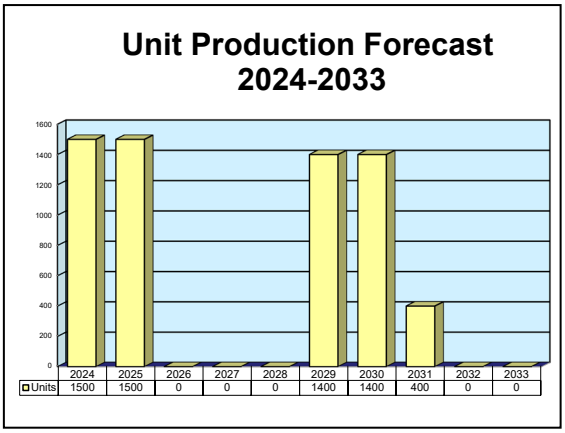
SSQ-110(V) Sonobuoy

Outlook

- Joint venture ERAPSCO dissolved
- Replenishment contracts ongoing under individual company brands
- Look for rise in ASW R&D funding
- China steps up undersea warfare capabilities
- Russia increases submarine activity in Arctic Ocean



Orientation

Description. The SSQ-110(V) is an expendable, extended echo ranging (EER), active-source sonobuoy, available in several variants.

Sponsor

U.S. Navy
Naval Air Warfare Center
Aircraft Division
Indianapolis, IN USA

Status. In operational service.

Application. Anti-submarine warfare (ASW). The SSQ-110 and SSQ-110A operate with the P-3C Update III aircraft. The SH-60B, SH-2G, and SH-60F upgrade helicopters are also considered potential operating platforms.

Price Range. Based on contract cost averaging, the unit cost of the SSQ-110A has been estimated to be roughly $1,452 (in June 2024 dollars).

Contractors

Prime

Sparton Corp, an Elbit Systems of America Company	http://www.sparton.com, 5612 Johnson Lake Rd, De Leon Springs, FL 32130 United States, Tel: + 1 (386) 985-4631, Prime
Ultra USSI, Ultra Maritime	http://www.ultra.group, 4578 E Park 30 Dr, Columbia City, IN 46725-8869 United States, Tel: + 1 (260) 248-3500, Fax: + 1 (260) 248-3510, Email: sales@ultra-ussi.com, Prime

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

SSQ-110(V) Sonobuoy

Technical Data

Specifications	SSQ-110A	SSQ-110B
Size	A	A
Weight	16.4 kg (36 lb)	16.4 kg (36 lb)
Depths	2 depths	3 depths
Channels	96	96
Life (hr)	6 +/- 1	6 +/- 1
RF Link	A	A
RF Power	0.5 W	0.5 W

Design Features. The air-launched sonobuoy is deployed from both fixed-wing aircraft and helicopters; it transmits data back to the platform by way of radio transmission. Some sonobuoys can be deployed from surface ships. Most sonobuoys in service are the A size (4.875 in x 36 in), which allows the units to fit the buoy ejector on most aircraft. In addition to the standard size, some specialized units have been developed; the B size (6.875 in x 60 in) and the C size (9 in x 60 in) were developed for use by the U.K. and several other nations. Each sonobuoy in the same area is assigned an operating frequency so as not to interfere with one another. A typical sonobuoy is assigned a specific channel from among, depending on variant, 31 or 99 channels.

Sonobuoys can be passive, active, or a combination of both. A passive sonobuoy transmits all sound, including sea noise, back to the platform. Active sonobuoys function in a similar manner to active sonar in that they send out a signal that is returned and then transmitted to the platform. The main advantage of the active unit is that there is less sea noise in the signal. Sonobuoys are either directional or omnidirectional in nature. A directional sonobuoy picks up sound in one direction, whereas the omnidirectional sonobuoy picks up sound from all directions.

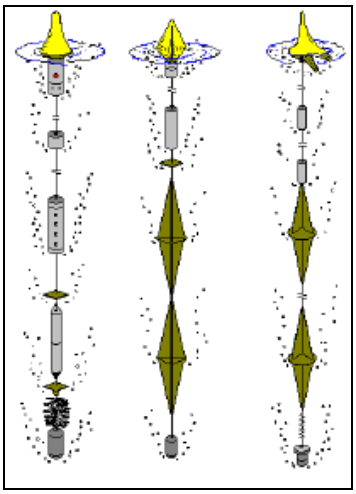
Operation. When air-launched, the unit is ejected from the aircraft at a predetermined altitude; once the unit is clear of the aircraft, a parachute opens to slow the descent. When the unit enters the water, the antenna remains at the surface and the sensing unit sinks to a preset depth. The battery activates and the unit begins to transmit data to the platform. The data will either be processed aboard the platform or relayed to a command ship for analysis. Data are fed into a computer, which analyzes the information against the known characteristics of the ocean at the drop point and other sea noises that are stored in the computer's memory. After the information is analyzed by the computer, clean data are displayed for the operator to evaluate. The operator will then have a visual display and an acoustic signal to evaluate. As with most detection and evaluation systems, the final assessment is performed by the operator.

Variants/Upgrades

SSQ-110. The original model, developed by Sparton, is an EER A-size, air-dropped, expendable, non-repairable sonobuoy. It operates on one of 31 selectable frequency channels with a VHF-FM relay transmission.

SSQ-110A. Originally developed by Magnavox (under the control of Ultra Electronics, as Magnavox was acquired by Hughes, then Raytheon, and finally Ultra Electronics), this version is an improved model to more effectively deal with the environmental conditions particular to the shallow water environment. It is similar to the original SSQ-110, but includes several improvements and modifications, and operates on one of 99 selectable frequency channels. It also has two depth settings that can be controlled via UHF radio commands.

SSQ-110B. U.S. Navy documents began mentioning an SSQ-110B version around June 1999. It is produced by both Sparton and Ultra Electronics, incorporating two multipoint initiation explosive payloads remotely activated to operate at one of three depth settings. The SSQ-110B is used in conjunction with appropriate passive receiver sonobuoys.



Typical Sonobuoy Deployment

Source: U.S. Navy

SSQ-110B Sonobuoy

Source: Ultra Electronics

Program Review

Background. The SSQ-110 sonobuoy was reportedly developed in the early 1990s, when U.S. Navy ASW efforts shifted emphasis to focus on the severely underdeveloped shallow water environment. Sparton Electronics, De Leon Springs, Florida, was one of the early designers and producers of this sonobuoy, and the U.S. Navy procured more than 18,600 units beginning in 1993. Unfortunately for Sparton, the company's efforts were rather short-lived. Magnavox Electronic Systems was given a contract in 1994 to develop the next generation of this sonobuoy, designated SSQ-110A, and has since captured all the known production contracts for this model.

SSQ-110(V) Sonobuoy

An experiment conducted in the Gulf of Mexico to measure low-angle bottom scattering in shallow water, as applied to the SSQ-110 sonobuoy, was completed by 1997. This test led to the development of a high-resolution version of the acoustic sonar propagation model for the Naval Air Warfare Center.

U.S. Navy Looks to Replenish Batteries

The U.S. Navy issued a notice in June 2011 (and an add-on in October 2011) that it would probably be looking to award a sole-source contract to UnderSea Sensor Systems Inc (USSI) around March 2012 to produce 3,200-4,200 chloride-magnesium seawater batteries for the SSQ-110A sonobuoy. Although unconfirmed, the contract was likely awarded as part of an overall general sonobuoys contract, with the batteries likely having been delivered by the end of 2013.

Ultra Electronics Buys Out Raytheon Sonobuoy Division

In late 1998, the U.K.-based aerospace and defense electronics company Ultra Electronics acquired Raytheon's sonobuoy product line. This acquisition (coupled with its previous buyout of Hermes in Canada) gave Ultra Electronics a significant capability to expand into the North American – and specifically U.S. – sonobuoy market.

Every Sonobuoy Except the SSQ-110(V)

In October 2016, the U.S. Navy awarded a major sonobuoy replenishment contract to ERAPSCO, to the tune of $203.7 million.

The order was apparently placed to replenish of all major U.S. Navy sonobuoys except the SSQ-110(V), including 6,000 SSQ-36 sonobuoys, 95,000 SSQ-53s, 15,500 SSQ-62s, 10,000 SSQ-101s, and 15,000 SSQ-125s. Deliveries were completed in October 2019.

ERAPSCO Joint Venture to be Dissolved

Sonobuoy manufacturer ERAPSCO (a joint venture between Sparton and Ultra Maritime) announced on its website that it will be dissolved as of September 30. The two companies will continue to produce sonobuoys individually under their own names.

ERAPSCO will continue fulfilling existing contracts through the end of 2023.

Sparton and Ultra Maritime (part of Ultra Group, once more commonly known as Ultra Electronics) have produced sonobuoys for the U.S. Navy in this joint venture for over 35 years. Another joint venture between the two, Sonobuoy TechSystems (STS), which produces another model of sonobuoys, will also be disbanded.

Rumors of the decision to dissolve the joint venture date back to at least February 2022, when Sparton president and CEO Tracy Howard said that big changes lay ahead.

Apparently, the U.S. Navy became tired of dealing with the same two sonobuoy makers, Sparton and Ultra Electronics. In a January 2014 solicitation for the Coherent Source Sonobuoy project, the U.S. Navy announced it was searching for other manufacturers. However, while other companies can make sonobuoys – probably very good ones – they would be priced much higher than those produced by Sparton and Ultra, which owe much of their control of market share to pricing as well as product quality.

In theory, there is supposed to be a competitive bidding process in the United States to avoid giving one company a monopoly. However, in the sonobuoy industry as in the shipbuilding industry, when there are only two major manufacturers in a competition, each one tends to get a piece of a contract in order to keep the production line and facilities viable. This doesn't always work well for the consumer – in this case the American taxpayer.

Along these lines, the U.S. Navy tried to block Sparton (one half of ERAPSCO, the other half being Ultra Electronics) from bidding on the next-generation variant, the SSQ-125A; however, Sparton filed a protest and won.

The U.S. Navy had to reverse its decision and in December 2018 awarded ERAPSCO half of the SSQ-125A production contract for 18,000 SSQ-125A sonobuoys worth up to a combined $220.8 million.

This was then followed up with supplemental contracts awarded to ERAPSCO: one in July 2020 and another in March 2021.

The other half went to Lockheed Martin (possibly to make the contract look competitive), which had entered the A-size sonobuoy market thanks to its expertise in making A-size autonomous underwater vehicles (AUVs) that can be launched from the same canisters as the SSQ-125(V) sonobuoys.

Sparton anticipated that should the U.S. Navy push for the dissolution of the ERAPSCO joint venture, the service would, in turn, assist in funding the company's transition to independently developing, producing, and selling sonobuoys. Again, however, as evidenced by the shipbuilding industry, when there are only two manufacturers, each one tends to get a piece of a contract to keep the production lines and facilities viable.

Despite these misgivings from the service, ERAPSCO scored a major sonobuoy contract in July 2019 when the

Navy purchased thousands of various sonobuoys for some $1 billion. These systems are being delivered through 2023 and are aimed at dealing with increased production of submarines by China and undersea warfare activity in the South China Sea, as well as Russia's not-so-subtle plans for the Arctic.

After the failure of the earlier merger attempt to combine Sparton with Ultra Electronics, a new suitor swept in and bought Sparton. This time it was a private equity firm, Cerberus Capital Management. In March 2019, Cerberus successfully acquired Sparton for $181.5 million.

However, the Cerberus acquisition wasn't for long, as Sparton was promptly sold again. This time it appeared that Sparton may had found its forever home with the announcement that it would be acquired by Elbit Systems of Israel in a $380 million deal in December 2020 (see below). This was the latest in a series of merger and acquisition moves undertaken in the past few years.

At the time, the acquisition by Elbit Systems was thought to be a step in the right direction – which it apparently was, albeit a few years later.

Elbit Acquires Sparton in 2020

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Following the failure of an earlier merger attempt by Sparton to combine with Ultra Electronics, Cerberus Capital Management swept in and bought Sparton. Cerberus successfully acquired the company in March 2019 for $181.5 million and quickly became purely a defense firm, divesting the more commercial-oriented Manufacturing & Design Services operations.

Previously, in early 2018, the U.S. Department of Justice put the kibosh on Ultra Electronics' $234 million acquisition of Sparton. According to the DoJ, the merger would have created a monopolistic supplier of sonobuoy systems to the U.S. Navy.

French Navy Acquires New SonoFlash Sonobuoy from Thales

Thales announced in March 2021 that the French Navy had selected the SonoFlash new-generation sonobuoy from Thales. Unveiled for the first time at the Euronaval show in October 2018, SonoFlash will enable France to reach its strategic capability goal for acoustic sensors.

The threat posed by submarines is evolving rapidly. Three decades ago, only the superpowers had a true undersea warfare capability, but numerous countries now deploy modern submarine fleets. At the same time, forces increasingly operate in littoral waters, which are much more complex for sonar systems, rather than in the relative certainty of open-ocean environments.

Responding to this evolving threat environment, Thales developed the SonoFlash buoy. The SonoFlash buoy combines a powerful, optimized low-frequency transmitter with a high-directivity passive receiver, making it suitable for a wide array of deployment scenarios.

Thales reports that the SonoFlash buoy offers high tactical flexibility and opens up new opportunities for multistatic operation. Coupled with the FLASH dipping sonar, for example, the SonoFlash buoy enables an aircraft to expand its coverage area and respond with greater agility to evasive maneuvers by a submarine. Thanks to its digitized signal and optimal communication range, the SonoFlash buoy data can be "readily exploited by any piloted or remotely piloted aircraft, naval vessel or shore center equipped with a sonobuoy processing system."

The French Navy will be the first operational user of the SonoFlash buoy, which will be deployed by the modernized Atlantique 2 maritime patrol aircraft and NH90 Caiman tactical transport helicopter. It will be delivered to the French Navy from 2025 and could be available to export markets for modern maritime patrol aircraft and helicopters as well as autonomous surface vehicles and vertical takeoff and landing (VTOL) and fixed-wing unmanned aerial vehicles (UAVs) equipped with a suitable multi-sonobuoy dispenser.

The SonoFlash buoy is manufactured in France by a network of small and medium enterprises (SMEs) such as Telerad, Selha Group, and Realmeca. SonoFlash itself will not have an effect on the U.S. sonobuoy market, but it may start to pull some international customers in the near future.

Joint Venture ERAPSCO Dissolved

Sonobuoy manufacturer ERAPSCO (a joint venture between Sparton and Ultra Maritime) announced on its website that it was dissolved as of September 30, 2023. ERAPSCO will continue fulfilling existing contracts through the end of 2023. Going forward, the two companies will continue to produce sonobuoys individually under their own names. The exact division of existing and future production has yet to be determined.

SSQ-110(V) Sonobuoy

Funding

U.S. FUNDING

	FY23 QTY	FY23 AMT	FY24 QTY	FY24 AMT	FY25 QTY	FY25 AMT
Procurement (U.S. Navy)						
Line 97 Sonobuoys						
All Types	-	303.5	-	311.1	-	323.4

All $ are in millions.

Source: U.S. Navy FY25 P-1 Procurement Program

Contracts/Orders & Options

Contracts for specific sonobuoy models can be difficult to identify, as many contract awards are for an unspecified across-the-board sonobuoy replenishment order. The contracts listed below specifically mention the SSQ-110(V) or are believed by Forecast International to be highly applicable.

Contractor	Award ($ millions)	Date/Description
ERAPSCO	165.9	Jul 2014 – A firm-fixed-price, indefinite delivery/indefinite quantity (IDIQ) contract from the U.S. Navy for the procurement of 141,263 SSQ series sonobuoys (SSQ-36B, SSQ-53F, SSQ-62E, SSQ-101, SSQ-110A, and SSQ-125) and 5,000 Mk 84 signal underwater sound devices. Work was performed in De Leon Springs, FL (51.7 percent) and Columbia City, IN (48.3 percent), and completed in Oct 2019. Fiscal 2014 Other Procurement (Navy) funds in the amount of $165,997,792 were obligated at time of award. This contract was competitively procured via an electronic Request for Proposals, and one offer was received. The Naval Air Systems Command, Patuxent River, MD, was the contracting activity. (N00421-14-D-0025)
ERAPSCO	195.2	Nov 2014 – Contract modification to a previously awarded firm-fixed-price, IDIQ contract (N00421-14-D-0025) from the U.S. Navy to exercise an option for the procurement of up to 141,500 SSQ series sonobuoys and 10,000 Mk 84 signal underwater sound devices. Work was performed in De Leon Springs, FL (51.7 percent) and Columbia City, IN (48.3 percent), and completed in Sep 2016. No funding was obligated at time of award; funds were obligated on individual delivery orders as they were issued. The Naval Air Systems Command, Patuxent River, MD, was the contracting activity.

Worldwide Distribution/Inventories

This is a **U.S. Navy** sonobuoy, although it is reported to have been used by several other navies for bistatic testing.

Forecast Rationale

A revival in ASW is being driven by China's increasing aggression in the South China Sea around the Spratly Islands, Russia's renewed interest in the Arctic (and its natural resources), and aggressive rants coming out of North Korea. In response, existing sonobuoy inventories will need to be replenished and new models developed.

Sonobuoys are at their simplest a portable and expendable sonar system used to detect submarines. They are typically launched from ASW aircraft in a pattern that will "box-in" a submarine in a given area. Initially developed in the 1960s, sonobuoys were used to corral Soviet submarines during the Cold War. Fundamentally, they all operate pretty much the same,

with the main differences being environment (arctic, deep water, littoral, and such) and depth setting. They last for several hours, at which point the battery dies and the sonobuoy scuttles itself. Because they are relatively inexpensive, sonobuoys are used in rather large numbers to increase their efficiency.

The U.S. Navy has an extensive inventory of sonobuoys, to the point that many expire sitting on the shelf. Those units with an expiring shelf life need to be replaced, or at the least will need a new battery. In June 2011, the Navy announced that it was looking into replenishing the SSQ-110(V) sonobuoy's batteries. While not specifically identified as such, some replacement contracts likely fall under the Navy's procurement budget line "Sonobuoys - All Types."

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Although no major sales of the SSQ-110(V) sonobuoy beyond the November 2014 replenishment order have been identified (deliveries of the last exercised option were completed by the end of 2019), replenishment contracts (probably for several hundred per production run) may start as early as 2024.

The forecast is based on the assumption that a full sonobuoy replenishment will occur after a round of battery replacement has been completed as a cost-saving measure to extend the life of the SSQ-110(V)s remaining in inventory.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total
MFR Varies												
SSQ-110 A <> United States <> Navy												
	66,868	500	500	0	0	0	400	400	400	0	0	2,200
SSQ-110 B <> United States <> Navy												
	5,250	1000	1000	0	0	0	1000	1000	0	0	0	4,000
Subtotal	72,118	1500	1500	0	0	0	1400	1400	400	0	0	6,200
Total	72,118	1500	1500	0	0	0	1400	1400	400	0	0	6,200