-1(V) Advanced Signal Processor. The UYS-1(V) ASP replaced the Lockheed Sanders OL-82 system. While no major airframe modifications were required, significant redesign of the internal avionics bay was necessary in order to install the UYS-1(V). The program was completed in 1994.

In 1989, a manufacturing license agreement (MLA) was reached between Lockheed Martin and NEC Corporation-Tokyo, Japan. The MLA, which is valid through 2004, permits the licensed production of the UYS-1 and USQ-78 acoustic processing suite in Japan. When complete, NEC is expected to have outfitted 80 P-3C aircraft with these systems for the Japan Defense Agency.

An RDT&E effort related to the UYS-1(V) was the development of ASP Common Operational Support System (ACOS) software tools to reduce coding and maintenance costs. ACOS enables the UYS-1(V) to be programmed using the Signal Processing Graph Notation (SPGN) methods demonstrated in the UYS-2(V) EMSP Common Operating System (ECOS) project. The ACOS project was completed in FY91 and funded under US Navy PE#0604507N US Navy Standard Signal Processor. The last known contract for the UYS-1(V) system was reportedly completed in January 1998.

Funding

Specific line-item funding not available.

Recent Contracts

Contractor	Award ($ millions)	Date/Description
IBM	25.0	May 1993 – FFP for 46 UYS-1(V) systems and related engineering support services. (N00024-93-C-6352)
Lockheed Martin	6.3	Jan 1997 – CPFF contract for the PMS 428 US Navy Signal Processor Program Office to provide technical, engineering management, repair and refurbishment services in support of the UYS-1(V) spectrum analyzer and commercial insertion efforts. This contract contains options which, if exercised, would bring the cumulative value of the contract to US$19 million. (N00024-97-C-6368)

Timetable

Month	Year	Major Development
Mid	1970s	Development of UYS-1(V) begun
	1981	UYS-1 enters low-level production
	1985	Dual UYS-1(V) incorporated in Surveillance Towed Array Sensor; advanced sonobuoy software development continues; S-3B conversions begin, with delivery of first in October 1985
	1987	Honeywell selected as second source for UYS-1(V) modules
	1988	IBM begins offering two upgraded versions of the UYS-1(V)
	1996	Lockheed Martin Federal Systems starts to make a UYS-1 retrofit upgrade called UYS-1A using commercial off-the-shelf (COTS) technology
	1999	UYS-1(V) production line transitions to spares production

Worldwide Distribution

The UYS-1 is primarily a **US Navy** system; however, it has been sold to selected nations using US platforms. Furthermore, as the UYS-1 begins to age and become too obsolete for the US Navy, it will likely begin to appear more internationally.

Ship and Submarine Applications: The UYS-1(V) ship and submarine applications include the BQQ-5 Expanded DIFAR, the Surveillance Towed Array Sensor System (SURTASS), the SQQ-89 Surface ASW Combat System, the BSY-1(V) Submarine Combat System and the mobile ground versions for the US Air Force. BSY-1(V) elements include the Tri-Advanced Signal Processors (TRIASPs), which are three UYS-1(V)s working in concert. The SURTASS system also fields a TRIASP configuration.

Installations: The UYS-1(V) has been installed in the S-3B conversion program and the P-3C Update III upgrade program.

Forecast Rationale

The UYS-1 is an advanced signal processor developed for repetitive and intense processing of sensor signals. Initially used on US Navy airborne anti-submarine warfare platforms, the UYS has been also employed as a signal processor for surface ships, submarines, vehicles and trainers. The UYS-1(V) applications include the BQQ-5 Expanded DIFAR, the Surveillance Towed Array Sensor System (SURTASS), the SQQ-89 Surface ASW Combat System, and the BSY-1(V) Submarine Combat System.

In order to keep pace with improving technology, the UYS-1 underwent a number of upgrades. However, after almost 30 years of service, UYS-1 is no longer capable of competing with more modern systems. A newer processor, the UYS-2 Enhanced Modular Signal Processor (EMSP), has begun replacing the UYS-1. Since the late 1990s, the EMSP has been installed on several US naval platforms The last production unit of the UYS-1 is believed to have been delivered in 1996. During its production life, approximately 1895 UYS-1 signal processors were purchased. The most recent US Navy contract, which provided repair and refurbishment services, has been completed. Except for possible maintenance contracts, no further production activity is expected for the UYS-1 signal processor. Barring any new contracts, this report will be archived in the near future.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Designation	**Application**	**Thru 01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**Total 02-11**
UYS-1(V)	Prior Prod'n:	1895	0	0	0	0	0	0	0	0	0	0	0