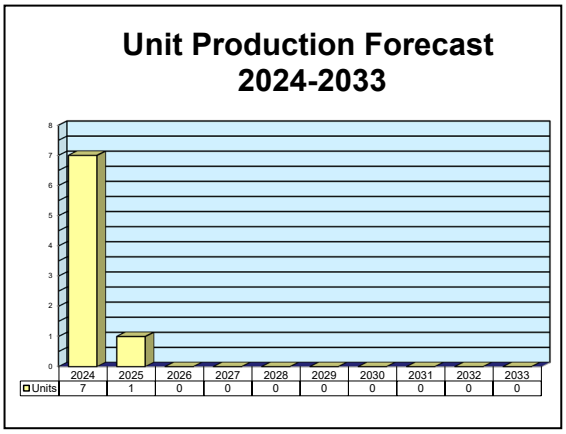
AQS-14/AQS-24

Outlook

- AQS-14(V) out of production, but is in service worldwide
- AQS-24C replaces the AQS-24B
- Worldwide support market expected to remain strong



Orientation

Description. The AQS-14(V)/AQS024(V) are helicopter-towed, side-looking multibeam minehunting sonar systems. The AQS-24(V) is an upgraded version of the AQS-14(V) and includes a laser line scan system.

Sponsor

U.S. Navy
Naval Air Systems Command
Arlington, VA
USA
(Program manager)

Status. The AQS-14(V) is in operational service. The AQS-14A is available. The AQS-14A(V1) is in limited service at this time. The AQS-24, AQS-24A, and AQS-24B are in production and service. The AQS-24C is in limited production.

Total Produced. There are an estimated 27 active AQS-14(V) systems (all versions) in operation by the U.S. Navy. An estimated 31 AQS-24B units and 20 AQS-20C units (full and conversions) have been procured by the U.S. Japan is believed to have procured 10 AQS-24A units.

Platform. These systems are used on the RH-53D, MH-53E, S-80M, and MCM-101 helicopters, among others, for mine clearance. Also, they reportedly can be used as a towed array from a surface ship or fitted to a hovercraft. The AQS-24 was successfully demonstrated from an unmanned surface vehicle in October 2003.

Application. Naval mine countermeasures.

Price Range. The per-unit price of the AQS-14(V) was estimated to be $1.3 million in 1993 U.S. dollars, which equates to $2.8 million in current dollars when adjusted for inflation.

The price of an AQS-24B conversion kit is estimated at $2.53 million in current dollars (based upon contract cost averaging and adjustments for inflation).

The price of a complete AQS-24C is estimated at $8.68 million in current collars (based on cost averaging of a July 2018 contract and adjusted for inflation).

AQS-14/AQS-24

Contractors

Prime

Northrop Grumman Mission Systems	http://www.northropgrumman.com, 7323 Aviation Blvd, Baltimore, MD 21240-2001 United States, Tel: + 1 (410) 765-1000, Email: ES_Communications@ngc.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

Technical Data

AQS-14	**Metric**	**U.S.**
Dimensions		
Underwater Vehicle		
Length	3.25 m	10.66 ft
Width (wing span)	1.7 m	5.57 ft
Weight	251 kg	553.45 lb
Electronics Console (6-drawer)		
Height	1.4 m	4.59 ft
Width	1.2 m	3.93 ft
Length	0.7 m	2.29 ft
Weight	254 kg	560 lb
Tow Cable		
Length	305 m/107 m faired	1,000.4 ft/350.96 ft faired
Diameter	1.2 cm	0.47 in
Weight	180 kg	396.9 lb
Winch (hydraulic)		
Length	1.52 m	4.98 ft
Width	1.06 m	3.47 ft
Height	1.06 m	3.47 ft
Weight (without cable)	249.48 kg	550.10 lb
Power		
Electronics	400 Hz, 115 V, 3.5 kW, 28 Vdc, 20 amps	

Design Specifications. The AQS-14(V) is a high-speed minehunting system that is towed by and recovered from U.S. Navy RH-53D Sea Stallion and MH-53E Sea Dragon helicopters. The system is capable of detecting, classifying, and marking mines and other underwater objects. It consists of an active, stabilized underwater vehicle, an electromechanical tow cable and winch, and an electronic control/monitor console. The underwater vehicle houses the side-looking multibeam sonar, which features all-range focusing through electronic beam forming, providing system operators with a continuous high-resolution TV image of objects to either side of the sonar.

The system also employs an active control system and sensors that allow the sonar to operate at safe and effective depths with little operator attention. The Navy reports that the underwater vehicle can maintain an operator-selected altitude above the bottom or a depth below the surface, and can even right itself if launched upside down. Self-protection circuits prevent the vehicle from broaching or striking the bottom, while a closed-loop roll control adds further vehicle stability.

Two operators man the control/monitor console, which is housed forward in the RH-53/MH-53 helicopters. The console has a TV (with the sonar information being displayed as a moving window), underwater vehicle controls and status displays, system status indicators, a magnetic tape recorder for sonar and other mission data, tape recorder playback and controls, and built-in test equipment (BITE) controls and displays.

Operational Characteristics. The AQS-14(V) can be used for area mine reconnaissance and surveillance, as well as to provide data on bottom characteristics.

System functions cover all tasks required to locate, classify, mark, permanently record, and review records of mines, mine-like objects, and underwater terrain features in the search area.

The operational effectiveness of the AQS-14(V) in locating underwater objects in adverse weather conditions has been documented. In January 1992, a helicopter-borne AQS-14(V) was employed to locate four trailer-sized containers of arsenic trioxide that were washed overboard into the Delaware Bay during a storm. Using the AQS-14(V), the Navy worked with the U.S. Coast Guard and Environmental Protection Agency (EPA) to locate the sunken containers. While the heavy weather kept the Coast Guard and EPA vessels from retrieving the containers, the AQS-14(V) continued to function in 30-knot winds and 12-foot seas.

AQS-14A Minehunting Sonar System Being Deployed from a U.S. Navy MH-53E Sea Dragon Helicopter

Source: U.S. Navy

AQS-14A Minehunting Sonar System

Source: Northrop Grumman

AQS-14/AQS-24

The AQS-24A airborne minehunting system can be launched from helicopters or surface vessels.

Source: Northrop Grumman

AQS-24A Common Post-Mission Analysis Station

Source: Northrop Grumman

Variants/Upgrades

Shipborne Adaptability. The system is primarily designed to be used on minehunting helicopters, but because of the compact nature of the equipment, it can also be installed on surface ships. It is easily adaptable to hovercraft, hydrofoils, and various other craft. Testing has been conducted on a Halter Marine MSH class ship.

AQS-14A. This variant, produced by Northrop Grumman, is a post-Persian Gulf War upgrade of the original AQS-14. Among the reported enhancements are a digital recorder-reproducer, a high-resolution 19-inch color video monitor, and a navigation and acoustic control processor. This processor is said to use commercial off-the-shelf (COTS) boards to improve system reliability and maintainability. Eight AQS-14A systems were believed to have been delivered to the U.S. Navy in 1995.

Post-Mission Analysis (PMA) System. The PMA (developed by Northrop Grumman) is a subsystem of the AQS-14A model and has extensive analytical tools with the ability to freeze frames for analysis and to enlarge object images, measure them, and compare them with known objects in its database. It also provides a log of the size, location, and classification of each object. At least 12 of these subsystems are believed to be in service with the U.S. Navy (10 were reportedly delivered in 1994 and two in 1995).

AQS-14A Trainer System. This Northrop Grumman trainer system allows operators of the AQS-14A minehunting sonar to prepare for a variety of conditions and checklists when using the AQS-14A in actual fleet use. Two trainers were reportedly delivered to the U.S. Navy in 1995.

AQS-14A(V1). Developed by Northrop Grumman, this is an enhanced version of the AQS-14A that includes a side-scan sonar, Northrop Grumman's SM2000 laser line scanner, and a bottom-penetrating sonar. It is said to provide twice the resolution of the AQS-14A, and to incorporate a high-resolution display mode to increase the operator's chance of detecting and correctly classifying mine-like objects. Additionally, it is reported to be able to operate at twice the depth of its predecessor. The U.S. Navy has taken delivery of four AQS-14A(V1) systems and placed them in immediate operational fleet use for the Middle East region aboard MH-53E helicopters.

This system is also being marketed internationally for the upgrade of currently installed versions of the AQS-14(V). Other potential platforms include the EH101 helicopter and the German Navy's future MJ2000 minehunter.

AQS-24. This is an upgraded version of the AQS-14 that features digital electronics, smaller avionics, higher resolution (image clarity), and the option of a laser line scanner for target identification. Northrop Grumman has reportedly converted several U.S. Navy Fleet inventory AQS-14s to the AQS-24 configuration.

AQS-24A. This variant contains a laser line scanner that provides precision optical identification of underwater mines and other objects of interest. It allows for simultaneous operation of the sonar and laser, which significantly improves area coverage rate, shortens the mine clearance timeline, and alleviates unnecessary maintenance cycles.

AQS-24B. This model is an enhanced version of the AQS-24A that includes higher operating speeds and sonar processing, as well as enhanced image resolution.

AQS-24C. This version is a modification to the AQS-24B configuration, providing high-speed capability to detect and classify volume (moored) mines while simultaneously hunting bottom mines. It originally was to be deployed from the MH-53E Sea Dragon helicopter but will now be towed through the water beneath an unmanned surface vehicle (USV), which allows for scanning at higher traveling speed through the water.

Program Review

Background. The first AQS-14(V) sonar successfully completed operational evaluation (OPEVAL) in September 1979, and was approved for service use in March 1980. The 1980s were good years for Westinghouse (which was later acquired by Northrop Grumman) and the AQS-14(V) sonar. Approval for full-scale production was granted in August 1981, and Westinghouse received the first production contract, for six sonars, in January 1982. In June 1983, Westinghouse received a $4.2 million contract for five units. In FY84, the company received two contract increments worth $8.9 million for 13 sonars. A September 1985 increment covered the production of five AQS-14s, and a $7.2 million increment received on January 30, 1987, covered production of six AQS-14s. A $6.1 million delivery order on September 18, 1987, called for 15 line items to repair AQS-14(V) systems. Westinghouse's work on the sonars performed under the January 1987 contract increment was completed in January 1989.

The Navy ordered two system enhancements in 1993. The first was a post-mission analysis system to allow for tactical analysis of a portable side-scan sonar. The PMA system was primarily designed to support mine countermeasures. It was capable of computer-aided detection and mine classification and automatic target logging. The second enhancement was a realistic AQS-14(V) operator training system.

Additional Platforms to be Fitted for AQS-14(V) Installation

In 1996, media sources reported that Textron had announced a new application for its landing craft air cushion (LCAC) hovercraft on the export market. Using U.S. Navy funding, Textron developed a mine countermeasures kit consisting of the AQS-14(V) mine-detecting sonar and related minesweeping gear that was deployed and tested on its LCAC. While this novel use as a mine countermeasures platform was demonstrated and validated, the U.S. Navy decided not to proceed with adaptation due to funding considerations. Textron hoped to sell the concept on the export market, but nothing further has been reported.

The enhanced versions, AQS-14A and AQS-14A(V1), are deployed on MH-53E helicopters and have additional platform potential for the U.S. Navy's SH-60R Seahawk helicopter, Europe's EH101 helicopter, and the German Navy's MJ2000 minehunter.

AQS-14/AQS-24

Laser Line Scanner a Major System Upgrade

Northrop Grumman upgraded the AQS-14(V) for both the U.S. Navy and its export clients. The topside avionics were upgraded and delivered to the Navy in the form of the AQS-14A. Similar upgrades were done to the wet end of the system. The company also added a laser line scanner suitable for high-definition close-range viewing of targets of interest. Then, in May 1999, the U.S. Navy awarded Northrop Grumman a one-year, $3.2 million contract to incorporate laser line scanning technology into the AQS-14A. The system was renamed the AQS-14A(V1). Adding a laser-driven electro-optical mine identification capability to the AQS-14 allows the operator to identify the mines.

In 2001, modifications were made to the AQS-14A(V1) for smoother LLS operation, and support equipment was developed. The four limited production units of the AQS-14A(V1) were rushed into operational service in October 2002 as tensions with Iraq escalated.

System Upgraded from Analog to Digital

In October 2003, Northrop Grumman successfully demonstrated its AQS-24 mine detection system on a 1-meter USV. The objective of the test was to prove the feasibility of remotely deploying, operating, and recovering the AQS-24 from a rigid-hull inflatable boat.

During the demonstration, the AQS-24 mapped shipping lanes 180 yards wide by 45 feet deep and 8 miles long, and transmitted the data in real time to the bridge of the USS *Scout* (MCM 8), a mine countermeasures ship. The system also swept the channel in front of the USS *Scout* as it transited into and out of the shipping lane, demonstrating the ability to ensure unobstructed passage for a transiting naval vessel.

Other work included development of a sensor training module for a LAN-based Surface Network Embedded Analysis and Tactical Trainer (SNEATT).

According to Northrop Grumman, several of the U.S. Navy's fleet-inventoried AQS-14s have been upgraded to the improved AQS-24 configuration.

Northrop Grumman Supplies AQS-24A to Japan

In October 2011, Northrop Grumman won a contract from Kawasaki Heavy Industries to supply the AQS-24A for installation on the Japan Maritime Self-Defense Force's new airborne mine countermeasures MCH-101 helicopter.

Additional Minehunting Systems for Japan

Northrop Grumman announced a series of follow-on contract awards from the JMSDF in July 2012 for the supply of three additional AQS-24A airborne minehunting sonar systems. The contract for Japan's first AQS-24A had been awarded in October 2011. All of the sonar systems are to fly on board Japan's new MCH-101 helicopters. The first AQS-24A was delivered to Japan in June 2013.

Northrop Grumman is reportedly also delivering four Airborne Laser Mine Detection Systems (ALMDS) to the JMSDF to operate in conjunction with the AQS-24A. (The ALMDS is a laser-based light detection and ranging sensor system that detects, classifies, and localizes near-surface mine-like objects from above the waterline, and is complementary to the AQS-24A.)

Additionally, part of the AQS-24A deal involves a technology transfer, allowing for certain components to be built in Japan. The Japan deal is the first direct commercial sale of the AQS-24A to a non-U.S. Navy.

The AQS-24A and its predecessors, the AQS-24 and AQS-14 – all built by Northrop Grumman – are the only operational airborne minehunting search systems that have been used by the U.S. Navy for the past 29 years. The AQS-24A is a high-speed minehunting system that is primarily towed from the MH-53E helicopter. It has been adapted easily to the JMSDF version of the EH101 aircraft.

Later, in August 2015, Northrop Grumman delivered the first of four ALMDS to the JMSDF to operate in conjunction with the AQS-24A.

The U.S. Navy continued development of the AQS-20A to serve as the eventual replacement of the AQS-14(V) and AQS-24(V). Development, test and evaluation of the AQS-24 continued through FY16.

AQS-24B Minehunting System Sets New Standard for Synthetic Aperture Sonar

In September 2015, Northrop Grumman announced that, during a U.S. Navy field test, its AQS-24B minehunting system had successfully demonstrated the ability to perform synthetic aperture sonar processing at 18 knots in real time. The AQS-24B was developed at Northrop Grumman's Undersea Systems campus in Annapolis. The field testing took place at the U.S. Navy Central Command in Bahrain, May 19-28, 2015. The AQS-24B finished 12 for 12 in successfully executing missions during the test exercise. During separate Tactics Development trials held in Panama City, Florida, Northrop Grumman reports that the AQS-24B achieved

"a record long single sortie tow duration of 16.25 hours from a surface ship."

The AQS-24B has significantly improved image resolution, as well as the speed of real-time sonar processing, on both MH-53E helicopters and minehunting unmanned surface vessels.

Northrop Grumman Delivers First AQS-24B Minehunting Sonar Upgrades to U.S. Navy

In September 2016, Northrop Grumman delivered the first of three lots of minehunting sonar upgrade kits to the U.S. Navy`s Naval Surface Warfare Center, Panama City Division. The ultimate end users will be the HM-12, -14 and -15 Mine Countermeasures Squadrons. In all, 27 AQS-24A minehunting systems would be upgraded to the more advanced AQS-24B.

Following delivery of the first production lot, production lot two was delivered in the fall of 2017. Production lot three was delivered in the spring of 2018.

The upgrades eliminate diminishing material issues while increasing performance by adding "the world`s first high-speed synthetic aperture sonar," which increases sonar resolution by a factor of three while maintaining an 18-knot speed.

Northrop Grumman Demos Landmark Unmanned Minehunting Capabilities

During the Belgian Defense Technology & Industry Day trials at the Naval Base at Zeebrugge, Belgium, in June 2017, Northrop Grumman successfully demonstrated unmanned minehunting capabilities using the high-speed AQS-24B sensor. This effort, which was a follow-on to the successful operation during Unmanned Warrior in Scotland in October 2016, demonstrated the high area coverage rate achievable by combining the Atlas Elektronik UK ARCIMS USV and Northrop Grumman's AQS-24B minehunting system. The ARCIMS USV was proven to be an extremely stable platform ideally suited for towing the high-speed AQS-24B in rough seas. The exercise demonstrated not only the modularity and ease of integration of the AQS-24B payload, but also the importance of the laser line scan sensor, which serves as a gapfiller for the high-speed synthetic aperture sonar.

The ARCIMS USV is customizable for multiple mission roles, including minesweeping, minehunting, coastal surveillance, ASW, hydrography, maritime security, and force protection.

AQS-24B Data Now on SeeTrack System

Northrop Grumman and SeeByte are collaborating to incorporate AQS-24B minehunting sensor data into the SeeTrack system to enhance its autonomous target recognition (ATR) capability. Northrop Grumman announced the partnership in June 2018.

"The merging of the unmanned surface vessel-based AQS-24B with the SeeByte ATR will provide international navies with a better probability of detection and classification of bottom mines than is currently possible with an operator-only system," said Alan Lytle, vice president, undersea systems, Northrop Grumman.

The product of this collaboration will be available for new mine countermeasures ship and payload programs across Europe, the Middle East and the Pacific Rim.

Okeanus Delivers Winch System for Northrop Grumman AQS-24

In November 2018, Okeanus Science & Technology LLC completed the factory acceptance testing, source inspection, and delivery of its latest USV-based winch for Northrop Grumman's AQS-24 minehunting USV system. This winch, referred to as the MHU, incorporates several new features developed specifically for autonomous USV winches.

AQS-24B Minehunting Capability Demonstrated at Autonomous Warrior 2018

The AQS-24B successfully demonstrated the benefits of performing mine warfare from a high-speed USV at the Royal Australian Navy-sponsored Autonomous Warrior 2018 exercise in Jervis Bay, Australia, in late 2018.

The remote-control MHU, with the AQS-24B sensor, demonstrated a safe standoff minehunting and undersea surveillance capability targeted at addressing three key aspects of the mine warfare challenge: reducing the mine clearance timeline; accurate detection, localization, classification and identification of undersea objects of interest; and improving crew safety by keeping the sailor out of the minefield. According to Northrop Grumman, the AQS-24B system includes the world's first combined operational high-speed synthetic aperture sonar and an optical laser line scan sensor, which provides complete coverage out to maximum range on a single pass. The real-time analysis capability demonstrated how unmanned systems can augment manned mine warfare operations.

The MHU was outfitted with the L3 ASView unmanned control system. The system provided the capability to control the vessel from a remote location with minimal human oversight. ASView's situational awareness displays provided the remote operator "full control and awareness to safely execute dynamic demands of mine warfare missions."

AQS-14/AQS-24

AQS-24C Upgrade Minehunting System Delivered

Northrop Grumman successfully completed the development of the AQS-24C and delivered the first two systems to the U.S. Navy around January 2019.

The AQS-24C upgrade adds an in-stride volume search capability to the AQS-24B. The "C" version builds on the AQS-24B that was introduced to the Fleet in 2017. The AQS-24C recently completed shipboard contractor testing and government helicopter testing on the MH-53E platform, and is now in production.

Northrop Grumman Successfully Tests AQS-24 Deep Tow

Northrop Grumman successfully operated the AQS-24 minehunting sonar at depths greater than 400 feet during system testing off the coast of Ft. Lauderdale, Florida, in the fall of 2019.

Embarked on the M/V *Richard Becker*, the Northrop Grumman test team demonstrated AQS-24 system operations with "excellent" sonar performance at all tested depths (up to and beyond 400 ft) while using the system to classify bottom objects of interest.

Earlier in 2019, Northrop Grumman demonstrated an autonomy upgrade path for the AQS-24's minehunting system by integrating and successfully testing the company's image exploitation suite, incorporating state-of-the-art machine learning for automatic target recognition using multiple ATR algorithms. Following this demonstration, the U.S. Navy planned to incorporate this new capability into existing AQS-24 minehunting systems.

The success of Deep Tow was followed by in-water testing of the AQS-24 on the U.S. Navy's MCM USV at Naval Surface Warfare Center Panama City in preparation for testing aboard the LCS in 2020.

Textron's CUSV Could See Mission Expansion

The U.S. Navy announced in January 2020 that it is considering an expansion in the missions performed by the Textron Common Unmanned Surface Vehicle (CUSV). The initial mission is minesweeping.

The CUSV is capable of towing or carrying payloads. The system is under development for the Navy's Mine Countermeasures USV (MCM USV) program. The CUSV is currently in testing with Raytheon's AQS-20 and Northrop Grumman's AQS-24 minehunting sonars.

A Milestone C decision, which would authorize low-rate initial production, could come in the near future.

Export Surface Vessel Variant

Northrop Grumman has also marketed, in particular for export, a portable integrated mine countermeasures system for shipboard deployment from air-cushioned vehicles or patrol craft.

Funding

The last documented funding for the AQS-14(V) system was for the outfitting of the MH-53E helicopter.

U.S. FUNDING

	FY22 QTY	FY22 AMT	FY23 QTY	FY23 AMT	FY24 QTY	FY24 AMT	FY25 QTY	FY25 AMT
RDT&E (U.S. Navy)								
PE#0604373N								
Project 9179								
Surface Navy Integrated Undersea								
Tactical Technology (SNIUTT)	-	0.953	-	0.958	-	1.001	-	0.984

	FY26 QTY	FY26 AMT	FY27 QTY	FY27 AMT	FY28 QTY	FY28 AMT	FY29 QTY	FY29 AMT
RDT&E (U.S. Navy)								
PE#0604373N								
Project 9179								
Surface Navy Integrated Undersea								
Tactical Technology (SNIUTT)	-	1.001	-	1.-15	-	1.035	-	N/A

All $ are in millions.

N/A = Not Available

Source: U.S. Department of Defense FY24 RDT&E Budget Item Justification, R-2

Note: Project 9179 Surface Navy Integrated Undersea Tactical Training (SNIUTT) has been used to develop the SQQ-32, AQS-24 and AQS-20A sensor training modules. Funds will continue to support training in use of these sonar systems, "as well as the REMUS sonar systems and other Organic Airborne Mine Countermeasures (OAMCM) systems such as the Airborne Mine Neutralization System (AMNS), Airborne Laser Mine Detection System (ALMDS) and COBRA, in the same format as previous training." The SNIUTT sensor training modules will be developed by the Naval Surface Warfare Center Panama City Division, Florida. Funds are being provided for the development and delivery of refresher scenario-based contact recognition training, and the update and modification of interactive Web-based training and proficiency-focused stand-alone training in support of the SNIUTT program.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Northrop Grumman	25.0	Apr 2014 – Modification to a previously awarded contract (N61331-10-D-0009) from the U.S. Navy for the continuation of depot-level repair, maintenance, and engineering services and provision of change kits and support documentation for the AQS-14A sonar detecting set, the AQS-24 minehunting system, the ALQ-141 acoustic minehunting/minesweeping system, USM-668 intermediate-level test equipment, the modified USM-668A ILTE, and the swivel slip-ring assembly. Work was performed in Annapolis, MD, and completed by Feb 2015. No funding was obligated at time of award. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.
Northrop Grumman	18.9	Sep 2014 – A delivery order under a previously awarded contract (N61331-10-D-0009) for the procurement of field-upgradeable kits and fleet support for the conversion of AQS-24A systems to the AQS-24B configuration in support of the Airborne Mine Countermeasure Systems program. Work was performed in Annapolis, MD, and completed Mar 2016. Fiscal 2014 Operations and Maintenance (Navy) funding in the amount of $18,970,332 was obligated at time of award. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.
Northrop Grumman	16.5	Feb 2015 – A delivery order under a previously awarded contract (N61331-10-D-0009) for the procurement of field-upgradeable kits and fleet support for the conversion of AQS-24A mine detecting sensor systems to the AQS-24B configuration in support of the Airborne Mine Countermeasure Systems program. Work was performed in Annapolis, MD, and completed Jul 2016. Fiscal 2014 Other Procurement (Navy) funding in the amount of $16,552,553 was obligated at time of award. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.
Northrop Grumman	14.7	Jul 2015 – A cost-plus-fixed-fee, firm-fixed-price contract for the design, development, fabrication, testing, production and delivery of AQS-24C minehunting sonar systems. The purpose of this effort was to meet an urgent operational need of the MH-53E Sea Dragon helicopter for volume search minehunting capability. Work was performed in Annapolis, MD (93 percent); Salt Lake City, UT (5 percent); Poway, CA (1 percent); and Lawrenceville, GA (1 percent), and completed by Dec 31, 2016. Fiscal 2014 RDT&E and fiscal 2015 Other Procurement (Navy) funding in the amount of $7,031,000 was obligated at time of award. The Naval Sea Systems Command, Washington, DC, was the contracting activity. (N00024-15-C-6320)
Northrop Grumman	18.0	Sep 2015 – A delivery order under a previously awarded contract (N61331-15-D-0011) for the procurement of field-upgradeable kits and fleet support for the conversion of AQS-24A systems to the AQS-24B configuration in support of the Airborne Mine Countermeasure Systems program. Work was performed in Annapolis, MD, and completed by Apr 2017. Fiscal 2015 Other Procurement (Navy) funding in the amount of $18,037,106 was obligated at time of award. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.

AQS-14/AQS-24

Contractor	Award ($ millions)	Date/Description
Northrop Grumman	14.3	Jul 2018 – A firm-fixed-price, cost-plus-fixed-fee modification to a previously awarded contract (N00024-15-C-6320) to exercise options for the fabrication, testing, production and delivery of (likely two) AQS-24C minehunting sonar systems. The system was deployed from the MH-53E Sea Dragon helicopter. Work was performed in Annapolis, MD (83 percent) and Panama City, FL (17 percent), and was to be completed in Jun 2021. Fiscal 2017 and 2018 Other Procurement (Navy) funding in the amount of $14,304,010 would be obligated at time of award. The Naval Sea Systems Command, Washington, DC, was the contracting activity.
Northrop Grumman	9.9	Jul 2018 – A firm-fixed-priced, cost-plus-fixed-fee modification to a previously awarded contract (N61331-15-D-0011) to exercise options for the depot-level repair, maintenance, and modification of the AQS-24 mine detecting system to support currently deployed airborne mine countermeasures legacy systems. Northrop Grumman Undersea Systems provided depot repairs and incorporated engineering change proposals. Work was performed in Annapolis, MD, and completed by Apr 2019. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.
Northrop Grumman	10.2	Mar 2019 – A firm-fixed-price and cost-plus-fixed-fee modification to a previously awarded contract (N61331-15-D-0011) to exercise options for the depot-level repair, maintenance, and modification of the AQS-24. Northrop Grumman Undersea Systems provided depot repairs and incorporated engineering change proposals, including the update of all integrated logistics documentation to support the conversions and sustainment. Work was performed in Annapolis, MD, and completed by Apr 2020. No funding was obligated at time of award. The Naval Surface Warfare Center, Panama City Division, FL, was the contracting activity.
Northrop Grumman	17.2	Mar 2022 – A firm-fixed-priced, cost-plus-fixed-fee, IDIQ contract for depot-level repair. This follow-on contract covers maintenance, modifications, repairs, alterations, upgrades of systems, and the provision of spares for the AQS-24 sonar detecting set (all variants), as well as common post-mission analysis and intermediate-level test equipment to support the U.S. Navy's currently deployed airborne mine countermeasures legacy systems. This contract includes options which, if exercised, would bring its cumulative value to $77,590,973. Work will be performed in Annapolis, MD, and is expected to be completed by Oct 2026. No funding would be obligated at time of award. The contract was not competitively procured, in accordance with Defense Federal Acquisition Regulation 6.302-1(a)(2)(ii) and (iii) – there was only one responsible source, and no supplies or services would satisfy agency requirements. The Naval Surface Warfare Center, Panama City Division, FL, is the contracting activity. (N61331-22-D-0001)
Northrop Grumman	14.8	Mar 2023 – A modification to previously awarded, indefinite-delivery/indefinite-quantity requirements contract N61331-22-D-0001 to exercise an option for depot level repair, maintenance, and modifications in support for the AQS-24 Sonar Mine Detecting Set (all variants), Common Post Mission Analysis and Intermediate Level Test Equipment to support the Navy for the currently deployed airborne mine countermeasures legacy systems. Work will be performed in Annapolis, Maryland, and is expected to be completed by March 2024. There will be no funding assigned at the time of this modification. The U.S. Navy's Naval Surface Warfare Center Panama City Division, Panama City, Florida, is the contracting activity.

Worldwide Distribution/Inventories

Japan. Installed on MCH-101 helicopters.

United States. Installed on RH-53D and MH-53E helicopters and minehunting unmanned surface vehicle (MHU) platforms.

Forecast Rationale

Production of the AQS-14(V) has been completed, with orders favoring the more advanced AQS-24(V) model. However, the AQS-14(V) is still widely used, and support work will therefore remain strong. Additionally, the AQS-14(V) is available for export from Northrop Grumman, which has marketed it not only for helicopter applications but for surface ships (including hovercraft) as well. Nevertheless, prospects for international procurement do not appear realistic now.

A number of AQS-14 units have been upgraded to the AQS-24(V) configuration, and such upgrades will likely continue. Meanwhile, product improvements in the form of shore-based computer-aided detection and classification systems are continuing, along with improvements that will lengthen the time available for analysis.

The AQS-24(V) is currently in service, with AQS-24A units produced for installation on Japan's 14 MCH-101 helicopters. The U.S. Navy is converting its AQS-24A units into the upgraded AQS-24B configuration. Meanwhile, the AQS-24C has entered production, with conversion kits available to upgrade the AQS-24B into the AQS-24C configuration.

At present, the U.S. Navy is leaning toward pairing the AQS-24C with a yet-to-be-determined unmanned surface vessel.

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
Northrop Grumman Mission Systems												
AQS-24C <> United States <> Navy Note: Upgrade Conversion Kits from AQS-24B to AQS-24C												
	20	6	0	0	0	0	0	0	0	0	0	6
AQS-24A <> Japan <> Navy												
	12	1	1	0	0	0	0	0	0	0	0	2
Subtotal	32	7	1	0	0	0	0	0	0	0	0	8
Total	32	7	1	0	0	0	0	0	0	0	0	8