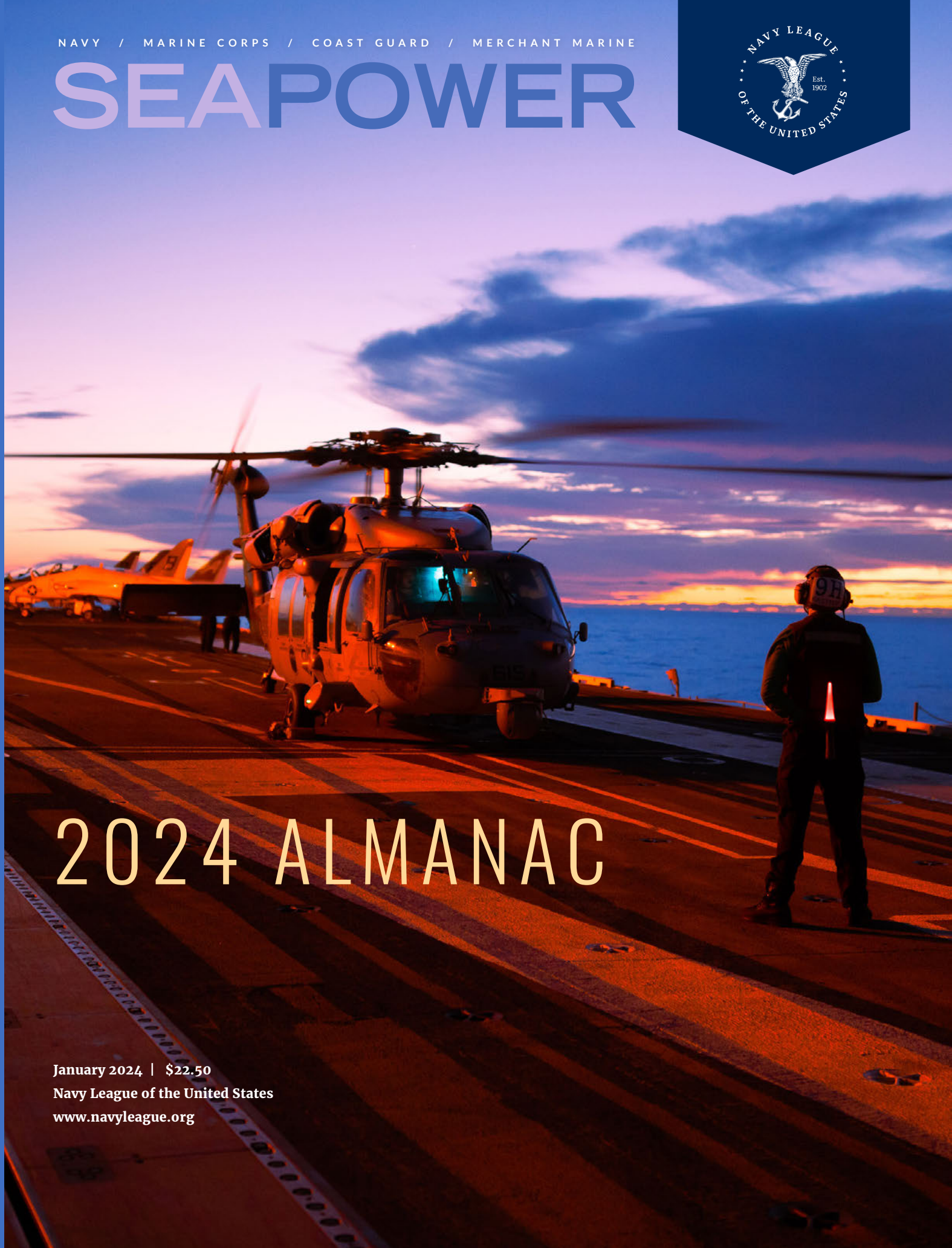
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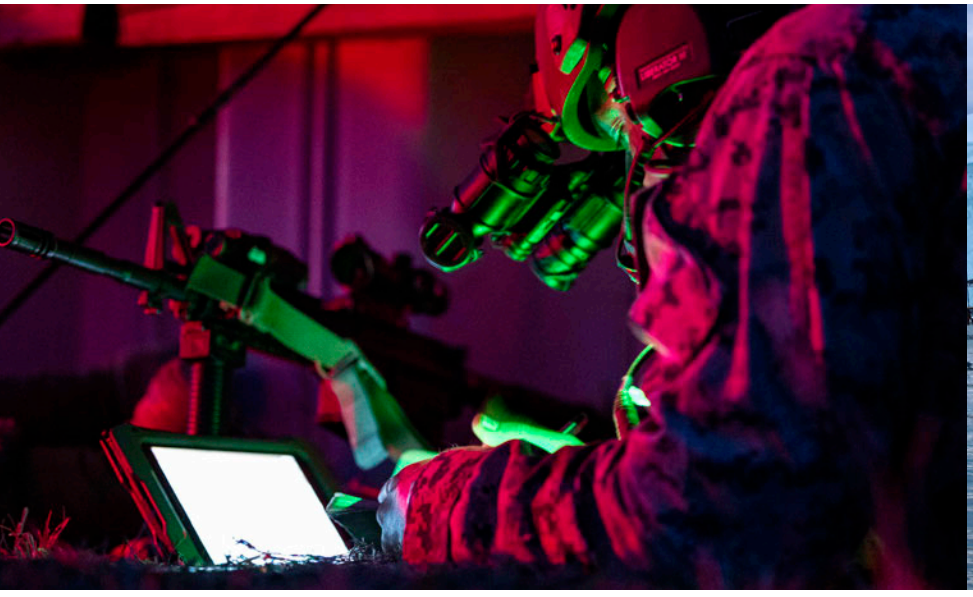
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ON THE COVER

A Navy MH-60S Sea Hawk spins up on the flight deck of the USS George Washington at dawn in the Atlantic Ocean, Oct. 31, 2023. Photo Credit: U.S. Navy | Seaman August Clawson.

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- Eleanor Roosevelt

Making a Difference

BY CHRISTOPHER TOWNSEND, NAVY LEAGUE NATIONAL PRESIDENT

As citizens of the United States, we enjoy many freedoms that are not readily available to people of other nations. As such, we inherit a responsibility to uplift our neighbors, whether across borders or in our local communities. Although we should not expect everyone to join the armed forces, there should be a reasonable expectation for our citizens to give back when and where we can for the common good.

Navy League members are an excellent example of this. They actively serve our United States Sea Services - hosting events for our service members, supporting their families when the service members are away, and recognizing service members for their extraordinary work. The deployment of sea service personnel across the world is made a little easier thanks to the selfless and daily efforts of Navy League members, dedicated to serving those that serve us.

Traveling the country as often as I do, I witness these efforts first hand from coast to coast. I am continuously amazed by the dedication to our Navy League mission. It is important to recognize that our sea services are better able to execute their mission because of the selfless efforts of our Navy League members.

Of course, the greatest service is shown day-in and day-out by the people we serve, the brave men and women of the sea services and their families. They personify the responsibility that comes with freedom. They stand the watch 24/7 so that we as Americans can sleep more soundly at night. If the average American could observe the amount of time, energy, and skill the military community gives to support the American way of life, I am confident that everyone would want to give back to them in some way.

It is my honor in this edition of our Navy League Almanac to take the opportunity to thank our membership who have committed themselves to serve the Navy League's mission of education, advocacy, and support of our sea services.

In doing so, you are setting a great example for others and for generations to come!

You are making a difference. Thank you Navy Leaguers for all that you do!



Christopher "Towny" Townsend
52nd National President

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U.S. Coast Guard 7th District
Commander, 7th Coast Guard District
Brickell Plaza Federal Building
909 SE 1st Ave.
Miami, FL 33131-3050
305-415-6683
atlanticarea.uscg.mil/Our-Organization/District-7

U.S. Coast Guard 8th District
Commander, 8th Coast Guard District
Hale Boggs Federal Building
500 Poydras St., Suite 1324
New Orleans, LA 70130
504-671-2020
atlanticarea.uscg.mil/Our-Organization/District-8

U.S. Coast Guard 9th District
Commander, 9th Coast Guard District
1240 E. Ninth St., Room 2133
Cleveland, OH 44199
216-902-6020
atlanticarea.uscg.mil/Our-Organization/District-9

U.S. Coast Guard 11th District
Commander, 11th Coast Guard District
Coast Guard Island, Bldg. 50
Alameda, CA 94510
510-437-5371
pacificarea.uscg.mil/Our-Organization/District-11

U.S. Coast Guard 13th District
Commander, 13th Coast Guard District
915 2nd Ave. #2664
Seattle, WA 98174
800-982-8813
pacificarea.uscg.mil/Our-Organization/District-13

U.S. Coast Guard 14th District
Commander, 14th Coast Guard District
300 Ala Moana Blvd., Room 9-204
Honolulu, HI 96850-4982
800-818-8724
pacificarea.uscg.mil/Our-Organization/District-14

U.S. Coast Guard 17th District
Commander, 17th Coast Guard District
P.O. Box 25517
Juneau, AK 99802-5517
907-463-2065
pacificarea.uscg.mil/Our-Organization/District-17

U.S. Coast Guard Academy
31 Mohegan Ave.
New London, CT 06320-8103
860-444-8270 | uscga.edu

DEPARTMENT OF TRANSPORTATION

Department of Transportation
1200 New Jersey Ave. SE
Washington, D.C. 20590
855-368-4200 | transportation.gov

MILITARY AND MARITIME AGENCIES

Maritime Administration
1200 New Jersey Ave. SE
Washington, D.C. 20590
202-366-5807 | maritime.dot.gov

U.S. Merchant Marine Academy
300 Steamboat Road
Kings Point, NY 11024
516-726-5800 | usmma.edu

Federal Maritime Commission
800 N. Capitol St. NW
Washington, D.C. 20573
202-523-5911 | fmc.gov

National Oceanic and Atmospheric Administration
1401 Constitution Ave. NW, Room 5128
Washington, D.C. 20230
202-482-6090 | noaa.gov

National Aeronautics and Space Administration
300 E St. SW
Washington, D.C. 20024
202-358-0000 | nasa.gov

National Transportation Safety Board
490 L'Enfant Plaza SW
Washington, D.C. 20594
202-314-6000 | ntsb.gov

U.S. Department of Defense Military Health System
TRICARE Management Activity
7700 Arlington Blvd., Suite 5101
Falls Church, VA 22042-5101
(North) 877-874-2273 | (South) 800-444-5445
(West) 888-874-9378 | tricare.mil

U.S. CONGRESS

SENATE COMMITTEES RELEVANT TO THE SEA SERVICES

Appropriations Committee
appropriations.senate.gov

Armed Services Committee
armed-services.senate.gov

Budget Committee
budget.senate.gov

Commerce, Science and Transportation Committee
commerce.senate.gov

Environment and Public Works
epw.senate.gov

Finance Committee
finance.senate.gov

Foreign Relations Committee
foreign.senate.gov

Homeland Security and Governmental Affairs Committee
hsgac.senate.gov

Veterans' Affairs Committee
veterans.senate.gov

Select Intelligence Committee
intelligence.senate.gov

HOUSE COMMITTEES RELEVANT TO THE SEA SERVICES

Appropriations Committee
appropriations.house.gov

Armed Services Committee
armedservices.house.gov

Budget Committee
budget.house.gov

Energy and Commerce Committee
energycommerce.house.gov

Financial Services Committee
financialservices.house.gov

Foreign Affairs Committee
foreignaffairs.house.gov

Homeland Security Committee
homeland.house.gov

Natural Resources
naturalresources.house.gov

Oversight and Government Reform
oversight.house.gov

Permanent Select Intelligence Committee
intelligence.house.gov

Science, Space and Technology Committee
science.house.gov

Transportation and Infrastructure Committee
transportation.house.gov

Veterans' Affairs Committee
veterans.house.gov





The U.S. Navy maintained a posture of ships and aircraft forward deployed and engaged with allies and partners around the world in support of the National Defense Strategy.

Navy ships and aircraft operated in several regions where wars raged and tensions festered, as the United States worked to prevent the spread of wars into regional conflicts and to assert the right of freedom of navigation on the high seas. The aircraft carrier USS Gerald R. Ford — on its first deployment to the U.S. 6th Fleet area of responsibility — and its strike group operated in the eastern Mediterranean Sea to discourage expansion of the Israel-Hamas War by Iranian proxies. On several occasions, Navy destroyers shot down Houthi cruise missiles and drones from Yemen that posed threats to the ships or to Israel.

The USS Dwight D. Eisenhower carrier strike group deployed to the Persian Gulf as a counter to Iranian activity, the first carrier to enter the Gulf since 2020. The USS Bataan amphibious ready group also operated in the Middle East to protect commercial shipping and stand ready for crisis response. Navy patrol and reconnaissance aircraft also supported these operations and also kept watch over the Black Sea and Western Pacific. The Navy also increased freedom of navigation operations in the East China Sea and South China Sea and its naval exercises with allies and partners in the Indo-Pacific region.

During 2023, the Navy also conducted large-scale experimentation with small uncrewed systems in the U.S. 5th Fleet and U.S. 4th Fleet. A fleet of four medium uncrewed surface vehicles of Unmanned Surface Vessel Division One deployed to the Western Pacific as an experiment in extended uncrewed operations.

The Navy's ballistic-missile submarine force continued the service's top mission by maintaining continuous patrols as the sea-based leg of the nation's nuclear triad.

Carlos Del Toro, the 78th secretary of the Navy, leads the Department of the Navy. Adm. Lisa Franchetti, became the 33rd chief of naval operations (CNO), the first woman to become the CNO and the first woman to serve on the Joint Chiefs of Staff. She previously served as vice CNO and as commander of the U.S. 6th Fleet.

During 2023, the Navy commissioned one Virginia-class attack submarine, three Arleigh Burke-class guided-missile destroyers and four littoral combat ships. The Navy's Military Sealift Command received one expeditionary sea base ship, one expeditionary fast transport, and one John Lewis-class fleet oiler.

Construction of the first Columbia-class ballistic-missile submarine is underway. Construction also continued on aircraft carriers, Flight III of the Arleigh Burke-class guided-missile destroyers, littoral combat ships, the first Flight II San Antonio-class amphibious transport dock ship, Constellation-class guided-missile frigates, John Lewis-class fleet oilers, the Navajo-class towing, salvage and rescue ships, new classes of utility landing craft and ship-to-shore connectors, and the first Orca extra-large uncrewed underwater vehicles. Conversion began of the Zumwalt-class DDGs to replace its main battery with tubes to launch Conventional Prompt Strike hypersonic missiles.

During 2023 the Navy decommissioned the last of its Cyclone-class coastal patrol ships, four Ticonderoga-class cruisers, and four Freedom-class littoral combat ships. Three Los Angeles-class attack submarines also were retired.

In naval aviation, the Navy's second operational F-35C squadron, Strike Fighter Squadron 97, began its first deployment with the aircraft. The production Block III versions of the F/A-18E/F Super Hornet strike fighters for the fleet continued into 2023. The MQ-4C Triton uncrewed aircraft achieved initial operational capability with a Guam-based orbit established in the Western Pacific region.

AIRCRAFT CARRIERS

Aircraft carriers provide a significant combat strike capability and play a key role in protecting U.S. security interests and establishing stability in the world's trouble spots. By law, the Navy maintains a force of 11 carriers. The all-nuclear-powered carrier force comprises the 10-ship Nimitz class and the USS Gerald R. Ford, lead ship of the Ford class.

The Ford was commissioned July 22, 2017. The ship engaged in an extended series of trials and completed full-ship shock trials in September 2021. The carrier began its first limited deployment Oct. 4, 2022, in the Atlantic Ocean and in 2023 deployed to the Mediterranean Sea; when the Israel-Hamas war began in October 2023, the deployment was extended.

The Ford class has many features intended to increase the aircraft sortie-generation rate, reduce personnel and improve survivability. The Ford-class configuration and electrical generating plant are designed to accommodate foreseeable requirements during its 50-year service life. Key features include a new nuclear propulsion plant, electromagnetic catapults, advanced arresting gear and new integrated warfare and weapons and materiel handling systems.

The Ford class includes technologies and ship design initiatives that replace maintenance-intensive systems with low-maintenance systems expected to reduce watchstanding and maintenance work for the crew. The Ford is the first carrier designed with all-electric utilities that eliminate steam service lines within the ship, reducing maintenance requirements and improving corrosion-control efforts. The new A1B reactor, Electromagnetic Aircraft Launch System, Advanced Arresting Gear and — on the lead ship only — Dual-Band Radar offer enhanced capability.

A SPY-6 Enterprise Air Surveillance Radar will be installed on the USS John F. Kennedy (CVN 79) and later ships in the class. In November 2020, the Navy awarded a contract to HII to shift the procurement strategy for CVN 79 from a dual-phase delivery — first the hull and then the combat systems — to a single-phase delivery. When delivered in 2025, the Kennedy will be able to operate F-35C carrier variants of the Lightning II aircraft, a capability that will be back-fitted into the Ford.

Newport News Shipbuilding received a $15.2 billion contract award in January 2019 for detail design and construction of the third and fourth Ford-class ships, CVN 80 and CVN 81, under a two-ship block buy. A keel ceremony for the Enterprise (CVN 80) was held Aug. 27, 2022. While the carriers will be built in the same graving dock as previous CVNs, the dry dock has been extended to a length of 2,173 feet to allow construction of two carriers at the same time, thus shortening the overall construction time.

A Nimitz-class ship undergoes a midlife Refueling Complex Overhaul, or RCOH, to achieve its 50-year service life. The overhaul, which generally lasts three to four years, is the most comprehensive maintenance and modernization period the ship undergoes. Both reactors are refueled, and most systems are upgraded and rebuilt. The RCOH of the USS George Washington — which began in 2018 — was completed in 2023. The USS John C. Stennis entered Newport News Shipbuilding's yard May 3, 2021, for its RCOH, scheduled to be complete in 2024.

The Navy had proposed in its 2020 budget proposal to inactivate the USS Harry S. Truman rather than putting it through RCOH in 2024 as part of a plan to invest in other technologies. Congress has refused to support the plan.

In April 2016, the USS Carl Vinson became the first CVN modified with an uncrewed aerial vehicle command center and in August 2021 became the first CVN to deploy with the F-35C along with the CMV-22B Osprey long-range tilt-rotor aircraft in the carrier onboard delivery role.

The USS George Washington will shift homeport to Yokosuka, Japan, in spring 2024, swapping with the USS Ronald Reagan.

Gerald R. Ford Class (CVN)



U.S. NAVY

USS GERALD R. FORD WITH USNS LARAMIE

DISPLACEMENT ..... about 100,000 long tons full load
LENGTH ..... 1,092 feet
BEAM ..... 134 feet
FLIGHT DECK WIDTH ..... 256 feet
SPEED ..... 30+ knots (34.5+ mph)
POWER PLANT ..... 2 nuclear reactors, 4 shafts
AIRCRAFT ..... 75+ (F-35C, F/A-18E/F, EA-18G, E-2D, C-2A, CMV-22B, MH-60R/S)
ARMAMENT ..... Evolved Sea Sparrow Missile (ESSM), Rolling Airframe Missile (RAM), Close-In Weapon System (CIWS)
COMPLEMENT ..... 4,539 (ship's company, air wing and flag staff)
BUILDER ..... HII Newport News Shipbuilding

HOMEPORT

CVN 78 Gerald R. Ford ..... Norfolk, Va.
CVN 79 John F. Kennedy ..... (under construction)
CVN 80 Enterprise ..... (under construction)
CVN 81 Doris Miller ..... (under construction)

Nimitz Class (CVN)



U.S. NAVY

USS DWIGHT D. EISENHOWER | Nimitz Class

DISPLACEMENT ..... about 97,000 tons full load
LENGTH ..... 1,092 feet
BEAM ..... 134 feet
FLIGHT DECK WIDTH ..... 252 feet
SPEED ..... 30+ knots
POWER PLANT ..... 2 nuclear reactors, 4 geared steam turbines, 4 shafts, 280,000 shaft horsepower (shp)
AIRCRAFT ..... about 60 (F-35C, F/A-18E/F, EA-18G, E-2C/D, C-2A, CMV-22B, MH-60R/S)

ARMAMENT.....NATO Sea Sparrow launcher, Vulcan Phalanx CIWS mounts; post-RCOH and CVN 76 configuration includes re-architected Sea Sparrow launchers and RAM launchers

COMPLEMENT.....4,700 (ship's company, air wing and flag staff)

BUILDER.....Newport News Shipbuilding

HOMEPORT

CVN 68 Nimitz.....Bremerton, Wash.

CVN 69 Dwight D. Eisenhower.....Norfolk, Va.

CVN 70 Carl Vinson.....Coronado, Calif.

CVN 71 Theodore Roosevelt.....Coronado, Calif.

CVN 72 Abraham Lincoln.....Coronado, Calif.

CVN 73 George Washington.....Norfolk, Va.

CVN 74 John C. Stennis.....Newport News, Va.

CVN 75 Harry S. Truman.....Norfolk, Va.

CVN 76 Ronald Reagan.....Yokosuka, Japan

CVN 77 George H.W. Bush.....Norfolk, Va.

SUBMARINES

BALLISTIC-MISSILE SUBMARINES (SSBN)

The 14 active Ohio-class SSBNs are the nation's sea-based strategic deterrent force. The last of 18 Ohio-class boats was commissioned in September 1997. The first eight boats of the class initially carried the UGM-96 Trident I C4 missile. In March 1990, the ninth boat of the class, the USS Tennessee, was the first to deploy with the advanced UGM-133A Trident II D5 missile; all later boats were built to carry the D5. Beginning in 2003, the first four boats were converted to guided-missile submarines (SSGNs) armed with conventional weapons while the other four were retrofitted for D5 missiles.

The Ohio-class design allows the submarines to operate for 15 or more years between major overhauls. On average, the submarines spend 77 days at sea followed by 35 days in port for maintenance. Each SSBN has two crews, Blue and Gold, which alternate manning the submarines on patrol. This maximizes strategic availability; reduces the number of submarines required to meet strategic requirements; and allows for proper crew training, readiness and morale. Normally, five SSBNs are at sea at any given time.

The Ohio-class SSBNs are scheduled to begin deactivation in 2027 when the new District of Columbia class begins to enter service. The Navy is making plans for short service-life extensions of up to five Ohio-class boats to provide a margin to maintain the undersea deterrent given the tight schedule for deploying the Columbia-class SSBN.

General Dynamics Electric Boat was awarded a $5.1 billion contract in September 2017 to complete the design of the lead Columbia-class boat, SSBN 826, and in November 2020, GDEB received a nearly $9.5 billion award for construction and test of the USS District of Columbia and lead work on the USS Wisconsin. Including the District of Columbia, hull numbers SSBN 826 through 837 have been reserved for the new class, which previously was known as the Ohio-class Replacement Program. The name of the lead boat was changed in June 2022 to the USS District of Columbia to avoid confusion with the Los Angeles-class attack submarine USS Columbia, which will serve during the SSBN's service.

The District of Columbia design features a new reactor with a core designed to last the life of the boat. The District of Columbia class also will feature an X-stern plane configuration with a waterjet propulsor, electric drive and integrated power system, a six-mast sail with sail planes and a large-aperture bow sonar. The subs will retain the Trident D5LE missile system. Advance construction of the District of Columbia began in 2019; delivery is expected in 2027. The keel-laying ceremony was conducted June 4, 2022. The District of Columbia's first patrol is planned for 2031. Construction of the Wisconsin is scheduled to begin in March 2024. The new submarines are to completely replace the Ohio class by 2039.

Ohio Class (SSBN)



U.S. NAVY

USS MAINE | Ohio Class (SSBN)

DISPLACEMENT.....18,750 tons submerged

LENGTH.....560 feet

BEAM.....42 feet

SPEED.....20+ knots submerged

POWER PLANT.....1 nuclear reactor, 1 shaft

SSBN ARMAMENT.....24 tubes for Trident missiles; 4 torpedo tubes for Mk48 torpedoes

COMPLEMENT.....15 officers, 140 enlisted

BUILDER.....General Dynamics Electric Boat

HOMEPORT

SSBN 730 Henry M. Jackson.....Bangor, Wash.

SSBN 731 Alabama.....Bangor, Wash.

SSBN 732 Alaska.....Kings Bay, Ga.

SSBN 733 Nevada.....Bangor, Wash.

SSBN 734 Tennessee.....Kings Bay, Ga.

SSBN 735 Pennsylvania.....Bangor, Wash.

SSBN 736 West Virginia.....Kings Bay, Ga.

SSBN 737 Kentucky.....Bangor, Wash.

SSBN 738 Maryland.....Kings Bay, Ga.

SSBN 739 Nebraska.....Bangor, Wash.

SSBN 740 Rhode Island.....Kings Bay, Ga.

SSBN 741 Maine.....Bangor, Wash.

SSBN 742 Wyoming.....Kings Bay, Ga.

SSBN 743 Louisiana.....Bangor, Wash.

Columbia Class (SSBN)

HOMEPORT

SSBN 826 Columbia.....(under construction)

SSBN 827 Wisconsin.....(under contract)

GUIDED-MISSILE SUBMARINES (SSGN)

The first four Ohio-class submarines were converted in the mid-2000s to cruise missile-carrying SSGNs intended to carry out strike warfare and special operations. Most of the former Trident missile tubes now are fitted with Multiple All-Up-Round Canisters, each of which can accommodate seven Tomahawk land-attack cruise missiles for a total of up to 154 missiles. The MACs can be removed and replaced with stowage canisters to

accommodate equipment for 66 special operations forces members who can embark aboard each SSGN. The missile tubes also provide additional capability to host future payloads, such as new types of missiles and other weapons and uncrewed aerial and underwater vehicles.

To help facilitate special operations, the two forward-most missile tubes were converted to lock-in/lock-out chambers that double as docking stations for dry deck shelters, or DDSs. The SSGNs can carry two DDSs or two future dry combat submersibles, or one of each.

SSGNs also are equipped with the Common Submarine Radio Room, two High-Data-Rate Antennas and the Battle Management Center, significantly improving the ships' command and control capabilities.

Following conversion, the USS Ohio returned to service Feb. 7, 2006, and deployed in October 2007. The USS Florida was redelivered in April 2006. The USS Michigan and the USS Georgia returned to service in 2007 and 2008, respectively. Each SSGN has Blue and Gold crews that typically swap out while the submarine is on yearlong deployments.

The Florida became the first of its class to participate in combat operations when it launched more than 90 Tomahawk missiles against targets in Libya during Operation Odyssey Dawn in March 2011.

Ohio Class (SSGN)



U.S. NAVY

USS MICHIGAN | Ohio Class (SSGN)

DISPLACEMENT.....18,750 tons submerged
LENGTH.....560 feet
BEAM.....42 feet
SPEED.....25+ knots submerged
POWER PLANT.....1 nuclear reactor, 1 shaft
ARMAMENT.....up to 154 Tomahawk cruise missiles, 2 lock-in/lock-out chambers for DDS; four torpedo tubes for Mk48 torpedoes
COMPLEMENT.....15 officers, 144 enlisted; up to 66 special operations forces members
CONVERSION TEAM.....overhaul: Puget Sound Naval Shipyard; Norfolk Naval Shipyard
CONVERSION.....General Dynamics Electric Boat

HOMEPORT

SSGN 726 Ohio.....Bangor, Wash.
SSGN 727 Michigan.....Bangor, Wash.
SSGN 728 Florida.....Kings Bay, Ga.
SSGN 729 Georgia.....Kings Bay, Ga.

ATTACK SUBMARINES (SSN)

Submarines of the Los Angeles class began entering service in 1976 with the last boat, the USS Cheyenne, commissioned in September 1996. Boats of the improved Los Angeles class, beginning with the USS San Juan, are quieter and originally featured improved combat systems. However, the submarine force's transition to common, open-architecture and commercial, off-the-shelf Submarine Warfare Federated Tactical Systems provides all classes with the same baseline systems that can be easily upgraded with improved hardware and software.

By late 2021, more than 30 Los Angeles-class boats had been permanently withdrawn from service, but the Navy is extending the service lives of six subs to maintain a greater number of operational boats. The first of the six, the Cheyenne, began a 30-month overhaul in November 2021. Recent decommissionings include the USS Oklahoma City in 2022 and the USS Chicago and USS Key West in 2023.

The three-boat Seawolf class supports multiple warfare missions, including strike, mine, anti-submarine, anti-ship and littoral special operations. The third boat of the class, the USS Jimmy Carter, commissioned Feb. 19, 2005, is 100 feet longer to incorporate a multimission section aft of the sail. The enhanced payload allows the Jimmy Carter to conduct special missions along with research and development efforts that aid in the advancement of future submarine technologies and capabilities. The USS Connecticut, damaged Oct. 2, 2021, when it struck an uncharted seamount while submerged in the South China Sea, is undergoing repairs and not expected to return to service at least until late 2025.

The introduction in 2004 of the Virginia class provides the fleet with advanced stealth submarines having improved ability to gain access and remain undetected. These boats possess increased capabilities to perform intelligence collection, surveillance and reconnaissance and communications as well as to launch strike attacks. Virginia-class submarines are configured to carry a dry deck shelter and have a large lockout chamber that allows up to nine special forces operators at a time to leave or enter the boat while submerged. The torpedo room is reconfigurable and, with torpedoes and cradles removed, can accommodate up to 36 special forces operators while retaining four weapons loaded in the torpedo tubes. The submarines also incorporate significant habitability upgrades to eliminate "hot bunking" by having a one-for-one bunk-to-Sailor ratio.

The Virginia boats have non-hull-penetrating photonics masts instead of traditional periscopes. With the arrangement of the control room and location of the sail no longer determined by the boat's optical system, designers moved the sail forward for improved hydrodynamics and positioned the command-and-control room farther aft and down one deck, making it larger and more functional. The boat's wide-aperture array sonar is optimized for littoral and blue-water operations, having improved mine-detection and avoidance capabilities and a higher search speed than previous classes. Virginia boats also have a fly-by-wire ship-control system for precise handling and improved depth control while operating in shallower waters.

A contract for the first four Block I Virginia-class submarines was awarded in 1998 under a teaming arrangement with General Dynamics Electric Boat as the prime contractor and Northrop Grumman Shipbuilding in Newport News, Virginia, as the principal subcontractor. The two shipyards share equally in building each submarine, with each yard responsible for specific hull sections. Final assembly and delivery alternates between GDEB and HII Newport News Shipbuilding (the former Northrop Grumman yard). The lead boat, the USS Virginia, was commissioned Oct. 23, 2004, and began its first mission in September 2005.

A second contract for construction of six Block II submarines was finalized in January 2004. The first of these boats, the USS New Hampshire, was commissioned in 2008. The USS Minnesota, the last Block II boat, was commissioned in 2013.

In 2009, the Navy awarded a contract for eight Block III Virginia-class submarines. The Block III features a revised bow with the sonar sphere replaced by a large-aperture bow array and the 12 Vertical Launching System, or VLS, tubes replaced by two large-diameter MAC launch tubes like those installed in the SSGNs. The Block III contract raised the procurement rate to two boats per year starting in fiscal 2011. Construction of

SSN 784, the first Block III boat, began in fiscal 2009. That boat, the USS North Dakota, was commissioned Oct. 25, 2014, while the last Block III boat, the USS Delaware, was commissioned in April 2020. The Delaware's commissioning ceremony was held underwater at sea — a direct result of the COVID-19 pandemic.

Multiyear procurement of Block IV began with the May 1, 2014, start of construction on the USS Vermont, the first of 10 Block IV boats. The Vermont was commissioned in April 2020. Block IV features improvements in life-cycle sustainment to reduce the number of major maintenance periods and increase the number of major deployments by one over the life of the submarine.

On Dec. 2, 2019, the Navy awarded GDEB a $22.2 billion contract for nine Block V boats and the option for a 10th for a 2025-2029 delivery. The Block V will feature improved acoustic quieting. Eight of the Block V boats will include the Virginia Payload Module, an additional 84-foot hull section placed amidships with four tubes for cruise missiles and other payloads.

The Navy is planning a Block VI version, which will build on the acoustic quieting of the USS South Dakota and include improvements such as additional payloads, a new propulsor, improvements to stealth, enhanced sonar performance in a bow-mounted conformal array, and the ability to sense and interact with more of the water column and sea floor. Procurement is planned for 2024-2028.

A new submarine design, designated SSN(X), will follow production of 48 Virginia-class SSNs, the last of which is scheduled for delivery in 2034. The Navy plans to begin an analysis of alternatives in 2024 and expects to begin construction of the first SSN(X) in 2035. Affordability will be a key focus of the design, leveraging the technology existing at the time. The Navy expects the SSN(X) to make extensive use of off-board sensors. Navy officials have stated that the Navy wants the SSN(X) to incorporate the speed and payload of the Navy's fast and heavily armed Seawolf-class SSN design, the acoustic quietness and sensors of the Virginia-class design, and the operational availability and service life of the Columbia-class design.

Virginia Class



U.S. NAVY

USS MONTANA | Virginia Class

DISPLACEMENT ..... about 7,800 tons submerged; 10,200 tons for Block V with VPM
LENGTH ..... 377 feet; 460 feet for Block V with VPM
BEAM ..... 33 feet
SPEED ..... 25+ knots submerged
POWER PLANT ..... 1 nuclear reactor, 1 shaft
ARMAMENT ..... 4 21-inch torpedo tubes for Mk48 torpedoes and Harpoon missiles; SSN 774-784: 12 VLS tubes for Tomahawk cruise missiles; SSN 784-802: 2 payload tubes for Tomahawks in lieu of 12 VLS tubes; SSN 803 and subsequent: VPM with four payload tubes for 40 Tomahawks
COMPLEMENT ..... 15 officers, 117 enlisted
BUILDERS ..... General Dynamics Electric Boat; HII Newport News Shipbuilding

HOMEPORT

Block I

SSN 774 Virginia ..... Portsmouth, N.H.
SSN 775 Texas ..... Groton, Conn.
SSN 776 Hawaii ..... Pearl Harbor, Hawaii
SSN 777 North Carolina ..... Pearl Harbor, Hawaii

Block II

SSN 778 New Hampshire ..... Norfolk, Va.
SSN 779 New Mexico ..... Norfolk, Va.
SSN 780 Missouri ..... Pearl Harbor, Hawaii
SSN 781 California ..... Groton, Conn.
SSN 782 Mississippi ..... Pearl Harbor, Hawaii
SSN 783 Minnesota ..... Groton, Conn.

Block III

SSN 784 North Dakota ..... Groton, Conn.
SSN 785 John Warner ..... Norfolk, Va.
SSN 786 Illinois ..... Pearl Harbor, Hawaii
SSN 787 Washington ..... Norfolk, Va.
SSN 788 Colorado ..... Groton, Conn.
SSN 789 Indiana ..... Groton, Conn.
SSN 790 South Dakota ..... Groton, Conn.
SSN 791 Delaware ..... Groton, Conn.

Block IV

SSN 792 Vermont ..... Pearl Harbor, Hawaii
SSN 793 Oregon ..... Groton, Conn.
SSN 794 Montana ..... Groton, Conn.
SSN 795 Hyman G. Rickover ..... Groton, Conn.
SSN 796 New Jersey ..... (under construction)
SSN 797 Iowa ..... (under construction)
SSN 798 Massachusetts ..... (under construction)
SSN 799 Idaho ..... (under construction)
SSN 800 Arkansas ..... (under construction)
SSN 801 Utah ..... (under construction)

Block V

SSN 802 Oklahoma ..... (under construction)
SSN 803 Arizona ..... (under construction)
SSN 804 Barb ..... (under construction)
SSN 805 Tang ..... (under construction)
SSN 806 Wahoo ..... (under construction)
SSN 807 Silversides ..... (under construction))
SSN 808 John H. Dalton ..... (named)
SSN 809 Long Island ..... (named)
SSN 810 San Francisco ..... (named)
SSN 811 ..... (ordered)

Seawolf Class

DISPLACEMENT ..... 9,138 tons submerged (12,158 for the Jimmy Carter)
LENGTH ..... 353 feet (453 feet for the Jimmy Carter)
BEAM ..... 40 feet
SPEED ..... 25+ knots submerged



U.S. NAVY

USS SEAWOLF | Seawolf Class

POWER PLANT ..... 1 nuclear reactor, 1 shaft
ARMAMENT ..... 8 torpedo tubes to launch Mk48 torpedoes and Tomahawk and Harpoon missiles
COMPLEMENT ..... 14 officers, 126 enlisted
BUILDER ..... General Dynamics Electric Boat

HOMEPORT

SSN 21 Seawolf ..... Bangor, Wash.
SSN 22 Connecticut ..... Bremerton, Wash. (future: Bangor, Wash.)
SSN 23 Jimmy Carter ..... Bangor, Wash.

Los Angeles Class



U.S. NAVY

USS SAN JUAN | Los Angeles Class

DISPLACEMENT ..... 6,900 tons submerged
LENGTH ..... 360 feet
BEAM ..... 33 feet
SPEED ..... 25+ knots submerged
POWER PLANT ..... 1 nuclear reactor, 2 geared turbines, 1 shaft
ARMAMENT ..... 4 torpedo tubes to launch Mk48 torpedoes and Tomahawk and Harpoon missiles, VLS (in SSN 719 and later)
COMPLEMENT ..... 16 officers, 127 enlisted
BUILDERS ..... SSNs 750, 753, 756, 758, 759, 764-767, 769, 770, 772, 773, 775, 777, 779, 781: Northrop Grumman Shipbuilding/HII Newport News Shipbuilding; SSNs 725, 751, 752, 754, 757, 760-763, 768, 771, 774, 776, 778, 780, 782: General Dynamics Electric Boat

HOMEPORT

SSN 725 Helena ..... Norfolk, Va.
SSN 750 Newport News ..... Portsmouth, N.H.
SSN 751 San Juan ..... Groton, Conn.
SSN 752 Pasadena ..... Norfolk, Va.
SSN 753 Albany ..... Norfolk, Va.
SSN 754 Topeka ..... Pearl Harbor
SSN 756 Scranton ..... San Diego
SSN 757 Alexandria ..... San Diego
SSN 758 Asheville ..... Guam
SSN 759 Jefferson City ..... Guam
SSN 760 Annapolis ..... Guam
SSN 761 Springfield ..... Guam
SSN 762 Columbus ..... Newport News, Va.
SSN 763 Santa Fe ..... Portsmouth, N.H.
SSN 764 Boise ..... Norfolk, Va.
SSN 765 Montpelier ..... Groton, Conn.
SSN 766 Charlotte ..... Pearl Harbor, Hawaii
SSN 767 Hampton ..... San Diego
SSN 768 Hartford ..... Groton, Conn.
SSN 769 Toledo ..... Portsmouth, Va.
SSN 770 Tucson ..... Pearl Harbor, Hawaii
SSN 771 Columbia ..... Pearl Harbor, Hawaii
SSN 772 Greeneville ..... Portsmouth, N.H.
SSN 773 Cheyenne ..... Portsmouth, N.H.

GUIDED-MISSILE CRUISERS

GUIDED-MISSILE CRUISERS (CG)

The 13 Ticonderoga-class cruisers are multimission — air warfare, undersea warfare, naval surface fire support and surface warfare — surface combatants capable of supporting carrier battle groups, supporting amphibious forces or operating independently and as flagships of surface action groups. These ships are equipped with Tomahawk cruise missiles, giving them long-range strike warfare capability. The ships were designed with defensive capability against high-performance aircraft and surface-, air- and submarine-launched missiles. Each ship's Aegis Combat System enables it to control all friendly aircraft in its operating area and still have the capability for surveillance, detection and tracking of enemy aircraft and missiles. The cruisers are essential components in deployed carrier strike groups and embark the air warfare commander for the defense of the carrier.

The class originally comprised 27 ships, but all five Baseline 1 cruisers, equipped with twin-arm missile launchers rather than Vertical Launching System tubes, were decommissioned in 2004 and 2005. All 22 VLS cruisers had their service lives extended beyond original projections. Five cruisers were decommissioned in 2022: the USS Vella Gulf, USS Monterey, USS Anzio, USS Hue City and USS Port Royal. Four more were decommissioned in 2023: the USS Bunker Hill, USS Mobile Bay, USS San Jacinto and USS Lake Champlain.

The USS Lake Erie, which had operated under the direction of the Missile Defense Agency to conduct ballistic missile testing, was transferred from Pearl Harbor, Hawaii, to San Diego in 2014 to undergo modernization and then returned to the fleet for regular operations.

Two cruisers are based in Japan with Forward Deployed Naval Forces-Japan: the USS Antietam and USS Robert Smalls. The USS Shiloh transferred to Pearl Harbor in 2023. The USS Chancellorsville, named for a Confederate victory in the Civil War, was renamed the USS Robert Smalls on Feb. 27, 2023.

The USS Gettysburg was returned to service in 2023 following a lengthy modernization period. The USS Cowpens, USS Chosin and USS Vicksburg continue to undergo similar modernization overhauls.

All Ticonderoga-class cruisers are scheduled to be decommissioned by 2027. They are being replaced in the Air Warfare Commander role by new Flight III Arleigh Burke-class destroyers.

Ticonderoga Class



U.S. NAVY

USS SHILOH | Ticonderoga Class

DISPLACEMENT.....9,600 tons full load
LENGTH.....567 feet
BEAM.....55 feet
SPEED.....30+ knots
POWER PLANT.....4 gas turbines, 2 shafts, 80,000 shp
AIRCRAFT.....2 MH-60Rs
ARMAMENT.....Tomahawk, Harpoon and Standard missiles; 2 5-inch/54-caliber guns; 2 Phalanx CIWS; 6 Mk32 torpedo tubes
COMPLEMENT.....24 officers, 340 enlisted
BUILDERS.....CGs 54,55, 59, 62, 65, 69, 71 Ingalls Shipbuilding; CGs 58, 60, 63, 64, 67, 70: General Dynamics Bath Iron Works

HOMEPORT

CG 54 Antietam.....Yokosuka, Japan
CG 55 Leyte Gulf.....Norfolk, Va.
CG 58 Philippine Sea.....Norfolk, Va.
CG 59 Princeton.....San Diego
CG 60 Normandy.....Norfolk, Va.
CG 62 Robert Smalls.....Yokosuka, Japan
CG 63 Cowpens.....San Diego
CG 64 Gettysburg.....Norfolk, Va.
CG 65 Chosin.....Everett, Wash.
CG 67 Shiloh.....Pearl Habor, Hawaii
CG 69 Vicksburg.....Norfolk, Va.
CG 70 Lake Erie.....San Diego
CG 71 Cape St. George.....Everett, Wash.

DESTROYERS

GUIDED-MISSILE DESTROYERS (DDG)

The Arleigh Burke-class guided-missile destroyers employ an array of weapons and sensors integrated into a multimission warship, including the Aegis Combat System, which integrates air, surface, anti-submarine warfare sensors and engagement systems. The class is further enhanced with a formidable land-attack capability. The Mk41 Vertical Launching System is capable of firing SM-2 Block III/IV surface-to-air, SM-6 and Tomahawk land-attack missiles. Ballistic weapons include the Mk45 5-inch gun and the Mk15 Phalanx Close-In Weapons System.

A total of 62 Arleigh Burke destroyers (DDGs 51-112) constituted the initial planned buy for the class, but in mid-2008, the Navy decided to restart production of the ships. Construction continues, with the total yet to be determined. Altogether, the ships represent the largest class of surface combatants built for the U.S. Navy since World War II.

Four "flights," or variants, of the class are in service: DDGs 51-71 represent the original Flight I design, DDGs 72-78 are Flight II, and DDGs 79-124 and 127 are built to the Flight IIA design, and DDG 125, 126, 128 and subsequent are Flight III ships. There are no significant visual differences between the Flight I and II ships, but Flight IIA introduced a pair of helicopter hangars, adding the ability to carry and support two H-60 helicopters. The stern is extended 5 feet to accommodate aviation facilities, which include a Recover Assist Secure and Traverse system. Other Flight IIA improvements include the Kingfisher mine-avoidance capability, blast-hardened bulkheads, distributed electrical system and advanced networked systems. Six Flight IIA DDGs, 91-96, were intended to carry the WLD-1 Remote Minehunting System, but the system was canceled, and the RMS hangar closed in or converted for other uses.

Flight III DDGs feature the SPY-6(V)1 Air and Missile Defense Radar and upgraded electrical power and air-conditioning plants to accommodate the more powerful SPY-6. The AMDR replaces the SPY-1D radar as the primary Aegis system sensor in these ships. Flight III changes include an enhanced Advanced Capability Build for the Aegis system, more powerful electric and air-conditioning plants and a wider stern for improved stability.

The Navy on June 27, 2017, awarded HII a contract to incorporate the Flight III baseline into the previously awarded DDG 125, the USS Jack H. Lucas. On Sept. 28, 2019, General Dynamics Bath Iron Works received a similar contract to build DDG 126, the USS Louis H. Wilson, as a Flight III; the Navy at the same time ordered DDG 127 from Bath as the last Flight IIA ship. Two major block-buy contracts were awarded Sept. 27, 2018: HII received an order for six ships, DDGs 128, 129, 131, 133, 135 and 137, with an option to add DDG 132 (exercised in December 2018), while General Dynamics Bath Iron Works received an order for DDGs 130, 134, 136 and 138. In August 2023, the Navy awarded contracts to HII Ingalls and Bath Iron Works for six and three Flight III DDGs, respectively. The first Flight III, the USS Jack H. Lucas, was commissioned Oct. 7, 2023.

In 2023, the Navy approved the retrofit modification of some Block IIA DDGs with the SPY-(V)4 radar. Eighteen DDGs have been or will be modified with Standard Missile 3 missiles capable of intercepting and destroying certain types of short-range and midrange ballistic missiles. More ships are expected to be selected for the upgrade.

In March 2023, the Navy approved the service-life extension of five Arleigh Burke class guided-missile destroyers: the USS Arleigh Burke by five years through fiscal year 2031; the USS Ramage and USS Benfold by five years to fiscal year 2035 and fiscal year 2036, respectively; and the USS Mitscher and USS Milius by four years to fiscal year 2034 and fiscal year 2035, respectively. The extension puts each destroyer beyond their estimated service life of 35 years.

In 2014 and 2015, four East Coast guided-missile destroyers, the USS Carney, USS Ross, USS Donald Cook and USS Porter, were forward-deployed to Rota, Spain, to provide ballistic missile defense in Europe. The original four Rota ships were relieved in 2020-2022. The Forward Deployed Naval Force-Europe ships now comprise the USS Arleigh Burke, USS Roosevelt, USS Bulkeley and USS Paul Ignatius. The Biden administration announced in 2022 its intention to expand the force to six destroyers, but the specific ships and a timeline for the expansion had not been announced.

Nine DDGs are based in Yokosuka with Forward-Deployed Naval Forces-Japan: the USS Benfold, USS Milius, USS Higgins, USS Howard, USS Shoup, USS Dewey, USS John Finn, USS Ralph Johnson and USS Rafael Peralta. Two DDGs — the USS Fitzgerald and USS John S. McCain — were

severely damaged in collisions with merchant ships in the Western Pacific in summer 2017. The Fitzgerald's repairs were completed in June 2020 by Ingalls Shipbuilding, while the John S. McCain's repairs were completed in October 2019 in Yokosuka, Japan. Another guided-missile destroyer, the USS Oscar Austin, was severely damaged by fire while in overhaul at BAE Systems in Norfolk, Virginia, in November 2018.

In late 2023, while deployed in the Red Sea, the air-defense systems of three DDGs — USS Carney, USS Thomas Hudner, and USS Mason — destroyed numerous cruise missiles and aerial drones launched from Yemen by Houthi rebels in connection with the Israel-Hamas war.

Modernization: A DDG modernization plan has been developed to backfit design and technology improvements into Flight I and II DDGs to ensure a mission-relevant service life of at least 35-plus years. The DDG modernization technologies were integrated during construction of DDGs 111 and 112 and then retrofitted into Flight I and II ships during in-service overhaul periods.

DDG modernization reduces total ship class ownership costs with hull, mechanical and electrical technology upgrades that include a full integrated bridge, improved machinery and damage control, wireless communications, digital video surveillance, quality-of-life improvements and an advanced galley. Commercial, off-the-shelf computing equipment in an open-architecture environment allows for more affordable future combat system upgrades. Fielding the HM&E systems began with two ships in fiscal 2010 and three ships in each successive year. The combat system upgrades began in fiscal 2012, with ships already installed with the HM&E systems using the same fielding profile.

Zumwalt Class: The Zumwalt-class DDG 1000, formerly DD(X), is a multimission destroyer built to an entirely new design tailored for sustained operations in littoral and land-attack missions. The ships complement but do not replace the Arleigh Burke class. The USS Zumwalt (DDG 1000) can provide independent forward presence and deterrence, support special operations forces and operate as an integral part of joint and combined expeditionary forces. The design of the Zumwalt class integrates numerous technologies, systems and principles that include multispectral signature reduction, low operation and support costs, and improved human systems integration and quality of life in a balanced warfighting design.

The ship's defensive systems employ active and passive sensors as well as onboard weapon systems and uncrewed vehicles. The Zumwalt is designed to defeat anti-access systems such as advanced cruise missiles, sea mines and quiet submarines. The ship also has capabilities against hypersonic air-breathing and atmospheric missile threats.

The Zumwalt class features a wave-piercing tumblehome hull along with an integrated deckhouse and apertures designed to minimize signatures. The ship's open-architecture Total Ship Computing Environment uses plug-and-play systems to provide adaptability and scalability to cost-effectively upgrade and modernize the class throughout its service life. Open architecture and spiral development ensures compatibility with future ships and simplifies insertion of new technologies to increase operational capabilities.

The Zumwalt is fitted with an integrated power system, consisting of two main and two auxiliary turbine generator sets that produce and distribute power for all the ship's electrical needs, from the motors to combat systems and "hotel" services. Integrated power generates and distributes enough power to enable future employment of directed-energy weapons.

The ship's sensors and combat system include the Integrated Undersea Warfare System and the SPY-3 X-band Multifunction Radar. The Zumwalt can conduct area air surveillance, including over land, throughout the cluttered sea-land interface. The SPY-3 also can detect and support engagement of the most advanced anti-ship cruise missile threats.



U.S. NAVY

USS NITZE | Arleigh Burke Class

The ship's offensive weaponry originally included two 155 mm Advanced Gun Systems and Tomahawk land-attack missiles. The AGS battery was designed to satisfy Marine Corps naval surface fires requirements by providing sustained precision and volume fire support for forces on the ground. The guns were designed to fire precision-guided Long-Range Land Attack Projectiles that reach up to 76 nautical miles, tripling fire-support coverage compared with the Mk45 5-inch gun. The Navy in 2016 canceled further procurement of LRLAP projectiles on cost grounds. The ship's missile payload is housed in the Peripheral VLS, a new damage-tolerant system that directs explosive damage outward, greatly reducing the chance of a single-hit ship loss.

In 2023, the USS Zumwalt transferred to HII's Ingalls shipyard for removal of the AGS and the installation of the Large Missile Vertical Launch System for Conventional Prompt Strike hypersonic missiles. Two launch tubes will replace each AGS for a total of four tubes. Each tube will be able to accommodate multiple Common-Hypersonic Glide Body vehicles. The CPS is scheduled to be deployed on the Zumwalt in 2025. The other two Zumwalt-class DDGs are expected to follow in the conversion: the USS Lyndon Johnson followed by the USS Michael Monsoor.

Earlier plans called for as many as 32, then 28 and then seven Zumwalt-class ships, but in 2008, the Navy reduced the size of the class to three ships in conjunction with a decision to restart construction of Arleigh Burke-class destroyers. Construction of the ships was planned to alternate between Northrop Grumman Shipbuilding and General Dynamics Bath Iron Works, but the acquisition strategy was changed in 2008 to build all three ships at Bath Iron Works.

The ships were originally to have been delivered in two phases, the first of which was delivery of the ship's HBM&E from the builder followed by a second delivery after installation of the full combat system at San Diego. Fabrication of the Zumwalt began Feb. 11, 2009. The ship was launched Oct. 28, 2013, and ceremonially commissioned Oct. 15, 2016. The ship's mission systems were installed in San Diego from 2017 to 2019, and the Zumwalt was placed in full commission April 24, 2020. Delivery of the USS Michael Monsoor was April 24, 2018; the ship was placed in commission Jan. 26, 2019. The Lyndon Johnson began initial sea trials in August 2021 and moved in January 2022 from Bath Iron Works to HII's shipyard in Pascagoula, Mississippi, in 2022. In August 2022, HII received a $41.6 million contract to complete the ship (expected in 2024) in Pascagoula. All three ships are or will be homeported in San Diego with Surface Development Squadron 1. The Zumwalt deployed to the Western Pacific in September 2022.

A new large surface combatant, DDG(X), is under development to follow Arleigh Burke-class production.

Arleigh Burke Class

DISPLACEMENT....Flight I and II: 8,960; Flight IIA: 9,496

LENGTH....Flight I and II: 505 feet; Flight IIA: 510 feet

BEAM....59 feet

SPEED....30+ knots

POWER PLANT....4 GE LM2500 gas turbines, 2 shafts, 100,000 total shp

AIRCRAFT....Flights I and II: landing platform and handling facilities only; Flight IIA: 2 MH-60Rs

ARMAMENT....Harpoon (Flights I and II), Tomahawk and Standard missiles, ESSM (DDG 79 and following), Mk41 VLS, 1 or 2 Mk15 Phalanx CIWS, 1 Mk45 5-inch/54-caliber gun (DDG 51-80), 1 Mk45 5-inch/62-caliber gun (DDG 81 and following), Mk38 Mod 2 25 mm machine gun (DDG 100 and following), Mk32 dual surface vessel torpedo tube launchers; DDGs 64, 71, 75 and 78 also armed with SeaRam launcher

COMPLEMENT....DDG 51-71: designed for 341; DDG 72-78: 356; DDG 79-90: 383; DDG 91-106: 369; DDG 107-112: 314, crew reduction initiatives ongoing, with 276 typical

BUILDERS....DDGs 51, 53, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 73, 75-77, 79, 81, 83, 85, 87, 90, 92, 94, 96, 99, 101, 102, 104, 106, 108, 109, 111, 112, 115, 116, 118, 120, 122, 124, 126, 127, 130, 132, 134, 136, 138: General Dynamics Bath Iron Works; DDGs 52, 55, 57, 59, 61, 63, 65, 67, 69, 71, 74, 78, 80, 82, 84, 86, 88, 89, 91, 93, 95, 97, 98, 100, 103, 105, 107, 110, 113, 114, 117, 119, 121, 123, 125, 128, 129, 131, 133, 135, 137: HII

HOMEPORT

Flight I

DDG 51 Arleigh Burke....Rota, Spain
DDG 52 Barry....Seattle
DDG 53 John Paul Jones....Seattle
DDG 54 Curtis Wilbur....San Diego
DDG 55 Stout....Norfolk, Va.
DDG 56 John S. McCain....Everett, Wash.
DDG 57 Mitscher....Norfolk, Va.
DDG 58 Laboon....Norfolk, Va.
DDG 59 Russell....San Diego
DDG 60 Paul Hamilton....San Diego
DDG 61 Ramage....Norfolk, Va.
DDG 62 Fitzgerald....San Diego
DDG 63 Stethem....San Diego
DDG 64 Carney....Mayport, Fla.
DDG 65 Benfold....Yokosuka, Japan
DDG 66 Gonzalez....Norfolk, Va.
DDG 67 Cole....Norfolk, Va.
DDG 68 The Sullivans....Mayport, Fla.
DDG 69 Milius....Yokosuka, Japan
DDG 70 Hopper....Pearl Harbor, Hawaii
DDG 71 Ross....Norfolk, Va.

Flight II

DDG 72 Mahan....Norfolk, Va.
DDG 73 Decatur....Pearl Harbor, Hawaii
DDG 74 McFaul....Norfolk, Va.
DDG 75 Donald Cook....Mayport, Fla.
DDG 76 Higgins....Yokosuka, Japan
DDG 77 O'Kane....San Diego
DDG 78 Porter....Norfolk, Va.

Flight IIA

DDG 79 Oscar Austin....Norfolk, Va.
DDG 80 Roosevelt....Rota, Spain
DDG 81 Winston S. Churchill....Norfolk, Va.
DDG 82 Lassen....Mayport, Fla.
DDG 83 Howard....Yokosuka, Japan
DDG 84 Bulkeley....Rota, Spain
DDG 85 McCampbell....Everett, Wash
DDG 86 Shoup....Yokosuka, Japan
DDG 87 Mason....Mayport, Fla.
DDG 88 Preble....San Diego
DDG 89 Mustin....San Diego
DDG 90 Chafee....San Diego
DDG 91 Pinckney....San Diego
DDG 92 Momsen....San Diego
DDG 93 Chung-Hoon....San Diego
DDG 94 Nitze....Norfolk, Va.
DDG 95 James E. Williams....Norfolk, Va.
DDG 96 Bainbridge....Norfolk, Va.
DDG 97 Halsey....San Diego
DDG 98 Forrest Sherman....Norfolk, Va.
DDG 99 Farragut....Mayport, Fla.
DDG 100 Kidd....Everett, Wash.
DDG 101 Gridley....Everett, Wash.
DDG 102 Sampson....Everett, Wash.
DDG 103 Truxtun....Norfolk, Va.
DDG 104 Sterett....San Diego
DDG 105 Dewey....Yokosuka, Japan
DDG 106 Stockdale....San Diego
DDG 107 Gravely....Norfolk, Va.
DDG 108 Wayne E. Meyer....Pearl Harbor, Hawaii
DDG 109 Jason Dunham....Mayport, Fla.
DDG 110 William P. Lawrence....Pearl Harbor, Hawaii
DDG 111 Spruance....San Diego
DDG 112 Michael Murphy....Pearl Harbor, Hawaii
DDG 113 John Finn....Yokosuka, Japan
DDG 114 Ralph Johnson....Yokosuka, Japan
DDG 115 Rafael Peralta....Yokosuka, Japan
DDG 116 Thomas Hudner....Mayport, Fla.
DDG 117 Paul Ignatius....Rota, Spain
DDG 118 Daniel Inouye....Pearl Harbor, Hawaii
DDG 119 Delbert D. Black....Mayport, Fla.
DDG 120 Carl M. Levin....Pearl Harbor, Hawaii
DDG 121 Frank E. Petersen Jr....Pearl Harbor, Hawaii
DDG 122 John Basilone....(under construction)
DDG 123 Lenah Sutcliffe Higbee....San Diego
DDG 124 Harvey C. Barnum Jr....(under construction)

Flight III

DDG 125 Jack H. Lucas....San Diego
DDG 126 Louis H. Wilson Jr....(under construction)

Flight IIA

DDG 127 Patrick Gallagher....(under construction)

Flight III

DDG 128 Ted Stevens.....(under construction)
DDG 129 Jeremiah Denton.....(under construction)
DDG 130 William Charette.....(under construction)
DDG 131 George M. Neal.....(under construction)
DDG 132 Quentin Walsh.....(under construction)
DDG 133 Sam Nunn.....(under construction)
DDG 134 John E. Kilmer.....(ordered)
DDG 135 Thad Cochran.....(ordered)
DDG 136 Richard Lugar.....(ordered)
DDG 137 John F. Lehman.....(ordered)
DDG 138 J. Wiliam Middendorf.....(ordered)
DDG 139 Telesforo Trinidad.....(ordered)
DDG 140 Thomas G. Kelley.....(ordered)
DDG 141 Ernest E. Evans.....(ordered)
DDG 142.....(ordered)

Zumwalt Class



U.S. NAVY

USS ZUMWALT | Zumwalt Class

DISPLACEMENT.....15,482 long tons
LENGTH.....600 feet
BEAM.....80.7 feet
SPEED.....30 knots
POWER PLANT.....Integrated power system: 2 main turbine generators, 2 auxiliary turbine generator sets, 2 34.6-megawatt propulsion motors
ARMAMENT.....80-cell Advanced VLS cells for Tomahawk, Standard, ESSM and Vertical-Launch Anti-Submarine Rocket missiles, 2 155 mm AGSs; 2 Mk46 30 mm guns
AIRCRAFT.....2 MH-60Rs
COMPLEMENT.....130 plus 28 in aviation detachment
BUILDER.....General Dynamics Bath Iron Works

HOMEPORT

DDG 1000 Zumwalt.....Pascagoula, Miss.
DDG 1001 Michael Monsoor.....San Diego
DDG 1002 Lyndon B. Johnson.....(under construction; future: San Diego)

NEXT-GENERATION GUIDED-MISSILE DESTROYER (DDG(X))

The Navy plans to field a new generation of DDGs. The DDG(X) will feature the DDG 51 Flight III combat system with a new hull, will be equipped with an integrated power system and greater endurance, and will feature the space, weight and power to be able to incorporate evolutionary upgrades over its life.

FRIGATES

GUIDED-MISSILE FRIGATES (FFG)

A full and open competition for a new guided-missile frigate with the program designation FFG(X) was announced in 2017. Four competitive bids were received. On April 30, 2020, Fincantieri Marinette Marine was announced as the winner with the award of a $795 million detail design and construction contract for the first ship, the USS Constellation (FFG 62). The contract includes options for nine more ships, and current plans call for a total of at least 20 new frigates.

The Constellation-class design is based on the Italian FREMM frigate built by Fincantieri in Italy. The ships are intended to conduct anti-air warfare, anti-surface warfare, anti-submarine warfare and electronic warfare and to operate independently or as part of tactical formations. The FFG will feature a Mk41 Vertical Launching System, canister-launched Naval Strike Missiles, Mk110 57 mm gun, RAM Mk49 launcher, CAPTAS-4 variable-depth sonar, TB-37 Multi-Function Towed Array, SQQ-89(V)16 undersea combat system, SLQ-25E Nixie, SLQ-32(V)6 SEWIP Block 2, SPY-6(V)3 Enterprise Air Surveillance Radar (EASR), Aegis Baseline 10 combat system, one MH-60R helicopter and two 7-meter rigid-hull inflatable boats. Delivery of the Constellation is planned for 2026; after extensive operational testing, the frigate is scheduled to be fully operational in 2029.

Constellation Class



U.S. NAVY

USS LAFAYETTE (ARTIST'S RENDERING) | Constellation Class

DISPLACEMENT.....6,112 tons light; 7,408 tons full load
LENGTH.....496 feet
BEAM.....64.6 feet
SPEED.....30 knots
POWER PLANT.....1 gas turbine, 2 electric propulsion motors, 4 ship service diesel generators, 1 auxiliary propulsion unit (Combined Diesel Electric and Gas Turbine)
ARMAMENT.....32-cell Mk41 VLS, 16 Naval Strike Missiles in deck canisters, 1 Mk110 57 mm gun, 21-cell RAM Mk49
AIRCRAFT.....1 MH-60R
COMPLEMENT.....193 plus 27 in aviation detachment
BUILDER.....Fincantieri Marinette Marine Group

HOMEPORT

FFG 62 Constellation.....(under construction; future: Everett, Wash.)
FFG 63 Congress.....(ordered)
FFG 64 Chesapeake.....(ordered)
FFG 65 Lafayette.....(ordered)

LITTORAL COMBAT SHIPS

LITTORAL COMBAT SHIPS (LCS)

The LCS was intended to carry out littoral or coastal missions while equipped with one of several specific mission modules. The first three mission packages were for anti-mine, anti-submarine and anti-surface warfare. The original concept of swapping out mission modules as needed has been dropped, and ships now are designated for either anti-surface or anti-mine warfare; the anti-submarine module for LCS was canceled.

The ships are intended to fight in enclosed or coastal contested waters, with their abilities optimized by networked, off-board sensors and weapons. They feature an advanced networking capability to share tactical information with other Navy aircraft, ships, submarines and joint units. Mission packages consist of mission modules — sensors, weapons and crewed and uncrewed vehicles used above, on and below the surface — operated by special personnel detachments. The LCS can perform self-defense; high-speed transit; maritime interdiction operations; and intelligence, surveillance, reconnaissance and anti-terrorism/force-protection missions. It can also support special operations forces and provide homeland defense. Armed with the Naval Strike Missile, the ships also have a longer-range anti-surface capability.

A total of 52 LCSs had been envisioned, but in February 2014, then-Defense Secretary Chuck Hagel ordered the Navy to truncate the program at 32 ships and proceed with development of a frigate-sized small surface combatant, which became the FFG(X) program.

LCS 1, the USS Freedom, a semi-planing monohull design built by the Lockheed Martin team, was commissioned Nov. 8, 2008. The ship conducted a demonstration deployment to the U.S. Southern Command and U.S. Pacific Command areas of operations in 2010 and a more extensive, 10-month deployment in 2013, operating for much of the year from Singapore, where the U.S. had planned to forward-deploy four Freedom-class LCSs.

LCS 2, the USS Independence, an all-aluminum trimaran built by the General Dynamics team, was delivered to the Navy in December 2009 and commissioned Jan. 16, 2010. It primarily has been assigned to tests of the mine warfare mission package. In a break from the test schedule, the ship took part in Rim of the Pacific exercises in and around Hawaii in mid-2014. The Independence completed initial operational testing and evaluation in June 2016.

In September 2016, the Navy announced several significant changes to the LCS program based on operational experience. The original 3:2:1 crew concept — three crews, two ships, one deployed — was changed to a Blue/Gold concept like that used by the SSBN force, with two crews dedicated to each LCS. The mission package detachments merged with the LCS crews.

The Navy also decided to base the LCSs according to class, with the Independence variant based in San Diego and the Freedom class in Mayport, Florida. The decision to base the Freedom variant on the East Coast was a matter of pier support. The Freedom class, due to its size, is a better fit for the port loading requirements of Mayport.

The USS Montgomery and the USS Gabrielle Giffords deployed to the Western Pacific in mid-2019, the latter the first to be armed with the RGM-184 Naval Strike Missile. The USS Detroit was the first to deploy from the East Coast and was armed with Hellfire missiles as part of its surface warfare mission package. Independence-class ships fitted with NSM now routinely deploy to the Western Pacific, while Freedom-class ships deploy largely to the U.S. 4th Fleet area of operations around Central America and the Caribbean. In 2022, the USS Sioux City carried out the first LCS deployment to the U.S. 6th Fleet in Europe and the U.S. 5th Fleet in the Mideast. In 2023, the USS Indianapolis operated for even longer with the U.S. 5th Fleet.

On Oct. 6, 2023, an SM-6 was fired from a containerized launcher on the deck of the USS Savannah. The Navy stated it was a demonstration of how capabilities could quickly be fitted onboard an LCS and just as quickly removed.

Three of the first four LCSs have been decommissioned and placed in reserve to free up funds for other investments. The Freedom was decommissioned Sept. 30, 2021; the Independence was decommissioned July 31, 2021; and the Coronado was decommissioned Sept. 14, 2022. The Freedom and Independence were stricken for disposal Sept. 15, 2022. In 2023, the Freedom-class USS Milwaukee, USS Detroit and USS Sioux City were decommissioned and stricken for disposal.

Deliveries of the Freedom-class ships were delayed beginning in August 2020 pending an approved "fix" to the design's combining gear. After testing aboard the USS Minneapolis-St. Paul, then-Chief of Naval Operations Adm. Mike Gilday approved the fix in November 2021, and the Navy accepted delivery of the Minneapolis-St. Paul on Nov. 18, 2021. The fix also has been applied to the USS St. Louis, and all remaining Freedom-class ships will be delivered with the fix in place.

In the 2023 budget proposal, the Navy planned to decommission nine Freedom-class LCS over five years and retain only six in service, equipped with the surface warfare mission package. A total of 15 Independence-class LCSs would be retained, all equipped with the mine countermeasures mission package.

The USS Fort Worth, currently based in San Diego, will be transferred to Mayport in 2024.

Freedom Class



FINCANTIERI MARINE GROUP

USS ST. LOUIS | Freedom Class

DISPLACEMENT	about 3,000 metric tons full load
LENGTH	378 feet
BEAM	57.4 feet
SPEED	40+ knots
POWER PLANT	2 gas turbines, 2 diesel engines
AIRCRAFT	1 MH-60R/S, 1 MQ-8 VTUAV with mission package
ARMAMENT	1 Mk110 57 mm gun, 1 RAM launcher, Surface-to-Surface Mission Module
COMPLEMENT	50 core crew; berthing for 75
BUILDERS	Lockheed Martin; Fincantieri Marinette Marine

HOMEPORT

LCS 3 Fort Worth	San Diego
LCS 13 Wichita	Mayport, Fla.
LCS 15 Billings	Mayport, Fla.
LCS 17 Indianapolis	Mayport, Fla.

LCS 19 St. Louis ..... Mayport, Fla.
LCS 21 Minneapolis-St. Paul ..... Mayport, Fla.
LCS 23 Cooperstown ..... Mayport, Fla.
LCS 25 Marinette ..... Mayport, Fla.
LCS 27 Nantucket ..... (under construction; future: Mayport, Fla.)
LCS 29 Beloit ..... (under construction; future: Mayport, Fla.)
LCS 31 Cleveland ..... (under construction; future: Mayport, Fla.)

Independence Class



U.S. NAVY

USS CINCINNATI | Independence Class

DISPLACEMENT ..... about 3,000 metric tons full load
LENGTH ..... 419 feet
BEAM ..... 103.7 feet
SPEED ..... 40+ knots
POWER PLANT ..... 2 gas turbines, 2 diesel engines
AIRCRAFT ..... 1 MH-60R/S, 1 MQ-8 VTUAV with a mission package installed
ARMAMENT ..... 1 Mk110 57 mm gun, 1 SeaRAM launcher, 4 RGM-184 missiles on some ships
COMPLEMENT ..... 50 core crew; berthing for 75
BUILDERS ..... LCS 2, 4: General Dynamics Bath Iron Works team; LCS 6 and subsequent: Austal USA

HOMEPORT

LCS 6 Jackson ..... San Diego
LCS 8 Montgomery ..... San Diego
LCS 10 Gabrielle Giffords ..... San Diego
LCS 12 Omaha ..... San Diego
LCS 14 Manchester ..... San Diego
LCS 16 Tulsa ..... San Diego
LCS 18 Charleston ..... San Diego
LCS 20 Cincinnati ..... San Diego
LCS 22 Kansas City ..... San Diego
LCS 24 Oakland ..... San Diego
LCS 26 Mobile ..... San Diego
LCS 28 Savannah ..... San Diego
LCS 30 Canberra ..... San Diego
LCS 32 Santa Barbara ..... San Diego
LCS 34 Augusta ..... San Diego
LCS 36 Kingsville ..... (under construction; future: San Diego)
LCS 38 Pierre ..... (under construction; future: San Diego)

AMPHIBIOUS WARFARE SHIPS

AMPHIBIOUS ASSAULT SHIPS (LHA, LHD)



U.S. NAVY

USS BATAAN | Wasp Class

The Wasp-class LHDs and America-class LHAs provide the Marine Corps with a means of ship-to-shore movement by helicopter and by landing craft. The ships can accommodate the landing craft utility and landing craft air cushion; can operate all helicopters and tilt-rotor aircraft flown by the Marine Corps; and can operate and support AV-8B and F-35B short takeoff and vertical landing aircraft. They have extensive storage capacity and have proven very useful in combat operations, major humanitarian assistance and disaster relief missions.

Amphibious assault ships served as launching platforms for Marine Corps expeditionary forces to Afghanistan in Operation Enduring Freedom in 2001 and 2002 and to Iraq in Operation Iraqi Freedom in 2003. During the latter operation, two LHDs served as "Harrier carriers," each operating an air group of AV-8Bs against targets inside Iraq. The USS Kearsarge launched strikes against Libyan government forces in 2011 in Operation Odyssey Dawn/Uphold Protector. Other LHAs/LHDs have launched strikes in Iraq and Syria since 2014 against the Islamic State.

The eighth LHD, the USS Makin Island, commissioned Oct. 24, 2009, is powered by gas turbine engines in lieu of a steam plant. Similar gas turbine plants power the America class.

The USS Bonhomme Richard was extensively damaged by fire beginning July 12, 2020, while being upgraded in San Diego. Deemed uneconomical to repair, the ship was decommissioned and stricken April 15, 2021, and scrapped.

The USS America, the first ship of the LHA Replacement Program, is an aviation-centric variant of the LHD 8. Along with the USS Tripoli, the ships are the only big-deck amphibious ships without a well deck. Key differences between the America and the Makin Island include an enlarged hangar deck, enhanced maintenance facilities, additional aviation storerooms and an electronically reconfigurable command, control, communications, computers, intelligence, surveillance and reconnaissance suite. The America was commissioned Oct. 11, 2014, and the Tripoli was commissioned July 15, 2020.

The Tripoli deployed in 2022 with a complement of 20 F-35Bs for concept development of the "Lightning Carrier" concept. The America deployed in 2023 with a full squadron of F-35Bs.

Follow-on ships beginning with the USS Bougainville feature a well deck as in LHD-type ships but retain the aviation capabilities of the America and Tripoli; they also feature the Enterprise Air Surveillance Radar in lieu of the SPS-48 radar. Construction of the Bougainville began in 2018, with delivery scheduled for 2025. Construction of the Fallujah began in late 2022 while long-lead procurement for LHA 10 began in late 2023.

The USS Wasp deployed in 2016 for the first time in 11 years after having been modified to support F-35B testing and launched combat missions against Islamic State targets in Libya in mid- to late 2016 in support of Operation Odyssey Lightning. The Wasp, as the first ship to deploy with F-35Bs, was forward-deployed to Japan in January 2018 in place of the Bonhomme Richard but redeployed after only 20 months to the West Coast. The America relieved the Wasp in late 2019 as the forward-deployed assault ship in Sasebo, Japan.

All five Tarawa-class LHAs have been removed from service. The last Tarawa-class LHA, the USS Peleliu, was decommissioned March 31, 2015, and remains in reserve status.

Wasp Class (LHD)

DISPLACEMENT.....LHDs 1-4: 40,650 tons full load; LHDs 5-7: 40,358 tons full load; LHD 8: 41,772 tons full load

LENGTH.....844 feet

BEAM.....106 feet

SPEED.....20+ knots

POWER PLANT.....LHDs 1-7: 2 boilers, 2 geared turbines, 2 shafts, 70,000 shp; LHD 8: 2 gas turbines, 70,000 shp, 2 auxiliary propulsion motors (5,000 hp each)

AIRCRAFT.....F-35B, AV-8B, MV-22, CH-53, UH-1, AH-1,

MH-60S ARMAMENT.....2 RAM launchers, 2 NATO Sea Sparrow launchers, 3 20 mm Phalanx CIWS mounts (2 on LHDs 5-8), 4 .50-caliber machine guns, 4 25 mm Mk38 machine guns (LHDs 5-8 have 3 25 mm Mk38 machine guns)

COMPLEMENT.....ship's company LHDs 1-7: 66 officers, 1,004 enlisted; LHD 8: 65 officers, 994 enlisted

BUILDER.....Ingalls Shipbuilding, a division of HII

HOMEPORT

LHD 1 Wasp.....Norfolk, Va.

LHD 2 Essex.....San Diego

LHD 3 Kearsarge.....Norfolk, Va.

LHD 4 Boxer.....San Diego

LHD 5 Bataan.....Norfolk, Va.

LHD 7 Iwo Jima.....Norfolk, Va.

LHD 8 Makin Island.....San Diego

America Class (LHA)



U.S. NAVY

USS AMERICA | America Class

DISPLACEMENT.....44,971 long tons full load

LENGTH.....844 feet

BEAM.....106 feet

SPEED.....20+ knots

POWER PLANT.....2 gas turbines, 2 shafts, 70,000 bhp, 2 auxiliary propulsion motors (5,000 hp each)

AIRCRAFT.....F-35B, AV-8B, MV-22, CH-53, UH-1, AH-1,

MH-60S ARMAMENT.....2 RAM launchers, 2 NATO Sea Sparrow launchers (with ESSM), 2 Phalanx CIWS mounts, 7 twin .50-caliber machine gun mounts

COMPLEMENT.....ship's company: 65 officers, 994 enlisted; embarked Marines: 1,687 (plus 184 surge)

BUILDER.....Ingalls Shipbuilding, a division of HII

HOMEPORT

Flight 0

LHA 6 America.....Sasebo, Japan

LHA 7 Tripoli.....San Diego

Flight I

LHA 8 Bougainville.....(under construction)

LHA 9 Fallujah.....(under construction)

AMPHIBIOUS TRANSPORT DOCK SHIPS (LPD)



U.S. NAVY

USS JOHN MURTHA | San Antonio Class

LPDs are used to transport and land Marines, their equipment and supplies by embarked air cushion or conventional landing craft or amphibious assault vehicles, augmented by helicopters or vertical takeoff and landing aircraft. These ships support amphibious assault, special operations or expeditionary warfare missions and can serve as secondary aviation platforms for expeditionary strike groups. They have extensive command and control facilities, much advanced from previous LPDs.

The USS San Antonio, the lead ship of its class, was commissioned Jan. 14, 2006, and deployed for the first time Aug. 28, 2008. The USS New York's bow stem was cast in 2003 using 7.5 tons of steel salvaged from the World Trade Center following the 9/11 terrorist attacks. The Navy named the eighth and ninth ships of the class — the USS Arlington and USS Somerset — in honor of the victims of the attacks on the Pentagon and United Flight 93, respectively. The Arlington and the Somerset also incorporate materials salvaged from those sites.

The Somerset, commissioned April 1, 2014, was the last ship built at HII Avondale Shipyard near New Orleans.

The USS Fort Lauderdale and the USS Richard M. McCool Jr. are modified versions of the LPD 17 design, designated "Flight 1+." They dispense with the composite structure masts of the original design and instead have a tripod foremast somewhat similar to those installed on Arleigh Burke-class destroyers. Flight 1+ is considered a transitional design between the earlier LPD 17 design and later Flight II ships.

In 2018, the LX(R) program to replace the Whidbey Island-class and Harpers Ferry-class LSDs was renamed the Flight II San Antonio-class LPD. The Flight II LPDs feature tripod masts, modified hangar doors, an open upper stern gate and a flight deck able to handle MV-22B aircraft.

The Navy and Marine Corps have a requirement for 21 LPDs of all flights, but in 2022, the Pentagon initiated a procurement "pause" of further Flight II LPDs pending a cost/capability study. Further procurement of Flight II LPDs beyond LPD 32 is under review.

San Antonio Class

DISPLACEMENT.....about 24,900 long tons full load
LENGTH.....684 feet
BEAM.....105 feet
SPEED.....22+ knots
POWER PLANT.....4 sequentially turbocharged marine diesels, 2 shafts, 41,600 shp
AIRCRAFT LAND/LAUNCH SPOTS.....2 CH-53Es or 2 MV-22s (4 total with 2 wings spread/2 folded), or 4 of any of the following: AH-1, UH-1
AIRCRAFT HANGAR.....storage for 1 CH-53E, 1 MV-22 or 2 UH/AH-1s when cross-decked
ARMAMENT.....2 Mk31 Mod 1 RAM launchers, 2 Mk46 30 mm gun systems, 10 .50-caliber machine guns
LANDING CRAFT.....2 LCACs or 1 LCU and 14 amtracs
COMPLEMENT.....28 officers, 351 Sailors and 3 Marines; 699 troop-fixed accommodations plus 101 surge (800 total)
BUILDERS.....Ingalls Shipbuilding, a division of HII

HOMEPORT

Flight I

LPD 17 San Antonio.....Norfolk, Va.
LPD 18 New Orleans.....Sasebo, Japan
LPD 19 Mesa Verde.....Norfolk, Va.
LPD 20 Green Bay.....Sasebo, Japan
LPD 21 New York.....Norfolk, Va.
LPD 22 San Diego.....San Diego
LPD 23 Anchorage.....San Diego
LPD 24 Arlington.....Norfolk, Va.
LPD 25 Somerset.....San Diego
LPD 26 John P. Murtha.....San Diego
LPD 27 Portland.....San Diego
LPD 28 Fort Lauderdale.....Norfolk, Va.
LPD 29 Richard M. McCool Jr.....(under construction)

Flight II

LPD 30 Harrisburg.....(under construction)
LPD 31 Pittsburgh.....(under construction)
LPD 32 Philadelphia.....(ordered)

DOCK LANDING SHIPS (LSD)

The versatile Whidbey Island-class ships were the first dock landing ships specifically designed to operate landing craft air cushion; they can carry four in their well decks. LSDs accommodate a sizable number of troops but carry more cargo and vehicles than LPDs. The Harpers Ferry variant carries only two LCACs in favor of a greater cargo-carrying capacity, improved facilities for embarked troops and a greater operating range.

Ships of the Whidbey Island class have begun to be decommissioned as further San Antonio-class LPDs enter service. The USS Fort McHenry was decommissioned April 16, 2021, and the Whidbey Island was decommissioned Aug. 20, 2022. Three more ships may be decommissioned during 2024.

Whidbey Island Class

DISPLACEMENT.....15,939 tons full load
LENGTH.....609 feet
BEAM.....84 feet



U.S. NAVY

USS RUSHMORE | Whidbey Island Class

SPEED.....20+ knots
POWER PLANT.....4 Colt Industries 16-cylinder diesels, 2 shafts, 33,000 shp
AIRCRAFT.....the equivalent of 2 CH-53Es; capable of vertical takeoff and landing
LANDING CRAFT.....4 LCACs
ARMAMENT.....2 RAM launchers, 2 Phalanx CIWSs, 2 20 mm guns, 2 25 mm Mk38 guns (starting with LSD 43), 6 .50-caliber machine guns
COMPLEMENT.....22 officers and 391 Sailors, 402 Marines (plus 102 surge)
BUILDERS.....LSDs 41-43: Lockheed Shipbuilding and Construction; LSDs 44-48: Northrop Grumman Shipbuilding

HOMEPORT

LSD 42 Germantown.....San Diego
LSD 44 Gunston Hall.....Little Creek, Va.
LSD 45 Comstock.....San Diego
LSD 46 Tortuga.....Little Creek, Va.
LSD 47 Rushmore.....Sasebo, Japan
LSD 48 Ashland.....Sasebo, Japan

Harpers Ferry Class



U.S. NAVY

USS HARPERS FERRY | Harpers Ferry Class

DISPLACEMENT.....16,708 tons full load
LENGTH.....609 feet
BEAM.....84 feet
SPEED.....20+ knots
POWER PLANT.....4 Colt Industries 16-cylinder diesels, 2 shafts, 33,000 shp
AIRCRAFT.....the equivalent of 2 CH-53Es; capable of vertical takeoff and landing
LANDING CRAFT.....2 LCACs

ARMAMENT.....2 RAM launchers, 2 Phalanx CIWSs, 2 20 mm guns, 2 25 mm Mk38 guns (starting with LSD 43), 6 .50-caliber machine guns
COMPLEMENT.....22 officers and 397 Sailors, 402 Marines (plus 102 surge)
BUILDER.....Northrop Grumman Shipbuilding

HOMEPORT

LSD 49 Harpers Ferry.....San Diego
LSD 50 Carter Hall.....Little Creek, Va.
LSD 51 Oak Hill.....Little Creek, Va.
LSD 52 Pearl Harbor.....San Diego

MEDIUM LANDING SHIP (LSM)

The LSM program is being developed to support the Marine Corps Expeditionary Advanced Base Operations concept. Previously known as the Light Amphibious Warship, the LSM would be much smaller than current amphibious ships and hence, much less expensive. The LSM would support small Marine Corps units moving between islands in the western Pacific to counter and deny sea control to Chinese forces.

According to a Navy briefing, an LSM is likely to measure about 200 feet long, designed with a ramp for loading/offloading on a beach. The vessel should have 8,000-plus square feet of space for vehicles and accommodation for 75 Marines and a crew of 40 Sailors. The ship is likely to have a speed of 14 knots and a range of 3,500 nautical miles. The smaller size of the LSM should allow it to be built in any of several U.S. shipyards.

The Navy expects to build 18 to 35 LSMs, with procurement beginning in 2025. The first LSM is scheduled to be delivered in mid-2028.

COASTAL PATROL SHIPS (PC)

The last of 14 coastal patrol ships built for the U.S. Navy was decommissioned in 2023. Ten of the PCs served their last years deployed to the Persian Gulf as units of the U.S. 5th Fleet.

The three PCs based on the U.S. East Coast — the USS Shamal, USS Zephyr and USS Tornado — were decommissioned in February and March 2021. The USS Firebolt, USS Typhoon, USS Tempest, USS Whirlwind and USS Squall were decommissioned in early 2022 and transferred to Bahrain. The remaining five were decommissioned in March 2023: The USS Hurricane, USS Sirocco and USS Thunderbolt were transferred to the Egyptian Navy, and the USS Monsoon and USS Chinook were transferred to the Philippine Navy.

AMPHIBIOUS COMMAND SHIPS

AMPHIBIOUS COMMAND SHIPS (LCC)

The two Blue Ridge-class LCCs are the only ships designed from the keel up for an amphibious/command ship role. After entering service, both ships largely served as fleet flagships.

The USS Mount Whitney serves as the U.S. 6th Fleet flagship, having served earlier as the U.S. 2nd Fleet flagship. The Mount Whitney underwent a Military Sealift Command conversion in fiscal 2005. It is a commissioned Navy warship under the command of an active-duty Navy commanding officer but with a crew that includes civilian mariners from Military Sealift Command. The USS Blue Ridge became the U.S. 7th Fleet flagship in 1979 and is forward-deployed to Yokosuka, Japan.

Blue Ridge Class

DISPLACEMENT.....18,874 tons, full load 19,700 tons
LENGTH.....634 feet
BEAM.....108 feet



U.S. NAVY

USS BLUE RIDGE | Blue Ridge Class

SPEED.....23 knots
POWER PLANT.....1 geared turbine, 2 boilers, 1 shaft, 22,000 shp
ARMAMENT.....2 Phalanx Close-In Weapon Systems, 2 25 mm Mk38 guns
AIRCRAFT.....none (helicopter landing area only)
COMPLEMENT.....34 officers, 564 Sailors
BUILDERS.....LCC 19: Philadelphia Naval Shipyard; LCC 20: Newport News Shipbuilding

HOMEPORT

LCC 19 USS Blue Ridge.....Yokosuka, Japan

MISCELLANEOUS SHIPS

EXPEDITIONARY SEA BASE SHIPS (ESB)

The Lewis B. Puller-class expeditionary sea base ships, modified from the Montford Point-class mobile landing platform design and formerly known as afloat forward staging base ships, are configured with a 52,000-square-foot flight deck, fuel and equipment storage, repair spaces, magazines, mission planning spaces and accommodations for up to 250 personnel.

The ships support multiple missions, including airborne mine countermeasures, counterpiracy operations, maritime security operations, humanitarian-aid and disaster-relief missions and Marine Corps crisis response. They also support AH-1, UH-1, MH-53 and MH-60 helicopters and V-22 tilt-rotor aircraft. General Dynamics NASSCO was awarded a $106 million advance procurement contract in June 2016 for ESB 5. The USS Lewis B. Puller (ESB 3) was commissioned Aug. 17, 2017, and deployed to the U.S. 5th Fleet to replace the now-decommissioned USS Ponce. The USS Hershel "Woody" Williams (ESB 4) entered service in February 2018 and was commissioned March 7, 2020, with a mixed crew of Navy and civilian mariners. The Williams shifted homeport to Souda Bay in Crete, Greece, Oct. 1, 2020, and was assigned to Naval Forces Africa. The USS Miguel Keith (ESB 5) was commissioned May 8, 2021, and is assigned to the Pacific Fleet. The USNS John L. Canley was placed in service March 1, 2023, with Military Sealift Command.

In August 2019, General Dynamics was awarded a $1.6 billion contract to build ESBs 6 and 7, with an option for ESB 8. ESBs 6 and 7 have accommodations for an additional 100 military personnel.

Lewis B. Puller Class

DISPLACEMENT.....81,406 metric tons
LENGTH.....784 feet
BEAM.....164 feet
SPEED.....15 knots



U.S. NAVY

USS HERSHEL "WOODY" WILLIAMS | Lewis Puller Class

POWER PLANT ..... 2 General Electric Marine LM2500 gas turbines, 64,000 hp, 2 shafts, 2 controllable-pitch propellers
RANGE ..... 9,500 nautical miles
CREW ..... 101 Navy, 44 civilian mariners
BUILDER ..... General Dynamics NASSCO

DEPLOYMENT LOCATION

ESB 3 USS Lewis B. Puller ..... Manama, Bahrain
ESB 4 USS Hershel "Woody" Williams ..... Souda Bay, Greece
ESB 5 USS Miguel Keith ..... Saipan
ESB 6 USNS John L. Canley ..... in service with MSC
ESB 7 USS Robert E. Simanek ..... (under construction)
ESB 8 Hector A. Cafferata Jr. ..... (under construction)

MINE COUNTERMEASURES SHIPS (MCM)



U.S. NAVY

USS GLADIATOR AND FLEET OCEAN TUG USNS CATAWBA

The Avenger-class ships are dual-role vessels intended to act as minesweepers and minehunters, able to find and destroy moored and bottom mines. Their composite construction hulls significantly reduce magnetic and acoustic signatures, and their sophisticated mission payload systems meet rigorous shock qualifications. The anti-mine capability of the class will be replaced by littoral combat ships, but because of delays in developing and fielding the LCS and its mine mission modules, some MCMs have been upgraded and modernized. Increased operational demand for MCMs in the Persian Gulf in 2012 also led to improved material support for all the ships. All remaining MCMs are forward-deployed to either Japan or Bahrain.

The USS Guardian was decommissioned and stricken from the naval registry Feb. 15, 2013, after grounding on a reef off Palawan in the Philippines. The ship was dismantled on the scene. The USS Avenger and USS Defender were decommissioned in 2014 and scrapped. The USS Champion, USS Scout and USS Ardent were decommissioned in August 2020.

Avenger Class

DISPLACEMENT ..... 1,312 tons full load
LENGTH ..... 224 feet
BEAM ..... 39 feet
SPEED ..... 14 knots
PROPULSION PLANT ..... 4 diesels, 2 shafts, 2,400 bhp
AIRCRAFT ..... none
ARMAMENT ..... mine neutralization system, 2 .50-caliber machine guns
COMPLEMENT ..... 8 officers, 76 enlisted
BUILDERS ..... MCMs 3, 6, 8-14: Peterson Builders; MCMs 4, 7: Marinette Marine

HOMEPORT

MCM 3 Sentry ..... Manama, Bahrain
MCM 6 Devastator ..... Manama, Bahrain
MCM 7 Patriot ..... Sasebo, Japan
MCM 9 Pioneer ..... Sasebo, Japan
MCM 10 Warrior ..... Sasebo, Japan
MCM 11 Gladiator ..... Manama, Bahrain
MCM 13 Dextrous ..... Manama, Bahrain
MCM 14 Chief ..... Sasebo, Japan

SUBMARINE TENDERS

The submarine tender USS Emory S. Land transferred to MSC in 2008; the USS Frank Cable was transferred in February 2010. Operated by Military Sealift Command, the sub tenders, like the command ships, have hybrid crews of uniformed Navy personnel and civilian mariners serving under the leadership of a Navy captain. This allows the ships to retain their commissioned status. (See the MSC Ships section for description and characteristics.)

FAST SEA FRAME

The Sea Fighter is an experimental, high-speed vessel developed by the Office of Naval Research. The aluminum catamaran is testing a variety of technologies to operate in littoral waters. The Sea Fighter also is used to evaluate the hydrodynamic performance, structural behavior, mission flexibility and propulsion system efficiency of high-speed vessels.

The Sea Fighter carries mission modules, housed in standard 20-foot containers, in a large, climate-controlled mission bay. The mission bay can accommodate 12 containers, permitting the vessel to be quickly reconfigured for experimentation to support a variety of potential missions, including battle-force protection, mine countermeasures, anti-submarine warfare, amphibious assault support and humanitarian support. Although similar in concept to the modules carried by LCS, the Sea Fighter sports a different arrangement, storing the modules in stalls arranged along the mission bay.

A reconfigurable stern ramp allows the Sea Fighter to launch and recover surface and subsurface vehicles up to the size of an 11-meter rigid-hull inflatable boat. From its flight deck, the Sea Fighter can operate one H-60-type helicopter or vertical takeoff uncrewed aerial vehicle.

After a modernization overhaul completed in November 2009, the Sea Fighter supported development of the LCS mine mission module. Initially operated by a joint Navy-Coast Guard crew, the ship now is crewed by civilians.

Sea Fighter



U.S. NAVY

SEA FIGHTER

DISPLACEMENT.....1,600 tons
LENGTH.....overall, 262 feet; waterline, 240 feet
BEAM.....72 feet (overall)
DRAFT.....11.5 feet
SPEED.....50+ knots; 40 knots in sea state 4 with active ride control
POWER PLANT.....GE LM2500 gas turbine engines, 2 MTU 16V 595 TE 90 propulsion diesel engines, 4 KaMeWa 125SII waterjets
AIRCRAFT.....1 H-60 helicopter or VTUAV
ARMAMENT.....none
COMPLEMENT.....16-26 core crew
BUILDER.....Nichols Brothers Boat Builders

HOMEPORT

FSF 1 Sea Fighter.....Panama City, Fla.

SAILING FRIGATE



U.S. NAVY

USS CONSTITUTION

The USS Constitution, a wooden-hulled, three-masted frigate, is the oldest commissioned ship in the U.S. Navy. The third (and sole survivor) of the original six frigates authorized to form the Navy for operations against the Barbary pirates, "Old Ironsides" was built to be powerful enough to defeat an enemy of equivalent strength and fast enough to outsail a stronger opponent. The frigate is crewed by active-duty Sailors and supported in its 1812 configuration by skilled ship restorers and riggers of the Naval History and Heritage Command Detachment Boston. It is open for public visitation at the Charlestown Navy Yard, Massachusetts.

In 1997, following an extensive overhaul and the fabrication of a limited set of sails, the Constitution sailed under its own power for the first time in 116 years in commemoration of its 200th anniversary. On Oct. 28, 2010, then-President Barack Obama signed legislation designating the Constitution America's "ship of state." The Constitution sailed again Aug. 12, 2012, to commemorate the War of 1812 and to mark 200 years of peace between the United States and Great Britain. The ship continues to get underway periodically in and around Boston Harbor, although not under its own power and propelled by a tugboat alongside.

DISPLACEMENT.....1,900+ tons
LENGTH.....207 feet (billet head to taffrail); 175 feet at waterline
BEAM.....43.5 feet
MAST HEIGHT.....172 feet (spar/top deck to mainmast truck/top)
SPEED.....13+ knots
POWER PLANT.....48 sails, 44,000+ square feet of canvas
ARMAMENT.....30 24-pound long guns, 24 32-pound carronades and 1 18-pounder bow chaser (installed in April-June 1812 and removed September-October 1812).
COMPLEMENT.....450, including 55 Marines (1812); 80+ officers and Sailors today
DESIGNER.....Joshua Humphreys
BUILDER.....Col. George Claghorn, Edmond Harrt's Shipyard, Boston

SURFACE CRAFT

FORCE PROTECTION LARGE HARBOR SECURITY PATROL BOAT (FP-L)

The FP-L is a 36-foot high-speed boat based on the North River Valor model designed to protect harbors. It features an enclosed cabin, a deck aft for cargo, a hybrid foam and air fender, several mounts for automatic weapons and an infrared sensor. Nine FP-Ls were delivered by 2013 to the Navy for harbor security patrols.

LENGTH.....36 feet
BEAM.....12 feet
SPEED.....cruising, 27.9 to 29.3 knots; maximum, 39.2 knots
POWER PLANT.....2 Yamaha Twin 250 4.2L 4-stroke outboard engines
ARMAMENT.....machine guns
BUILDER.....North River Boats

FORCE PROTECTION MEDIUM HARBOR SECURITY PATROL BOAT (FP-M)

In June 2013, the Navy ordered, under an indefinite quantity contract to Gravois Aluminum Boats, several FP-M patrol boats for harbor security. The boats have mounts for four .50-caliber machine guns.

FORCE PROTECTION MEDIUM PATROL BOAT (FP-M)

A contract for up to 119 FP-Ms was awarded in February 2020 with deliveries beginning in September 2021. The aluminum V-hull boats will be used for harbor and waterway patrols, interrogation of other waterborne assets and escorting large vessels in and out of ports in various weather and water conditions.

LENGTH.....33 feet
BEAM.....10 feet

POWER PLANT ..... twin 225-horsepower outboard engines
ARMAMENT ..... four stations for .50-caliber/M2HB machine guns
BUILDER ..... Lake Assault Boats LLC

SPECIAL OPERATIONS CRAFT-RIVERINE

The SOC-R performs short-range insertion and extraction of special operations forces in riverine and littoral environments. The aluminum-hull SOC-R is a high-performance craft with ample weapons and equipment capacity. It is sized to permit air transport aboard C-130 or larger military aircraft. Each craft is crewed by four special warfare combatant-craft crew and can carry eight special operations forces personnel. The boats are equipped with Combatant Craft Forward Looking Infrared I electro-optical/infrared sets. Special Operations Command has 24 SOC-Rs on strength.

WEIGHT ..... 20,500 pounds (armored load)
LENGTH ..... 33 feet
BEAM ..... 9 feet
DRAFT ..... 2 feet
SPEED ..... 40+ knots maximum
RANGE ..... 195+ nautical miles
POWER PLANT ..... 440 twin Yanmar 6LY2M-STE diesels powering Hamilton HJ292 water jets
ARMAMENT ..... combination of .50-caliber/M2HB, 40 mm/Mk19, 7.62 mm/M60, M240 or GAU-17 guns at 5 stations
COMPLEMENT ..... 4 crew, 8 passengers
BUILDER ..... United States Marine Inc.

RIVERINE BOATS

The Riverine Assault Boat, Riverine Patrol Boat, Riverine Command Boat and Riverine Assault Craft have been withdrawn from service and placed in storage.

SPECIAL FORCES TRAINING BOAT

The Navy Special Forces Training Boat is used to train sailors from foreign navies for coastal riverine and force protection roles. The Navy requires up to eight boats. The first was delivered in September 2017.

LENGTH ..... 36 feet
BEAM ..... 10 feet
RANGE ..... 320 nautical miles
POWER PLANT ..... 3 Yamaha 325 hp outboard engines
ARMAMENT ..... 2 mounts for machine guns
CONTRACTOR ..... North River Boats

25-FOOT OSWALD-CLASS TACTICAL CRAFT

The 25-foot TC is a highly maneuverable, welded aluminum boat powered by two outboard gasoline engines. Assigned to Maritime Expeditionary Security Groups 1 and 2, the TCs are organized into boat detachments consisting of two per unit in addition to a table of organization allowance of four 34-foot TCs. The TC is designed to perform a variety of patrol, surveillance and security functions.

WEIGHT ..... 7,430 pounds full load
LENGTH ..... 25 feet
BEAM ..... 8.5 feet
DRAFT ..... 34 inches at operating trim
SPEED ..... cruise, 35 knots; maximum, 40+ knots
POWER PLANT ..... 2 gasoline outboard engines
ARMAMENT ..... 4 machine gun mounts
COMPLEMENT ..... 4 crew
BUILDER ..... SAFE Boats International

34-FOOT SEAARK DAUNTLESS TACTICAL CRAFT

The 34-foot SeaArk Dauntless TC is a highly maneuverable, welded aluminum boat powered by two inboard, turbocharged, diesel engines with outdrives. The latest versions of the TC, to include earlier hulls undergoing conversion, are equipped with Hamilton jet drives, increasing maneuverability and reducing maintenance costs. Assigned to Maritime Expeditionary Security Groups 1 and 2, the TCs are organized into boat detachments consisting of four per unit in addition to a table of organization allowance of two 25-foot TCs. The Dauntless boats perform a variety of patrol, surveillance and security functions.



U.S. NAVY

SEAARK DAUNTLESS TACTICAL CRAFT

WEIGHT ..... 17,600 pounds
LENGTH ..... 34 feet
BEAM ..... 12 feet (maximum)
DRAFT ..... 25 inches jet-drive, 52 inches stern-drive
SPEED ..... 35+ knots
POWER PLANT ..... 2 inboard diesel engines
ARMAMENT ..... 4 mounts for 7.62 mm and/or .50-caliber machine guns
COMPLEMENT ..... 6 crew
BUILDER ..... SeaArk Marine

40-FOOT PATROL BOAT

In October 2017, the Navy awarded a contract to Metal Shark for a new patrol boat, PB(X), to replace between 100 and 160 of the service's Oswald- and Dauntless-class TCs in the Coastal Riverine Force (now Maritime Expeditionary Security Force). Based on Metal Shark's 40 Defiant design, the PB is a 43-foot-long welded aluminum boat powered by twin diesel inboard engines. The boats have a wide-waterplane, sharp-entry hull capable of attaining 40 knots and enhanced handling at cruise speeds of 10 to 15 knots. The boats offer ballistic protection; an armored, climate-controlled pilothouse; five whole-body isolation suspension seats; and an advanced communications, navigation and situational awareness suite.

Metal Shark built and tested a running prototype. After the initial order of 11 boats in October 2017, the Navy in July 2018 ordered another 40 boats and four more in July 2020. Deliveries began in June 2021. A total of 120 PBs are expected to be procured to replace the 34-foot Dauntless and 25-foot Oswald tactical craft.

LENGTH ..... 43.9 feet
BEAM ..... 11.8 feet

SPEED.....40 knots
POWER PLANT.....2 Cummings QSB 6.7 inboard diesel engines, driving Hamilton HTX30 waterjets
ARMAMENT.....6 mounts for machine guns; one foundation for a remotely operated Mk49/50 weapon
COMPLEMENT.....5 crew
BUILDER.....Metal Shark

7-METER RIGID-HULL INFLATABLE BOAT

The 7-meter RHIB is used for maritime interdiction and security patrols by Navy ships.

WEIGHT.....7,700 pounds full load
LENGTH.....23.75 feet
BEAM.....9.0 feet
DRAFT.....1.9 feet full load
SPEED.....28 knots full load
POWER PLANT.....1 230 hp Cummins diesel powering Mercury Bravo 2X stern-drive twin Doen DJ110Z waterjets
ARMAMENT.....1 mount for 7.62 mm machine gun
COMPLEMENT.....up to 18 including crew
BUILDER.....Willard Marine Inc.

11-METER RIGID-HULL INFLATABLE BOAT

The 11-meter RHIB is a highly maneuverable, turbocharged, diesel-powered tactical craft able to operate in extreme weather. Two variants of the craft are in service or on order: eight with an enclosed cabin and another for LPD 17 amphibious ships. The Naval Special Warfare variant has a primary mission of SEAL insertion and extraction and a secondary mission of marine interdiction operations. The craft can operate in heavy seas and winds of 45 knots. In the Special Warfare role, the craft carries a crew of three with a SEAL team of eight. In the visit, board, search and seizure role, the craft carry a Navy crew of three with a Marine Corps boarding team.



U.S. NAVY

11-METER RHIB

WEIGHT.....22,000 pounds full load
LENGTH.....38.3 feet
BEAM.....11.8 feet
DRAFT.....3.2 feet full load
SPEED.....40+ knots
POWER PLANT.....2 380 hp Cummins QSB 6.7-liter diesels or dual Caterpillar 3126 DITA 6 in-line cylinder diesels powering twin Doen Jet DJ110Z or Hamilton Jet HJ292 waterjets
ARMAMENT.....2 mounts for 7.62 mm Mk19 40 mm or.50-caliber machine guns
COMPLEMENT.....up to 26 including crew
BUILDER.....Willard Marine Inc.

8- AND 11-METER SURFACE SUPPORT CRAFT

The Navy Special Warfare SSC is an aluminum deep-V-hulled rigid-hull inflatable boat with a protective collar. The SSC is built in two lengths, 8 and 11 meters. The SSC has the role of SEAL insertion and extraction, diver and swimmer support, medical transport, vessel towing and water airdrop training. Silver Ships received in October 2021 a delivery order for up to 110 SSCs.

BUILDER.....Silver Ships

11-METER EXPEDITIONARY MINE-COUNTERMEASURE BOAT

The Navy awarded in March 2020 a contract to Ribcraft for an estimated 48 Expeditionary Mine-Countermeasure Boats. The craft are transportable 11-meter rigid-hull inflatable boats optimized to support explosive ordnance disposal personnel in Expeditionary Mine Countermeasures companies in both shallow and deep-water operations.

Ribcraft is building the craft in two configurations, one with an open aft deck for stowage and deployment of two combat rubber raiding craft and the other featuring a launch, recover and handling system for deployment and retrieval of underwater drones, with the capability to launch, recover and handle two underwater drones using a single davit.

LENGTH.....39 feet
POWER PLANT.....2 473 hp Cummins QSB 6.7-liter diesel engines powering twin Hamilton Jet 292 waterjets
BUILDER.....Ribcraft

COMBATANT CRAFT ASSAULT MK 1

The CCA is a low-observable, composite-material craft designed for high-speed insertion and extraction of special operations forces and for coastal surveillance. The CCA is equipped with a small mast with a surface search radar, CCFLIR II electro-optical/infrared sensor and satellite communications. The mast is being redesigned to add command, control, computers, communications, cyber, intelligence, surveillance and reconnaissance capabilities. Development began by 2010 for U.S. Special Operations Command, with the first delivered by 2013. Full operational capability will be reached in 2024 with 42 CCAs fielded. SOCOM has ordered more CCAs under a Capital Equipment Replacement Program to sustain a 42-craft fleet.

WEIGHT.....26,600 lbs (full load)
LENGTH.....41 feet
COMPLEMENT.....variable
BUILDER.....United States Marine Inc.

COMBATANT CRAFT MEDIUM MK 1

The CCM is a semi-enclosed multimission combatant craft for platoon-size maritime mobility in maritime contested environments. The CCM can perform maritime interdiction, insertion and extraction, and visit, board, search and seizure operations. The CCM is Naval Special Warfare's craft of choice for long-range, high-payload special operations forces mobility operations in contested environments. The CCM can operate at 40 knot speeds and has a 10,000 pound payload capacity. At 60 feet long, the CCM is C-17/C-5 transportable and can launch/recover by well deck or shore-based trailer. Naval Surface Warfare has an inventory of 31 craft. Modernization efforts are focused on reliability, maintainability and future sensor integration.

WEIGHT.....69,600 lbs (full load)
LENGTH.....60 feet



U.S. NAVY

COMBATANT CRAFT MEDIUM MK 1

ARMAMENT.....2 mounts for machine guns
COMPLEMENT.....4 crew and up to 19 passengers
BUILDERS.....Vigor (formerly Oregon Iron Works)

COMBATANT CRAFT HEAVY MK 1 (SEALION)

The CCH is the SEALION (SEAL Insertion, Observation and Neutralization) craft and is described as semi-submersible. It has retractable masts for sensors and communications. The craft can be transported by air. SEALION 2 is an improved design that entered service in 2014. The Navy developed two as demonstrators, SEALION 1 and SEALION 2, and SOCOM turned them into operational craft. One is forward-deployed at any given time. The first two SEALIONs entered service with SOCOM in 2014.

On June 2, 2017, Vigor was awarded a contract for one SEALION III built from the keel up for SOCOM. Initial operational capability was achieved in 2022.

WEIGHT.....75,000 lbs (full load)
LENGTH.....80 feet
COMPLEMENT.....7 crew and passengers
BUILDERS.....Vigor (formerly Oregon Iron Works)

SURVEY BOAT

The Fleet Survey Team, a rapid-response unit designed to meet combatant commander requests for hydrographic survey of poorly charted areas, acquired two Defender-class boats in March 2009. The boats have climate-controlled cabins and are deployable in a C-130 transport aircraft. The boats can deploy echo-sounders and side-scan sonar with a winch system.

WEIGHT.....9,200 pounds full load
LENGTH.....24.5 feet
BEAM.....8.5 feet
SPEED.....40 knots
RANGE.....150 nautical miles
POWER PLANT.....2 Honda outboard gasoline engines, 550 hp
ARMAMENT.....none
COMPLEMENT.....4
BUILDER.....SAFE Boats International

LANDING CRAFT AIR CUSHION

The LCAC is a high-speed, over-the-beach, fully amphibious landing craft. LCAC's air-cushion capability allows it to proceed inland to discharge cargo on dry, trafficable beaches, thus reducing buildup of troops, equipment and other materiel in the surf zone. The landing craft can carry a 60- to 75-ton payload, including an Abrams M1 main battle tank. The LCAC is unrestricted by tides, beach gradients or surf conditions, allowing it to access more than 70% of the world's beach areas. LCACs are carried by LHAs, LHDs, LPDs and LSDs.



U.S. NAVY

LANDING CRAFT AIR CUSHION

A personnel-transport module, capable of accommodating up to 180 seated passengers, 145 combat-loaded Marines or 108 litters, was developed by Naval Sea Systems Command and deployed to serve three LCAC mission roles: combat-ready Marine transport, medical evacuation and noncombatant-evacuation operations. Of 91 LCACs delivered, 73 were given a service-life extension program through 2018. The LCAC 100 class is a fully amphibious craft with a corrosion-resistant aluminum hull, composite-material propeller shrouds and an improved skirt design. It is powered by the same engines used on V-22 aircraft and uses fly-by-wire controls.

The Navy awarded a contract to Textron on July 6, 2012, for a new ship-to-shore connector craft to replace the retiring LCAC. Fabrication of the lead craft, Craft 100, began Nov. 17, 2014. This single test/training craft was delivered in 2018 and began in-water testing. LCAC 100 was delivered Feb. 6, 2020. The LCAC 100 class have similar dimensions to earlier LCACs but feature updated electronic and computer systems more compatible with newer amphibious ships and Marine Corps vehicles.

The Navy plans to procure 72 operational LCAC 100s in eight production versions. LCAC 101 was delivered in 2020 and was in initial operator training along with LCAC 100. LCAC 102 was delivered in June 2021. Two were delivered to Assault Craft Unit 4 in mid-2022, with a total of eight delivered by November 2023. A total of 11 more were under construction or on order. Initial operational capability was expected to be reached by late 2023.

LCAC 1

DISPLACEMENT.....82.7 tons light; 170-182 tons full load
LENGTH.....88 feet; 92 feet deep skirt
BEAM.....47 feet; 48 feet deep skirt
SPEED.....40+ knots full load
RANGE.....with payload: 200 miles at 40 knots or 300 miles at 35 knots
POWER PLANT.....legacy configuration: 4 AlliedSignal TF-40B gas turbines (2 for propulsion, 2 for lift); 16,000 hp sustained; 2 shrouded reversible pitch airscrews; 4 double-entry fans, centrifugal or mixed flow (lift). SLEP configuration: 4 Vericor Power Systems ETF-40B gas turbines with Full Authority Digital Engine Control (2 for propulsion, 2 for lift); 19,000 hp sustained; 2 shrouded reversible pitch airscrews; 4 double-entry fans
CARGO CAPACITY.....60-ton design; 75-ton overload
ARMAMENT.....2 M2HB .50-caliber, M60 7.62 mm or Mk19 Mod 3 40 mm machine guns
COMPLEMENT.....5 crew, 24 Marines
BUILDERS.....Textron Marine Systems, Avondale Gulfport Marine

LCAC 100

SPEED.....35+ knots full load
POWER PLANT.....2 Rolls-Royce MT7 turboshaft engines
CARGO CAPACITY.....74 tons
PASSENGERS.....145 Marines or 108 casualties in an enclosed module
BUILDERS.....Textron Systems; L3Harris; Alcoa; Rolls-Royce

LANDING CRAFT (LCM, LCU)

Landing craft are capable of transporting tracked and/or wheeled vehicles and troops from amphibious assault ships to beachheads or piers. Landing craft mechanized and landing craft utility each feature a bow ramp for onloading and offloading. LCUs have a stern gate to permit drive-through capability and can link with other LCUs to form a causeway.

The LCU 1700-class has a roll-on/roll-off monohull configuration, with hydraulically controlled bow and stern ramps that allow multiple vessels to connect and form a causeway for fast and secure unloading and loading. The craft are designed to be transported within and load/unload from the well decks of amphibious assault ships, carrying loads up to 3.5 meters high, above the vessel's vehicle deck. With a crew of 13, each vessel can conduct independent open-ocean transits or operations at sea with a range of 1,200 nautical miles (at 8 knots) and a top speed of 11 knots.

To begin replacement of the entire LCU 1600-class vessels, the Navy in March 2018 awarded Swiftships LLC a detail design and construction contract for the first LCU 1700-class ship, with options for up to 31 additional craft for delivery by 2027. LCUs 1701 and 1702 of the class were ordered in February 2019, followed by orders for LCUs 1703-1706 in April 2020 and LCUs 1707-1711 in May 2021. In September 2023, the Navy ordered three craft from Austal USA.

LCU 1610, 1627 AND 1646 CLASSES



U.S. NAVY

LCU 1633

DISPLACEMENT.....220 long tons (light), 375 long tons full load
LENGTH.....134.9 feet
BEAM.....29 feet
SPEED.....11 knots
RANGE.....1,200 miles at 8 knots
POWER PLANT.....2 Detroit Diesel 12V-71NA engines; 425 x 2 hp, twin shafts; Kort nozzles; 2 40 kW Detroit Diesel 3-71NA engines
LIFT CAPACITY.....170 tons: (3 M1 Abrams tanks or 10 LAVs or 400+ Marines)
CARGO DECK AREA.....2,205 square feet
ARMAMENT.....4 .50-caliber machine guns
COMPLEMENT.....14
ENDURANCE (underway).....10 days
BUILDERS.....various yards

LCU 1700 CLASS

DISPLACEMENT.....434.9 tons
LENGTH.....139.1 feet
RANGE.....1,200 nautical miles at 8 knots
LIFT CAPACITY.....2 M1A1 main battle tanks or 350 combat troops or 400 persons or 170 short tonnes of cargo
COMPLEMENT.....13
BUILDERS.....Swiftships LLC; Austal USA

LCM 8 TYPE

DISPLACEMENT.....105 tons full load
LENGTH.....73.7 feet
BEAM.....21 feet
SPEED.....12 knots
RANGE.....190 miles at 9 knots full load
POWER PLANT.....2 Detroit Diesel 12V-71NA engines, 874 shp combined, twin shafts
LIFT CAPACITY.....180 tons; 1 tank or 200 troops
ARMAMENT.....2 .50-caliber machine guns
COMPLEMENT.....5
BUILDERS.....various yards

IMPROVED NAVY LIGHTERAGE SYSTEM

The INLS is a system of sectional craft with floating sections that lock together like building blocks to create a variety of floating structures such as causeways, docks and ferries. These structures allow Navy ships to transport heavy equipment and vehicles to shore and cargo, such as food, water and equipment parts, between ships and from ship to shore when moorings have been damaged or are unavailable. The system can operate in sea state 3 and survive in sea state 5. The INLS replaces a lighterage system that had served for more than 50 years and could only operate in seas up to sea state 2. INLS craft are operated by Amphibious Construction Battalions 1 and 2.

CONTRACTOR.....Fincantieri Marinette Marine

CREWED SUBMERSIBLES

DRY COMBAT SUBMERSIBLE

Planning began in 2010 for a Joint Multimission Submersible to meet requirements of special operations forces after the Advanced SEAL Delivery System was canceled. The single ASDS sustained a severe battery fire in November 2008, and in July 2009, SOCOM announced that repairing the craft was not economically feasible.

In October 2010, SOCOM announced a continued need for a dry diver lockout submersible for special operations. The 30-ton DCS provides a fully enclosed environment to transport SEAL teams to and from objectives without being exposed to cold and fatigue. The hull features two topside hatches as well as a lockout chamber. Unlike the ASDS, the DCS Block 1 is not intended to operate from submarines. In July 2016, Lockheed Martin was awarded a $166 million contract to build up to three lithium-battery-powered DCSs over five years. DCS1 was delivered in 2019 to begin sea trials. DCS2 was delivered in 2022. Initial operating capability was achieved in mid-2023.

LENGTH.....12 meters
POWER PLANT.....Lithium-ion batteries
COMPLEMENT.....2 pilots plus 8 SEALs
CONTRACTORS.....Lockheed Martin (including Submergence Group/MSubs Ltd., Northrop Grumman and Newport News Shipbuilding); General Dynamics (including Giunio Santi Engineering Group)

MK8 SEAL DELIVERY VEHICLE

The Mk8 Mod 1 SDV is a crewed wet-submersible vehicle used to deliver Navy SEALs and their equipment to mission areas. The crew operates and navigates the submerged SDV while using underwater breathing apparatus for life support.

The SDV, developed by the Naval Surface Warfare Center Panama City Division is battery-powered and equipped with propulsion, navigation, communication and life-support equipment. It can deliver several fully equipped SEALs to a mission area, loitering, retrieving the SEALs and returning while remaining submerged. The Mk8 Mod 1 SDV, delivered to Naval Special Warfare forces in 1996, has increased range, speed, capacity and maintainability over previously operational SDVs.

A fleet modernization for all SDVs was completed in September 2006, including increased diver air capacity, improved diver communications, satellite communications capability, reduction of signal acquisition time for the GPS and installation of a Windows-based computer. The SDV eventually will be replaced by the shallow-water combat submersible.

DISPLACEMENT.....3 tons (dry)
LENGTH.....15.4 feet
BEAM.....6.2 feet
COMPLEMENT.....2 crew plus SEALs

MK11 SHALLOW-WATER COMBAT SUBMERSIBLE

The SWCS is a free-flooding combat submersible mobility platform suitable for transporting and deploying SEALs and other special operations forces and their payloads. The primary use of the SWCS is to provide assured access for special operations. The battery-powered, aluminum-hull SWCS is intended to replace the Mk8 Mod 1 SDV. The SWCS will be deployable from any dry deck shelter-configured submarine as well as surface ships.

Teledyne Brown was awarded a $383 million contract in 2011 to design and build the SWCS, which is a one-for-one replacement for the SDV, for a total of 10 operational boats and one training craft. The first two SWCSs were delivered to SOCOM by 2018, with three more delivered in 2020. Delivery of the next five is scheduled for 2023-2024. Initial operating capability is scheduled for late 2023.

DRY WEIGHT.....10,000 pounds
LENGTH.....23 feet
BEAM.....5 feet
CONTRACTOR.....Teledyne Brown Engineering Inc.

UNCREWED UNDERSEA VESSELS

ORCA EXTRA-LARGE UNCREWED UNDERWATER VEHICLE

The Orca XLUUV is an open-architecture, reconfigurable UUV that will be modular in construction and have a modular payload bay. The XLUUV core vehicle will provide guidance and control, navigation, autonomy, situational awareness, core communications, power distribution, energy and power, propulsion and maneuvering, and mission sensors. The length will be greater than 80 feet. The Orca, too large to be carried by a submarine, will be pier-launched. Laying mines will be the first role for the XLUUV, which will be equipped with a 34-foot-long payload module to carry mines. Boeing is developing the Orca based on its Echo Voyager concept and is under contract to produce five Orcas. The first unit was christened in April 2022. After delays, all five vehicles are expected to be delivered between February and June 2024.



U.S. NAVY

ORCA XLUUV

LENGTH.....51 feet
RANGE.....6,500 nautical miles
CONTRACTOR.....Boeing

SNAKEHEAD LARGE DIAMETER UNCREWED UNDERWATER VEHICLE

The Snakehead LUUV was an open-architecture, reconfigurable, modular, long-endurance UUV under development by the Naval Undersea Warfare Development Center. Under Phase I, a single Snakehead prototype was built. It was to be deployable from a ship or the dry deck shelter of a submarine with the missions of intelligence collection and battlespace preparation of the environment. The single LDUUV was christened Snakehead on Feb. 2, 2022.

For Phase II, a request for proposals was issued in December 2020. The LDUUVs delivered under Phase II would be integrated with dry deck shelters on submarines. The Navy canceled Phase II in April 2023, citing cost and schedule delays, particularly regarding alignment of the design and the submarine hosting interfaces. A government notice seeking information on commercially available large diameter unmanned undersea vehicles was issued in mid-2023.

MEDIUM UNCREWED UNDERSEA VEHICLE

The MUUV is planned as a vehicle to support intelligence preparation of the environment with autonomous oceanographic sensing and data collection as well as deploying surface-launched mine countermeasures. In August 2022, Leidos was awarded a contract valued at $358 million if all options are exercised.

CONTRACTOR.....Leidos

LARGE-SCALE VEHICLE 2

At 205 tons, LSV 2 Cutthroat is the world's largest uncrewed autonomous test submarine and offers a cost-effective and scalable platform for advanced research and development in hydro-acoustics, hydrodynamics and radiated noise reduction. Fully autonomous and battery-powered, the Cutthroat offers the capability of improving the performance, while reducing the risk, of future submarine technologies.

With a hull form like the USS Virginia, the Cutthroat was designed with specific emphasis for supporting submarine stealth, hydrodynamics, hydro-acoustics and submarine propulsion designs to permit technology

insertion into current and future submarines. After delivery in 2001 and final assembly on site, LSV 2 has operated on Lake Pend Oreille at the Acoustic Research Detachment in Bayview, Idaho.

DISPLACEMENT.....205 tons

LENGTH.....111 feet

BEAM.....10 feet

POWER PLANT.....electric drive; 3,000 shp plant coupled with electric motor controller, expandable to 6,000 shp with additional motor-controlled modules

BUILDERS.....Northrop Grumman Shipbuilding; General Dynamics Electric Boat

UNCREWED SURFACE VESSELS

SEA HUNTER/SEAHAWK MEDIUM UNCREWED SURFACE VESSEL



U.S. NAVY

SEAHAWK

The Sea Hunter is a medium-displacement USV developed by DARPA under the Anti-submarine Continuous Trail Unmanned Vehicle project, which transferred to the Office of Naval Research in 2018 and to Surface Development Squadron 1 in December 2019. The trimaran was developed to independently trail diesel submarines for 30 days, but since delivery in November 2016, the craft has been used to test a variety of other unspecified missions believed to include mine countermeasures and intelligence, surveillance and reconnaissance. In 2019, the Sea Hunter completed a transit from San Diego to Hawaii. A second ship, the Seahawk, ordered by the Navy in 2017, was delivered in April 2021. Both ships participated in the 2022 Rim of the Pacific exercise in Hawaiian waters and in 2023 operated in the Western Pacific in an Integrated Battle Problem 23.2 and in exercises with the Royal Australian Navy.

DISPLACEMENT.....140 tons

LENGTH.....132 feet

SPEED.....27 knots

CONTRACTORS.....Leidos; Vigor

OVERLORD MEDIUM UNCREWED SURFACE VESSEL



U.S. NAVY

NOMAD

Under the Ghost Fleet Overlord project, the Office of the Secretary of Defense's Special Capabilities Office developed two autonomous USVs to experiment with uncrewed fleet technologies and mature and develop concepts of operations, tactics, techniques, procedures and operator experience. The USVs — Ranger and Nomad — are repurposed vessels first built for oil rig offshore support. In 2021, the two ships, fitted with a government-furnished control system, made autonomous transits from the Gulf of Mexico through the Panama Canal to San Diego. The two ships were transferred to the Navy on March 3, 2022. The two ships are operated by Unmanned Surface Division 1 and participated in the 2022 Rim of the Pacific exercise.

Two more ships, Vanguard and Mariner, were built to be operated by Unmanned Surface Division 1. Mariner entered service in August 2022 and in 2023, along with Ranger, operated in the Western Pacific in an Integrated Battle Problem 23.2 and in exercises with the Royal Australian Navy. Production of Vanguard was beset by problems, and in 2022, construction of the hull was moved to Austal USA; delivery is expected in 2024. Each Overlord ship is different with a variety of hull, mechanical and engineering systems and mission systems.

MEDIUM UNCREWED SURFACE VESSEL

The Navy issued a request for proposals July 16, 2019, for the MUSV, a pier-launched, self-deploying modular, open-architecture, surface vessel capable of autonomous safe navigation and mission execution. The craft would be up to 190 feet long with displacements of roughly 500 tons. In July 2020, the Navy awarded L3Harris a $35 million contract for a prototype MUSV, with options for up to eight more vessels. The program aimed for a fiscal 2023 delivery but has encountered serious production problems.

The Navy is expected to field the MUSV along with a large USV as adjuncts to its future surface fleet that will include the future surface combatant and the new Constellation-class guided-missile frigate as well as Arleigh Burke-class guided-missile destroyers and the Independence- and Freedom-class littoral combat ships.

CONTRACTORS.....L3Harris; Gibbs & Cox; Incat Crowther; Swiftships

LARGE UNCREWED SURFACE VESSEL

The LUSV will be a high-endurance, reconfigurable ship able to carry out strike and anti-surface warfare missions to augment the Navy's crewed surface force. The ships are to be fitted with 16 to 32 vertical launching system cells able to launch anti-ship and land-attack missiles. The vessel will be designed to conduct a variety of warfare operations independently or in conjunction with crewed surface combatants and capable of semi-autonomous or fully autonomous operation with operators in-the-loop (controlling remotely) or on-the-loop (enabled through autonomy). Likely based on a commercial hull design, the ship is expected to be 200 to 300 feet long and displace 2,000 tons.

A draft request for proposals for the LUSV was issued Aug. 9, 2019. The Navy on July 29, 2022, awarded contracts for conceptual designs from HII, Lockheed Martin, Fincantieri Marinette Marine, Bollinger Shipyards, Austal USA and Gibbs & Cox. The design studies are to be completed in September 2024.

MINE HUNTING UNCREWED SURFACE VEHICLE



U.S. NAVY

MINE HUNTING UNCREWED SURFACE VEHICLE

The MHU is an uncrewed 11-meter rigid-hull inflatable boat equipped with a winch to deploy the AQS-24B mine-detection sonar body. The MHU is dispatched on preplanned mission search tracks, deploying and recovering the AQS-24B. Sensor data is transmitted via data link to a control station on ship or shore. Four MHUs were delivered, and some have been deployed to the Persian Gulf.

CONTRACTOR.....Northrop Grumman

MINE COUNTERMEASURES UNCREWED SURFACE VEHICLE



U.S. NAVY

MINE COUNTERMEASURES UNCREWED SURFACE VEHICLE

The MCM USV is an autonomous uncrewed small boat designed to accommodate various payloads and be launched and recovered by a littoral combat ship. Developed under the Common USV program as the tow platform for the Unmanned Influence Sweep System, the MCM USV now reflects an expansion of the craft's missions to include mine hunting. Prototype craft from Bollinger Shipyards and Textron were tested at Navy ranges, and two production-representative pilot line craft were delivered to be fitted with the AQS-20C and AQS-24 sonar systems for mine hunting. On April 8, 2022, Bollinger Shipyards was awarded a potential $123 million contract to produce the MCM USV. Four of the craft were ordered by the Navy in October 2023.

CONTRACTORS.....craft and UISS: Bollinger; AQSO-20C: Raytheon; AQS-24: Northrop Grumman

WAM-V USV

The WAM-V is an autonomous, portable catamaran uncrewed surface vehicle. One has been acquired by the Naval Information Warfare Center Pacific to support development of autonomous maritime systems. The 5-meter-long craft is powered by two 5-horsepower thrusters.

CONTRACTOR.....Marine Advanced Robotics

More than 125 ships were in daily operation for Military Sealift Command during fiscal 2023, delivering combat cargo and petroleum products to U.S. and partner nation warfighters. The MSC kept the U.S. Navy supplied and underway; supported humanitarian assistance; shared expertise and techniques with partners in Central America, South America and Africa; provided special mission ships for U.S. Department of Defense customers; and supplied materials and equipment to the U.S. military in contingency operations with pre-positioned ships.

Since 2016, the MSC has grouped its ships according to programs rather than mission areas. The MSC's operations are organized into six program areas. (During 2023, PM5 Surge Sealift was folded into PM3 Pre-positioning):

- PM1: Fleet Oiler
- PM2: Special Mission
- PM3: Pre-positioning
- PM4: Service Support
- PM6: Fleet Ordnance and Dry Cargo
- PM8: Expeditionary Fast Transport
- Dry Cargo and Tankers

Note: MSC ships carry the prefix USNS, for United States Naval Ship, unless otherwise noted.

PM1: FLEET OILER PROGRAM

FLEET REPLENISHMENT OILERS (T-AO)

Fleet oilers provide a variety of fuels for ship propulsion, aircraft operations and power generation. Henry J. Kaiser-class ships carry jet fuel, diesel fuel and lubricating oil and small quantities of fresh and frozen provisions, stores, potable water and other items. Fleet replenishment oilers normally operate with five underway replenishment stations capability when deployed.

Three ships within the class — the USNS Laramie, the USNS Patuxent and the USNS Rappahannock — were built with double hulls in compliance with the Oil Pollution Act of 1990, although government-owned ships currently are exempt from the act. The USNS Walter S. Diehl (T-AO 193) was taken out of service in 2022.

The John Lewis class is under construction under a $3.2 billion Navy contract awarded in June 2016 to General Dynamics National Steel and Shipbuilding Co. in San Diego. The initial contract was for six ships; three more have been ordered of a planned total of 20 ships in the class.

Henry J. Kaiser Class

DISPLACEMENT ..... 41,225 tons full load (double hull); 40,900 tons full load (single hull)
LENGTH ..... 677.5 feet
BEAM ..... 97.5 feet
SPEED ..... 20 knots



U.S. NAVY

USNS GUADALUPE | Kaiser Class

POWER PLANT ..... 2 fully automatic diesel engines, twin shafts, controllable-pitch propellers, 32,540 shp
AIRCRAFT ..... none (landing platform for vertical replenishment provided)
CARGO CAPACITY ..... 180,000 barrels of aviation and diesel fuel
CREW ..... 74-89 civilian mariners (CIVMARS), 5 military
BUILDER ..... Avondale Shipyards

AREAS OF OPERATION

T-AO 187 Henry J. Kaiser ..... Pacific/West Coast
T-AO 188 Joshua Humphreys ..... Atlantic/Europe/Africa
T-AO 189 John Lenthall ..... Atlantic/Europe/Africa
T-AO 194 John Ericsson ..... Pacific/Far East
T-AO 195 Leroy Grumman ..... Atlantic/Europe/Africa
T-AO 196 Kanawha ..... Atlantic/Europe/Africa
T-AO 197 Pecos ..... Pacific/West Coast
T-AO 198 Big Horn ..... Pacific/Far East
T-AO 199 Tippecanoe ..... Pacific/Far East
T-AO 200 Guadalupe ..... Pacific/West Coast
T-AO 201 Patuxent ..... Atlantic/East Coast
T-AO 202 Yukon ..... Pacific/Far East
T-AO 203 Laramie ..... Atlantic/Europe/Africa
T-AO 204 Rappahannock ..... Pacific/Far East

John Lewis Class

DISPLACEMENT ..... 22,173 metric tons (lightship)
LENGTH ..... 227.3 meters
BEAM ..... 32.2 meters
SPEED ..... 20 knots
POWER PLANT ..... twin-shaft, geared medium-speed diesels with power take-off generators/power take-in motors
AIRCRAFT ..... none (landing platform for vertical replenishment can accommodate H-1, H-53, H-60, MV-22 and MSC's commercial logistics helicopters)
CARGO CAPACITY ..... fuel payload capacity: 162,000 barrels; dry stores capacity: 1,576 cubic meters; freeze/chill capacity: 1,362 cubic meters
CREW ..... 99 CIVMARS
BUILDER ..... General Dynamics NASSCO

AREAS OF OPERATION

T-AO-205 John Lewis ..... Pacific/West Coast
T-AO-206 Harvey Milk ..... Pacific/West Coast
T-AO 207 Earl Warren ..... (under construction)



GENERAL DYNAMICS NATIONAL STEEL AND SHIPBUILDING CO

USNS JOHN LEWIS | John Lewis Class

T-AO 208 Robert F. Kennedy ..... (under construction)
T-AO 209 Lucy Stone ..... (under construction)
T-AO 210 Sojourner Truth ..... (under construction)
T-AO 211 Thurgood Marshall ..... (ordered)
T-AO 212 Ruth Bader Ginsburg ..... (ordered)
T-AO 213 Harriet Tubman ..... (ordered)

PM2: SPECIAL MISSION PROGRAM

MISSILE-RANGE INSTRUMENTATION SHIPS (T-AGM)

The USNS Howard O. Lorenzen entered service in March 2014 as a support platform for the Cobra King phased-array radar system used for detecting and collecting data from missile launches around the world, replacing the USNS Observation Island. The ship supports the enforcement of strategic weapons treaties and weapons tests. The USNS Invincible, a converted Stalwart-class ocean surveillance ship used as a platform for a dual-band radar developed by the U.S. Air Force to support its data-collection requirements against theater ballistic missiles, was removed from service in 2022.

Howard O. Lorenzen

DISPLACEMENT ..... 12,642 tons
LENGTH ..... 534 feet
BEAM ..... 89 feet
CREW ..... 35 CONMARS, 25 scientists, 1 military
BUILDER ..... VT Halter Marine

NO LAYBERTH ASSIGNED

T-AGM 25 Howard O. Lorenzen

NAVIGATION TEST-SUPPORT SHIP (T-AGS)

The USNS Waters supports submarine navigation system testing and provides ballistic missile flight-test support services under the sponsorship of Strategic Systems Programs. The ship also conducts operational tests of upgrades to submarine navigation systems.

Waters (Conversion)

DISPLACEMENT ..... 12,208 tons full load
LENGTH ..... 442 feet
BEAM ..... 69 feet
SPEED ..... 13.2 knots, sustained
POWER PLANT ..... diesel-electric, twin screw, 7,400 shp
CREW ..... 28 CIVMARS, 59 military and scientific personnel
BUILDER ..... Avondale Industries
CONVERSION YARD ..... Norfolk Shipbuilding and Drydock

NO LAYBERTH ASSIGNED

T-AGS 45 Waters

OCEANOGRAPHIC SURVEY SHIPS (T-AGS)

Six Pathfinder-class ships were delivered from 1994 to 2001 to operate in an oceanographic survey-support capacity, gathering underwater data in the deep ocean and coastal waters. A seventh, the USNS Maury, was delivered in February 2016. The Maury is 25 feet longer than its sister ships and is equipped with a moon pool for operating underwater drones. The USNS Sumner (T-AGS 61) was inactivated in August 2014 and transferred to the Maritime Administration. A new ship, T-AGS 67, is being built at Bollinger Mississippi Shipbuilding to a modified repeat Pathfinder design. A contract to complete the ship was awarded June 3, 2021, and a keel ceremony was held Oct. 4, 2022. On March 8, 2023, the USNS Maury was renamed the USNS Marie Tharp as part of the Defense Department renaming of facilities and ships that bore the names of Confederate officials from the Civil War era.

Pathfinder Class



U.S. NAVY

USNS PATHFINDER | Pathfinder Class

DISPLACEMENT ..... 5,000 tons full load
LENGTH ..... 328.5 feet (353 feet for the Marie Tharp)
BEAM ..... 58 feet
SPEED ..... 16 knots, sustained
POWER PLANT ..... integrated diesel-electric, twin azimuthing thrusters, 8,000 total hp (4,000 each)
CREW ..... 24 CONMARS, 18-26 oceanographers
BUILDER ..... Bollinger Mississippi Shipbuilding

NO LAYBERTHS ASSIGNED

T-AGS 60 Pathfinder
T-AGS 62 Bowditch
T-AGS 63 Henson
T-AGS 64 Bruce C. Heezen
T-AGS 65 Mary Sears
T-AGS 66 Marie Tharp (formerly Maury)
T-AGS 67 Robert Ballard (under construction)

SEA-BASED X-BAND RADAR ONE (SBX-1)

The SBX-1 vessel is a semi-submersible, self-propelled platform capable of sustained underway operations. It provides ballistic missile tracking information to the Ground-based Midcourse Defense System and functions as a research development testing and evaluation asset for the Missile Defense Agency. The SBX-1 consists of the X-band radar and mission systems, including the GMD fire-control and communications subcomponents.

DISPLACEMENT.....32,690 tons (registered)
LENGTH.....389 feet
BEAM.....238 feet
SPEED.....8 knots
POWER PLANT.....6 ship's service diesel generators and 1 emergency diesel generator; 4 fixed-pitch, controllable-speed, fully azimuthing and retractable 3,400 kW thrusters
CREW.....34 full operating status or 19 reduced operating status CONMARS, 49 FOS or 23 ROS mission support
BUILDER.....Moss Maritime; modified by Keppel AmFELS

HV HERCULES (TOW SHIP FOR SBX-1)

DISPLACEMENT.....9,052 tons
LENGTH.....288 feet
BEAM.....62 feet

OCEAN SURVEILLANCE SHIPS (T-AGOS)



U.S. NAVY

USNS ABLE | Victorious Class

Military Sealift Command operates two classes of ocean surveillance ships that use surveillance towed-array sensor system equipment to support the Navy's anti-submarine warfare capability. The SURTASS mission gathers ocean acoustical data and transmits anti-submarine warfare information for prompt analysis.

The Victorious class comprises four small waterplane-area, twin-hull ships. The USNS Impeccable, placed in service in October 2001, is larger and faster with a more powerful propulsion plant and designed specifically for deploying an additional low-frequency active array system. The Victorious-class ships can deploy compact LFA arrays.

The HOS Red Rock is a time charter used to perform duties as an expeditionary SURTASS in support of U.S. Fleet Forces and U.S. European Command.

Austal USA is developing a new class of T-AGOS(X) ocean surveillance ships under a detail design contract awarded in May 2023 that includes options for the construction of up to seven ships.

Victorious Class

DISPLACEMENT.....3,384 tons full load
LENGTH.....234.5 feet
BEAM.....93.5 feet
SPEED.....10 knots
POWER PLANT.....4 Caterpillar diesel generators, 2 General Electric propulsion motors (1 on each side of the hull), twin shafts, 1,600 shp
CREW.....21 CONMARS, 7 technicians (T-AGOS 19-21); 19 CONMARS, 6 technicians, 8-14 military (T-AGOS 22)
BUILDER.....McDermott Marine

NO LAYBERTHS ASSIGNED

T-AGOS 19 Victorious
T-AGOS 20 Able
T-AGOS 21 Effective
T-AGOS 22 Loyal

Impeccable Class

DISPLACEMENT.....5,730 tons full load
LENGTH.....281.6 feet
BEAM.....95.8 feet
SPEED.....12 knots
POWER PLANT.....2 direct-drive electric motors, 2,500 shp, 4 generators
CREW.....19 CONMARS, 6 technicians, 10-20 military
BUILDER.....VT Halter Marine

NO LAYBERTH ASSIGNED

T-AGOS 23 Impeccable

HOS Red Rock

DISPLACEMENT.....3,911 tons
LENGTH.....292 feet
BEAM.....64 feet
SPEED.....12 knots

NO LAYBERTH ASSIGNED

HOS Red Rock

CABLE LAYING AND REPAIR SHIP (T-ARC)



U.S. NAVY

USNS ZEUS

The first and only cable laying and repair ship built especially for the U.S. Navy, the USNS Zeus can lay up to 1,000 miles of cable to depths up to 9,000 feet. The ship supports the Sound Surveillance System network of

strategically placed sonar sensors providing early warning of submarines. BMT has been awarded a contract for industry studies for a T-ARC(X) to replace the Zeus. The CS Global Sentinel is a time charter used to support Integrated Undersea Surveillance System fixed surveillance system repair.

Zeus

DISPLACEMENT.....14,334 tons full load
LENGTH.....513 feet
BEAM.....73 feet
SPEED.....14 knots
POWER PLANT.....integrated, twin shaft, diesel-electric, 10,000 shp (5,000 hp each shaft)
CREW.....58 CIVMARS
BUILDER.....General Dynamics NASSCO

NO LAYBERTH ASSIGNED

T-ARC 7 Zeus

CS Global Sentinel

DISPLACEMENT.....16,118 tons full load
LENGTH.....478 feet
BEAM.....71 feet
SPEED.....14 knots
POWER PLANT.....Diesel electric propulsion
CREW.....58 CIVMARS
BUILDER.....Far East Shipbuilding Industries

NO LAYBERTH ASSIGNED

CS Global Sentinel

SUBMARINE ESCORT SHIPS

The USNS Arrowhead, the USNS Eagle View, the USNS Black Powder and the USNS Westwind are government-owned vessels purchased in 2015. They provide submarine support services, including blocking and escort duties for submarines moving in and out of port.

DISPLACEMENT.....4,453 tons full load
LENGTH.....258 feet
BEAM.....54 feet
POWER PLANT.....diesel electric twin-shaft
CREW.....48
BUILDER.....Leevac Industries

AREAS OF OPERATION

T-AGSE 1 Black Powder.....Bremerton, Wash.
T-AGSE 2 Westwind.....Bremerton, Wash.
T-AGSE 3 Eagleview.....Kings Bay, Ga.
T-AGSE 4 Arrowhead.....Kings Bay, Ga.

PM3: PRE-POSITIONING PROGRAM

MARITIME PRE-POSITIONING FORCE

The two maritime pre-positioning ship squadrons, or MPSRONs, carry enough equipment and supplies to sustain more than 16,000 Marine expeditionary brigade and Navy personnel for up to 30 days. The ships can offload equipment at established port facilities or while anchored using onboard watercraft operated by naval support element forces. MPSRON assets complement naval amphibious forces. All surge sealift ships were transferred in 2023 to the Maritime Administration.

Bobo Class (purpose-built in support of MPF mission)

DISPLACEMENT.....46,111 long tons
LENGTH.....673.2 feet
BEAM.....105.5 feet
SPEED.....17.7 knots
POWER PLANT.....2 diesel main engines, 1 screw, 30,000 shp
ENDURANCE.....11,107 nautical miles (at maximum speed)
CAPACITY.....bulk petroleum, oil and lubricants (1.6 million gallons), water (98,994 gallons), equipment and vehicles
CREW.....30 CIVMARS
BUILDER.....General Dynamics Shipbuilding

DEPLOYMENT LOCATION

T-AK 3008 2ND LT John P. Bobo.....Guam/Saipan MPSRON 3 (FOS till March 2023)
T-AK 3009 PFC Dewayne T. Williams.....Guam/Saipan/MPSRON 3
T-AK 3010 1ST LT Baldomero Lopez.....ROS Earle, N.J.
T-AK 3011 1ST LT Jack Lummus.....ROS Jacksonville, Fla.
T-AK 3012 SGT William R. Button.....Diego Garcia/MPSRON 2

LARGE, MEDIUM-SPEED, ROLL-ON/ ROLL-OFF SHIPS (T-AKR)

In 2008, the large, medium-speed, roll-on/roll-off ship the USNS Sisler began operating as a maritime pre-positioning ship, followed by the USNS Dahl in 2009. The U.S. Army's six LMSRs returned to MPSRON 2 and MPSRON 3 by 2012. In late 2014, the Army placed one of its six LMSRs in reduced operating status.

Watson Class (New Construction LMSR)



U.S. NAVY

USNS DAHL | Watson Class

DISPLACEMENT.....62,644 long tons full load
LENGTH.....950 feet
BEAM.....105.8 feet
SPEED.....24 knots
POWER PLANT.....2 General Electric Marine LM2500 gas turbines, 64,000 hp, 2 shafts, 2 controllable-pitch propellers
ENDURANCE.....12,000 nautical miles
CAPACITY.....392,627 square feet
CREW.....30 CIVMARS
BUILDER.....General Dynamics NASSCO

DEPLOYMENT LOCATION (ONE VESSEL ROTATED INTO SURGE SEALIFT)

T-AKR 310 Watson....FOS Indian Ocean/MPSRON 2
T-AKR 311 Sisler....FOS Indian Ocean/MPSRON 2
T-AKR 312 Dahl....FOS Western Pacific/MPSRON 3
T-AKR 313 Red Cloud....FOS Western Pacific/MPSRON 3
T-AKR 315 Watkins....FOS Western Pacific/MPSRON 3
T-AKR 316 Pomeroy....FOS Indian Ocean/MPSRON 2
T-AKR 317 Soderman....FOS Western Pacific/MPSRON 3

Bob Hope Class (New Construction LMSR)



U.S. NAVY

USNS SEAY | Bob Hope Class

DISPLACEMENT....62,069 long tons full load
LENGTH....950 feet
BEAM....105.9 feet
SPEED....24 knots
POWER PLANT....4 Colt Pielstick 10 PC4.2 V diesels, 65,160 hp, 2 shafts, 2 controllable-pitch propellers
ENDURANCE....12,000 nautical miles
CAPACITY....387,662 square feet
CREW....29 FOS, 50 supercargoes
BUILDER....Northrop Grumman Shipbuilding

DEPLOYMENT LOCATION

T-AKR 302 Seay....Diego Garcia/MPSRON 2
T-AKR 304 Pililaau....ROS Jacksonville, Fla.

MODIFIED SHUGHART CLASS

The USNS GySgt. Fred W. Stockham combines enhanced pre-positioning capabilities with modifications to provide a multimission vessel to the unified commander. The ship can carry Navy Mobile Construction Battalion equipment, fleet hospital equipment, expeditionary airfield materials and a headquarters support unit.

Stockham Conversion Container and RO/RO Ship

DISPLACEMENT....55,123 long tons full load
LENGTH....906.9 feet
BEAM....105.6 feet
SPEED....24 knots
POWER PLANT....slow-speed diesel
ENDURANCE....12,000 nautical miles
CREW....30 CIVMARS
CONVERSION YARD....General Dynamics NASSCO

DEPLOYMENT LOCATION

T-AK 3017 GYSGT Fred W. Stockham..ROS Earle, N.J.

ARMY CONTAINER SHIPS

T-AK 4496 MV LTC John U.D. Page....Diego Garcia/MPSRON 2
T-AK 4544 MV SSG Edward A. Carter Jr.....Diego Garcia/MPSRON 2

AIR FORCE CONTAINER SHIPS

Chartered vessels are forward-deployed overseas for most of their operational time and return to the continental United States once in five years.

The roll-on/roll-off container ships MV Maj. Bernard F. Fisher and MV Capt. David I. Lyon support U.S. Air Force munitions requirements in the Western Pacific.

T-AK 4396 MV MAJ Bernard F. Fisher....Diego Garcia/MPSRON 2
T-AK 5362 MV CAPT David I. Lyon....Korea/MPSRON 3

EXPEDITIONARY TRANSFER DOCK SHIPS (T-ESD)

The T-ESD, formerly known as the mobile landing platform, functions as a transfer station for pre-positioning ships to offload and transfer cargo to ship-to-shore connector craft such as landing craft air cushion. It features add-on modules to support a vehicle staging area, side-port ramp, large mooring fenders and parking lanes for three landing craft. The USNS Montford Point was delivered May 14, 2013, and deployed to MPSRON 3 in spring 2015. The ship was placed in an inactive, reduced operating status Feb. 23, 2022. The USNS John Glenn was delivered March 12, 2014, and placed in an inactive, reduced operating status Oct. 1, 2020. Both ships are maintained in a ROS 5 status, able to be made ready for tasking within five days of notice to support fleet operations.

Montford Point Class



U.S. NAVY

USNS JOHN GLENN | Montford Point Class

DISPLACEMENT....81,406 metric tons
LENGTH....784 feet
BEAM....164 feet
SPEED....15 knots
POWER PLANT....2 General Electric Marine LM2500 gas turbines, 64,000 hp, 2 shafts, 2 controllable-pitch propellers
RANGE....9,500 nautical miles
CREW....34 CIVMARS
BUILDER....General Dynamics NASSCO

DEPLOYMENT LOCATION

T-ESD 1 Montford Point.....ROS Norfolk, Va.

T-ESD 2 John Glenn.....ROS Oakland, Calif.

EXPEDITIONARY SEA BASE SHIPS (ESB)

The Lewis B. Puller-class expeditionary sea base ship program is managed by Military Sealift Command, but all but one of the ESBs are commissioned, Navy-crewed ships; the exception being the USNS John L. Canley (T-ESB 6), which is operated by the MSC. (See the Navy Ships section for description and characteristics.)

OFFSHORE PETROLEUM DISTRIBUTION SYSTEM

The USNS VADM K.R. Wheeler uses an offshore petroleum distribution system uniquely designed to pump fuel ashore from up to 8 miles, which supports U.S.-deployed warfighters. It takes less than 48 hours for the ship to set up the full length of pipe and begin pumping fuel to shore. The 160-foot USNS Fast Tempo performs as the Wheeler's primary support vessel.

USNS VADM K.R. Wheeler

DISPLACEMENT.....6,389 long tons

LENGTH.....349 feet

BEAM.....70 feet

DRAFT.....26 feet

SPEED.....15 knots

CREW.....6 CIVMARS (22 when FOS)

PUMP RATE.....1.7 million gallons/day

DEPLOYMENT LOCATION

T-AG 5001 VADM K.R. Wheeler.....ROS Lake Union, Wash.

USNS Fast Tempo

DISPLACEMENT.....601 long tons

LENGTH.....160 feet

BEAM.....30 feet

DRAFT.....12.6 feet

SPEED.....26 knots

DEPLOYMENT LOCATION

T-AG 4907 Fast Tempo.....ROS Lake Union, Wash.

PM4: SERVICE SUPPORT PROGRAM

RESCUE AND SALVAGE SHIPS (T-ARS)

The Safeguard-class salvage ships were built for service in the active Navy but transferred to Military Sealift Command in 2006 and 2007. The USNS Salvor operates from Pearl Harbor, Hawaii, and the USNS Grasp transferred to San Diego in October 2018. The USNS Safeguard and the USNS Grapple were placed out of service and in reserve in 2016. The Navy is procuring a new class of towing, salvage and rescue ships (T-ATS) to replace the T-ARSs and fleet ocean tugs.

Safeguard Class

DISPLACEMENT.....3,283 tons full load

LENGTH.....255 feet

BEAM.....51 feet

SPEED.....14 knots

POWER PLANT.....4 diesels, 2 shafts, 4,200 shp



U.S. NAVY

USNS SALVOR | Safeguard Class

AIRCRAFT.....none

CREW.....28 CIVMARS, up to 35 mobile diving and salvage unit members

BUILDER.....Peterson Builders

AREAS OF OPERATION

T-ARS 51 Grasp.....Pacific

T-ARS 52 Salvor.....Pacific

FLEET OCEAN TUGS (T-ATF)

There is one remaining ocean tug in the Military Sealift Command fleet. The design of the Powhatan-class tugs was patterned after commercial offshore supply ships, and they entered service with the MSC in 1979. Each is fitted with a 300-horsepower bow thruster and a 10-ton-capacity crane and has 150,000 pounds of bollard pull. The USNS Navajo was inactivated and stricken for disposal in 2016. A fifth ship, the USNS Mohawk, was stricken for disposal in 2015. The USNS Sioux was placed out of service in 2021, and the USNS Apache was placed out of service in 2022. The USNS Catawba is scheduled to leave service in 2024.

Powhatan Class

DISPLACEMENT.....2,260 tons full load

LENGTH.....226 feet

BEAM.....42 feet

SPEED.....14.5 knots

POWER PLANT.....2 diesels, 2 shafts, controllable-pitch propellers, 7,250 shp

CREW.....18 CIVMARS (19 civilians on Catawba)

BUILDER.....Marinette Marine

AREAS OF OPERATION

T-ATF 168 Catawba.....Persian Gulf

TOWING, RESCUE AND SALVAGE SHIPS (T-ATS)

The Navajo class of towing, salvage and rescue ships are being procured to replace the Powhatan-class T-ATF and Safeguard-class T-ARS ships. The Navajo class will serve as open-ocean towing vessels and will additionally support salvage operations and submarine rescue missions. A $63.5 million contract was awarded in 2018 to Gulf Island Shipyards LLC in Houma, Louisiana, for detail and design of construction of the USNS Navajo, with options for up to seven more ships. A $128.6 million award was made to Gulf Island Shipyards in April 2019 for construction of the second and third ships. In March 2020, the Navy ordered construction of the fourth and fifth ships from Gulf Island Shipyards. Bollinger Shipbuilding

acquired Gulf Island Shipyards in 2021 and renamed the facility Bollinger Houma Shipyard. Austal USA was awarded a contract in September 2021 for T-ATS 11 and T-ATS 12 with options for three additional ships, all of which had been awarded by 2023. A keel ceremony was held in November 2014 for the Billy Frank Jr. at Austal USA.

Navajo Class



U.S. NAVY

NAVAJO CLASS (ARTIST'S RENDERING)

BUILDER.....Bollinger Houma Shipyard (T-ATS 6-8); Austal USA (T-ATS 9-15)

AREAS OF OPERATION

T-ATS 6 Navajo.....(under construction)
T-ATS 7 Cherokee Nation.....(under construction)
T-ATS 8 Saginaw Ojibwe Anishinabek.....(under construction)
T-ATS 9 Lenni Lenape.....(under construction)
T-ATS 10 Muscogee Creek Nation.....(under construction)
T-ATS 11 Billy Frank Jr.....(under construction)
T-ATS 12 Solomon Atkinson.....(under construction)
T-ATS 13 (unnamed).....(under construction)
T-ATS 14 (unnamed).....(under construction)
T-ATS 15 (unnamed).....(under construction)

AMPHIBIOUS COMMAND SHIPS (LCC)

The two Blue Ridge-class LCCs are the only ships designed from the keel up for an amphibious/command ship role. After entering service, both ships largely have served as fleet flagships. The USS Blue Ridge became the U.S. 7th Fleet flagship in 1979 and is forward-deployed to Yokosuka, Japan. The USS Mount Whitney serves as the U.S. 6th Fleet flagship, having served earlier as the U.S. 2nd Fleet flagship.

The Mount Whitney underwent a Military Sealift Command conversion in fiscal 2005 and operates with a hybrid crew of civilian mariners and active Navy personnel. It remains a commissioned ship with an active-duty Navy commanding officer. The Blue Ridge retains an all-Navy crew.

Blue Ridge Class

DISPLACEMENT.....18,874 tons, full load 19,700 tons
LENGTH.....634 feet
BEAM.....108 feet
SPEED.....23 knots
POWER PLANT.....1 geared turbine, 2 boilers, 1 shaft, 22,000 shp
ARMAMENT.....2 Phalanx Close-In Weapon Systems, 2 25 mm Mk38 guns
AIRCRAFT.....none (helicopter landing area only)
COMPLEMENT.....34 officers, 564 Sailors



U.S. NAVY

USNS MOUNT WHITNEY | Blue Ridge Class

BUILDERS.....LCC 19: Philadelphia Naval Shipyard;
LCC 20: Newport News Shipbuilding

HOMEPORT

LCC 20 Mount Whitney.....Gaeta, Italy

SUBMARINE TENDERS (AS)



U.S. NAVY

USNS EMORY S. LAND | L.Y. Spear Class

These two forward-deployed ships are the vestiges of the previously large fleet of submarine and destroyer tenders and repair ships. Although their sister ships were decommissioned after the Cold War, the two L.Y. Spear-class tenders, the USS Emory S. Land and the USS Frank Cable, are important assets intended to serve into the mid-2020s.

Both ships remain commissioned U.S. Navy units and have hybrid crews of military and civilian personnel. Military Sealift Command civilian mariners assumed responsibility in 2008 to crew, operate and maintain the ships, while uniformed Navy personnel, under the command of a Navy captain, handle the mission roles. Both ships have been given modernization and habitability upgrades. The ships routinely deploy throughout the Western Pacific and Indian Ocean regions.

In May 2022, the Navy selected three companies to submit design proposals for the next-generation submarine tender, AS(X), under a concept refinement and preliminary design study.

L.Y. Spear Class

DISPLACEMENT.....approximately 23,493 tons full load
LENGTH.....644 feet
BEAM.....85 feet
SPEED.....20 knots
POWER PLANT.....2 boilers, steam turbines, 1 shaft, 20,000 shp
AIRCRAFT.....none
ARMAMENT.....4 25 mm Mk38 guns
COMPLEMENT.....AS 39: 292 officers and enlisted, 158 CIVMARs; AS 40: 206 officers and enlisted, 158 CIVMARs
BUILDER.....Lockheed Shipbuilding and Construction

HOMEPORT

AS 39 USS Emory S. Land.....Apra Harbor, Guam
AS 40 USS Frank Cable.....Apra Harbor, Guam

HOSPITAL SHIPS (T-AH)



U.S. NAVY

USNS COMFORT | Mercy Class

The two Mercy-class hospital ships have become prime assets in the Navy's efforts to reach out to foreign countries and provide humanitarian assistance and disaster relief.

When fully operational, the hospital ships have a crew of about 71 civilians and up to 1,200 Navy medical and communications personnel. The precise crew composition and size varies by mission type. During humanitarian-assistance missions, the crew often includes representatives from other U.S. services, foreign militaries and nongovernmental organizations.

Since 2001, the hospital ships have conducted humanitarian-assistance and disaster-response missions at home and abroad, providing care to more than approximately 500,000 people.

The USNS Comfort, which originally drew most of its medical staff from the Washington area, was transferred to Norfolk, Virginia, in 2013 to be closer to the Portsmouth Naval Medical Center, where most of its medical staff are based. In 2020, the Comfort and the USNS Mercy deployed to New York and Los Angeles, respectively, to ease the patient load of those cities during the COVID-19 pandemic. The Comfort deployed to the Southern Command in 2022. The Mercy supported Pacific Partnership in 2023.

In July 2023, Philly Shipyard received a contract to conduct the T-AH(X) Hospital Ship Feasibility Study for Gibbs and Cox, a Leidos Inc. company. The six-month design study will cover a solution for preliminary designs to replace the two current hospital ships.

Mercy Class

DISPLACEMENT.....69,360 tons full load
LENGTH.....894 feet
BEAM.....106 feet
SPEED.....17 knots
POWER PLANT.....geared steam turbine, 2 boilers, 1 shaft, 24,500 shp
CAPACITY.....1,000 beds, 12 operating rooms
CREW.....71 CIVMARs plus up to 1,200 medical personnel
CONVERSION YARD.....General Dynamics NASSCO

LAYBERTH

T-AH 19 Mercy.....San Diego
T-AH 20 Comfort.....Norfolk, Va.

SUBMARINE AND SPECIAL WARFARE SUPPORT SHIPS

Several chartered vessels are used in special mission and submarine support roles. These ships are owned and operated by contract operators in support of Naval Special Warfare Command, U.S. submarine forces, U.S. Pacific Command and U.S. Special Operations Command. The MV Gary Chouest is owned and operated by Edison Chouest Offshore and provides towing and salvage support to U.S. Fleet Forces Command. The MV Kellie Chouest is owned and operated by Edison Chouest Offshore and provides support to Southern Command. The MV HOS Dominator provides submarine support and is owned and operated by Hornbeck Offshore Services in Covington, Louisiana. The MV Malama also provides submarine support and is owned and operated by Hawaiian Resource Group. The MV Ocean Valor is a fleet experimentation ship.

The MV HOS Resolution is a stern-ramp equipped force mobility asset for U.S. Marine Corps test and evaluation use that was delivered in fiscal 2023. Initial testing is being conducted at Blount Island Command in Jacksonville, Florida, with follow-on testing on the West Coast in the second quarter of fiscal 2024.

AREAS OF OPERATION

MV Kellie Chouest.....Atlantic/Pacific Ocean Area and Caribbean Sea
MV Gary Chouest.....U.S. East Coast
MV HOS Dominator.....U.S. West Coast
MV Malama.....Pearl Harbor, Hawaii
MV Ocean Valor.....U.S. West Coast
MV HOS Resolution.....U.S. West Coast

PM6: FLEET ORDNANCE & DRY CARGO PROGRAM

DRY CARGO/AMMUNITION SHIPS (T-AKE)

Lewis and Clark-class ships employ sophisticated handling systems to deliver ammunition, fuel, provisions, stores, spare parts, potable water and petroleum products to ships and other naval forces at sea. Depending on operational requirements, a T-AKE can operate independently as a resupply shuttle ship or paired with an oiler as a station ship, deployed as part of a carrier strike group.

The class is designed and built to commercial specifications and standards and certified and classed by the American Bureau of Shipping, U.S. Coast Guard and other regulatory bodies. The USNS Lewis and Clark was delivered to Military Sealift Command in 2006; the last ship of the class, the USNS Cesar Chavez, was placed in service in 2012. The USNS William

McLean and the Cesar Chavez were assigned to the Combat Logistics Force in 2012 in exchange for the Lewis and Clark and the USNS Sacagawea, which were assigned to the pre-positioning mission in support of the Marine Corps.

Lewis and Clark Class



U.S. NAVY

USNS RICHARD E. BYRD | Lewis and Clark Class

DISPLACEMENT.....25,231 long tons
LENGTH.....689 feet
BEAM.....105.6 feet
SPEED.....20 knots
RANGE.....14,000 miles at 20 knots
POWER PLANT.....integrated propulsion and ship service electrical system, with generation at 6.6 kV by 4 FM/MAN B&W diesel generators; 1 fixed-pitch propeller; bow thruster
AIRCRAFT.....2 MH-60S or commercial H225 Super Puma helicopters
CARGO CAPACITY.....24,900 barrels of fuel; dry cargo volume, 673,600 cubic feet; chill/freeze volume, 158,300 cubic feet; specialty cargo volume, 164,700 cubic feet; freshwater cargo volume, 52,800 gallons
CREW.....129 CIVMARS
BUILDER.....General Dynamics NASSCO

AREAS OF OPERATION

T-AKE 1 Lewis and Clark.....Diego Garcia/MPSRON 2
T-AKE 2 Sacagawea.....Guam/Saipan/MPSRON 3
T-AKE 3 Alan Shepard.....Western Pacific/Indian Ocean/Persian Gulf
T-AKE 4 Richard E. Byrd.....Western/Eastern Pacific
T-AKE 5 Robert E. Peary.....Atlantic/Mediterranean/Persian Gulf
T-AKE 6 Amelia Earhart.....Western Pacific/Indian Ocean/Persian Gulf
T-AKE 7 Carl Brashear.....Western Pacific/Indian Ocean/Persian Gulf
T-AKE 8 Wally Schirra.....Persian Gulf/Indian Ocean
T-AKE 9 Matthew Perry.....Western Pacific/Indian Ocean/Persian Gulf
T-AKE 10 Charles Drew.....Western Pacific/Indian Ocean/Persian Gulf
T-AKE 11 Washington Chambers.....Western/Eastern Pacific
T-AKE 12 William McLean.....Atlantic/Mediterranean/Persian Gulf
T-AKE 13 Medgar Evers.....Atlantic/Mediterranean
T-AKE 14 Cesar Chavez.....Western Pacific/Indian Ocean/Persian Gulf

FAST COMBAT SUPPORT SHIPS (T-AOE)

Fast combat support ships have the speed to keep up with carrier strike groups and can carry more than 177,000 barrels of oil, 2,150 tons of ammunition, 500 tons of dry stores and 250 tons of refrigerated stores. The ships receive petroleum products, ammunition and stores from shuttle ships when possible to minimize in-port time and remain with the carrier strike groups. T-AOEs can simultaneously transfer fuel, ammunition and stores to ships in carrier strike groups, reducing the vulnerability of serviced ships by minimizing at-sea alongside time. They have greater speed to keep up with an aircraft carrier and its escort ships.

Built originally for Navy operation, the four remaining fast combat support ships were decommissioned and transferred to Military Sealift Command for civil service operation between 2001 and 2004. The USNS Bridge was inactivated Sept. 30, 2014, and the USNS Rainier was inactivated Sept. 30, 2016, as cost-reduction measures.

Supply Class



U.S. NAVY

USNS ARCTIC | Supply Class

DISPLACEMENT.....48,500 tons full load
LENGTH.....754 feet
BEAM.....107 feet
SPEED.....25+ knots
POWER PLANT.....4 GE LM2500 gas turbines, 2 shafts, 105,000 shp
AIRCRAFT.....2 MH-60S
CREW.....170 CIVMARS (helicopter detachment adds 35)
BUILDER.....General Dynamics NASSCO

AREAS OF OPERATION

T-AOE 6 Supply.....Atlantic/Mediterranean/Persian Gulf
T-AOE 8 Arctic.....Atlantic/Mediterranean/Persian Gulf

PM8: EXPEDITIONARY FAST TRANSPORT

EXPEDITIONARY FAST TRANSPORTS (T-EPF)

Formerly designated joint high-speed vessels, T-EPFs are high-speed, shallow-draft ships capable of intra-theater personnel and cargo lift for the armed services. Able to reach speeds of more than 35 knots, they enable the rapid transit and deployment of conventional and special forces, equipment, and supplies in support of maneuver and sustainment operations. The vessels can carry Army and Marine Corps company-sized units with vehicles and tanks and are able to support a variety of noncombat missions, including humanitarian assistance/disaster relief, theater security cooperation, maritime domain awareness and noncombatant evacuations.

The design features a flight deck capable of landing an H-53 helicopter and parking an H-60. There is a stern ramp for vehicle access to the mission deck. The ramp is suitable for the types of austere piers and quay walls common in developing countries as well as for lighters and floating causeways in a low sea state. The ship's crane can be used for the launch and recovery of small craft as well as cargo movement between the mission bay and flight deck and over the side. The ship's draft and maneuverability allow it to operate in shallow waters without tug support.

T-EPFs are operated by Military Sealift Command civilian mariners and forward-deployed to assigned combatant commands. The first EPF, the USNS Spearhead, was delivered by Austal USA as JHSV 1 in December 2012. The USNS Apalachicola was modified for a demonstration of autonomous capability under a $44 million contract awarded in June 2021; while the Navy has no requirement for the capability, the system was left in place upon delivery for potential future use. The Apalachicola is a hybrid of the Flight I and Flight II Variant. T-EPFs 14 and 15 will be the Flight II Variant. The Flight II Variant is an adaptive, modular package that can better host an embarked unit or be set up as a Role 2E medical facility, capable of performing primary surgery, resuscitative trauma surgery, critical care, oxygen generation, blood operations, laboratory functions and associated ancillary services. The Flight II variant also incorporates an 11-meter workboat for mission use and can land V-22 tilt-rotor aircraft.

Spearhead Class



U.S. NAVY

USNS CARSON CITY | Spearhead CLass

DISPLACEMENT ..... 2,400 long tons
LENGTH ..... 338 feet
BEAM ..... 93.5 feet
DRAFT ..... 13 feet
SPEED ..... 35 knots
RANGE ..... 1,200 nautical miles carrying 600 short tons at an average speed of 35 knots; 4,700 nautical miles at 23 knots, empty of cargo
COMPLEMENT ..... 26 CIVMARS or contract mariners
LIFT CAPACITY ..... 600 short tons and 312 passengers
POWER PLANT ..... 4 MTU 8000 diesel engines
BUILDER ..... Austal USA

AREAS OF OPERATION

FLIGHT I

T-EPF 1 Spearhead ..... Atlantic
T-EPF 2 Choctaw County ..... Far East
T-EPF 3 Millinocket ..... Western Pacific
T-EPF 4 Fall River ..... Western Pacific
T-EPF 5 Trenton ..... Atlantic/Mediterranean
T-EPF 6 Brunswick ..... Western Pacific
T-EPF 7 Carson City ..... Atlantic/Mediterranean
T-EPF 8 Yuma ..... Mediterranean
T-EPF 9 City of Bismarck ..... Pacific
T-EPF 10 Burlington ..... Atlantic
T-EPF 11 Puerto Rico ..... Central/Western Pacific
T-EPF 12 Newport ..... Atlantic
T-EPF 13 Apalachicola ..... Western Pacific

FLIGHT II

T-EPF 14 Cody ..... (under construction)
T-EPF 15 Point Loma ..... (under construction)
T-EPF 16 (unnamed) ..... (under construction)

EXPEDITIONARY MEDICAL SHIPS (EMS)

A new type of expeditionary medical ship is under development by Austal USA to provide hospital-level medical care in support of distributed maritime operations. The ships are to be a further variant of the Spearhead class of expeditionary fast transports. The Bethesda (EMS 1) was named on May 14, 2023, and the Balboa (EMS 2) on Oct. 27, 2023, but funding for either ship has yet to be provided.

HIGH-SPEED TRANSPORTS (HST)

BRIEFING: The USNS Guam provides transport for U.S. Marine Corps III Marine Expeditionary Force personnel and equipment to and from exercise areas in the Western Pacific. HST 2 (ex-Puerto Rico, ex-MV Alakai), owned by Military Sealift Command, is under lease to Bay Ferries Ltd., a Canadian company, to operate ferry service between Portland, Maine, and Yarmouth, Nova Scotia.

Guam Class

DISPLACEMENT ..... 1,646 tons
LENGTH ..... 373 feet
BEAM ..... 78 feet
DRAFT ..... 12 feet
SPEED ..... 33 knots with 700 short tons of cargo, 39 knots without payload
RANGE ..... 2,400 nautical miles at 34 knots, 5,800 nautical miles at 17 knots
COMPLEMENT ..... 15-18 CIVMARS
LIFT CAPACITY ..... 24,500 square feet
POWER PLANT ..... 4 Rolls-Royce KaWeMa 125 MkII waterjets, 4 MTU diesel engines M70, 4 420 eKW Cat generator sets
BUILDER ..... Austal USA

DEPLOYMENT LOCATION

HST 1 Guam ..... Okinawa, Japan
HST 2 ..... Bar Harbor, Maine, and Yarmouth, Nova Scotia (commercial charter)

DRY CARGO AND TANKERS

Military Sealift Command charters five tankers to deliver petroleum products to Department of Defense storage and distribution facilities worldwide. The ships below are currently under contract or recently have been:

- MT Allied Pacific
- MT Empire State (T-AOT 5193)
- MT Evergreen (T-AOT 5205)
- MT Maersk Peary (T-AOT 5246)
- MT SLNC Pax (T-AOT 5356)
- MT SLNC Goodwill (T-AOT 5419)
- MT Stena Polaris (T-AOT 5356)

The MSC charters two dry cargo ships for logistics to overseas ports:

The MT SLNC Corsica (T-AK 5423) makes regular resupply runs from Singapore to Diego Garcia. Self-tending allows cargo operations without assistance.

The T/B Sea Eagle (MB 1219) operates as a shuttle between Port Canaveral, Florida, and Andros Island, Bahamas, carrying cargo for the Naval Undersea Warfare Center.



GENERAL DYNAMICS BATH IRON WORKS

USS CARL M. LEVIN (DDG 120)

This list covers changes in the status of ships of the U.S. Navy, Coast Guard and fleet support auxiliary ships of the Military Sealift Command for calendar year 2023. Data is considered correct as of December 8, 2023; future dates are subject to change. All dates are for 2023 unless otherwise noted; some late events for 2022 and near-future projected events for 2024 are included. Some ceremonial events, such as christenings and commissionings, were delayed by the pandemic.

— Compiled by Christopher P. Cavas

AIRCRAFT CARRIERS

George Washington (CVN 73) redelivered May 25 from HII Newport News Shipbuilding following Refueling Complex Overhaul (RCOH).

SUBMARINES

Chicago (SSN 721) placed In Commission, In Reserve January 24 at Bremerton, Washington. Decommissioning ceremony held July 21 at Bremerton.

Key West (SSN 722) placed In Commission, In Reserve (Stand Down) September 21 at Bremerton for inactivation.

Hyman G. Rickover (SSN 795) delivered October 8 from General Dynamics Electric Boat, Groton, Connecticut. Commissioned October 14 at Groton.

New Jersey (SSN 796) placed In Service, Special July 1 at HII Newport News Shipbuilding. Commissioning scheduled for April 6, 2024.

Iowa (SSN 797) christened June 17 at GD Electric Boat. Floated off August 10.

Massachusetts (SSN 798) christened May 6 at Newport News. Launch scheduled for Dec. 2023.

Oklahoma (SSN 802) keel ceremony held August 2 at Newport News.

Tang (SSN 805) keel ceremony held August 17 at GD Electric Boat, Quonset Point, Rhode Island.

John H. Dalton (SSN 808) name announced February 28.

Long Island (SSN 809) name announced May 25.

San Francisco (SSN 810) name announced October 3.

SSN 812 and SSN 813 contract modification for long-lead-time material awarded to GD Electric Boat May 23.

SSN 814 and SSN 815 contract modification for long-lead-time material awarded to GD Electric Boat October 13.

CRUISERS

Bunker Hill (CG 52) decommissioning ceremony held September 22 at San Diego. Officially decommissioned and stricken September 29.

Mobile Bay (CG 53) decommissioning ceremony held August 10 at San Diego. Officially decommissioned and stricken August 18.

San Jacinto (CG 56) decommissioning ceremony held September 15 at Norfolk, Virginia. Officially decommissioned and stricken September 29.

Lake Champlain (CG 57) decommissioning ceremony held September 1 at San Diego. Officially decommissioned and stricken September 8.

Robert Smalls (CG 62) renamed February 27 from Chancellorsville.

DESTROYERS

Carl M. Levin (DDG 120) delivered January 26 from General Dynamics Bath Iron Works, Bath, Maine and placed In Commission, Special. Commissioned June 24 at Baltimore, Maryland. Homeported at Pearl Harbor.

Lenah Sutcliffe Higbee (DDG 123) commissioned May 13 at Key West, Florida. Homeported at San Diego.

Harvey C. Barnum Jr. (DDG 124) christened July 29 at Bath Iron Works. Launched October 4.

Jack H. Lucas (DDG 125) delivered June 27 from Huntington Ingalls Industries Ingalls Shipbuilding, Pascagoula, Mississippi. Commissioned October 7 at Tampa, Florida. Homeported at San Diego.

Louis H. Wilson Jr. (DDG 126) keel ceremony held May 16; official keel date 5 July at Bath Iron Works.

Ted Stevens (DDG 128) launched August 9 at Ingalls Shipbuilding; christened August 19.

George M. Neal (DDG 131) keel ceremony held Dec. 15 at Ingalls Shipbuilding.

John E. Kilmer (DDG 134) start of fabrication ceremony held November 8 at Bath Iron Works.

Thad Cochran (DDG 135) start of fabrication ceremony held November 13, 2023 at Ingalls Shipbuilding.

Thomas Kelley (DDG 140) name announced Jan. 12. Construction contract awarded August 1 to Bath Iron Works.

Ernest E. Evans (DDG 141) construction contract awarded August 1 to Ingalls Shipbuilding. Name announced November 15.

DDG 142 construction contract option awarded August 11 to Ingalls Shipbuilding.

FRIGATES

Lafayette (FFG 65) construction contract awarded May 18 to Fincantieri Marinette Marine. Name announced June 29.

LITTORAL COMBAT SHIPS

Milwaukee (LCS 5) decommissioning ceremony held September 8 at Mayport, Florida. Officially decommissioned and stricken September 29 at Mayport.

Detroit (LCS 7) decommissioned and stricken September 29 at Mayport.

Little Rock (LCS 9) decommissioned and stricken September 29 at Mayport.

Sioux City (LCS 11) decommissioned and stricken August 14 at Mayport.

Cooperstown (LCS 23) commissioned May 6 at New York City. Homeported at Mayport.

Marinette (LCS 25) delivered February 3 from Fincantieri Marinette Marine. Commissioned September 16 at Marinette, Wisconsin. Homeported at Mayport.

Canberra (LCS 30) commissioned July 22 at Sydney, Australia. Homeported at San Diego.

Cleveland (LCS 31) christened and launched April 15 at Fincantieri Marinette Marine.

Santa Barbara (LCS 32) commissioned April 1 at Port Hueneme, California. Homeported at San Diego.

Augusta (LCS 34) delivered May 12 from Austal USA, Mobile, Alabama. Commissioned September 30 at Eastport, Maine. Homeported at San Diego.

Kingsville (LCS 36) launched March 27 at Austal USA; christened April 22.

Pierre (LCS 38) keel ceremony held June 16 at Austal USA.

PATROL TYPES

Hurricane (PC 3) decommissioned and stricken March 20 at Alexandria, Egypt. Transferred to Egypt March 21.

Monsoon (PC 4) decommissioned and stricken March 28 at Manama, Bahrain and transferred same day to Philippines as Valentin Diaz (PS 177).

Sirocco (PC 6) decommissioned and stricken March 20 at Alexandria, Egypt. Transferred to Egypt March 21.

Chinook (PC 9) decommissioned and stricken March 28 at Manama, Bahrain and transferred same day to Philippines as Ladislao Diwa (PS 178).

Thunderbolt (PC 12) decommissioned and stricken March 20 at Alexandria, Egypt. Transferred to Egypt March 21.

AMPHIBIOUS TYPES

Bougainville (LHA 8) launched September 30 at Ingalls Shipbuilding. Christened Dec. 2.

Fallujah (LHA 9) name announced December 13, 2022. Construction start December 19, 2022. Keel ceremony held September 20.

Pittsburgh (LPD 31) keel ceremony held June 2 at Ingalls Shipbuilding.

Philadelphia (LPD 32) construction contract modification awarded March 31 to Ingalls Shipbuilding. Name announced October 12.

AUXILARIES AND SUPPORT SHIPS

Bethesda (T-EMS 1) name announced May 15.

Balboa (T-EMS 2) name announced October 27.

Apalachicola (T-EPF 13) delivered February 16 from Austal USA and placed in service with Military Sealift Command.

Cody (T-EPF 14) christened February 25 at Austal USA; launched March 20.

Point Loma (T-EPF 15) keel ceremony held June 27 at Austal USA.

EPF 16 fabrication began September 18 at Austal USA.

John L. Canley (T-ESB 6) delivered March 1 from General Dynamics National Steel & Shipbuilding Co. (NASSCO), San Diego and placed in service with MSC.

Robert E. Simanek (ESB 7) keel ceremony held October 21 at GD NASSCO.

Hector E. Cafferata, Jr. (ESB 8) name announced July 27. Construction start August 8 at GD NASSCO.

T-AGOS 25 construction authorized by Austal USA authorized on May 18.

Marie Tharp (T-AGS 66) renamed March 8 from Maury.

Robert Ballard (T-AGS 67) name announced December 21, 2022.

Harvey Milk (T-AO 206) delivered July 10 from GD NASSCO, San Diego and placed in service with MSC.

Earl Warren (T-AO 207) christened January 21 at GD NASSCO.

Robert F. Kennedy (T-AO 208) keel ceremony held December 5, 2022 at GD NASSCO. Christened and launched Oct. 28.

Lucy Stone (T-AO 209) keel ceremony held August 8 at GD NASSCO.

Sojourner Truth (T-AO 210) construction start March 27 at GD NASSCO.

Harriet Tubman (T-AO 213) name announced September 17.

Navajo (T-ATS 6) christened and launched May 24 at Bollinger Houma Shipyard, Houma, Louisiana. Christened August 26.

Muscogee Creek Nation (T-ATS 10) start of fabrication ceremony held March 7 at Bollinger Houma Shipyard.

Billie Frank Junior (T-ATS 11) name announced July 14. Keel ceremony held November 14 at Austal USA.

Solomon Atkinson (T-ATS 12) construction start January 30 at Austal USA, Mobile, Alabama. Name announced August 7.

T-ATS 15 construction contract option exercised June 16 with Austal USA.

COAST GUARD

Calhoun (WMSL 759) delivered October 13 from Ingalls Shipbuilding and placed In Commission, Special.

Argus (WMSM 915) christened and launched October 27 at Eastern Shipbuilding Group, Panama City, Florida.

Warren Deyampert (WPC 1151) delivered December 23, 2022. Commissioned March 30 at homeport of Boston, Massachusetts.

Maurice Jester (WPC 1152) delivered from Bollinger Shipyards March 2 at Key West, Florida. Commissioned June 2 at homeport of Boston.

John Patterson (WPC 1153) delivered from Bollinger Shipyards May 11 at Key West. Commissioned August 10 at Portland, Maine. Homeported at Boston.

William Sparling (WPC 1154) delivered from Bollinger Shipyards July 20 at Key West. Commissioned Oct. 19 at New Castle, New Hampshire. Homeported at Boston.

Melvin Bell (WPC 1155) delivered from Bollinger Shipyards November 16 at Key West. Homeported at Boston.

Decisive (WMEC 629) decommissioned March 2 at Pensacola, Florida.

Bayberry (WLI 65400) "special status" ceremony held June 7 at Oak Island, North Carolina to mark decommissioning after 69 years in service.



OFFICE OF NAVAL RESEARCH

Thomas G. Thompson

Seventeen civilian oceanographic research ships are used as part of the University-National Oceanographic Laboratory System fleet. While ownership of the vessels varies from the Navy to the National Science Foundation to universities, all are operated by universities or research institutions. The UNOLS also schedules the U.S. Coast Guard Cutter Healy — a medium icebreaker — and the National Oceanic and Atmospheric Administration ship Ronald H. Brown. More information on the vessels can be obtained through the UNOLS website: www.unols.org.

SHIP NAME	OPERATOR	HOMEPORT
Global Ships		
Atlantis*	Woods Hole Oceanographic Institution	Woods Hole, Mass.
Roger Revelle*	Scripps Institution of Oceanography, University of California San Diego	San Diego
Thomas G. Thompson*	School of Oceanography, University of Washington	Seattle
Marcus Langseth**	Lamont-Doherty Earth Observatory, Columbia University	Palisades, N.Y.
Sikuliaq	Seward Marine Center, University of Alaska at Fairbanks	Seward, Alaska
Ocean/Intermediate Ships		
Kilo Moana*	University of Hawaii at Manoa	Honolulu
Endeavor**	Graduate School of Oceanography, University of Rhode Island	Narragansett, R.I.
Atlantic Explorer	Bermuda Institute of Ocean Sciences, Arizona State University	Bermuda
Sally Ride*	Scripps Institution of Oceanography, University of California San Diego	San Diego
Neil Armstrong*	Woods Hole Oceanographic Institution	Woods Hole, Mass.
Regional Ships		
Hugh R. Sharp	College of Earth, Ocean and Environment, University of Delaware	Lewes, Del.
Coastal/Local Ships		
Robert Gordon Sproul	Scripps Institution of Oceanography, University of California San Diego	San Diego
Pelican	Louisiana Universities Marine Consortium	Chauvin, La.
F.G. Walton Smith	Rosenstiel School of Marine, Atmospheric and Earth Science, University of Miami	Miami
Blue Heron	Large Lakes Observatory, University of Minnesota Duluth	Duluth, Minn.
Savannah	Skidaway Institute of Oceanography, University of Georgia	Savannah, Ga.
Rachel Carson	School of Oceanography, University of Washington	Seattle

Owned by the U.S. Navy

****Owned by the National Science Foundation***

BALLISTIC MISSILES

UGM-133A TRIDENT II (D5)



U.S. NAVY

UGM-133A TRIDENT II

The UGM-133A Trident II (D5) is a three-stage, solid-propellant, inertially guided fleet ballistic missile carried by the Ohio-class nuclear-powered ballistic-missile submarines (SSBNs). Trident II is more sophisticated than the UGM-96A Trident I (C4), with a significantly greater payload capability.

The missile's range is increased by the aerospike, a telescoping, outward extension that reduces frontal drag by about 50%. Trident II is launched by the pressure of expanding steam within the launch tube. When the missile attains sufficient distance from the submarine, the first-stage motor ignites, the aerospike engine nozzle extends and the boost stage begins. Within about two minutes, after the third-stage motor ignites, the missile is traveling at nearly 20,000 feet per second.

The long-range Trident II D5, initially deployed in 1990, vastly increased the areas in which SSBNs can operate and still have their missiles reach their targets, offsetting improvements in the anti-submarine warfare capability of potential adversaries. Trident II D5s are subject to the limitations of the 1993 Strategic Arms Reduction Treaty II and the 2011 New Strategic Arms Reduction Treaty.

The Trident I C4 was deployed in the first eight boats of the Ohio class. The Trident II D5 was deployed in the remaining 10 boats of the class. The last Trident I C4 patrol was completed in September 2005 and the missile withdrawn from service. Of the eight Ohio-class boats that deployed with the Trident I C4, the first four have been converted to SSGN configurations. The remaining four boats have been backfit to carry Trident II D5 missiles.

The Trident has been selected to arm the next-generation Columbia-class ballistic-missile submarine. The Trident inventory is going through a life extension, with the upgraded missiles designated D5LE. The D5LE entered service in 2017. The Navy is working on a follow-on missile, the D5LE2, for service on the Columbia class.

In response to the 2018 Nuclear Posture Review, the National Nuclear Safety Administration developed the W76-2 low-yield nuclear warhead for the Trident missile. The first production W76-2 was produced in February 2019 and deployed later that year.

LENGTH	44 feet
DIAMETER	83 inches
WEIGHT	130,000 pounds
RANGE	4,000+ nautical miles
POWER PLANT	3-stage solid-fuel rocket
WARHEADS	W76-Mk4/Mk4A or W88-Mk5 thermonuclear multiple independently targetable reentry vehicles
CONTRACTOR	Lockheed Martin Space Systems Co.

HYPERSONIC MISSILES

CONVENTIONAL PROMPT STRIKE

Under the Navy's Conventional Prompt Strike program, the Navy and Army are developing a hypersonic missile capability for long-range precision strike. Hypersonic weapons are capable of flying at five times the speed of sound. The system consists of a common solid-fuel rocket with a hypersonic glide body that includes a conventional warhead, a guidance system, cabling and thermal protection. The missile is fired by a mobile truck-towed launcher or from a ship or submarine.

Test firings were conducted in October 2017 and March 2020. Tests of the first- and second-stage rocket motors were conducted in May and August 2021, respectively. The Army and Navy will use the Common-Hypersonic Glide Body. The Army's version of the CPS — the Long-Range Hypersonic Weapon — was to be deployed in 2023. Initial unit training began without the all-up-round in 2021. Delivery of the Army's prototype truck-hauled delivery system was scheduled for 2023. The delivery of the all-up-round — including the hypersonic glide body — is planned for 2024.

The first Navy deployment is scheduled on Zumwalt-class guided-missile destroyers by 2025 and Virginia-class attack submarines with the Virginia payload module by 2028.

CRUISE MISSILES

R/UGM-109 TOMAHAWK LAND-ATTACK MISSILE



U.S. NAVY

R/UGM-109 TOMAHAWK

Tomahawks are all-weather, long-range, subsonic cruise missiles used for deep land-attack warfare. These missiles are launched from U.S. Navy surface ships and U.S. Navy and Royal Navy submarines. Tomahawks are designed to fly at extremely low altitudes at high subsonic speeds and are piloted over an evasive route by several mission-tailored guidance systems. The missile was first used in Operation Desert Storm in 1991 and has since been used in several other conflicts. In 1995, the United States and the United Kingdom signed a Foreign Military Sales Agreement for the acquisition of 65 missiles, marking the first sale of the Tomahawk to a foreign country.

In 2003, the U.S. approved another FMS agreement for the United Kingdom to procure 65 Block IV Torpedo Tube-Launch Tomahawks. The United Kingdom began to receive Block IV missile deliveries in January 2008 and declared them in service as of March 2008. The Tomahawk Block IV (Tactical Tomahawk, TLAM-E) conventional variant, which entered U.S. Navy service in 2004, adds the capability to reprogram the missile in flight via two-way satellite communications to strike any of 15 pre-programmed alternate targets or redirect the missile to any GPS target coordinates. Guidance systems for the Block IV TLAM-E include an inertial

navigation system, a terrain contour mapping system, a digital scene matching area correlator system and GPS. The Block IV missile is capable of loitering over a target area to respond to emerging targets or, with its onboard camera, provide battle damage information to commanders.

The Navy received its first Block V-configured Tomahawk missile from Raytheon in March 2021. The first Block V missiles are from the existing Tomahawk Block IV inventory and have been recertified and modernized for fleet use. The midlife recertification process replaces life-limited components in Block IV missiles to enable their remaining 15 years of service life and provides the opportunity for the missiles to receive Block V modernizations. All Block IV missiles will undergo recertification and modernization.

Block V missiles feature a navigation and communications upgrade. Future Block V capabilities will include the Maritime Strike Tomahawk variant, which adds a seeker kit (designated as Block Va), and a replacement for the current warhead with the Joint Multiple Effects Warhead System (designated as Block Vb).

In May 2022, the Navy ordered 154 Block V Tomahawks, including 54 for the Marine Corps and 30 for the Army. The missiles for the Marine Corps and Army will be mounted on vehicles.

Note: The Block II TLAM-A, which became operational in 1984, has been retired. The Block II TLAM-N, equipped with the W80 nuclear warhead, also has been retired. The Block III TLAM-C and D, which became operational in 1994, also have been retired.

LENGTH ..... 18.3 feet; with booster, 20.6 feet
DIAMETER ..... 20.4 inches
WINGSPAN ..... 8.9 feet
WEIGHT ..... 2,900 pounds; 3,500 pounds with booster
SPEED ..... high subsonic, approximately 550 mph
RANGE ..... Block IV/V: 900 nautical miles (1,000 statute miles, 1,600 kilometers)
PROPULSION ..... Launch — Block IV/V: ARC/CSD solid-fuel booster; Cruise — Block IV/V: Williams International F415-WR-400 turbojet
WARHEADS ..... Block IV: 1,000-pound class WDU-36B unitary warhead
CONTRACTOR ..... Raytheon Missiles and Defense

RGM-84/AGM-84 HARPOON



U.S. NAVY

RGM-84 HARPOON

The Harpoon, an autonomous, all-weather, over-the-horizon anti-ship missile, uses midcourse guidance with a radar seeker to attack surface ships. Its low-level, sea-skimming cruise trajectory, active radar guidance and warhead design ensure high survivability and effectiveness. The Harpoon is deployed onboard Navy attack submarines and surface combatants (cruisers, destroyers, one littoral combat ship) as well as on F/A-18 Hornet, F/A-18E/F Super Hornet, and P-8 Poseidon aircraft.

In 1998, the RGM-84L Harpoon Block II was introduced as an upgrade and incorporates the inertial measuring unit from the Joint Direct Attack Munition. Harpoon Block II can execute anti-ship missions by using GPS-aided inertial navigation. The Block II improvements maintain Harpoon's high-hit probability even against ships very close to land or neutral shipping. It is deployable from all current Harpoon missile system platforms with existing command and launch equipment or the new Advanced Harpoon Weapon Control System. The Block II version was not adopted by the U.S. Navy but has been integrated on foreign F-16 and F-15 aircraft as well as international surface combatants.

The latest upgrade is the AGM-84N Harpoon Block II+, which includes a new GPS guidance kit and improved weapon reliability and survivability. Fleet introduction of the Block II+ was achieved in 2017 on F/A-18E/F aircraft followed by the P-8A in 2019.

The UGM-84A Harpoon was withdrawn from the submarine force in 1997 but is being reintroduced as an undersea weapon with the encapsulated Block 1C version fitted with a rocket booster to propel it above the water's surface and into flight. A demonstration of the missile was conducted during the 2018 Rim of the Pacific exercise when the attack submarine USS Olympia launched a Harpoon against a target ship. Initial work to produce refurbished Harpoons for underwater launch has been completed.

LENGTH ..... 15 feet
DIAMETER ..... 13.5 inches
WINGSPAN ..... 3 feet
WEIGHT ..... 1,523 pounds (with booster)
SPEED ..... high subsonic
RANGE ..... 67 nautical miles
PROPULSION ..... Teledyne turbojet (660 pounds thrust) and solid-propellant booster for other than air launch
WARHEAD ..... 488-pound penetration high-explosive blast
CONTRACTOR ..... Boeing Co.

RGM-184 NAVAL STRIKE MISSILE



U.S. NAVY

NAVAL STRIKE MISSILE

The NSM was selected in 2018 as the missile for an over-the-horizon weapon system that is being installed on some littoral combat ships. The NSM is a sea-skimming cruise missile designed for GPS-denied environments that uses multiple programmable waypoints. It features automatic target recognition and a passive seeker and is resistant to electronic countermeasures. The littoral combat ship USS Gabrielle Giffords made the first operational deployment with the weapon to the western Pacific in mid-2019. One NSM was test-launched from the ship Oct. 1, 2019. In

May 2019, Raytheon was awarded $47.6 million to integrate the NSM into the Marine Corps force structure, with the NSM arming the Navy Marine Expeditionary Ship Interdiction System. The NSM is arming Independence-class littoral combat ships and will arm the Freedom class. The NSM also will arm Constellation-class guided-missile frigates.

LENGTH.....12.3 feet
DIAMETER.....13.5 inches
WEIGHT.....910 pounds (with booster)
RANGE.....100+ nautical miles
SPEED.....high subsonic
PROPULSION.....JP-10 liquid-fuel turbojet and solid-propellant booster
WARHEAD.....500-pound class penetration high-explosive blast
CONTRACTORS.....Kongsberg Defense; Raytheon Missiles and Defense

SURFACE-TO-SURFACE TACTICAL MISSILES

MK60 GRIFFIN MISSILE SYSTEM

The Mk60 GMS was installed aboard Cyclone-class coastal patrol ships, all of which have been decommissioned and transferred to foreign navies.

SURFACE-TO-SURFACE MISSILE MODULE



L3HARRIS

SURFACE-TO-SURFACE MISSILE MODULE (SSMM)

The SSMM is an anti-surface missile system for the littoral combat ship surface warfare mission package. The Navy selected the AGM-114L Hellfire Longbow missile version (see Air-Launched Weapons section) as the weapon for the system, which includes two launchers of 24 cells each. A test firing from the USS Detroit was conducted Feb. 28, 2017, followed by more firings from the USS Milwaukee and the Detroit in 2018 and the USS Jackson in 2019. Initial operational capability was reached in mid-2019 with the deployment of the Detroit. Northrop Grumman is under contract to deliver four systems toward a Navy requirement of 12.

CONTRACTORS.....Northrop Grumman (prime); Lockheed Martin (missile); Teledyne Brown (launcher)

SURFACE-TO-AIR MISSILES

RIM-7 SEASPARROW

The RIM-7 SeaSparrow, a development of the AIM-7 Sparrow air-to-air missile, is used to defend against anti-ship missiles and aircraft. The SeaSparrow has a cylindrical body with four midbody wings and four tail fins. The short-range, semi-active homing missile makes flight corrections via radar uplinks. The missile has been upgraded to the RIM-7P with a reprogrammable missile-borne computer, rear receiver and newly developed surface-to-surface/anti-low-velocity air threat capability. It is fired from a trainable Mk29 Guided-Missile Launching System onboard aircraft carriers and amphibious assault ships.

LENGTH.....12 feet
DIAMETER.....8 inches
WINGSPAN.....36.4 inches
WEIGHT.....495 pounds
SPEED.....Mach 0.9 (average)
RANGE.....4.5 nautical miles
PROPULSION.....Alliant Techsystems Mk58 solid-propellant rocket motor
WARHEAD.....WAU-17A/B 90-pound angular blast-fragmentation warhead
CONTRACTORS.....Raytheon Missile Systems; General Dynamics

RIM-162D EVOLVED SEASPARROW MISSILE



U.S. NAVY

RIM-16 2D EVOLVED SEASPARROW

The all-weather, semi-active homing ESSM was designed as a replacement for RIM-7 to defeat advanced, highly maneuverable threats. The ESSM has greater speed, maneuverability and range from its more powerful rocket motor and tail-controlled airframe. The missile possesses an improved warhead specifically designed to defeat hardened anti-ship cruise missiles. A surface-to-surface/anti-low-velocity air threat capability was introduced for the ESSM in 2007.

In the U.S. Navy, the ESSM is deployed on Arleigh Burke-class Flight IIA guided-missile destroyers and some Nimitz-class aircraft carriers. It will be the primary self-defense weapon for Zumwalt-class, Gerald R. Ford-class and America-class ships. On U.S. Navy ships, it is fired from the Mk29, Mk41 and Mk57 launchers.

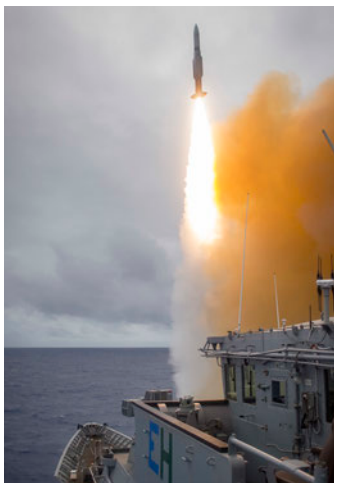
Operational in 2004, and designed and produced through an international cooperative effort, the ESSM also is considered the primary ship self-defense and local area defense weapon of 10 foreign navies.

The Block II version of the ESSM features an active guidance system in addition to semi-active guidance. Low-rate production was authorized in August 2019. Initial operational capability was achieved in 2020.

LENGTH.....12 feet
DIAMETER.....10 inches (rocket motor)/8 inches (guidance section)
TAILSPAN.....21.5 inches
WEIGHT.....622 pounds

SPEED.....supersonic (average)
RANGE.....horizon
PROPULSION.....Mk134 solid-propellant rocket motor
WARHEAD.....Mk139 90-pound angular blast-fragmentation warhead
CONTRACTOR.....Raytheon Missile Systems

RIM-66C/RIM-156/RIM-161/RIM-174 STANDARD MISSILE (SM-2, SM-3, SM-6)



U.S. NAVY

STANDARD MISSILE (SM-2)

The Standard family of missiles can be used against missiles, aircraft and ships. The RIM-66C SM-2 Block III, IIIA and IIIB MR (medium-range) missiles are the primary air-defense weapons for Ticonderoga-class guided-missile cruisers and Arleigh Burke-class guided-missile destroyers. The RIM-156A SM-2 ER (extended-range) Block IV was designed for the Aegis Weapon System and the Vertical Launching System to give the battle force greater area anti-air warfare defense capability against very-high-altitude, large-cross-range and high-g maneuvering targets. All variants are guided by inertial navigation and midcourse commands from AWS using semi-active radar or an infrared sensor for terminal homing. The Block IV is deployed as a terminal-phase ballistic missile defense interceptor.

The RIM-161 SM-3 is a development by the Missile Defense Agency of the SM-2 ER Block IV, optimized for sea-based defense against short- to intermediate-range ballistic missiles in midcourse flight. It includes a third rocket stage, a GPS/inertial guidance system and a Boeing-developed kinetic warhead. Since 2005, the RIM-161B SM-3 Block IA — featuring increased reliability and a one-color seeker — has been in production for the U.S. Navy and the Japan Maritime Self-Defense Force.

The RIM-161C SM-3 Block IB includes an advanced, two-color infrared seeker and throttling-divert and attitude-control system for increased maneuverability against sophisticated warheads. The Block IB was deployed aboard the guided-missile cruiser USS Lake Erie for a 2010 initial operational capability. The Block IB was deployed at the Aegis Ashore site in Romania in 2015. The Block IB is being enhanced with threat-upgrade software.

The SM-3 Block II was being developed as a phase of Block IIA by the United States and Japan and will not become operational.

The SM-3 Block IIA is designed to destroy short-to-medium-range ballistic missiles with a kinetic kill vehicle rather than an explosive warhead. It features a 21-inch-diameter rocket body, larger rocket motors, a more discriminating seeker and an advanced kinetic warhead. The SM-3 is or will be deployed on several Arleigh Burke-class destroyers and Ticonderoga-class cruisers and four Japanese destroyers. The Block IIA also is deployed to Aegis Ashore sites in Europe. In November 2020, an SM-3 Block IIA intercepted and destroyed an intercontinental ballistic missile target. In June 2021, the Defense Department ordered the transfer of 11 SM-3 Block IIA interceptors to Navy ballistic missile defense ships.

In April 2011, Lockheed Martin was awarded a contract to define the concept for the SM-3 Block IIB, which will provide an early intercept capability against intermediate- and long-range ballistic missiles. The Defense Department suspended development of the SM-3 Block IIB in 2013 in favor of shifting funding to other components of the nation's ballistic missile defense system.

The RIM-174 SM-6 Extended-Range Active Missile, a dual-mode active/semi-active radar missile, uses the active seeker radar from the AIM-120 Advanced Medium-Range Air-to-Air Missile. The SM-6 can increase the battlespace to the horizon using its autonomous active seeker mode either with Aegis in a stand-alone configuration or beyond the horizon with an engage-on-remote capability. The SM-6 also is capable of sea-based terminal ballistic missile defense, but no decision has been made to use the SM-6 in that role. In 2016, the Navy demonstrated the anti-ship capability of the SM-6.

Raytheon began low-rate initial production of the SM-6 Block I in 2010. Initial operational capability was achieved in November 2013. Full-rate production deliveries began in April 2015. Follow-on operational testing and evaluation was completed in 2016. Full operational capability was achieved in 2018. The SM-6 was approved for international customers in 2017.

LENGTH.....SM-2 MR: 15.5 feet; SM-2 ER: 21.5 feet; SM-3: 21.5 feet; SM-6 Block I ER: 21.5 feet
DIAMETER.....SM-2 MR: 13.5 inches; SM-2 ER: 13.5 inches; SM-3: 13.5 inches; SM-6 Block I ER: 13.5 inches; all: 21.0-inch booster
WEIGHT.....SM-2 MR: 1,558 pounds; SM-2 ER: 3,225 pounds; SM-3: 3,300 pounds; SM-6 Block I ER: 3,300 pounds
RANGE.....SM-2 MR: up to 90 nautical miles; SM-2 ER: 100–200 nautical miles
PROPULSION.....SM-2 MR: dual-thrust solid-fuel rocket; SM-2 ER: 2-stage solid-fuel rocket; SM-3, SM-6: 3-stage solid-fuel rocket;
WARHEAD.....SM-2 MR and SM-2 ER: contact and proximity fuse, high-explosive; SM-3: kinetic warhead SM-6 Block I ER
CONTRACTOR.....Raytheon Missile Systems

RIM-116 ROLLING AIRFRAME MISSILE

The RAM is a lightweight, quick-reaction weapon system jointly developed by the U.S. and German navies. A fire-and-forget missile that does not require external guidance for target tracking and intercept, the RAM is designed to counter various anti-ship cruise missiles attacking in waves or in streams, diving or maneuvering. The RAM is based on the seeker of a Stinger missile with the warhead, motor and fuse of the Sidewinder missile. The RAM Guided-Missile Launching System holds 21 rounds and has the capability to launch any RAM missile variant, depending on the type of threat.

Operational since 1993, the RAM has been installed on most U.S. Navy ships in the America, Wasp, Whidbey Island, Harpers Ferry, Nimitz and Gerald R. Ford classes as well as on the newer San Antonio-class amphibious transport docks and the Freedom-class littoral combat ships. A SeaRAM launcher based on the Phalanx close-in weapon system was developed to arm some forward-based Arleigh Burke-class destroyers.

RIM-116A RAM Block 0 targeted and guided on radio frequency and infrared emissions from threat missiles, using passive RF for midcourse guidance and passive IR for terminal guidance. RIM-116B RAM Block 1A incorporates an IR mode upgrade, which further improves the fire-and-forget capability and enables "all-the-way" IR guidance against non-RF-emitting cruise missiles. RAM Block 1A has replaced Block 0 on U.S. ships.

RAM Block 2 provides kinematic improvements — including more canard fins and a larger rocket motor — for countering maneuvering threats. Block 2 reached initial operational capability in May 2015 onboard the San

Antonio-class amphibious transport dock USS Arlington.

A software change — the helo/aircraft/surface mode — provides the RAM capability against helicopters, aircraft and surface craft in addition to retaining the anti-ship cruise missile capability.



U.S. NAVY

ROLLING AIRFRAME MISSILE

LENGTH.....Block 1A: 9.3 feet; Block 2: 9.45 feet
DIAMETER.....Block 1A: 5 inches; Block 2: 6.25 inches
WINGSPAN.....Block 1A: 17.7 inches; Block 2: 12.65 inches
WEIGHT.....Block 1A: 164 pounds; Block 2: 194.4 pounds
SPEED.....supersonic
PROPULSION.....solid-propellant rocket
WARHEAD.....7.9-pound high-explosive, proximity fuse
CONTRACTORS.....Raytheon Missile Systems; RAMSYS GmbH

MK41 VERTICAL LAUNCHING SYSTEM

The Mk41 VLS is a modular, below-deck missile-launching system that originally was designed for the Navy's Aegis-equipped guided-missile cruisers to provide air threat protection for naval strike groups. The versatile Mk41 is a multimissile, multimission launcher capable of launching the SM-2, SM-3, SM-6, ESSM, Tomahawk missile and Vertical Launch Antisubmarine missile.

The Mk41 is installed on all current Ticonderoga-class guided-missile cruisers and Arleigh Burke-class guided-missile destroyers. According to the Navy, the Mk41 has proven to be more than 99% reliable in more than 3,800 launches, including launches in operations Desert Storm, Enduring Freedom, Iraqi Freedom, and Odyssey Dawn and against targets in Syria in 2017 and 2018.

CONTRACTORS.....Lockheed Martin Mission Systems and Training; BAE Systems

MK57 PERIPHERAL VERTICAL LAUNCHING SYSTEM

The Mk57 PVLS is an open-architecture, modular, below-deck missile-launching system installed in Zumwalt-class guided-missile destroyers. The 20 four-cell launchers line the periphery of the hull to protect against a hit that would take out a ship's entire launch system. The Mk57 is designed to accommodate current and future missiles without major launch modifications, including the ESSM, Tomahawk, Vertical Launch Antisubmarine missile and the Standard family of missiles.

CONTRACTORS.....Raytheon Integrated Defense Systems; BAE Systems

SEARAM SYSTEM

SeaRAM combines the Ku-band high-resolution search-and-track radar of the Mk15 Phalanx Close-In Weapon System Block 1B Baseline 2 and the thermal imager of the Block 1B with the extended range, high maneuverability and accuracy of the RIM-116A RAM system. SeaRAM replaces the CIWS 20 mm gun with an 11-round rolling-airframe missile launcher, enabling it to engage higher speed, more maneuverable anti-ship cruise missiles and surface targets at longer ranges. The benefits of SeaRAM include eliminating or simplifying combat-system integration, providing firm track ranges that support maximum range RAM engagements and achieving rapid reaction time by coupling high-rate sensors into the RAM launcher. SeaRAM has been installed on Independence-class littoral combat ships and on some Arleigh Burke-class guided-missile destroyers. It is being installed on some Freedom-class littoral combat ships.

WEIGHT.....16,901 pounds above deck; 1,200 pounds below deck
HEIGHT.....15.8 feet
AMMUNITION.....11 RIM-116 RAM missiles
CONTRACTOR.....Raytheon Missile Systems

GLIDE-PHASE INTERCEPTOR

The GPI will be specifically designed to defeat hypersonic missiles by intercepting the weapons in the glide phase of flight, which occurs once a missile has reentered Earth's atmosphere and is maneuvering toward its target. The GPI will be integrated into the Aegis Combat System on guided-missile destroyers and the Aegis Ashore sites. The Missile Defense Agency selected Raytheon Missiles and Defense and Northrop Grumman to develop and test GPI technology.

LASER WEAPON SYSTEMS

SEQ-3 LASER WEAPON SYSTEM

The 30-kilowatt SEQ-3 is a prototype directed-energy weapon system that uses a solid-state laser to disable or destroy aerial and surface targets such as unmanned aerial vehicles and fast attack craft. The SEQ-3 was installed in mid-2014 on the forward superstructure of the Navy's interim afloat forward staging base ship USS Ponce, based in the Persian Gulf. The system was removed from the Ponce when the ship was decommissioned in October 2017.

CONTRACTOR.....Northrop Grumman

OPTICAL DAZZLING INTERDICTOR-NAVY

ODIN is a stand-alone laser system that enables a ship to counter unmanned aerial systems. The system has been installed on several Arleigh Burke-class guided-missile destroyers beginning with the USS Dewey in early 2020.

DEVELOPER.....Naval Surface Warfare Center Dahlgren Division, Va.

SOLID-STATE TECHNOLOGY MATURATION LASER WEAPON SYSTEM DEMONSTRATOR MK2 MOD 0

The 150-kilowatt SSL-TM LWSD, developed by the Office of Naval Research and built by Northrop Grumman, was installed on the amphibious transport dock ship USS Portland in late 2019. The system was demonstrated in May 2020 and deployed in the Pacific Ocean aboard the ship from August 2021 through March 2022.

CONTRACTOR.....Northrop Grumman

HIGH-ENERGY LASER AND INTEGRATED OPTICAL DAZZLER SYSTEM

In March 2018, Lockheed Martin was awarded a $150 million contract to develop, manufacture and deliver two high-power laser systems with intelligence, surveillance and reconnaissance and counter-unmanned aerial system/counter-small boat capabilities. The first system was delivered to the Navy in January 2021 and began tests at the Navy's test site on Wallops Island, Virginia. A 60-kilowatt HELIOS unit was delivered to the guided-missile destroyer USS Preble in 2022. The wattage will be upgraded sequentially to 150, 300 and 500 kilowatts. HELIOS will be fully integrated into the Aegis Combat System.

CONTRACTOR.....Lockheed Martin

NAVAL GUNS

MK45 GUN MOUNT



U.S. NAVY

MK45 GUN MOUNT

The 5-inch/54-caliber Mk45 Mod 2 gun mount is a lightweight, single-barrel, fully automatic gun system that provides surface ships with a weapon for firing 70-pound projectiles at surface craft, low-altitude aircraft and shore targets. It serves as the main gun battery aboard destroyers and cruisers. The battle stations of the six-man gun-mount crew are below the weather deck. In a tactical emergency, one crew member can activate the mount and rapidly aim and fire up to 20 conventional rounds. The Mk45 gun mount also has been manufactured for the Australian, Turkish, Hellenic, New Zealand and Thai navies.

The U.S. Navy developed modifications to the Mod 2 — a 5-inch/62-caliber Mk45 Mod 4 gun — designed to meet emerging requirements for highly accurate, longer-range fires by employing the Extended-Range Guided Munition, designed to reach ranges up to 63 nautical miles. The ERGM, however, was canceled in 2008 because of development problems. In 2008, the Navy, in conjunction with Alliant Techsystems, completed a demonstration of the rocket-powered Ballistic Trajectory Extended-Range Munition, which reached a range in excess of 50 miles.

The Mod 4 gun is installed on Arleigh Burke-class guided-missile destroyers from DDG 81 forward. In addition, Mk45 guns onboard some Ticonderoga-class guided-missile cruisers are being modified to the Mod 4 configuration under the Cruiser Modernization Program.

WEIGHT.....Mod 4: mounting without lower hoist — 50,456 pounds; mounting with 4-flight lower hoist: 54,398 pounds; Mod 2: 48,934 pounds
HEIGHT.....10.3 feet (above deck)
AMMUNITION.....5-inch conventional
FIRING RATE.....Mod 4: 15-16 rounds per minute; Mod 2: 16-20 rounds per minute
RANGE.....13 nautical miles
CONTRACTOR.....BAE Systems Land and Armaments

155 MM/62-CALIBER ADVANCED GUN SYSTEM

The 155 mm AGS was selected as the main battery gun system for the Zumwalt-class guided-missile destroyers. The AGS was designed primarily to support expeditionary warfighters in littoral areas and battlefields deep inland by firing the Lockheed Martin-built Long Range Land Attack Projectile, a 155 mm rocket-assisted round equipped with a unitary warhead guided by a GPS/inertial measuring unit to ranges up to 83 nautical miles. In late 2016, the Navy decided not to procure the LRLAP for cost reasons.

The AGS's fully automated, all-electric gun, housed in a low-signature weather-shield mount, is served below deck by a fully automated ammunition-handling-and-storage system. BAE Systems was awarded a contract in June 2007 to deliver four AGS guns and magazines; an additional two guns were later ordered for DDG 1002. The first magazine was delivered in 2010, and the guns followed beginning in 2011. The guns are inactive, and the Navy plans to remove them and install Large Missile Vertical Launch System modules for Conventional Prompt Strike hypersonic missiles in their place.

AMMUNITION.....155 mm LRLAP
FIRING RATE.....10 rounds per minute
RANGE.....up to 83 nautical miles
CONTRACTOR.....BAE Systems Land and Armaments

MK75 76 MM/62-CALIBER GUN MOUNT

The Mk75 is a fully automated, remotely controlled, fiberglass-shielded mount that stows, aims and fires 76 mm high-explosive, point-detonating/delayed, as well as several types of variable, time-fused ammunition. Against airborne targets, it is primarily a defensive weapon. However, it can be used effectively in attacking surface and shore targets.

The Mk75 can be fired only from a remote gun-control panel. The Mk92 fire-control system controls all firing sequences except rate of fire, which is controlled at the gun-control panel. Ammunition feeding is automatic, hydraulically operated and electrically controlled. Its projectile has a range of 18,300 yards and can reach an altitude of 37,800 feet. The compact, fast-firing, versatile weapon served as the main battery on Oliver Hazard Perry-class guided-missile frigates, the last of which was decommissioned in 2015. The Mk75 is in service in about 50 countries and has been installed on the U.S. Coast Guard's Famous-class cutters.

AMMUNITION.....76 mm
FIRING RATE.....80 rounds per minute
RANGE.....10 nautical miles
CONTRACTORS.....OTO Melara; BAE Systems

MK110 MOD 0 57 MM NAVAL GUN SYSTEM

The Mk110 Mod 0 57 mm naval gun system is a multimission, medium-caliber rapid-fire gun, an export version of the BAE Systems (Bofors) Mk3 designed to fire the 57 mm M295 Mod 0 ammunition that is programmable for six different modes, depending on the mission. The gun — intended to counter surface, aerial and land targets — is linked to a digital fire-control system and responds to pointing orders and selected ammunition fusing options. The gun mount includes a 120-round automatic loader drum. The gun is normally operated by remote control from the fire-control system by one operator but can be controlled locally in the gun mount. Additional rounds can be accomplished by the mount captain and two designated ammunition loaders, all of which are stationed below deck. The Mk110 is installed on the Navy's Freedom- and Independence-class littoral combat ships and the Coast Guard's Legend-class national security cutters and has been selected for the Coast Guard's offshore patrol cutter and the Navy's new Constellation-class guided-missile frigate.



U.S. NAVY

MK110

AMMUNITION ..... M295 57 mm programmable round
FIRING RATE ..... 220 rounds per minute
RANGE ..... 9.1 nautical miles
CONTRACTOR ..... BAE Systems Land and Armaments

MK46 30 MM CLOSE-IN GUN SYSTEM

The Mk46 Mod 1 30 mm close-in gun system is a derivative of the Mk46 Mod 0 gun system — with the Mk44 Bushmaster II gun — designed for the Marine Corps' since-canceled Expeditionary Fighting Vehicle program. The Mk46 Mod 1 gun is a stabilized, remotely operated 30 mm high-velocity gun equipped with a second-generation thermal day/night sight for close-in protection of the ship against high-speed targets. The Mk46 Mod 2 features open system architecture, fault-isolation software and an embedded training system.

The Mk46 Mod 1 was installed on the earlier San Antonio-class amphibious transport dock ships. The open-architecture Mod 2 is being installed on later San Antonio-class ships and is a major component of the Gun Mission Module of the surface warfare mission package for the Freedom- and Independence-class littoral combat ships. The Navy in 2012 decided to install the Mk46 on the Zumwalt-class guided-missile destroyers in lieu of the Mk110 gun.

AMMUNITION ..... 30 mm explosive
FIRING RATE ..... 200 rounds per minute
RANGE ..... 2,200 yards
GUIDANCE ..... closed-loop tracking with infrared and electro-optical sensors and laser range-finding
CONTRACTOR ..... General Dynamics

MK38 25 MM MACHINE GUN SYSTEM

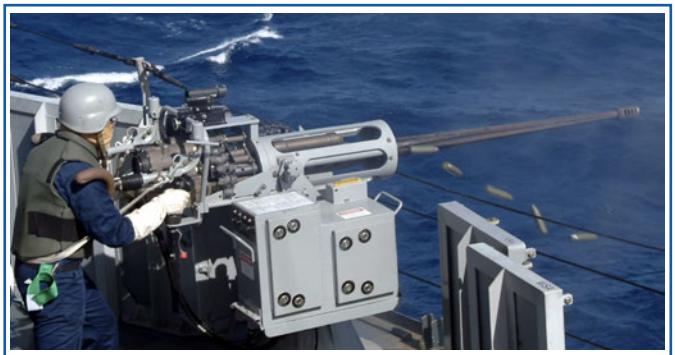
The Mk38 Mod 1 machine gun system consists of the 25 mm M242 automatic gun mounted on the Mk88 Mod 1 machine gun mount. The system is manually aimed in train and elevation. The M242 is an externally powered, air-cooled automatic gun that incorporates a rotating belt driven by a chain-drive mechanism. An on-mount rechargeable battery provides power for gun operation. Linked ammunition is fed to the cannon through flexible chuting from an on-mount container. The nonstabilized mount consists of stand, carriage, cradle, ammunition container and Mk218 power-and-control unit and sight.

The system provides self-defense against surface targets and can be operated in either semi-automatic or automatic modes of fire with high-explosive incendiary tracer and target-practice tracer ammunition. The gun is installed on a variety of ship classes, including surface combatants, amphibious and auxiliary ships, and Coast Guard cutters. The Mk38 Mod 1s are maintained in a rotatable pool, available for temporary installation on various deploying ships. A total of 387 Mod 1s were procured.

The Navy has upgraded the Mk38 to the Mod 2 configuration with stabilization, remote operation and an on-mount electro-optical fire control system for day and night surveillance/engagement. The stabilized gun improves a ship's layered self-defense against the small boat threat while underway, at anchor and in the littorals.

The first Mod 2s were installed in 2005 on Ticonderoga-class guided-missile cruisers. The Mod 3 is a technical refresh of the Mod 2. The Mod 2/3 is installed on a variety of Navy ship types as well as Coast Guard Sentinel-class fast-response cutters and will be installed on the Coast Guard's offshore patrol cutter. The Navy plans to procure a total of 517 Mod 2s/3s for installation on most classes of surface warships and some Coast Guard cutters.

Mod 3s are being modified with a coaxial Mk52 7.62 mm machine gun for remote-controlled close-in defense.



U.S. NAVY

MK38 25MM MACHINE GUN SYSTEM

WEIGHT ..... Mod 1: 1,300 pounds (with 170 rounds of ammunition); Mod 2: 2,300 pounds (without ammunition)
AMMUNITION ..... 25 mm M242 high-explosive incendiary tracer, armor-piercing discarding sabot tracer and semi-armor-piercing high-explosive incendiary tracer
FIRING MODE ..... Mod 1: manually aimed and fired; Mod 2: remotely operated using on-mount electro-optical infrared
FIRING RATE ..... Mod 1: 175 rounds per minute; Mod 2: 5 rates selectable from single shot to 180 rounds per minute
RANGE ..... Mod 1: 1,000 yards effective; Mod 2: 2,700 yards or greater, effective day or night
CONTRACTORS ..... BAE Systems Land and Armaments; Rafael Armament Development Authority Ltd.

MK15 PHALANX CLOSE-IN WEAPON SYSTEM

The Phalanx CIWS is a last-ditch defense system against aircraft and anti-ship missiles and surface craft. It combines — on a single mount — fire-control radar and a six-barrel, M61A1 Gatling gun firing 20 mm tungsten alloy projectiles at a rate of 4,500 rounds per minute. The Phalanx Block 1A incorporated a high-order language computer with improved fire-control algorithms to engage the high-speed maneuvering missile threat.

All Phalanx systems are being upgraded to Block 1B, which includes an integrated infrared tracker and the Phalanx Surface Mode. The IR improves the track quality, thereby increasing the accuracy against missiles with more radical maneuvers and enabling the Phalanx system to engage high-speed maneuvering surface targets and slow-moving air targets. The Block 1B thermal imager provides positive identification of surface and slow-moving air targets. The Phalanx 1B program will capitalize on radar improvements generated through the SeaRAM development program to improve reliability, reduce maintenance, address obsoles-

cence and improve detection capability. Block 1B also incorporates new optimized gun barrels that provide improved barrel life, decreased round dispersion and increased engagement ranges. The Block 1B2 is the current standard to which all are being modified.

The U.S. Army employs the CIWS in its Counter Rocket and Mortar system. An adaptation of the Phalanx Block 1B, it supported an urgent requirement in Iraq for a land-based system to counter mortar attacks.



U.S. NAVY

MK15 PHALANX CIWS

WEIGHT	12,500 pounds above deck (13,600 pounds in later models), 725 pounds below deck
HEIGHT	15.6 feet
GUN	M61A1 Gatling-type
AMMUNITION	20 mm armor-piercing; Block 1B: 20 mm tungsten-enhanced lethality cartridge with heavier penetrator
RANGE	4,000 yards maximum effective range
MAGAZINE CAPACITY	1,550 rounds
FIRING RATE	4,500 rounds per minute
CONTRACTOR	Raytheon Co.

M2 .50-CALIBER MACHINE GUN



U.S. NAVY

M2 .50-CALIBER MACHINE GUN

The Browning M2 .50-caliber (12.7 mm) machine gun is an automatic, belt-fed, recoil-operated, air-cooled, crew-operated machine gun with a basic design that dates from World War II. It is used to provide automatic weapon suppression fire for offensive and defensive purposes. This weapon can be used effectively against personnel, light armored vehicles and low-flying/slow-flying aircraft. The gun is installed on a variety of ship classes, including surface combatants, patrol boats, amphibious and auxiliary ships and Coast Guard cutters.

LENGTH	61.42 inches
WEIGHT	84 pounds
BORE DIAMETER	50 inches
MAXIMUM EFFECTIVE RANGE	2,000 meters
MAXIMUM RANGE	6,855 meters
CYCLIC RATE OF FIRE	550 rounds per minute
AMMUNITION	ball, armor-piercing, tracer and multipurpose
MANUFACTURER	General Dynamics Armament Systems (Saco) (numerous manufacturers originally produced the M2 heavy machine gun)
CONTRACTOR	Naval Surface Warfare Center Crane Division, Ind.

TORPEDOES AND MINES

MK46 LIGHTWEIGHT TORPEDO

The Mk46 torpedo, designed to attack high-performance submarines, is the NATO standard and has been acquired by more than 25 countries. The Mk46 has various configurations to enable use by surface combatants, fixed-wing and rotary-wing platforms. Various modifications — including improved acoustics, guidance and control upgrades and countermeasure detection capability — have been introduced into the weapon. U.S. Navy procurement of the Mk46 ended in 1991.

In the early 1990s, a major system upgrade — Mk46 Mod 5A(S) — was developed to improve weapon performance in shallow water. It also serves as the payload for the Vertical Launch Antisubmarine missile.

In September 1996, the Mk46 Mod 5A(SW) service-life extension program torpedo was introduced to improve counter-countermeasure performance, enhanced target acquisition, a bottom-avoidance preset and improved maintainability and reliability. The Mk46 is being replaced in the U.S. torpedo inventory by the Mk54.

LENGTH	8.5 feet
DIAMETER	12.75 inches
WEIGHT	518 pounds
RANGE	more than 1,000 yards at optimum depth
POWER PLANT	liquid propellant, piston engine
WARHEAD WEIGHT	96.8 pounds, high explosive
CONTRACTOR	Raytheon Integrated Defense Systems

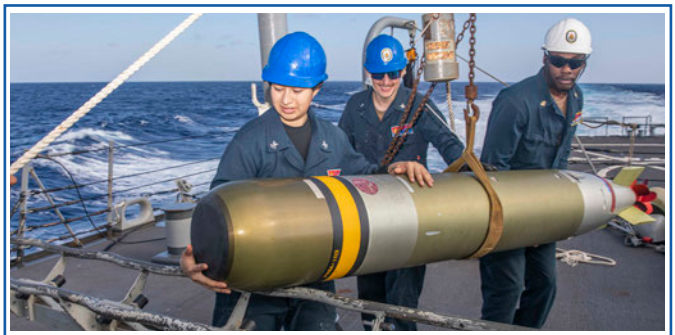
MK54 LIGHTWEIGHT TORPEDO

The Mk54 lightweight torpedo is the primary anti-submarine warfare weapon used by U.S. Navy surface ships, fixed-wing aircraft and helicopters. Designed to operate in shallow waters and in the presence of countermeasures, it can track, classify and attack underwater targets. It is designed specifically for optimal performance against advanced, quiet diesel/electric submarines operating in littoral or deep waters. It integrates existing torpedo hardware with state-of-the-art, commercial, off-the-shelf, or COTS, digital signal-processing technology and open architecture design philosophy. The design consists of Mk50 sonar, COTS guidance and control assembly, Mk46 warhead, a variable-speed version of the Mk46 propulsion system and advanced software algorithms developed for the Mk50 and Mk48 Mod 6 torpedo programs. The torpedo is simple and inexpensive to overhaul and has a 10-year maintenance cycle.

The Mk54 is the first all-digital lightweight torpedo, significantly enhancing options for weapon employment. The use of COTS technology

and open systems architecture enables the Mk54 to be cost-effectively upgraded to incorporate the latest technology to counter evolving threats. Produced by the same manufacturer as the Mk48 Advanced Capability torpedo, upgrades to the Mk54 have emphasized commonality with heavyweight torpedo sensor and processing technology. The Mk54 Mod 0 reached initial operational capability in 2004. The Mk54 Mod 0 reached initial operational capability on the Vertical Launch Antisubmarine missile in 2010. Future development will continue to provide improvements to shallow-water performance via software Advanced Processor Build upgrades. The Mk54 Mod 1 adds a new sonar array assembly and improved processing capability.

The Navy is developing a Mod 2 configuration, designed to be faster and more lethal against more challenging submarines. Aerojet Rocketdyne is developing an advanced propulsion system for the Mod 2.



U.S. NAVY

MK54 LIGHTWEIGHT TORPEDO

LENGTH	8.9 feet
DIAMETER	12.75 inches
WEIGHT	608 pounds
RANGE	more than 10,000 yards at optimum depth
PROPULSION	liquid propellant, piston engine
WARHEAD WEIGHT	96.8 pounds, high explosive
CONTRACTOR	Raytheon Integrated Defense Systems

VERTICAL LAUNCH ANTISUBMARINE MISSILE

The VLA is paired with the Mk46 Mod 5 torpedo to travel quickly from the launch platform and enter the water near a submarine target. It is intended to provide vertical-launch-capable surface combatants with an all-weather, 360-degree, quick reaction, standoff anti-submarine weapon capability. The VLA includes a solid-propellant booster with thrust vector control to guide the missile from a vertical orientation through a pitch-over maneuver into a ballistic trajectory intended to deliver the torpedo to a point on the ocean surface. The VLA is launched from the Mk41 VLS.

All VLAs were upgraded with the Mk46 Mod 5A (SW) torpedo that provides improved performance in shallow water. VLAs began being upgraded with the Mk54 Mod 0 torpedo beginning in 2010. The VLA, deployed on Ticonderoga-class guided-missile cruisers and Zumwalt- and Arleigh Burke-class guided-missile destroyers, has had its service life extended.

LENGTH	16.7 feet
DIAMETER	14.1 inches
WEIGHT	1,650 pounds
RANGE	more than 10 miles
PROPULSION	solid-propellant rocket
WARHEAD WEIGHT	96.8 pounds, high explosive
CONTRACTOR	Lockheed Martin

MK48 TORPEDO



U.S. NAVY

MK48 TORPEDO

The Navy uses Mk48 heavyweight torpedoes only in submarines, employing them as a primary anti-submarine and anti-surface weapon. The Mk48 torpedo also has been acquired by three allied countries.

With a need to continue torpedo performance upgrade programs to counter evolving threats, the Navy developed the Mk48 Mod 5 Advanced Capability torpedo with greater speed and accuracy than any submarine-launched torpedo in its history. The heavyweight acoustic-homing torpedo has sophisticated sonar, all-digital guidance and control systems, digital fusing systems and propulsion improvements. Its digital guidance system allows for repeated improvements through software upgrades. The last new ADCAP torpedo was delivered in 1996. The Navy has restarted Mk48 production.

To improve performance, several upgrades are being made to the existing ADCAP inventory. Details of the upgrades follow:

Mk48 Mod 6 ADCAP: The Mk48 Mod 6 ADCAP — which reached initial operational capability in 1997 — combines two improvements, one in guidance and control, the other in the torpedo propulsion unit. The G&C Mod improves the acoustic receiver, replaces the guidance and control set with updated technology, increases memory and improves processor throughput to handle the expanded software demands required to improve torpedo performance against evolving threats. The TPU Mod provides a tactically significant reduction in torpedo-radiated noise signatures.

The Mod 6 is the first torpedo to use the Torpedo Downloader System that can provide rapid software updates to embarked weapons, allowing the submarine to deploy with the most up-to-date software version. The latest improvement to the Mod 6 was fielded in 2009.

Mk48 Mod 7 Common Broadband Advanced Sonar System: The CBASS was jointly developed with the Royal Australian Navy. It includes a new broadband sonar system and its associated software to achieve significant increases in operating bandwidth. The system also includes new broadband processing algorithms to improve counter-countermeasure and shallow-water performance while retaining deep-water performance characteristics. The CBASS torpedo reached initial operational capability in 2006. New production of the Mk48 Mod 7 began in 2016.

In June 2018, the Navy awarded contracts to begin Phase 1 of the Torpedo Advanced Propulsion System to improve the engine efficiency of the Mk48. In September 2019, the Navy asked for the CBASS torpedo to be upgraded to enhance its electronic subsystems.

The Navy is developing with the Pennsylvania State University Applied Research Laboratory a new version called the TI2, a longer-range, improved-sensing torpedo with a new propulsion system.

LENGTH ..... 19 feet
DIAMETER ..... 21 inches
WEIGHT ..... 3,520 pounds
SPEED ..... more than 28 knots
RANGE ..... more than 5 miles
DEPTH ..... greater than 1,200 feet
PROPULSION ..... liquid propellant, piston engine, pump jet
WARHEAD WEIGHT ..... 650 pounds, high explosive
CONTRACTORS ..... Lockheed Martin; SAIC; Raytheon Integrated Defense Systems

MK67 SUBMARINE-LAUNCHED MOBILE MINE

The SLMM was developed to destroy enemy shipping in shallow-water areas inaccessible for other mine-deployment techniques or for covert mining of hostile environments. The SLMM is a shallow-water mine consisting basically of a modified Mk37 torpedo. Some Mk67s were removed from the serviceable inventory in 2012.

LENGTH ..... 161 inches
DIAMETER ..... 19 inches
WEIGHT ..... 1,658 pounds
GUIDANCE SYSTEM ..... magnetic/seismic target detection devices
WARHEAD WEIGHT ..... 510 pounds, high explosive
CONTRACTOR ..... Naval Undersea Warfare Center

HAMMERHEAD MINE

The Hammerhead is in development as a naval mine to be deployed from an unmanned underwater vehicle and detect, classify and destroy submarines. General Dynamics Mission Systems was chosen Sept. 30, 2021, to design, test and deliver Hammerhead prototypes by September 2023; the contract provided options for further production to September 2026.





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FIXED-WING AIRCRAFT

F/A-18E/F SUPER HORNET



U.S. NAVY

F/A-18F SUPER HORNET

The F/A-18E/F Super Hornet is a fourth-generation aircraft capable of performing both fighter and attack missions through selected use of external equipment and advanced networking capabilities. This "force multiplier" capability gives the operational commander more flexibility in employing tactical aircraft in rapidly changing battle scenarios. In its fighter mode, the aircraft performs offensive counter, escort and fleet air defense. In attack mode, it provides power projection and close and deep air support.

The Super Hornet achieved its initial operational capability in 2001 and is expected to be in service through 2046. Open-architecture design principles facilitate future development capabilities.

The Super Hornet provides aircrews the capability and performance necessary to face 21st century threats. In operations Iraqi Freedom, Enduring Freedom and Inherent Resolve, it performed new combinations of varied and distinct missions, including air dominance, fighter escort, defense suppression, all-weather day/night precision strike, reconnaissance and aerial refueling. The Super Hornet scored its first aerial kill June 18, 2017, when a Strike Fighter Squadron (VFA) 87 pilot shot down a Syrian Air Force Su-22 Fitter.

The single-seat F/A-18E and two-seat F/A-18F are 4.2 feet longer than the F/A-18A-D Hornet. In addition, the Super Hornet has a 25% larger wing area, a longer wingspan by 4.7 feet and a 33% higher internal fuel capacity, increasing mission range by 32%. Its carrier-recovery payload is more than 9,000 pounds, a significant increase over the F/A-18A-D variant.

The Super Hornet incorporates two additional wing stations over the F/A-18A-D Hornet, which allows for increased payload flexibility, particularly with respect to mixed loading of air-to-air and air-to-surface ordnance. The platform has five "wet" stations capable of carrying external fuel tanks, as well as the aerial refueling store, enabling it to serve as a tactical airborne tanker. The Super Hornet can carry nearly every tactical weapon in the U.S. Navy arsenal. Sophisticated systems such as the Integrated Defensive Electronic Countermeasures System, Advanced Targeting Forward-Looking Infrared, Joint Helmet-Mounted Cueing System, Multifunctional Information Distribution System, APG-73 mechanically scanned and APG-79 active electronically scanned array radars, and advanced mission computers and displays make the aircraft a lethal strike fighter platform.

The Navy procured 59 F/A-18E and 78 F/A-18F aircraft in the Block I configuration, followed by 259 F/A-18E and 204 F/A-18F aircraft in the Block II configuration, two of which were converted to NEA-18G test aircraft and two of which were delivered in the Block III Test Jet configuration. Block II Super Hornets include the APG-79 radar, high-order language mission computers and a more advanced IDECM suite over the Block I configurations. The last Block II version was delivered to the Navy on May 13, 2020.

Boeing delivered the first two Super Hornets in the Block III configuration to the Navy for early developmental testing in June 2020. The aircraft feature an advanced cockpit system that includes a single touch-activated large area display, tactical targeting network technology, distributed tactical processor-networked, satellite communication and other survivability enhancements. Boeing delivered the first production Block III to the Navy on Aug. 31, 2021. In 2019, Boeing was awarded a contract to produce 78 Block III Super Hornets for the Navy (61 F/A-18E and 17 F/A-18F). In 2022, Congress added 12 additional Block III Super Hornets to the Navy's budget to be procured as F/A-18Fs.

A service-life modification is extending the Block II Super Hornet's service life to 7,500 flight hours; service-life assessment continues to develop modifications necessary to extend the aircraft's service life to 10,000 flight hours. Four Block II aircraft were inducted in 2018, and the first delivery was made in January 2020. Beginning in 2023, Block II aircraft inducted into the modification were being upgraded to the Block III configuration and will receive a service-life extension to 10,000 flight hours.

The Super Hornet saw its first combat action Nov. 6, 2002, when VFA-115 participated in a strike on hostile targets during Operation Enduring Freedom. The second and third operational Super Hornet units, VFA-14 and VFA-41 (the latter being the first operational F/A-18F squadron), entered combat in Iraq in April 2003 and introduced the Shared Reconnaissance Pod. VFA-213 was the first operational squadron to fly the F/A-18F equipped with the APG-79 radar.

As of October 2023, there were more than 340 F/A-18E and over 280 F/A-18F Super Hornets in the Navy inventory. The Navy's total procurement plan is 696 Super Hornets.

The Navy currently fields operational strike fighter squadrons resourced with Block II and Block III Super Hornets. Additionally, Super Hornets perform duties with fleet replacement squadrons, a composite fighter squadron, air test and evaluation squadrons, the Naval Aviation Warfighting Development Center, the Blue Angels flight demonstration squadron and the U.S. Naval Test Pilot School.

Foreign military sales of the aircraft include 24 F/A-18Fs procured in 2008 and 2009 by Australia for the Royal Australian Air Force and 22 F/A-18E and six F/A-18F aircraft procured in 2018 by Kuwait for the Kuwaiti Air Force.



U.S. NAVY

F/A-18E SUPER HORNET

WINGSPAN	44.9 feet
LENGTH	60.3 feet
HEIGHT	16.2 feet
WEIGHT	66,000 pounds maximum takeoff
SPEED	Mach 1.7+
CEILING	about 50,000 feet

RANGE.....Hi-Lo-Lo-Hi profile radius with three 480-gallon external fuel tanks and four 1,000-pound bombs: 486 nautical miles

POWER PLANT.....2 General Electric F414-GE-400 engines, each with 20,700 pounds static uninstalled thrust

ARMAMENT.....One M61A2 20 mm gun; 16,000 pounds of external stores, including general-purpose bombs and GPS/laser-guided bombs; AIM-9, AIM-120, AGM-65, AGM-84, AGM-84K, AGM-88, AGM-154, and AGM-158C missiles; and various other types of pods and mines

CREW.....F/A-18E: 1 pilot; F/A-18F: 1 pilot, 1 weapons systems officer

CONTRACTOR.....Boeing

F/A-18A/B/C/D HORNET

The F/A-18A-D Hornet is a twin-engine, midwing, multimission tactical aircraft. Introduced in 1978, it replaced the F-4 Phantom and A-7 Corsair II aircraft. After widespread fleet service, the legacy Hornet largely has been replaced by the F/A-18E/F Super Hornet for the Navy. The last carrier deployment by a Navy F/A-18C squadron was completed in 2018 by Strike Fighter Squadron (VFA) 34, which converted to F/A-18Es in 2019.

As of October 2023, legacy Hornets in the Navy equipped two air test and evaluation squadrons.

(See the Marine Corps section for more detail on the F/A-18A-D Hornet.)

F-35C LIGHTNING II

The F-35 Lightning II program is designed to field transformational fifth-generation strike fighter aircraft for the U.S. Navy, U.S. Marine Corps, U.S. Air Force, seven international partners and six foreign military sales customers. This advanced air system includes next-generation sensors and weapons systems, low observable design and a high level of mission systems commonality among the three F-35A/B/C variants. The F-35C, designed for aircraft carrier operations, features a larger wing and a sturdier landing gear than the F-35A/B variants. All F-35 variants are powered by the world's most powerful fighter-sized engine, the F135.

The F-35 features an internal weapons bay to maintain the low-observable cross section of the aircraft. If required, the F-35 can also be configured to carry external stores.

As part of the suite of next-generation sensors, the F-35C is equipped with the APG-81 Active Electronically Scanned Array Radar and an internally integrated electro-optical targeting system to provide dual infrared imaging and infrared search and track targeting an advanced electronic warfare capability, and a Distributed Aperture System that provides 360-degree spherical missile approach warning, offers all-aspect infrared search and track, and is the source for the night-vision capability to be displayed directly on the pilot's helmet-mounted display system. The F-35 HMD replaces the traditional head-up display found on legacy aircraft.

A unique capability of the F-35 is the aircraft's ability to fuse all of the data from these sensors into one "clean" display offering unprecedented situational awareness to the pilot. Additionally, the F-35 is able share this information with other F-35s via the F-35 unique Multifunction Advanced Data Link, a low-probability-of-intercept, high-data-capability network, or via Link 16 to any Link 16-capable platform.

The F-35C made its first flight June 6, 2010, at Lockheed Martin in Fort Worth, Texas, and was delivered to the F-35 Integrated Test Force at Naval Air Station Patuxent River, Maryland, Nov. 6, 2010. In all, five F-35Cs were delivered to support the F-35 System Design and Demonstration flight-test program. In 2011, the F-35C completed shore-based catapult launch and jet-blast deflector tests leading up to the first arrested landing and catapult aboard the aircraft carrier USS Nimitz on Nov. 3, 2014.

An F-35C flight on April 11, 2018, marked the completion of the F-35's 12-year SDD flight-test program. The Operational Test-1 event was executed in August 2018 aboard the aircraft carrier USS Abraham Lincoln. F-35 initial operational testing and evaluation began in December 2018.

In 2012, the Navy's first F-35 Fleet Replacement Squadron, VFA-101, was established at Eglin Air Force Base, Florida, and received the first fleet F-35C on Oct. 1, 2013. An additional FRS, VFA-125, was activated in January 2017 at Naval Air Station Lemoore, California. VFA-147, the Navy's first operational F-35C squadron, completed the transition from F/A-18E to F-35C in December 2018 and was designated safe for flight. The Department of the Navy declared initial operational capability for the F-35C on Feb. 28, 2019. VFA-147 began the first F-35C deployment aboard the aircraft carrier USS Carl Vinson on Aug. 2, 2021. To maximize the efficiency and effectiveness of the F-35C fleet, VFA-101 was deactivated July 1, 2019, with all aircraft and personnel transferring to VFA-125. The Navy's second operational squadron, VFA-97, began transition to the F-35C in April 2021 and deployed in 2023.

In 2011, the Marine Corps also elected to procure the F-35C. VMFA-314, the Marine Corps' first operational F-35C squadron, was designated SFF in December 2020 and deployed aboard the Abraham Lincoln in early 2022. The current program of record is for the Navy and Marine Corps to procure 273 and 67 F-35Cs respectively, for a total of 340.

The Department of the Navy will continue to transition squadrons to the F-35C at a rate of approximately one squadron per year.

(See the Marine Corps Aircraft section for characteristics and description of the F-35B.)



U.S. NAVY

F-35C LIGHTNING II

WINGSPAN.....43 feet

LENGTH.....51.5 feet

WEIGHT.....empty: 34,800 pounds

WEIGHT.....maximum takeoff: 70,000 pounds

SPEED.....Mach 1.6

RANGE.....1,200 nautical miles unrefueled; 615 nautical mile radius

POWER PLANT.....1 Pratt & Whitney F-135 turbofan engine

ARMAMENT.....laser-guided bombs, Joint Direct Attack Munition, Joint Standoff Weapon, AIM-120, AIM-9X

CREW.....1 pilot

CONTRACTORS.....Lockheed Martin; Pratt & Whitney; Northrop Grumman; BAE Systems; Rolls-Royce

EA-18G GROWLER

The EA-18G Growler is a variant of the Block II F/A-18F Super Hornet and the Navy replacement for the EA-6B Prowler. This airborne electronic attack aircraft combines modern advances in airborne electronic attack systems and weapons with the tactical versatility, advancements and capabilities of the Block II Super Hornet.

The EA-18G uses the ALQ-99 Tactical Jamming System pods, ALQ-218 receiver, ALQ-227 Communications Countermeasures Set Receiver and



U.S. NAVY

EA-18G GROWLER

the Joint Tactical Terminal-Receiver. The ALQ-249 Next-Generation Jammer will augment and ultimately replace the ALQ-99 jamming pods in the 2020s.

Boeing rolled out EA-1, the first prototype NEA-18G Growler, Aug. 4, 2006. EA-1's first flight occurred Aug. 15, 2006. The aircraft was delivered to Naval Air Station Patuxent River, Maryland, Sept. 22, 2006. The EA-18G program received low-rate initial production approval in July 2007. The first EA-18G, G-1, made its first flight Sept. 26, 2007, and was delivered to Patuxent River in August 2008.

The first fleet Growler was delivered June 3, 2008, to Electronic Attack Squadron (VAQ) 129, the Growler fleet replacement squadron, at NAS Whidbey Island, Washington. Initial operational capability and full-rate production followed in fall 2009.

In November 2010, VAQ-132 took the EA-18G on its initial combat deployment, first to Iraq and then in March 2011 to Libya, where it provided electronic attack capability to NATO forces in operations Odyssey Dawn and Uphold Protector. VAQ-132 also deployed to Naval Air Facility Misawa, Japan, in 2013.

There are 14 EA-18G operational squadrons, one reserve squadron and one fleet replacement training squadron. Nine of the 14 operational squadrons are carrier-based, while five are expeditionary squadrons. EA-18G aircraft are also assigned to three air test and evaluation squadrons and the Naval Aviation Warfighting Development Center. The newest squadron, VAQ-144, was established in 2021 and consists of five aircraft.

In 2013, the Royal Australian Air Force ordered 12 EA-18Gs. In October 2015, the first Royal Australian Air Force Growler was delivered to the Naval Air Weapons Station China Lake in California to begin testing. The RAAF took delivery of 12 EA-18Gs in March 2017. The U.S. Navy's inventory objective for the EA-18G was 160 aircraft. As of November 2021, the Navy had taken delivery of all 160 Growlers.

Growler Block II phased upgrades will provide the warfighting capabilities and platform performance modifications required to sustain a strategic advantage in the electromagnetic spectrum. Upgrades will include the Advanced Cockpit System being incorporated on the Block III Super Hornets.

Boeing also has begun a five-year modification program for the Growler, including improvements to the ALQ-218 receiver system, data link and provisions for the Next-Generation Jammer. In March 2021, the first EA-18G was inducted into the Growler Capability Modification program at NAS Whidbey Island.

(See the F/A-18E/F Super Hornet entry for general characteristics.)

E-2C HAWKEYE

The all-weather E-2C Hawkeye carrier-based airborne command and control aircraft has served as the "eyes" of the U.S. Navy for more than 50 years. The E-2C provides simultaneous air and surface surveillance, strike and intercept control, battle management, and search and rescue capabilities. Four foreign militaries currently fly E-2 variants.

The E-2C, which had its first production delivery in 1973, is equipped with the APS-145 airborne early warning radar. The system can simultaneously and automatically detect and track more than 2,000 targets and control more than 20 airborne intercept operations.

The E-2C has demonstrated its capabilities during operations Enduring Freedom and Iraqi Freedom, providing critical battle and airspace management and combat search and rescue command and communication relay and excelling in strike- and tanker-control operations. It has also supported drug-interdiction efforts within the Western Hemisphere. The E-2C contributed to search and rescue operations after Hurricane Katrina in New Orleans in 2005 and the earthquake in Haiti in January 2010, providing urban relief efforts that included air traffic control. The E-2C also provided support in the aftermath of Hurricane Harvey, which devastated Louisiana and Texas in 2017.

The last variant of the E-2C, known as Hawkeye 2000, was introduced in fiscal 2002. It includes an improved commercial, off-the-shelf-based mission computer upgrade, a new operator display, an upgraded cooling system, improved satellite communications and the USG-3 Cooperative Engagement Capability system. Hawkeye 2000 E-2Cs equipped with CEC were deployed for the first time in 2002 over Afghanistan. The Navy continued procurement of the Hawkeye 2000 through 2007 and delivered the last E-2C Hawkeye aircraft Sept. 30, 2009, to Carrier Airborne Early Warning Squadron, now Airborne Command and Control Squadron (VAW) 120.

The Navy ensured the aircraft remained a viable and capable platform through several upgrades. Aircraft reliability updates started in 2013 and included enhancements to the intercommunication system, rate gyro and acceleration sensors, CEC system, and radar altimeter. Communications, navigation and identification and mission system avionics installations continued through 2014.

Upgrades to the E-2C continue and include a new radio, faster internet protocol capabilities and updated software configuration sets. All active fleet E-2Cs employ the all-composite eight-bladed NP2000 propeller. The E-2C equips two fleet airborne command and control squadrons (VAW-116 and VAW-123) and one fleet replacement squadron (VAW-120). As of October 2023, there were 15 E-2Cs in inventory. The single TE-2C training version has been retired. Phaseout of the E-2C is slated for 2026.

WINGSPAN	80.6 feet
LENGTH	57.7 feet
HEIGHT	18.3 feet
WEIGHT	maximum gross takeoff: 55,000 pounds
SPEED	maximum: 300+ knots
CEILING	30,000 feet
RANGE	ferry range, 1,300 nautical miles
POWER PLANT	2 Rolls-Royce T56-A-427 (E-2C) turboprop engines, 5,100 shp each
CREW	2 pilots, 3 mission systems operators
CONTRACTOR	Northrop Grumman

E-2D ADVANCED HAWKEYE

The E-2D is designed for modern threats and increased detection over water, over land and in the littorals. Its radar provides advanced 360-degree coverage with mechanical and electronic scanning capability for continuous detection and tracking of targets, expanding maritime domain awareness operations and sorting the dense maritime picture. Beyond the strike group, the E-2D's command and control capability makes it a diverse and flexible platform through its ability to coordinate airborne strike, provide land force support, offer rescue operations, man-



U.S. NAVY

E-2D ADVANCED HAWKEYE

age a reliable communications network between widely dispersed nodes and provide drug-interdiction operations support.

The systems and capabilities of the E-2D were completely redesigned to support current and future missions and integration with key players in the carrier strike group. The E-2D features the APY-9 radar with a two-generation leap in capability and upgraded aircraft systems that improve supportability and increase readiness. Another notable upgrade is the glass cockpit. The three 17-inch liquid crystal display panels enable either the pilot or co-pilot to become a fourth tactical operator — when not actively engaged in flying the aircraft — to give the crew more flexibility in performing its diverse missions.

The Navy developed an aerial refueling capability for fleet introduction in fiscal 2020. Five E-2Ds were retrofitted for development; addition of the capability began on the 46th E-2D, delivered in 2020. The first aerial-refueling-capable E-2D was delivered to VAW-120 in September 2019.

The E-2D made its first flight Aug. 3, 2007, and first mission systems flight Dec. 14, 2007. The E-2D completed initial operational testing and evaluation in October 2012 and was approved for full-rate production in March 2013. Later that year, the Navy awarded the full-rate production Lot 1 contract for five aircraft. The E-2D Multiyear Procurement Secretary of Defense Certification enabled the Navy to award a multiyear procurement contract to Northrop Grumman in June 2014 for the procurement of 25 E-2Ds, later increased to 26; a second multiyear procurement was awarded in April 2019 for 24 E-2Ds. The Navy's program of record is 86 E-2Ds. As of October 2023, 59 E-2Ds have been delivered.

In January 2015, Japan announced its intention to acquire E-2Ds. The first of four Japan Air Self-Defense Force E-2Ds was ordered in January 2016 and delivered in November 2017. The JASDF ordered nine more in September 2019. France ordered three E-2Ds to replace its E-2Cs by 2028.

The E-2D achieved initial operational capability Oct. 10, 2014, signifying that the first operational squadron, VAW-125, was manned, trained, equipped and ready to start deployment preparation with the aircraft. The first E-2D deployment occurred in 2015 aboard the aircraft carrier USS Theodore Roosevelt. Subsequent transitions have occurred with VAW-121, VAW-126, VAW-125, VAW-113, VAW-117 and VAW-115.

WINGSPAN	80.6 feet
LENGTH	57.7 feet
HEIGHT	18.3 feet
WEIGHT	maximum gross takeoff: 57,500 pounds
SPEED	maximum: 300+ knots
CEILING	37,000 feet
RANGE	ferry range, 1,300 nautical miles
POWER PLANT	2 Rolls-Royce T56-A-427A turboprop engines, 5,100 shp each, Full Authority Digital Engine Control
CREW	2 pilots (1 optional tactical operator), 3 mission systems operators
CONTRACTOR	Northrop Grumman

C-2A GREYHOUND

The C-2A Greyhound is the U.S. Navy's carrier onboard delivery aircraft, providing transport of personnel, logistic materiel and mail between shore facilities and carrier strike groups at sea. The C-2A can deliver a payload of up to 10,000 pounds over more than 1,000 nautical miles.

Nineteen C-2As were procured during the 1960s and phased out of service in 1987. Thirty-nine C-2A replacement aircraft — built with significant airframe and avionics improvements — were procured during the 1980s. One fleet logistics squadrons on the East Coast, with a detachment forward-deployed to Japan, deploys two-plane C-2A detachments on most aircraft carriers to support air connector capability for time-critical logistics, diplomatic presence operations and humanitarian assistance/disaster response.

The C-2A service-life extension program was completed in 2011. It included improvements such as structural enhancements, dual ARC-210 radios, the Terrain-Awareness Warning System, the Traffic Collision-Avoidance System and the replacement of Kapton wiring. Eight-blade NP2000 propellers are installed on all serving C-2As.

The Communication, Navigation, Surveillance/Air Traffic Management system features components that expand the aircraft's communications capability by increasing the number of usable radio frequencies, reducing channel congestion. As part of the navigation upgrade, a system combining GPS equipment and an inertial navigation system was integrated to provide accurate positioning and velocity, allowing flight crews to perform precise landing approaches. The C-2 is scheduled to be replaced by the CMV-22B by 2026.



U.S. NAVY

C-2A GREYHOUND

WINGSPAN	80.6 feet
LENGTH	56.8 feet
HEIGHT	17.2 feet
WEIGHT	maximum takeoff, carrier: 57,500 pounds; maximum takeoff, field: 60,000 pounds
SPEED	maximum: 343 knots
CEILING	30,000 feet
RANGE	1,300 nautical miles
POWER PLANT	2 Allison T56-A-425 turboprop engines (4,600 shp each)
CREW	2 pilots, 2 crew members
CONTRACTORS	Northrop Grumman; Boeing

P-8A POSEIDON



U.S. NAVY

P-8A POSEIDON

The P-8A Poseidon is a leader in long-range anti-submarine warfare; anti-surface warfare; and intelligence, surveillance and reconnaissance. It is proven as an aircraft capable of broad-area, maritime and littoral operations as well as search and rescue. The P-8A is a heavily modified military derivative of the Boeing Next-Generation 737-800 commercial platform and is built in-line using the Boeing commercial manufacturing process and militarized by Boeing Defense.The P-8A was initially forward-deployed in 2013, providing an extended global reach and operating envelope, greater payload capacity, open systems architecture and significant growth potential compared to previous maritime patrol aircraft. It includes major sensor systems upgrades to the command and control, antisubmarine warfare, and radar and optical detection systems. Major sensor systems include the AQQ-2(V) acoustic sensor system; an APY-10 radar system, developed specifically for the Poseidon, that features inverse synthetic aperture radar and synthetic aperture radar. The Poseidon also carries an electro-optical/infrared sensor turret and has increased acoustic capability to conduct concurrent passive and active processing.

To pace emergent threats, P-8A Increment 3 Engineering Change Proposals 6 and 7 upgrades will modify aircraft with improved combat systems, track management, anti-submarine warfare and communications systems. The Navy remains on track to field the High-Altitude Anti-Submarine Warfare Weapon Capability as part of the P-8A's ongoing incremental upgrade strategy. The Navy also plans to expand the weapons options for the P-8A to include the AGM-158C Long-Range Anti-Ship Missile.

In 2019, the Navy commenced retrofitting a sixth mission crew workstation onto previously delivered fleet aircraft to maintain a common configuration with an in-line production aircraft change that was implemented in 2017. The sixth workstation enables greater aircrew coordination and operational situational awareness across all P-8 mission tasking.

Australia joined the United States as a P-8A cooperative partner in April 2009, with 12 aircraft delivering to the Royal Australian Air Force by the end of 2019. The RAAF declared its initial operational capability in 2018, about five months earlier than scheduled. Australia ordered two more P-8As in March 2021 for a total of 14 aircraft.

In August 2016, the United Kingdom became a foreign military sales partner with an order of nine P-8A aircraft and associated support. The final U.K. aircraft was delivered in January 2022. In March 2017, Norway also became a foreign military sales program partner, placing orders for five aircraft with final delivery in May 2022. In 2018, New Zealand and South Korea approved the foreign military sales program procurements of four and six P-8As, respectively. New Zealand and South Korea deliveries began in late 2022/early 2023. Germany ordered five P-8As in 2021 for delivery beginning in 2024. These combined procurements and the commonality of the production configurations have produced unit cost savings for all partners, as well as substantial interoperability benefits during allied operations.

The Indian navy also procured 12 derivative aircraft, the P-8I, through direct commercial sales with Boeing. The 12th had been delivered in February 2022. India plans to procure six more, with parts of them to be made in India.

The U.S. Navy declared initial operational capability for the P-8A in November 2013. Patrol Squadron (VP) 16 executed the first P-8A operational deployment in December 2013. Since then, P-8A forward-deployed presence has extended to other the U.S. fleets. In addition to the initial six test aircraft, as of October 2022, 112 production P-8A aircraft had been delivered to the fleet, accumulating more than 350,000 flight hours since initial delivery in 2012. Fleet transition for all 12 active squadrons, the fleet replacement squadron and a special projects patrol squadron was completed in 2020. A reserve squadron, VP-62, began a transition to the P-8A in 2022. The other reserve squadron, VP-69, began transition in 2023. The Navy's program of record is 128 aircraft.

WINGSPAN.....123.6 feet
LENGTH.....129.5 feet
HEIGHT.....42.1 feet
WEIGHT.....maximum gross takeoff: 189,200 pounds
SPEED.....490 knots true air speed
CEILING.....41,000 feet
RANGE.....1,200 nautical miles radius with 4 hours on-station
POWER PLANT.....2 CFM56-7BE turbofan engines
CREW.....3 pilots, 2 naval flight officers, 3 or 4 sensor operators,
ARMAMENT.....Mk54 Mod 0/1 torpedoes, AGM-84D Block 1C/II+ missiles, sonobuoys
CONTRACTOR.....Boeing

EP-3E ARIES/P-3 ORION



U.S. NAVY

EP-3E ARIES

The EP-3E land-based electronic reconnaissance aircraft, a version of the P-3 Orion, deploys to intercept, collect, exploit, fuse, identify and disseminate signals intelligence in support of joint, theater and fleet commander tasking. The EP-3E crew fuses signals intelligence and off-board information and disseminates the data for direct threat warning, information dominance, battlespace situational awareness, suppression of enemy air defenses, destruction of enemy air-defense, anti-air warfare and anti-submarine warfare applications.

The Navy operates the EP-3E in one fleet air reconnaissance squadron based at Naval Air Station Whidbey Island, Washington. During the early 1990s, the Conversion-in-Lieu-of-Procurement program converted 12

P-3Cs to an EP-3E Airborne Reconnaissance Integrated Electronic System II configuration, which entered service in 1997, later augmented by four others to create a pool of 16 aircraft to sustain 12 in service. Currently eight remain in service.

Various multi-intelligence sensor improvement efforts have been executed over the years to incrementally improve signals intelligence, special signals and electro-optical/infrared systems in addition to enhanced networking capabilities. Recent efforts have focused on obsolescence and cybersecurity improvements.

The eight EP-3Es in service continue to meet operational tasking and will do so through the end of the aircraft's global force management requirement in fiscal year 2024, with projected retirement complete in fiscal year 2025.

The last active-component P-3C patrol squadron returned from its final P-3 deployment in October 2019 and completed its transition to the P-8A in May 2020. The last reserve force squadron retired its last P-3Cs in late 2022. The P-3C continues to serve as a support aircraft in VQ-1 and as a range clearance and scientific research aircraft (P-3C, NP-3C/D). As of October 2023, there were eight P-3Cs and three NP-3C/Ds in service.

The PMA-290 foreign military sales program staff works with foreign counterparts to maximize acquisition strategies that benefit both the U.S. Navy and allied forces. Several countries will continue to operate P-3s around the world. Many have modernized their aircraft to remain mission capable for the next 15-20 years or plan to do so, including Canada, Germany, Greece, Japan and Taiwan.

WINGSPAN ..... 99.5 feet
LENGTH ..... 116.6 feet
HEIGHT ..... 33.6 feet
WEIGHT ..... maximum gross takeoff: 142,500 pounds
SPEED ..... maximum: 411 knots; cruise: 328 knots
CEILING ..... 28,000 feet
RANGE ..... maximum mission: 2,380 nautical miles; for 3 hours on-station at 1,346 nautical miles
POWER PLANT ..... 4 Allison T-56-A-14 turboprop engines (4,600 shp each)
CREW ..... 3 pilots, 3 naval flight officers, 18 additional aircrew
CONTRACTORS ..... Lockheed Martin; L3Harris

E-6B MERCURY

The E-6B Mercury is a communications relay and strategic airborne command post aircraft. It provides survivable, reliable and endurable airborne nuclear command, control and communications for the U.S. president, secretary of defense and Strategic Command. Two operational squadrons — Fleet Air Reconnaissance Squadron (VQ) 3 and VQ-4 — deploy from their main operating base at Tinker Air Force Base, Oklahoma, supported by the Take Charge and Move Out Weapons School and the fleet replacement squadron (VQ-7). They deploy aircrews as directed to forward operating bases at Travis Air Force Base, California; Offutt Air Force Base, Nebraska; Naval Air Station Patuxent River, Maryland; and other locations.

Boeing derived the E-6A from its commercial 707 to replace the aging EC-130Q in the performance of the Navy's TACAMO mission. TACAMO links the National Command Authority with naval ballistic missile forces during times of crisis. The aircraft carries a very low frequency communication system with dual trailing wire antennas. The Navy accepted the first E-6A in August 1989.

The E-6B was conceived as a replacement for the Air Force's Airborne Command Post due to the age of the EC-135 fleet. The E-6A was modified to the E-6B by adding battle staff positions and other specialized equipment. The E-6B is a dual-mission aircraft capable of fulfilling either the no-fail TACAMO mission or the Looking Glass mission, which facilitates the launch of U.S. land-based intercontinental ballistic missiles using an airborne launch control system. The Navy accepted the first E-6B aircraft in December 1997, and the E-6B assumed its dual operational mission in October 1998. The E-6A fleet was completely modified to the E-6B configuration in 2003.

All E-6B completed a service-life extension program at Tinker Air Force Base to extend the life of the aircraft from 27,000 flight hours to 45,000 flight hours. In addition, the E-6B fleet has been undergoing upgrades, dubbed Block II, including the installation of the Multi Role-Tactical Common Data Link system. While simultaneously sustaining the aging E-6B airframe, the Navy has been working on a recapitalization aircraft (E-XX) that will take over the TACAMO mission. Three nonconfigured variations of the militarized C-130J-30 Super Hercules will be acquired for E-XX TACAMO testing.

The U.S. Navy has acquired a former U.K. Royal Air Force E-3D Sentry aircraft and is modifying it into an inflight trainer for the E-6B crew. It is scheduled to be modified to a TE-6B configuration and delivered to the fleet in the first quarter of fiscal year 2026.



U.S. NAVY

E-6B MERCURY

WINGSPAN ..... 148.3 feet
LENGTH ..... 150.3 feet
HEIGHT ..... 42.4 feet
WEIGHT ..... gross takeoff, 341,000 pounds
SPEED ..... Mach 0.88
CONTRACTOR ..... Boeing

C-130T/KC-130T HERCULES

The C/KC-130T Hercules is a medium-sized transport aircraft capable of intra-theater and inter-theater airlift operations. The aircraft fulfills the U.S. Navy Reserve Navy Unique Fleet Essential Airlift mission to provide rapid organic logistics support to forward-deployed naval operations. The aircraft can carry 92 ground troops or, when configured for cargo, transport more than 42,000 pounds of weapons, equipment or other supplies. It also can be configured as a medical evacuation platform capable of carrying 74 patients on stretchers and their attendants.

As of October 2023, the Navy inventory included 32 C-130T/KC-130T aircraft. Five Navy Reserve fleet logistics support squadrons operate 16 C-130Ts and 11 KC-130Ts. In addition, Naval Test Wing Atlantic and Naval Test Wing Pacific operate three and two KC-130Ts, respectively, to provide airborne flight test support and surveillance, clearance, logistics and persistent search and rescue support. The C-130T/KC-130T Reserve fleet has been retrofitted with NP2000 propellers, and other system obsolescence is being addressed through individual component upgrades.



U.S. NAVY

C-130T HERCULES

WINGSPAN.....132.6 feet
LENGTH.....97.75 feet
HEIGHT.....38.25 feet
WEIGHT.....maximum gross takeoff: 175,000 pounds
SPEED.....normal cruise speed: 300 mph
RANGE.....with maximum payload and allowance for 30 minutes at sea level: 2,046 nautical miles; with maximum fuel and 20,000-pound payload: 4,460 nautical miles
POWER PLANT.....4 Allison T56-A-16 turboprop engines
ARMAMENT.....none
CREW.....2 pilots, 1 flight engineer, 1 loadmaster
CONTRACTOR.....Lockheed Martin

C-40A CLIPPER



U.S. NAVY

C-40A CLIPPER

The C-40A, a derivative of the Boeing 737-700C commercial airliner, is a medium-lift aircraft used for U.S. Navy-unique, fleet-essential airlift missions and Marine Air-Ground Task Force support. The C-40A is certified to operate in three configurations: an all-passenger configuration that can carry 121 passengers, an all-cargo configuration of eight cargo pallets or a combination of three cargo pallets and 70 passengers. The C-40A has a state-of-the-art flight deck, avionics system and engines that are Stage III noise-compliant and certified for extended over-water operations. Seventeen C-40As, delivered between 2001 and 2019, are operated by six fleet logistics support squadrons. The Marine Corps procured two used Boeing 737-700Cs in 2018 and converted them to C-40As. One was delivered to Marine Transport Squadron 1 in May 2023, and the second was delivered in November 2023.

CONTRACTORS.....Boeing; AAR Corp.

C-37A/B GULFSTREAM V/550, NC-37B

The C-37 is a Gulfstream Aerospace-manufactured transport capable of all-weather, long-range, high-speed nonstop flights. C-37A Gulfstream V and C-37B Gulfstream 550 aircraft are low-wing, business jets powered by two turbofan engines equipped with thrust reversers. The C-37 provides special air missions for high-ranking government officials, Department of Defense officials and dignitaries. The C-37A has a distinguished visitor compartment capable of handling six passengers and a staff compartment capable of handling up to eight passengers. The C-37B has an executive compartment capable of accommodating four passengers and a staff compartment that can accommodate up to eight passengers.

The Navy procured four C-37A/B aircraft to replace the VP-3A fleet. The first C-37 was delivered in July 2002, and the last one was delivered in October 2006. Three C-37Bs and one C-37A are operated by Fleet Logistics Support Squadron 1.

In July 2018, the Navy took delivery of an NC-37B, a Gulfstream 550, to be used as a major range test support aircraft. The aircraft will be modified into a telemetry and range support aircraft equipped with phased array telemetry systems and delivered to the test community by 2026.

CONTRACTOR.....Gulfstream Aerospace Corp.

NC-20G GULFSTREAM IV

The NC-20G is a military version of the Gulfstream IV aircraft. The NC-20G is capable of all-weather, long-range, high-speed, nonstop trans-oceanic flights. One NC-20G is undergoing modernization upgrades and will be used as a test asset to support range surveillance and clearance and photometric data collection.

CONTRACTOR.....Gulfstream Aerospace Corp.

C-26A/D METROLINER



U.S. NAVY

C-26D

The C-26D is a Federal Aviation Administration-certified military utility transport version of the Fairchild Metroliner 23 commercial light-lift aircraft. It is a multipurpose low-wing, twin-engine turboprop with an engine on each wing. With a maximum payload capacity of 5,020 pounds, the cabin can be configured to accommodate up to 19 passengers and/or cargo. The aircraft incorporates a cargo door with an integral air-stair door to permit easy entry and access. Four C-26Ds are based in Italy, where they provide rapid-response transports for high-priority resupply and movement of key personnel to remote sites. Three other C-26D aircraft have been modified to be used as major range test support aircraft: two RC-26Ds and one EC-26D conduct range clearance and control. A single C-26A was delivered to the U.S. Naval Test Pilot School in 2018 to serve as an Airborne Systems Training and Research Support III flying classroom with an active electronically scanned array radar, Garmin G950 glass cockpit and MX-15 forward-looking infrared.

CONTRACTOR.....ONTIC

C-38A COURIER

The C-38 Courier is a Federal Aviation Administration-certified military utility transport. It's a derivative of the Gulfstream G100, formerly known as the Astra SPX. This twin-engine jet is used as a test and evaluation support aircraft and mission system test bed. Air Test and Evaluation Squadron 20 operates two C-38 aircraft.

CONTRACTOR.....V2X

C-12 HURON

The UC-12F/M Huron is a Federal Aviation Administration-certified military variant of the King Air 200 aircraft. The Huron is a low-wing, fully pressurized, multifunction T-tail monoplane with two turboprop engines. The aircraft is certified to operate on unimproved runways, certified and capable of operating in extreme weather conditions, and equipped with the latest FAA mandates for operations in and outside the continental United States. The cabin can be configured to accommodate passengers, cargo or both.

UC-12 Huron aircraft typically carry out transport missions; fly small troop movements, senior military commanders and congressional staff members; provide relief and aid in support of natural disasters; and can be configured for medical evacuation. All Navy UC-12 aircraft were procured with a cargo door that enables high-priority and sensitive cargo shipments.

The Navy operates six UC-12Fs and seven UC-12Ms. Additionally, the U.S. Naval Test Pilot School operates three U.S. Army C-12C aircraft for training support. (See the Marine Corps section for a description of the UC-12W version.)

CONTRACTOR.....Textron Aviation

T-6 TEXAN II



U.S. NAVY

T-6A TEXAN II (FOREGROUND) BESIDE A A T-45C GOSHAWK

The Joint Primary Aircraft Training System consists of the T-6 Texan II aircraft, simulators, computer-aided academic material and a training integration management system. The joint program, with the U.S. Air Force acting as the executive service, replaced the Navy T-34C and Air Force T-37B aircraft. The program is using commercial, off-the-shelf subsystems to the maximum extent possible. The aircraft is a derivative of the Swiss Pilatus PC9 with a Pratt & Whitney PT6A-68 engine, a digital cockpit, Martin-Baker ejection seats, cockpit pressurization and an on-board oxygen-generating system.

The Navy accepted its first two T-6A production aircraft in August 2002 and began naval flight officer training in Pensacola, Florida, in June 2003. The Navy operates 43 T-6As.

The Navy procured an upgraded avionics variant of the Texan II, the T-6B, for primary pilot training in 2007. The avionics upgrade package in the T-6B replaces federated avionics of the T-6A with an integrated avionics suite that includes an all-glass cockpit using three multifunction displays, a head-up display, hands-on throttle and stick, dual redundant integrated avionics computers and an open-architecture design to allow for future growth.

The first two T-6Bs were delivered Sept. 3, 2009, to Training Air Wing 5 at Naval Air Station Whiting Field, Florida. The T-6B reached initial operational capability in April 2010. The first student naval aviators trained in the T-6B completed their syllabus in late 2010. The last of 251 T-6Bs was delivered to the Navy in June 2016. Six T-6Bs are operated by the U.S. Naval Test Pilot School. In 2023, two AT-6E Wolverines, armed versions of the T-6B, were added to the school's inventory. As of October 2023, 43 T-6As and 251 T-6Bs remain in Navy inventory.

WINGSPAN.....33.4 feet
LENGTH.....33.3 feet
HEIGHT.....10.7 feet
WEIGHT T-6A.....empty: 5,500 pounds; maximum takeoff: 6,500 pounds
WEIGHT T-6B.....empty: 5,850 pounds; maximum takeoff: 6,900 pounds
SPEED.....316 knots at 1,000 feet level flight
RANGE.....maximum: 900 nautical miles
CEILING.....31,000 feet
POWER PLANT.....1 Pratt & Whitney PT6A-68 turboprop engine
CREW.....2 pilots (1 instructor, 1 student)
CONTRACTOR.....Textron Aviation

T-34C TURBOMENTOR

The T-34C Turbomentor is an unpressurized, two-seat, tandem cockpit low-wing turboprop trainer that was derived from the civilian Beechcraft Bonanza. The T-34C is used to provide pilot proficiency, range control and other support services to Navy and Marine Corps fleet replacement units and Naval Air Systems Command's "satellite sites" operated throughout the continental United States. Throughout its life, the aircraft has been operated and commercially supported by the Navy using Federal Aviation Administration processes, procedures and certifications. As of October 2022, 16 T-34Cs were in inventory.

WINGSPAN.....33 feet, 5 inches
LENGTH.....28 feet, 8 inches
HEIGHT.....9 feet, 11 inches
WEIGHT.....4,425 pounds; empty: 3,000 pounds
SPEED.....280 knots at 1,000 feet level flight
RANGE.....maximum: approximately 600 nautical miles
CEILING.....25,000 feet
POWER PLANT.....PT6A-25 turboprop engine (Pratt & Whitney Aircraft of Canada)
CREW.....Two (instructor pilot, student pilot)
CONTRACTOR.....Textron Aviation

T-44C PEGASUS

The T-44 "Pegasus" aircraft is a twin-engine, pressurized, Beech King Air B90 manufactured by Textron Aviation. The aircraft is used for advanced turboprop aircraft training at Naval Air Station Corpus Christi, Texas. The aircraft is equipped with autopilot and anti-icing systems. The interior includes a seating arrangement for an instructor pilot (right seat) and a student pilot (left seat), along with seating for up to three passengers. The aircraft is configured to allow a second student or observer to monitor all radio communications through an audio control panel in the aircraft cabin. The aircraft is maintained by contractor logistics support via a competitively awarded maintenance contract. Modification of the



U.S. NAVY

T-44C PEGASUS FORMATION FLIGHT

T-44A to the T-44C replaced obsolete analog avionics with a commercial, off-the-shelf integrated digital cockpit, and wing wiring was completed in fiscal year 2017. As of October 2022, 54 T-44Cs were in inventory.

WINGSPAN.....50 feet, 3 inches (15.32 meters)
LENGTH.....35 feet, 6 inches (10.82 meters)
HEIGHT.....14 feet, 3 inches (4.34 meters)
WEIGHT.....empty: 6,246 pounds (2,833 kg);
maximum takeoff: 9,650 pounds (4,377 kg)
SPEED.....maximum: 245 knots; 281.94 mph (453.74 kph)
RANGE.....maximum: 1,300 nautical miles (2,407.6 km)
CEILING.....31,300 feet
POWER PLANT.....2 Pratt & Whitney PT-6A 34B engines; 550 shp each
CREW.....1 instructor pilot, 2 student pilots
CONTRACTOR.....Textron Aviation

T-54A MULTI-ENGINE TRAINING SYSTEM

The U.S. Navy announced Jan. 25, 2023, that it awarded Textron Aviation a single, firm-fixed-price contract to develop the T-54A METS. The T-54A will provide advanced instrument and asymmetric engine handling training to student naval aviators selected for multi-engine fleet communities.

The T-54A, a derivative of the King Air 260, will replace the T-44C Pegasus aircraft and will train student naval aviators for advancement to the P-8, EP-3, KC-130, E-6, E-2, CMV-22, CV-22 and MV-22 aircraft.

The T-54A will feature a pressurized aircraft cockpit with side-by-side seating and a jump seat. The cockpit will be equipped with multifunction displays with a digital moving map; redundant ultra-high frequency and very high frequency radios; an integrated GPS/inertial navigation system; automatic dependent surveillance-broadcast; flight management system; weather radar, radar altimeter and a cockpit data recorder. The T-54A will include virtual reality and augmented reality devices to better prepare students for the advanced aircraft they will fly in the fleet. METS will also have tricycle landing gear and a reconfigurable cargo bay in the cabin.

METS will have a Federal Aviation Administration-type certification for single- and dual-pilot operations under day and night visual flight rules and under instrument flight rules. It also will cruise at speeds greater or equal to 195 knots and operate at a minimum of 20,000 feet above sea level. The aircraft also will have an endurance of 3.5 or more flight hours.

The Navy has a requirement for 64 T-54As. The base contract calls for Lot I of 10 aircraft with planned options for Lot II and Lot III of 27 aircraft each. Deliveries would take place from calendar year 2024 to 2026.

WINGSPAN.....54 feet, 6 inches
LENGTH.....43 feet, 9 inches
HEIGHT.....14 feet, 6 inches
WEIGHT.....maximum takeoff: 12,500 pounds
SPEED.....maximum: 259 knots
RANGE.....approximately 1,000 nautical miles
CEILING.....35,000 feet
POWER PLANT.....PT6A-52 turboprop engine
CREW.....1 instructor pilot, 2 student pilots
CONTRACTOR.....Textron Aviation

T-45 GOSHAWK



U.S. NAVY

T-45C GOSHAWK

The T-45 Goshawk, the U.S. Navy version of the British Aerospace Hawk aircraft, is a tandem-seat, carrier-capable jet designed for intermediate and advanced portions of the Navy/Marine Corps pilot training program for jet carrier aviation and tactical strike missions. The T-45 replaced the T-2C Buckeye and the TA-4J Skyhawk with an integrated training system that included the aircraft, operations and instrument fighter simulators, academics and training integration system. The T-45A, which became operational in 1991, contained an analog design cockpit, and the T-45C was built around a digital cockpit design. A Virtual Mission Training System modification that enables training of undergraduate military flight officers in radar and navigation skills replaced the T-39G and T-39N and became fully operational in 2014.

Boeing has delivered 83 T-45As and 138 T-45Cs. The last T-45C aircraft was delivered in October 2009. Through the Required Avionics Modernization Program, 63 T-45As have been converted to T-45Cs, completing the upgrade program in 2017. Planned future avionics upgrades include automatic dependent surveillance-broadcast, which will allow the T-45 to meet the Federal Aviation Administration's NextGen airspace requirements resulting in the continued ability to train student naval aviators for the planned life of the aircraft. As of October 2022, the Navy inventory included 193 T-45Cs.

WINGSPAN.....30 feet, 10 inches
LENGTH.....39 feet, 4 inches
HEIGHT.....13 feet, 6 inches
WEIGHT.....empty: 9,394 pounds; maximum takeoff: 13,500 pounds
SPEED.....645 mph
RANGE.....700 nautical miles
CEILING.....42,500 feet
POWER PLANT.....Rolls-Royce F405-RR-401 turbofan engine with 5,527 pounds thrust
CREW.....1 instructor pilot, 1 student pilot
CONTRACTOR.....Boeing

F-5F/N TIGER II



U.S. NAVY

F-5N TIGER II

The F-5N Tiger II is a single-seat, twin-engine, tactical fighter and attack aircraft that provides simulated air-to-air combat training. The F-5F is a dual-seat version used for training and adversary combat tactics. The F-5N/F aircraft serve in an aggressor-training role with simulation capability of current threat aircraft in fighter combat mode.

Surplus Swiss Air Force low-time F-5Es were purchased and upgraded for the adversary role as F-5Ns to replace U.S. Navy and Marine Corps F-5Es. The last of 41 F-5Ns was delivered April 29, 2009, and 40 remain in service. The fleet of eight F-5Fs was rebuilt from Swiss F-5E fuselages and F-5F nose and tail sections. The last of three was delivered in 2010. A further 16 F-5Es and six F-5Fs were purchased in 2021 from the Swiss Air Force for conversion.

The Navy began an F-5 block upgrade program in September 2021. Three F-5Ns are being fitted with modernized cockpit, avionics and supporting aircraft architecture. Aircraft receiving these modifications will be designated F-5N+/F-5F+. F-5Ns and F-5Fs are flown by Navy Fighter Squadron Composite (VFC) 204 and VFC-111 and Marine Corps Marine Fighter Training Squadron 401.

WINGSPAN ..... 26.7 feet
LENGTH ..... F-5F: 51.6 feet; F-5N: 47.4 feet
HEIGHT ..... F-5F: 13.3 feet; F-5N: 13.4 feet
WEIGHT ..... maximum gross takeoff: 24,722 pounds
SPEED ..... F-5F: Mach 1.56 at 36,000 feet; F-5N: Mach 1.64 at 36,000 feet
RANGE ..... maximum: 2,324 nautical miles
CEILING ..... 50,000+ feet
POWER PLANT ..... 2 J85-GE-21C afterburning turbojet engines
CREW ..... F-5F: 2 pilots; F-5N: 1 pilot
CONTRACTOR ..... Northrop Grumman

F-16 FIGHTING FALCON

The F-16A is a single-seat, single-engine multirole fighter jet with superior maneuverability and sophisticated tracking and weapon systems for the interception and attack of other aircraft. The F-16B is a two-seat version typically used for training by a student pilot with an instructor pilot in the rear cockpit. This aircraft is considered an agile modern fighter and has proven itself in air-to-air combat and air-to-surface attack. F-16 training aircraft focus on tactics development, assessment, graduate-level training, joint interoperability and standardization of training with the aviation communities.

Ten Block 15 F-16As and four F-16Bs were reacquired from Pakistan and refurbished for U.S. Navy use. The service life of the aircraft is being extended through the FalconUP program. F-16A/Bs are flown by the Naval Aviation Warfighting Development Center at Naval Air Station Fallon, Nevada.

The Navy is acquiring 20 Block 32 F-16Cs and six Block 25 F-16Ds from the Air Force to equip VFC-13. All Navy F-16s are scheduled to be upgraded with the APG-63 radar.



U.S. NAVY

F-16 FIGHTING FALCON

WINGSPAN ..... 31 feet
LENGTH ..... 47.7 feet
HEIGHT ..... 16.5 feet
WEIGHT ..... maximum gross takeoff: 37,500 pounds
SPEED ..... Mach 1.73 at 39,000 feet
RANGE ..... maximum: 1,260 nautical miles
CEILING ..... 50,000 feet
POWER PLANT ..... 1 Pratt & Whitney F100-PW-220 turbofan engine
CREW F-16A: 1; F-16B: 2
CONTRACTORS ..... Lockheed Martin; Pratt & Whitney

T-38C TALON

The T-38C Talon is a twin-engine, high-altitude, supersonic jet trainer used in a variety of roles because of its design, economy of operations, ease of maintenance, high performance and exceptional safety record. It is used primarily by the Air Force, but 10 are used by the U.S. Naval Test Pilot School.

WINGSPAN ..... 25.3 feet
LENGTH ..... 46.4 feet
HEIGHT ..... 12.9 feet
WEIGHT ..... maximum gross takeoff: 12,500 pounds
SPEED ..... Mach 1.08 at sea level
RANGE ..... 870 nautical miles
CEILING ..... 55,000+ feet
POWER PLANT ..... 2 J85-GE-5 turbojet engines
CREW ..... 1 instructor pilot, 1 student
CONTRACTOR ..... Northrop Grumman

TILT-ROTOR AIRCRAFT

CMV-22B OSPREY

The Navy's CMV-22B aircraft started replacing the C-2A Greyhounds for the carrier onboard delivery mission to transport personnel, mail, supplies and cargo from shore bases to aircraft carriers at sea.

The CMV-22B features extra fuel capacity, improved lighting for cargo handling and a public address system to MV-22B aircraft. It is capable of internally carrying the F-135 engine power module for the F-35 Lightning II.

The CMV-22B made its first flight Dec. 19, 2019, at Bell's Amarillo, Texas, assembly facility and later flew to Naval Air Station Patuxent River, Maryland, to continue flight testing in February 2020. The aircraft achieved initial operational capability Dec. 1, 2021. The CMV-22B deployed for the first time aboard the aircraft carrier USS Carl Vinson in August 2021 — 18 months after first flight.

The Navy has a requirement for 48 CMV-22Bs. Full operational capability is scheduled for 2024.



U.S. NAVY

CMV-22B OSPREY

WINGSPAN	83. 1 feet
LENGTH	57.3 feet
HEIGHT	22.1 feet
WEIGHT	maximum vertical takeoff weight: 52,600 pounds; maximum rolling takeoff weight: 60,500 pounds
SPEED	maximum: 280 knots
CEILING	25,000 feet
RANGE	1,150 nautical miles (6,000 pounds internal payload)
POWER PLANT	2 Rolls-Royce Liberty AE1107C engines
CREW	1 pilot, 1 co-pilot, 2 crew chiefs
TROOP SEATS	24
CONTRACTORS	Bell-Boeing Joint Program Office; Raytheon;Rolls-Royce

HELICOPTERS

H-60 SEAHAWK

The Navy executed a Helicopter Master Plan and its Helicopter Concept of Operations, which has reduced the different type/model/series of helicopters currently operating to two H-60 variants: the MH-60R and the MH-60S.

In addition to the MH-60R/S detailed in this section, the Navy also operates five UH-60Ls on loan from the Army for the U.S. Naval Test Pilot School.

GENERIC NAVY H-60 DATA (VARIES DEPENDING ON MODEL)

FUSELAGE LENGTH	50 feet
OVERALL LENGTH	64 feet (41 feet folded)
HEIGHT	17 feet (13 feet folded)
WEIGHT	23,500 pounds for R/S
SPEED	maximum cruise at 5,000 feet: 145 knots
RANGE	approximately 380 nautical miles without auxiliary fuel
POWER PLANT	2 T700-GE-401C/D turboshaft engines
CREW	2 pilots, 1-3 aircrew, varying passenger loads
ARMAMENT	50-caliber machine guns or 7.62 mm machine guns; AGM-114 missiles; 2.75-inch Hydra 70 and AGR-20A rockets; R: Mk46/54 torpedoes
CONTRACTOR	Lockheed Martin

MH-60R SEAHAWK



U.S. NAVY

MH-60R SEAHAWK

The MH-60R is the Navy's current submarine hunter and surface attack helicopter designed to replace SH-60B and SH-60F. The MH-60R's primary mission areas encompass undersea warfare, surface warfare, area surveillance and combat identification. Secondary mission areas include search and rescue, vertical replenishment, naval surface fire support, logistics support, personnel transport, medical evacuation and ultra-high frequency communication relay. The modular design of the MH-60R provides greater surveillance capabilities, flexibility and more options to address multiple mission requirements with a single platform.

The MH-60R is equipped with a glass cockpit — common with the MH-60S, with functionally equivalent workstations — and employs the AQS-22F Airborne Low-Frequency Sonar, sonobuoys, acoustic processing, the ALQ-210 Electronic Support Measures system, APS-147 or APS-153 Multimode Imaging Radar, AAS-44C Generation 3 infrared sensor, an integrated self-defense suite and an organizational-level interactive electronic technical manuals system. Additionally, it has four external stores stations that can carry various combinations of torpedoes, missiles or external fuel tanks.

The MH-60R completed operational evaluation in September 2005 and reached initial operational capability in December 2005 with Helicopter Maritime Strike Squadron (HSM) 41, the MH-60R West Coast fleet replacement squadron. HSM-71 was established in January 2007 as the first operational MH-60R squadron and took the MH-60R on its first deployment in 2009. Helicopter Anti-Submarine Squadron Light 47 became the first SH-60B squadron to transition to the MH-60R and was redesignated HSM-77. The Navy has procured 288 aircraft; 270 remained in service as of October 2023.

The U.S. Navy has several foreign MH-60R partners. Australia received its

24th MH-60R in July 2016 and in 2022 placed an order for an additional 12. Denmark received its ninth and final MH-60R in June 2018, and the Saudi Arabian navy received its 10th and final MH-60R in April 2019. India ordered 24 aircraft and took delivery of its first in April 2021, with two additional aircraft delivered by October 2021. Greece ordered seven MH-60Rs, three as U.S. Navy replacement-in-kind. The Republic of Korea ordered 12 MH-60Rs for delivery in 2024. In October 2023, Spain and Norway ordered eight and six MH-60Rs, respectively. As of October 2023, a total of 330 MH-60Rs had been delivered and 64 more were on order.

MH-60S SEAHAWK



U.S. NAVY

MH-60S SEAHAWK

The MH-60S is a multimission platform that has replaced the HH-1N, UH-3H and HH-60H helicopters. It performs several missions, including combat logistics support, vertical replenishment, amphibious search and rescue, combat search and rescue, utility support and airborne mine countermeasures. To support these missions, two MH-60S configurations have been fielded: a combat support configuration and an armed helicopter and airborne mine countermeasures configuration.

The MH-60S combat support configuration reached initial operational capability in August 2002, replacing the H-46D-series helicopters in the vertical replenishment and utility roles.

The AMCM-equipped MH-60S configuration will detect, localize and neutralize sea-based mines to clear the path for battle groups. AMCM systems developed for this configuration include the AES-1 Airborne Laser Mine-Detection System and the Airborne Mine-Neutralization System. The MH-60S AMCM systems technology is a critical aspect in enabling littoral combat ships to perform required organic minesweeping operational capabilities. The AMCM-equipped MH-60S configuration reached initial operational capability in 2014. The MH-60S conducted an early deployment to the Middle East with the ALMDS mine-hunting system in summer 2014.

The MH-60S armed helicopter configuration provides a robust capability in the areas of combat search and rescue, maritime interdiction operations and surface warfare. It includes eight Hellfire missiles and up to 38 Advanced Precision Kill Weapon System laser-guided 2.75-inch rockets, 2.75-inch unguided Hydra 70 rockets, M197 20 mm Gatling gun and fixed forward firing weapons, and the AAS-44C infrared sensor system. Additionally, the mission kit gives the crew capability to fire the M240 7.62 mm guns from the port and starboard gunners' windows and GAU-21 .50-caliber guns from the port and starboard cabin doors. The armed MH-60S reached initial operational capability in 2007 and was deployed for the first time in January 2009 with Helicopter Sea Combat Squadron 8.

The MH-60S also serves in test roles and as a search and rescue aircraft at several naval air stations. Production of all 275 U.S. Navy MH-60S aircraft was completed in December 2015, with 253 MH-60Ss in service as of October 2023. The Thai navy purchased two MH-60Ss.

MH-53E SEA DRAGON

The MH-53E Sea Dragon has two primary missions: airborne mine countermeasures and Navy heavy lift and vertical onboard delivery. The aircraft is a derivative of the CH-53E Super Stallion but is heavier and has a greater fuel capacity and range. Capable of transporting up to 55 troops, the MH-53E can carry a 16-ton payload 50 nautical miles or a 10-ton payload 300 nautical miles. In its primary mission, the MH-53E can tow a variety of mine countermeasures systems, including the Mk105 magnetic minesweeping sled, the AQS-24A side-scan sonar and the Mk103 mechanical minesweeping system. Mission duration can exceed four hours.

MH-53Es provide minesweeping and strike group logistics support for worldwide military operations and humanitarian assistance. The Navy operates 29 MH-53Es in Helicopter Mine Countermeasures Squadron (HM) 15 and in the fleet replacement squadron, HM-12. Two retired MH-53Es were acquired from Japan in 2015 for spare parts. The operational squadrons are manned by an 80/20 mix of active and reserve personnel. Currently out of production, the Navy is in the process of evaluating its requirement for both airborne mine countermeasure and vertical onboard delivery missions beyond 2025.



U.S. NAVY

MH-53E SEA DRAGON

FUSELAGE LENGTH	73.3 feet
OVERALL LENGTH	99 feet
HEIGHT	28.3 feet
WEIGHT	empty: 36,745 pounds; maximum gross: 69,750 pounds
SPEED	maximum: 172 mph (150 knots)
MISSION RADIUS	maximum: 272 statute miles (237 nautical miles) with 32 troops at 3,000 feet
POWER PLANT	3 General Electric T64-GE-419 turboshaft engines (4,750 shp each)
CREW	2 pilots, 1-6 aircrew, depending on mission
ARMAMENT	1 GAU-21, 2 XM-218 .50-caliber machine guns
CONTRACTOR	Sikorsky

VERTICAL TAKEOFF AND LANDING FAMILY OF SYSTEMS

(See the Marine Corps Aircraft section for a description.)

TH-57 SEA RANGER

The TH-57 is a derivative of the commercial Bell Jet Ranger 206. Although primarily used for advance training in the helicopter pilot syllabus, these aircraft are also used for photo, chase and utility missions. The Jet Ranger was initially designed to compete in a U.S. Army light observation helicopter competition. Bell lost that competition, but the Jet Ranger was commercially successful. The TH-57 Sea Ranger provides basic helicopter training and advanced instrument flight rules training in three helicopter



U.S. NAVY

TH-57 SEA RANGER

training squadrons to several hundred aviation students a year at Naval Air Station Whiting Field, Florida. The current TH-57B was introduced in 1981, and the TH-57C was introduced in 1982. The TH-57 retirement began in fiscal year 2023 and will conclude in fiscal year 2026. Its replacement is the TH-73 Advanced Helicopter Training System. As of October 2023, 34 TH-57Bs and 68 TH-57Cs remained in service.

LENGTH ..... fuselage: 31 feet; rotors turning: 39 feet
HEIGHT ..... 10 feet
WEIGHT ..... empty: 1,595 pounds; takeoff maximum: 3,200 pounds
SPEED ..... maximum: 138 mph; cruising: 117 mph
RANGE ..... 368 nautical miles
POWER PLANT ..... 1 Rolls-Royce Allison 250-C20J turbofan engine
CREW ..... 1 instructor pilot, 3 student pilots
CONTRACTOR ..... Bell

TH-73 THRASHER



U.S. NAVY

TH-73A THRASHER

In 2020, the Navy awarded a contract to AgustaWestland Philadelphia Corp. (a subsidiary of Leonardo) to acquire 130 TH-73A helicopters to replace the 35-year-old TH-57 Sea Rangers and meet advanced rotary wing and intermediate tilt-rotor training requirements for the Navy, Marine Corps and Coast Guard through 2050.

The TH-73A improves pilot training and skills by using current cockpit technologies and modernized training curriculum that reflect the capabilities in the current Navy, Marine Corps and Coast Guard inventory. Using a skills-based approach to training with just-in-time methodology, incorporating modern technology, the TH-73A ensures the Navy has capacity to train several hundred aviation students per year at Naval Air Station Whiting Field, Florida.

Training in the TH-73A began in 2022. As of October 2023, the Navy inventory included 64 TH-73As.

LENGTH ..... 42 feet, 5 inches (rotors turning)
HEIGHT ..... 10 feet, 9 inches
WEIGHT ..... empty: 3,325 pounds
SPEED ..... maximum: 152 knots
RANGE ..... 357 nautical miles
POWER PLANT ..... Pratt & Whitney PT6B-37A turboshaft engine
CREW/CAPACITY ..... 1 instructor pilot, 1 student pilot, 3 passengers
CONTRACTOR ..... AgustaWestland Philadelphia Corp. (Leonardo)

OTHER NAVY MANNED AIRCRAFT

NC-9D SKYTRAIN II ..... special test work (1)
UH-72A LAKOTA ..... test pilot trainer (5)
OH-58C KIOWA ..... test pilot trainer (5)
UV-18A TWIN OTTER ..... system development (2)
N**U-1B OTTER** ..... test pilot trainer (1)
U-6A BEAVER ..... test pilot trainer (2)
X-26A FRIGATE ..... test pilot trainer (2)

UNMANNED AERIAL STEMS

MQ-4C TRITON

The MQ-4C Triton Broad-Area Maritime Surveillance unmanned aerial system is a forward-deployed, land-based, remotely operated system that provides a persistent maritime intelligence, surveillance and reconnaissance capability. The MQ-4C provides combat information to operational and tactical users such as expeditionary strike groups, carrier strike groups and the joint force maritime component commander.

In April 2008, Northrop Grumman was awarded the system development and demonstration contract, leveraging the U.S. Air Force RQ-4B Global Hawk Block 20 design to provide the initial air vehicle baseline. The Navy has made improvements for reliability, maintainability, all-weather capability and maritime performance. Developmental testing and evaluation began in late 2011.

The MQ-4C's first flight occurred May 22, 2013. The first two MQ-4Cs were delivered to Air Test and Evaluation Squadron 20 at Naval Air Station Patuxent River, Maryland, in September and October 2014 to begin Navy testing and evaluation. A third MQ-4C, owned by Northrop Grumman, arrived at Patuxent River in December 2014.

An operational assessment was completed in February 2016. Low-rate initial production advanced procurement was approved February 2015, and the full contract for low-rate initial production was awarded Sept. 27, 2016, for three MQ-4Cs, one main operating base mission control system and one forward operating base mission control system. The first production MQ-4C was delivered to the Navy on Nov. 10, 2017. As of October 2023, 15 Tritons had been ordered, with five delivered. Procurement was paused in fiscal year 2021 to allow Integrated Functional Capability-4 — which includes a signals intelligence capability and the Minotaur mission system — to mature. The first MQ-4C with the IFC-4 installed made its first flight July 29, 2021. The first production IFC-4 aircraft was delivered to the Navy on Feb. 1, 2022. IFC-4 will enable the Navy to retire its EP-3E aircraft.

The Navy plans to procure 22 MQ-4Cs in addition to the five development aircraft. The first of two operational Triton squadrons, Unmanned Patrol Squadron (VUP) 19, formed at Naval Air Station Jacksonville, Floridawith a large detachment at Naval Station Mayport, Florida.. VUP-19 made its first Triton flights in July 2018.

VUP-11 will be established in the mid-2020s at NAS Whidbey Island, Washington, as the second operational squadron.

The two operational squadrons together would field three deployment orbits outside of the continental U.S. and two sites in the continental U.S. with a total operational requirement of 20 Tritons.

Early operational capability was achieved in January 2020 with the deployment of two MQ-4Cs — with the baseline Integrated Functional Capability-3 — to Guam. The Triton achieved initial operational capability in September 2023 when MQ-4Cs in the IFC-4 capability deployed to Guam to establish the first orbit, achieving the ability to operate from a deployment site. At full operational capability, the MQ-4C will support the three maritime orbits and two CONUS sites each with four aircraft as a key operational platform in maintaining maritime domain awareness.

The Australian government and the U.S. government entered a development, production and sustainment partnership with the signing of a memorandum of understanding in June 2018. The MOU covers the development, procurement and sustainment of up to six Australian Triton air vehicles and necessary ground systems. In May 2020, the Australian government authorized the procurement for three of the six total air vehicles, two main operating base mission control stations and one forward operating base mission control station, followed in September 2023 with an announcement of intent to order a fourth. The Australian MQ-4Cs will have the IFC-4 configuration. The first Australian MQ-4C made its first flight Nov. 9, 2023.



U.S. NAVY

MQ-4C TRITON

WINGSPAN	130.9 feet
LENGTH	47.6 feet
WEIGHT	gross takeoff weight: 32,250 pounds
AIRSPEED	330 knots true air speed
ENDURANCE	more than 24 hours
CEILING	greater than 50,000 feet
POWER PLANT	1 Rolls-Royce AE3007H turbofan engine
CONTRACTOR	Northrop Grumman

MQ-8 FIRE SCOUT

The Fire Scout unmanned helicopter system comprises mission control systems, one or more air vehicles, and associated handling and support equipment. Designed to operate from littoral combat ships and suitably equipped air-capable ships, the Fire Scout system is capable of more than eight hours of operations providing coverage out to 150 nautical miles from the host ship. A baseline payload that includes electro-optical/infrared sensors and a laser designator enables Fire Scout to find, track and designate tactical targets, accurately provide targeting data to strike platforms and perform battle damage assessment. The system provides a significant improvement to organic surveillance capability.

The follow-on MQ-8B airframe, based on the Schweitzer model 333, was developed as an upgrade to the RQ-8A to meet additional time-on-station and multimission requirements aboard suitably equipped air-capable ships. The MQ-8B includes four foldable main rotor blades as well as the UAV Common Automatic Recovery System.The MQ-8B initially deployed aboard frigates in 2009 and transitioned to LCSs in 2014. The MQ-8B achieved initial operational capability in 2014. From May 2011 until September 2013, a Fire Scout detachment was also deployed to Afghanistan, where it conducted land-based operations in support of U.S. and coalition forces.

In November 2014, the MQ-8B deployed for the first time aboard an LCS, the USS Fort Worth, with Helicopter Maritime Strike Squadron 35. It was the first LCS deployment of a composite manned and unmanned aviation detachment. The MQ-8B has amassed more than 19,077 total flight hours. Additional capability includes the integration of the AIS and the AN/ZPY-4 surface-search radar. The LCS USS Coronado deployed in 2016 with an MQ-8B fitted with the ZPY-4(V)1 surveillance radar. The Navy procured 30 MQ-8B Fire Scouts. The Navy retired its MQ-8B fleet as of October 2022.

As Fire Scout's mission sets continued to evolve, an MQ-8C Endurance Upgrade Rapid Deployment Capability effort was approved in February 2012. The larger MQ-8C, based on the Bell 407 airframe, incorporates the same control avionics as the MQ-8B but with an increased payload capacity and increased endurance. The air vehicles share a common mission control system, which is integrated with the ship's combat systems. Additionally, the MQ-8 can be controlled by the Mobile Mission Control Station from land-based and larger ship-based sites and has a portable mission control system that is host-platform agnostic.

Development of the MQ-8C began in 2009 with the first flight occurring in October 2013. In April 2017, an MQ-8C first flew from an LCS. Initial operational testing and evaluation was completed, and initial operational capability was achieved June 28, 2019. The MQ-8C's first underway period was on the LCS USS Montgomery in 2019. In May 2020, the Navy began testing the AN/ZPY-8 radar on the MQ-8C. The MQ-8C made its first deployment in December 2021 on the LCS USS Milwaukee in the U.S. 4th Fleet area of operations and on the LCS USS Jackson in the U.S. 7th Fleet area of operations in 2022. Future payloads to be added to the MQ-8C include an optical mine countermeasures payload. The Navy has completed procurement of all MQ-8Cs for a total buy of 38. The Navy budget estimate for 2023 drove the accelerated sundown of the MQ-8B (by fiscal year 2022) and reduced the total number of operational MQ-8Cs to 10 to support the mine-countermeasures mission set only. The remaining MQ-8Cs will remain in level 2 preservation.



U.S. NAVY

MQ-8 FIRE SCOUT

DATA BELOW APPLIES TO MQ-8C

OVERALL LENGTH	41.4 feet
HEIGHT	10.9 feet
WEIGHT	gross takeoff: 6,000 pounds
SPEED	130 knots
CEILING	16,000 feet
STATION TIME	8+ hours at 150 nautical miles
POWER PLANT	1 Rolls-Royce 250-C47E gas-turbine engine
CONTRACTOR	Northrop Grumman

NMQ-1A PREDATOR

This unmanned aircraft is used for unmanned aerial systems development.

RQ-21A BLACKJACK



U.S. MARINE CORPS

RQ-21A BLACKJACK

The RQ-21A unmanned aerial system has been retired from the Marine Corps but remains in service with the Navy. It provides warfighters with persistent land-based and maritime, tactical reconnaissance, surveillance and target acquisition data collection and dissemination capabilities. The RQ-21A gives the Navy a dedicated intelligence, surveillance and reconnaissance system capable of delivering intelligence products directly to the tactical commander in real time. The expeditionary nature of the Blackjack, which does not require a runway for launch and recovery, makes it possible to deploy from both austere land-based and shipboard environments.

Each system comprises five air vehicles, two ground control systems, and launch and recovery support equipment. At 8 feet long, a wingspan of 16 feet and endurance up to 16 hours, the air vehicle's open-architecture configuration is designed to seamlessly integrate multimission payloads. The Navy and Marine Corps had received all 31 Blackjack systems as of June 2019. The RQ-21A has been replaced in Marine Corps unmanned aerial vehicle squadrons by MQ-9A Reaper unmanned aircraft. The program continues to focus on readiness, reliability and sustainment.

CONTRACTOR.....Insitu Inc.

MQ-25 STINGRAY

The Stingray will deliver a robust aerial refueling capability and secondary intelligence, surveillance and reconnaissance capability that will extend the range and operational capability of the carrier air wing and carrier strike group. The MQ-25 will be the Navy's first operational, carrier-based unmanned air system, and the first system procured by the Navy's Unmanned Carrier Aviation Program Office, or PMA-268.



U.S. NAVY

MQ-25 T1 STINGRAY REFUELS F/A-18 SUPER HORNET.

The MQ-25 is comprised of two major segments: the MQ-25 air vehicle and the Unmanned Carrier Aviation Mission Control System, required for carrier integration and command and control of the air vehicle. PMA-268 manages these segments as the lead systems integrator. The MQ-25 will leverage existing line-of-sight and beyond-line-of-sight communications links and interface with existing ship- and land-based command and control systems.

MQ-25 will be an integral part of the future carrier air wing, increasing the mission effectiveness range with its enhanced refueling capabilities and increasing the number of F/A-18E/Fs available for the strike fighter mission by relieving them of the tanking role. The MQ-25 will also pioneer human-machine teaming and pave the way for future unmanned systems to pace emerging threats.

Boeing was selected Aug. 30, 2018, for the design, development, fabrication, testing, delivery and support of four MQ-25As, followed in April 2020 with an order for three more. The MQ-25 test asset, known as T1, made its first flight Sept. 19, 2019. In 2021, the MQ-25 T1 test asset refueled three different carrier-based aircraft: F/A-18F, F-35C and E-2D. The Unmanned Carrier Aviation Demonstration was conducted in December 2021 aboard the USS George H.W. Bush. The event marked the first time the MQ-25 T1 test asset was tested aboard an aircraft carrier. The testing provided an early evaluation of MQ-25 operations in a shipboard environment.

In September 2022, the Navy awarded to Boeing a contract for advance procurement low-rate initial production Lot 1 MQ-25As.

The MQ-25A is scheduled to achieve initial operational capability in 2026. It is anticipated that 72 air vehicles will be procured.

CONTRACTOR.....Boeing

RQ-26A AEROSTAR

The RQ-26A Aerostar is a multimission tactical unmanned aerial vehicle test bed for payloads.

CONTRACTOR.....AeroNautics Defense Systems

MQ-27A MULTIMISSION TACTICAL UNMANNED AERIAL SYSTEM

The MQ-27A MTUAS is a 48.5-pound, rail-launched, fixed-wing unmanned aerial vehicle that provides intelligence, surveillance and reconnaissance capability to Navy special operations forces. The MQ-27A is based on the Insitu-built ScanEagle. The ScanEagle will remain a contractor-owned, contractor-operated system providing ISR services to the Navy and other military services.

CONTRACTOR.....Insitu Inc.

V-BAT

The V-BAT is a third-generation, open-architecture Group-3 unmanned aerial system that has a tail-sitting airframe with a two-stroke oil and gasoline-powered ducted fan propulsion system, allowing for a vertical launch without any launch or recovery equipment. It can hover and make the transition to and from vertical flight. The V-BAT can carry intelligence, surveillance and reconnaissance payloads for maritime and land-based missions.



U.S. NAVY

V-BAT

The V-BAT has been in service or evaluation with various customers since 2016. These include the U.S. Army, Southern Command, the Marine Corps' 31st Marine Expeditionary Unit, 11th MEU and the Coast Guard. The U.S. Navy selected V-BAT for prototyping and development through the service's Mi2 technology demonstration in April 2020.

The V-BAT is the only tail-sitting, ducted-fan unmanned aerial vehicle in military service today. It is independent of runways or launch and recover equipment and can transition from hover to forward flight to hover. The newest baseline model, the 115-pound V-BAT 128, features a 200% larger payload over the V-BAT 118 version and can fly missions of up to 11 hours. The UAV's ceiling is 20,000 feet above mean sea level. The Navy's prototype will be an advanced version of the V-BAT 128. The Model 128 was produced in 2022. The V-BAT's sensor suite can be customized to meet the customer's mission set, including electro-optical/infrared, signals intelligence, 4G/LTE and synthetic aperture radar. The UAV kit can easily be assembled on site in 20 to 30 minutes.

CONTRACTOR.....Shield AI

BLACKWING

The Blackwing is a small, tube-launched unmanned aerial vehicle equipped with an advanced electro-optical/infrared sensor, an integrated GPS/inertial navigation system autopilot and secure digital data link. First deployed in 2017, it can be launched from submarines and unmanned undersea vehicles as well as from surface vessels and ground vehicles.

CONTRACTOR.....AeroVironment Inc.

BLUE WATER UNMANNED AERIAL SYSTEM

Blue Water UAS is a developmental effort by the Naval Air Warfare Center Aircraft Division to demonstrate unmanned logistics cargo transport at sea. The command is experimenting with multiple commercial vehicle configurations to demonstrate feasibility of future long-range naval ship-to-ship and ship-to-shore cargo transport. In October 2020, NAWCAD began evaluating its first commercially procured air vehicle and tailoring it to requirements set by Military Sealift Command and Fleet Forces Command. The prototype system is a Group 3-sized vehicle by Skyways. NAWCAD procured a second system selected for its alternative folding wings design. The prototype system is a Group 3-sized vehicle by Pterodynamics. The warfare center will continue experimentation to develop the Group 3-sized unmanned aerial system prototypes in-house for ongoing fleet demonstrations to assist the Office of the Chief of Naval Operations in determining whether the platform transitions into an official program of record.

SUBMARINE-LAUNCHED UNMANNED AERIAL SYSTEM

The SLUAS is a sensor-equipped unmanned aerial vehicle that can be launched from a submarine for beyond-line-of-sight targeting solutions. Acquisition was approved in March 2019, and the project began in May 2019. Three demonstrations were conducted in 2019 and 2020. Eight months after the project was started, the Navy conducted an at-sea demonstration of the SLUAS from the attack submarine USS Annapolis. Using the targeting information obtained by the SLUAS, the submarine was able to target and conduct a rapid simulated torpedo attack against a participating surface ship at near-maximum effective range of the torpedo. Two more demonstration flights were conducted in 2020, for a total of 21 launches by the end of 2020. Initial operational capability was achieved in September 2020. Five had been delivered to the fleet by November 2020.

Strike Fighter Squadrons (VFA)

SQUADRON	NICKNAME	AIRCRAFT TYPE	TAIL CODE	BASE
VFA-2	Bounty Hunters	F/A-18F	**	NAS Lemoore, Calif.
VFA-11	Red Rippers	F/A-18F	**	NAS Oceana, Va.
VFA-14	Tophatters	F/A-18E	**	NAS Lemoore, Calif.
VFA-22	Fighting Redcocks	F/A-18F	**	NAS Lemoore, Calif.
VFA-25	Fist of the Fleet	F/A-18E	**	NAS Lemoore, Calif.
VFA-27	Royal Maces	F/A-18E	**	MCAS Iwakuni, Japan
VFA-31	Tomcatters	F/A-18E	**	NAS Oceana, Va
VFA-32	Fighting Swordsmen	F/A-18F	**	NAS Oceana, Va.
VFA-34	Blue Blasters	F/A-18E	**	NAS Oceana, Va.
VFA-37	Ragin' Bulls	F/A-18E	**	NAS Oceana, Va.
VFA-41	Black Aces	F/A-18F	**	NAS Lemoore, Calif.
VFA-81	Sunliners	F/A-18E	**	NAS Oceana, Va.
VFA-83	Rampagers	F/A-18E	**	NAS Oceana, Va
VFA-86	Sidewinders	F-35C	**	NAS Lemoore, Calif.
VFA-87	Golden Warriors	F/A-18E	**	NAS Oceana, Va.
VFA-94	Mighty Shrikes	F/A-18E	**	NAS Lemoore, Calif.
VFA-97	Warhawks	F-35C	**	NAS Lemoore, Calif.
VFA-102	Diamondbacks	F/A-18F	**	MCAS Iwakuni, Japan
VFA-103	Jolly Rogers	F/A-18F	**	NAS Oceana, Va.
VFA-105	Gunslingers	F/A-18E	**	NAS Oceana, Va.
VFA-106*	Gladiators	F/A-18E/F	AD	NAS Oceana, Va.
VFA-113	Stingers	F/A-18E	**	NAS Lemoore, Calif.
VFA-115	Eagles	F/A-18E	**	MCAS Iwakuni, Japan
VFA-122*	Flying Eagles	F/A-18E/F, T-34C	NJ	NAS Lemoore, Calif.
VFA-125*	Rough Raiders	F-35C	NJ	NAS Lemoore, Calif.
VFA-131	Wildcats	F/A-18E	**	NAS Oceana, Va.
VFA-136	Knighthawks	F/A-18E	**	NAS Lemoore, Calif.
VFA-137	Kestrels	F/A-18E	**	NAS Lemoore, Calif.
VFA-143	Pukin' Dogs	F/A-18E	**	NAS Oceana, Va.
VFA-146	Blue Diamonds	F/A-18E	**	NAS Lemoore, Calif.
VFA-147	Argonauts	F-35C	**	NAS Lemoore, Calif.
VFA-151	Vigilantes	F/A-18E	**	NAS Lemoore, Calif.
VFA-154	Black Knights	F/A-18F	**	NAS Lemoore, Calif.
VFA-192	Golden Dragons	F/A-18E	**	NAS Lemoore, Calif.
VFA-195	Dambusters	F/A-18E	**	MCAS Iwakuni, Japan
VFA-211	Checkmates	F/A-18E	**	NAS Oceana, Va.
VFA-213	Blacklions	F/A-18F	**	NAS Oceana, Va.

Notes: VFA-86 was transitioning from the F/A-18E to the F-35C in 2023. VFA-94 transitioned from the F/A-18F to the F/A-18E in 2023.

Electronic Attack Squadrons (VAQ)

VAQ-129*	Vikings	EA-18G	NJ	NAS Whidbey Island, Wash.
VAQ-130	Zappers	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-131	Lancers	EA-18G	NL	NAS Whidbey Island, Wash.
VAQ-132	Scorpions	EA-18G	NL	NAS Whidbey Island, Wash.
VAQ-133	Wizards	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-134	Garudas	EA-18G	NL	NAS Whidbey Island, Wash.
VAQ-135	Black Ravens	EA-18G	NL	NAS Whidbey Island, Wash.
VAQ-136	Gauntlets	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-137	Rooks	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-138	Yellow Jackets	EA-18G	NL	NAS Whidbey Island, Wash.
VAQ-139	Cougars	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-140	Patriots	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-141	Shadowhawks	EA-18G	**	MCAS Iwakuni, Japan
VAQ-142	Gray Wolves	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-144	Main Battery	EA-18G	**	NAS Whidbey Island, Wash.
VAQ-209**	Star Warriors	EA-18G	AF	NAS Whidbey Island, Wash.

Note: VAQs-131, -132, -134, -135 and -138 provide electronic warfare support for land-based expeditionary operations.

Airborne Command and Control Squadrons (VAW)

VAW-113	Black Eagles	E-2D	**	NAS Point Mugu, Calif.
VAW-115	Liberty Bells	E-2D	**	NAS Point Mugu, Calif.
VAW-116	Sun Kings	E-2C	**	NAS Point Mugu, Calif.
VAW-117	Wallbangers	E-2D	**	NAS Point Mugu, Calif.
VAW-120*	Greyhawks	E-2C/D	AD	NS Norfolk, Va.
VAW-121	Bluetails	E-2D	**	NS Norfolk, Va.
VAW-123	Screwtops	E-2C	**	NS Norfolk, Va.
VAW-124	Bear Aces	E-2D	**	NS Norfolk, Va.
VAW-125	Tigertails	E-2D	**	MCAS Iwakuni, Japan
VAW-126	Seahawks	E-2D	**	NS Norfolk, Va.

Note: VAW-120 retired its C-2As in late 2023.

Carrier-Launched Multi-Role Squadron (VUQ)

VUQ-10*	(future: MQ-25A)			NAS Patuxent River, Md.

Helicopter Sea Combat Squadrons (HSC)

HSC-2*	Fleet Angels	MH-60S	HU	NS Norfolk, Va.
HSC-3*	Merlins	MH-60S	SA	NAS North Island, Calif.
Fleet Support Detachment		MH-60S	SA	NALF San Clemente Island, Calif.
HSC-4	Black Knights	MH-60S	**	NAS North Island, Calif.
HSC-5	Night Dippers	MH-60S	**	NS Norfolk, Va.
HSC-6	Screamin' Indians	MH-60S	**	NAS North Island, Calif.
HSC-7	Dusty Dogs	MH-60S	**	NS Norfolk, Va.
HSC-8	Eightballers	MH-60S	**	NAS North Island, Calif.
HSC-9	Tridents	MH-60S	**	NS Norfolk, Va.
HSC-11	Dragonslayers	MH-60S	**	NS Norfolk, Va.
HSC-12	Golden Falcons	MH-60S	**	NAF Atsugi, Japan
HSC-14	Chargers	MH-60S	**	NAS North Island, Calif.
HSC-21	Blackjacks	MH-60S	VR	NAS North Island, Calif.
HSC-23	Wildcards	MH-60S	WC	NAS North Island, Calif.
HSC-25	Island Knights	MH-60S	RB	Andersen AFB, Guam
Det. 6		MH-60S	RB	MCAS Iwakuni, Japan
HSC-26	Chargers	MH-60S	HW	NS Norfolk, Va.
Det. 1	Desert Hawks	MH-60S	HW	NSA Bahrain
HSC-28	Dragon Whales	MH-60S	BR	NS Norfolk, Va.
Det. 1	Ghostriders	MH-60S	BR	NSA Naples, Italy

Notes: HSC-21 and -23 also draw MQ-8Cs for some detachments. HSC-22 was deactivated June 30, 2023. HSC-85 was deactivated Sept. 30, 2023.

Helicopter Maritime Strike Squadrons (HSM)

HSM-35	Magicians	MH-60R	TG	NAS North Island, Calif.
HSM-37	Easyriders	MH-60R	TH	MCAS Kaneohe Bay, Hawaii
HSM-40*	Airwolves	MH-60R	HK	NS Mayport, Fla.
HSM-41*	Seahawks	MH-60R	TS	NAS North Island, Calif.
HSM-46	Grandmasters	MH-60R	HQ	NAS Jacksonville, Fla.
HSM-48	Vipers	MH-60R	HR	NS Mayport, Fla.
HSM-49	Scorpions	MH-60R	TX	NAS North Island, Calif.
HSM-50	Valkyries	MH-60R	HV	NS Mayport, Fla.
HSM-51	Warlords	MH-60R	TA	NAF Atsugi, Japan
HSM-60**	Jaguars	MH-60R	NW	NAS Jacksonville, Fla.
HSM-70	Spartans	MH-60R	**	NAS Jacksonville, Fla.
HSM-71	Raptors	MH-60R	**	NAS North Island, Calif.
HSM-72	Proud Warriors	MH-60R	**	NAS Jacksonville, Fla.
HSM-73	Battle Cats	MH-60R	**	NAS North Island, Calif.
HSM-74	Swamp Foxes	MH-60R	**	NAS Jacksonville, Fla.
HSM-75	Wolf Pack	MH-60R	**	NAS North Island, Calif.
HSM-77	Saberhawks	MH-60R	**	NAF Atsugi, Japan
HSM-78	Blue Hawks	MH-60R	**	NAS North Island, Calif.
HSM-79	Griffins	MH-60R	TK	NS Rota, Spain

Helicopter Mine Countermeasures Squadrons (HM)

HM-12*	Sea Dragons	MH-53E	AN	NS Norfolk, Va.
HM-15	Blackhawks	MH-53E	TB	NS Norfolk, Va.
Det.		MH-53E	TB	Pohang, Korea
Det.		MH-53E	TB	NSA Bahrain

Notes: HM squadrons are joint active/reserve squadrons. HM-14 was deactivated July 31, 2023, and combined with HM-15.

Patrol Squadrons (VP)

VP-1	Screaming Eagles	P-8A	YB	NAS Whidbey Island, Wash.
VP-4	Skinny Dragons	P-8A	YD	NAS Whidbey Island, Wash.
VP-5	Mad Foxes	P-8A	LA	NAS Jacksonville, Fla.
VP-8	Tigers	P-8A	LC	NAS Jacksonville, Fla.
VP-9	Golden Eagles	P-8A	PD	NAS Whidbey Island, Wash.
VP-10	Red Lancers	P-8A	LD	NAS Jacksonville, Fla.
VP-16	War Eagles	P-8A	LF	NAS Jacksonville, Fla.
VP-26	Tridents	P-8A	LK	NAS Jacksonville, Fla.
VP-30*	Pro's Nest	P-8A	LL	NAS Jacksonville, Fla.
VP-40	Fighting Marlins	P-8A	QE	NAS Whidbey Island, Wash.
VP-45	Pelicans	P-8A	LN	NAS Jacksonville, Fla.
VP-46	Grey Knights	P-8A	RC	NAS Whidbey Island, Wash.
VP-47	Golden Swordsmen	P-8A	RD	NAS Whidbey Island, Wash.
VP-62**	Broadarrows	P-8A	LT	NAS Jacksonville, Fla.
VP-69**	Totems	P-8A	PJ	NAS Whidbey Island, Wash.

Notes: VP-69 began upgrade to the P-8A in 2023. VP-30 retired its last P-3Cs in June 2023.

SQUADRON	NICKNAME	AIRCRAFT TYPE	TAIL CODE	BASE
Special Projects Patrol Squadron (VPU)				
VPU-2	Wizards	P-8A	SP	NAS Jacksonville, Fla.
Unmanned Patrol Squadron (VUP)				
VUP-19	Big Red	(none)		NAS Jacksonville, Fla.
Det. Mayport		MQ-4C	PE	NS Mayport, Fla.
Note: VUP-19 operates an MQ-4C ground control station at Naval Air Station Jacksonville. No air vehicles are stationed there.				
Fleet Air Reconnaissance Squadrons (VQ)				
VQ-1	World Watchers	EP-3E, P-3C	PR	NAS Whidbey Island, Wash.
VQ-3	Ironmen	E-6B	TC	Tinker AFB, Okla.
VQ-4	Shadows	E-6B	HL	Tinker AFB, Okla.
VQ-7*	Roughnecks	(future: TE-6B)	TL	Tinker AFB, Okla.
Notes: VQ-3 has detachments at Travis Air Force Base in California and Offutt Air Force Base in Nebraska. VQ-4 has a detachment at Naval Air Station Patuxent River in Maryland.				
Fighter Composite Squadrons (VFC)				
VFC-12**	Fighting Omars	F/A-18E/F	AF	NAS Oceana, Va.
VFC-13**	Saints	F-16C	AF	NAS Fallon, Nev.
VFC-111**	Sun Downers	F-5F/N	AF	NAS Key West, Fla.
VFC-204**	River Rattlers	F-5F/N	**	NAS-JRB New Orleans
Fleet Logistics Support Squadrons (VR, VRC)				
VR-1**	Star Lifters	C-37B	JK	JB Andrews-NAF Washington, Md.
Det. Hawaii		C-37A**	JB	Pearl Harbor-Hickam, Hawaii
VR-51**	Wind Jammers	C-40A	RG	MCAS Kaneohe Bay, Hawaii
VR-53**	Capital Express	C-130T	AX	JB Andrews-NAF Washington, Md.
VR-54**	Revelers	C-130T/KC-130T	CW	NAS-JRB New Orleans
VR-55**	Minutemen	KC-130T/T-30	RU	NAS Point Mugu, Calif.
VR-56**	Globemasters	C-40A	JU	NAS Oceana, Va.
VR-57**	Conquistadors	C-40A	RX	NAS North Island, Calif.
VR-58**	Sunseekers	C-40A	JV	NAS Jacksonville, Fla.
VR-59**	Lone Star Express	C-40A	RY	NAS-JRB Fort Worth, Texas
VR-61**	Islanders	C-40A	RS	NAS Whidbey Island, Wash.
VR-62**	Nomads	C-130T/KC-130T	JW	NAS Jacksonville, Fla.
VR-64**	Condors	C-130T	BD	JB McGuire-Dix-Lakehurst, N.J.
VRC-40	Rawhides	C-2A**	NS	Norfolk, Va.
Notes: VR squadrons are assigned tail codes that are not currently worn. VRC-30 Det. 5 was transferred to VRC-40 on Sept. 30, 2023. VRC-30 was deactivated Dec. 8, 2023.				
Fleet Logistics Multi-Mission Squadron (VRM)				
VRM-30	Titans	CMV-22B		NAS North Island, Calif.
VRM-40	Mighty Bison	CMV-22B		NAS North Island, Calif.
VRM-50*	Sunhawks	CMV-22B		NAS North Island, Calif.
Note: VRM-40 will move to Naval Station Norfolk in Virginia in 2024.				
Training Squadrons (VT)				
VT-2	Doerbirds	T-6B	E	NAS Whiting Field, Fla.
VT-3	Red Knights	T-6B	E	NAS Whiting Field, Fla.
VT-4	Warbucks	none	E	NAS Pensacola, Fla.
VT-6	Shooters	T-6B	E	NAS Whiting Field, Fla.
VT-7	Eagles	T-45C	A	NAS Meridian, Miss.
VT-9	Tigers	T-45C	A	NAS Meridian, Miss.
VT-10	Wildcats	T-6A	F	NAS Pensacola, Fla.
VT-21	Redhawks	T-45C	B	NAS Kingsville, Texas
VT-22	Golden Eagles	T-45C	B	NAS Kingsville, Texas
VT-27	Boomers	T-6B	G	NAS Corpus Christi, Texas
VT-28	Rangers	T-6B	G	NAS Corpus Christi, Texas
VT-31	Wise Owls	T-44C	G	NAS Corpus Christi, Texas
VT-35	Stingrays	T-44C	G	NAS Corpus Christi, Texas
VT-86	Sabrehawks	T-45C	F	NAS Pensacola, Fla.
Note: VT-4 is responsible for training future E-2 naval flight officers in simulators.				
Helicopter Training Squadrons (HT)				
HT-8	Eightballers	TH-57B/C, TH-73A	E	NAS Whiting Field, Fla.
HT-18	Vigilant Eagles	TH-57B/C, TH-73A	E	NAS Whiting Field, Fla.
HT-28	Hellions	TH-57B/C, TH-73A	E	NAS Whiting Field, Fla.

SQUADRON	NICKNAME	AIRCRAFT TYPE	TAIL CODE	BASE
Air Test and Evaluation Squadrons (VX, HX)				
VX-1	Pioneers	P-8A, E-2D, MH-60R/S, MQ-4C, MQ-8C, MQ-25A	JA	NAS Patuxent River, Md.
VX-9	Vampires	F/A-18E/F, EA-18G	XE	NAS China Lake, Calif.
Det. Edwards		F-35C		
VX-20	Force	P-8A, E-2D, C-38A, UC-12M, T-6A/B, KC-130J/T, MQ-4C	WB	NAS Patuxent River, Md.
HX-21	Blackjack	UH-1Y, AH-1Z, TH-57C MH-60R/S, CH-53E/K VH-92A, MV-22B, CMV-22B	HX	NAS Patuxent River, Md.
VX-23	Salty Dogs	F/A-18B/C/D/E/F, EA-18G, F-35B, F-35C, T-45C, MQ-25A	SD	NAS Patuxent River, Md.
UX-24	Ghost Wolves	MQ-8C, RQ-11, RQ-16, RQ-21A, RQ-23A, RQ-26A, COTS UAS		Webster Field, St. Inigoes, Md.
VX-30	Bloodhounds	E-2D, P-3C, NP-3C, NC-20G, KC-130T, NC-37B (future), NMQ-1B	VX	NAS Point Mugu, Calif.
VX-31	Dust Devils	F/A-18A/C/D/E/F, EA-18G, NEA-18G, AV-8B, MH-60S	DD	NAWS China Lake, Calif.
U.S. Naval Test Pilot School		F/A-18F, T-38C, T-6B, AT-6E, NU-1B, U-6A, OH-58C, UH-60L UH-72A, X-26A, C-12R, C-26A, Aero-M, X8-M, Lear 24	TPS	NAS Patuxent River, Md.
Scientific Development Squadron (VXS)				
VXS-1	Warlocks	NP-3C, RC-12M UV-18A, RQ-23A	RL	NAS Patuxent River, Md.
Naval Flight Demonstration Squadron (NFDS)				
NFDS	Blue Angels	F/A-18E/F, C-130J	BA	NAS Pensacola, Fla.
Miscellaneous Units				
Naval Aviation Warfighting Development Center		F-16A/B/C/D, E-2C, F/A-18C/E/F, EA-18G, MH-60S		NAS Fallon, Nev.
Strike Fighter Weapons School Pacific		T-34C		NAS Lemoore, Calif.
Strike Fighter Weapons School Atlantic		T-34C		NAS Oceana, Va.
Helicopter Sea Control Wing Pacific Maintenance Det.		MQ-8C		NAS Point Mugu, Calif.
Naval Special Warfare Group 10		RQ-21A		
Naval Postgraduate School		UV-18A		Marina Municipal Airport, Calif.
Fleet Logistics Medium Multi-Mission Wing Training Detachment 204		none		MCAS New River, N.C.

** Fleet replacement squadron | ** No tail code assigned; carrier squadrons use CVW codes | *** Navy Air Reserve squadron | Compiled by Senior Editor Richard R. Burgess and Tom Kaminski.*

CRUISE MISSILES

AGM-84K STANDOFF LAND ATTACK MISSILE-EXPANDED RESPONSE



U.S. NAVY

AGM-84K SLAM-ER MISSILE ON A P-8A POSEIDON

The SLAM-ER, a retrofit upgrade to the baseline SLAM missile system, provides the U.S. Navy with a precise standoff outside area defense, or SOAD, capability. It fills an operational need within U.S. and allied armed forces for a surgical strike capability against high-value, fixed or relocatable land targets and ships at sea or in port at standoff ranges greater than 150 nautical miles. It features an adaptive terrain-following, passive imaging infrared seeker, precise aim-point control through a man-in-the-loop data link and improved penetration warhead. For precision guidance, SLAM-ER uses an inertial navigation system integrated with a GPS receiver/processor for midcourse guidance and the Maverick infrared seeker with an advanced weapon data link for terminal aim-point refinement and target identification.

SLAM-ER was the first weapon to field automatic target acquisition, a breakthrough that uses a Boeing proprietary general pattern-matching algorithm to match a reference photographic image of a target with the imaging infrared seeker's image of the target. A moving land target capability for SLAM-ER was developed and fielded in 2009. This allows pilots to engage high-value moving land and surface ship targets at SOAD ranges by using third-party target updates from targeting platforms such as the Joint Surveillance Target Attack Radar System or Littoral Surveillance Radar System. The third-party targeting data is transmitted to an F/A-18 aircraft via Link 16 and automatically retransmitted to the SLAM-ER via the AWW-13 data-link pod. SLAM-ER's integration with the F/A-18 increases the combat radius and strike effectiveness of the aircraft.

SLAM-ER can be launched by F/A-18 and P-3C aircraft. More than 500 SLAM missiles have been retrofitted with the SLAM-ER upgrade.

LENGTH.....14.3 feet
DIAMETER.....missile body, 13.5 inches
WINGSPAN.....7.2 feet with planar wings
WEIGHT.....1,488 pounds
SPEED.....high subsonic
RANGE.....more than 150 nautical miles
PROPULSION.....Teledyne turbojet (660 pounds thrust)
WARHEAD.....500-pound-class reactive titanium penetrator
CONTRACTOR.....Boeing Integrated Defense Systems

AGM-84 HARPOON

See the Ship Weapons section for a description of the Harpoon missile.

AGM-158C LONG-RANGE ANTI-SHIP MISSILE



LOCKHEED MARTIN

AGM-158C LRASM

The LRASM is a defined near-term solution for the Offensive Anti-Surface Warfare, or OASuW, air-launch capability gap that provides flexible, long-range, advanced anti-surface capability against high-threat maritime targets. The weapon reduces dependency on intelligence, surveillance and reconnaissance platforms; network links; and GPS navigation in electronic warfare environments. Semi-autonomous guidance algorithms allow it to use less-precise target cueing data to pinpoint specific targets in a contested domain.

The Effects Deployment Office is developing the LRASM as the OASuW Increment 1 solution. The LRASM is based on the AGM-158B Joint Air-to-Surface Strike Missile-Extended Range cruise missile. Integration onto the F/A-18E/F began in 2015. Low-rate initial production began in July 2017, when also The first launch of a production-representative LRASM took place in August 2017. Early operational capability for the LRASM was in 2018 on the Air Force B-1 and in September 2019 on the Navy F/A-18E/F. Integration of the LRASM on the P-8A was ordered in April 2021.

LENGTH.....14 feet
WEIGHT.....2,500 pounds
SPEED.....subsonic
RANGE.....230+ nautical miles
WARHEAD.....1,000 pounds penetrating blast fragmentation
CONTRACTOR.....Lockheed Martin Missiles and Fire Control

SHORT-RANGE TACTICAL MISSILES

AGM-65 MAVERICK

The Maverick is an air-to-surface tactical missile designed for close-air support, interdiction and defense suppression. It is effective against a wide range of tactical targets, including armor, air defense, ships, ground transportation and fuel storage facilities. Mavericks can be launched with a lock-on-before-launch day-or-night capability and hit targets at a range greater than 14.6 nautical miles.

Navy P-3s carry the AGM-65F. The missile's infrared guidance system is optimized for ship tracking. The Navy and Marine Corps use the AGM-65E semi-active laser-guided variants that track laser energy reflected from a target being illuminated by an airborne or ground laser designator. All variants use the 300-pound penetrating warhead with a fuse that has a point-detonating capability to detonate on impact or a delay fuse to penetrate targets with its kinetic energy before detonating.

The AGM-65E2 variant completed developmental testing in August 2011 and entered inventory in February 2013. This variant has an enhanced laser seeker and software to reduce the risk of collateral damage. Maver-

icks were employed by F/A-18s, AV-8Bs and S-3Bs during Operation Iraqi Freedom. A Maverick launched by a P-3C disabled a Libyan Coast Guard boat during Operation Odyssey Dawn. AGM-65Es were used by F/A-18s and AV-8Bs in support of Operation Inherent Resolve in Iraq and Syria.



U.S. NAVY

AGM-65F MISSILE ON A P-3 ORION AIRCRAFT

LENGTH	8.2 feet
DIAMETER	12 inches
WINGSPAN	28 inches
WEIGHT	AGM-65E: 630 pounds; AGM-65F: 670 pounds
SPEED	approximately Mach 1.2
RANGE	17 nautical miles
WARHEAD	300-pound penetrating blast-fragmentation warhead for E and F variants; 125-pound shaped charge for earlier variants
PROPULSION	Thiokol SR 109-TC-1 solid-propellant rocket motor for earlier variants; Thiokol SR 114-TC-1 (or Aerojet SR 115-AJ-1) solid-propellant rocket motor for E and F variants
CONTRACTOR	Raytheon Missile Systems

AGM-88B/C HIGH-SPEED ANTI-RADIATION MISSILE; AGM-88E ADVANCED ANTI-RADIATION GUIDED MISSILE; AGM-88G AARGM-EXTENDED RANGE



U.S. NAVY

AGM-88G AARGM-ER FIRED FROM F/A-18F

The HARM and AARGM are air-to-ground missiles used to suppress and/or destroy land-based or sea-based air defense units. The HARM entered the U.S. Navy inventory in 1983 and is still in service today providing the capability to target radiating Integrated Air Defense Systems Radio Detection and Ranging signals employing an Anti-Radiation Homing receiver. HARM is operationally employed on Navy and Marine Corps F/A-18 and EA-18G aircraft and on Air Force F-16s.

The AARGM is an Acquisition Category 1C program currently in full-rate production and is an upgrade to the HARM system. The AARGM is operationally employed on Navy and Marine Corps F/A-18 and EA-18G aircraft. The upgrade includes a GPS/ inertial navigation system, a new guidance section with an active millimeter-wave radar and an upgraded wideband passive anti-radiation homing receiver. The AARGM baseline capabilities include an expanded target set, counter-shutdown capability, advanced signal processing for improved detection and locating, geographic specificity providing aircrew the opportunity to define missile-impact zones and impact-avoidance zones, and a weapon impact assessment broadcast capability. The AARGM's initial operational capability milestone was achieved in July 2012, and it began full-rate production in September 2012. The AARGM Block 1 software upgrade was fielded in 2017.

In January 2018, Orbital ATK was awarded a contract to develop the AGM-88G AARGM-Extended Range variant, which integrates the AGM-88E sensors and electronics with an upgraded rocket motor and tail control. Northrop Grumman, which acquired Orbital ATK, was awarded a contract in March 2019 for the engineering and manufacturing development of the AARGM-ER. It is compatible with the F-35C. The first captive carry on an F/A-18 was conducted in June 2020. Low-rate initial production of the AARGM-ER was awarded in September 2021. Initial operational capability is scheduled for fiscal year 2024.

HARM/AARGM Physical Characteristics



U.S. NAVY

AGM-88 HARM ON A E/A-18G GROWLER

LENGTH	13.7 feet
DIAMETER	10 inches
WINGSPAN	3.6 feet
WEIGHT	800 pounds
SPEED	supersonic
RANGE	approximately 80 nautical miles
PROPULSION	low-smoke/low-detectability rocket motor
WARHEAD	fragmentation type
CONTRACTORS	Raytheon Missiles and Defense: AGM-88B/C HARM; Northrop Grumman: AGM-88E/G AARGM

AGM-114 HELLFIRE/HELLFIRE II

The AGM-114 Hellfire missile is a supersonic, air-to-ground, precision laser-guided missile system designed to defeat individual hard-point targets and minimize exposure of the delivery vehicle to enemy fire. With the sea services, the Hellfire family is fielded on AH-1Z and MH-60R/S helicopters as well as the Harvest HAWK version of the KC-130J aircraft. The Hellfire Longbow version is being integrated on littoral combat ships.

The Navy and Marine Corps use multiple active variants of the Hellfire missile:

- **AGM-114K/K2:** Hellfire II missile with a tandem shaped charge including precursor warhead for reactive armor
- **AGM-114K2A:** Hellfire II missile with a tandem shaped charge with external steel blast-fragmentation sleeve for enhanced lethality against soft targets
- **AGM-114M:** Hellfire II missile with a blast-fragmentation warhead primarily used for military operations in urban terrain targets
- **AGM-114N:** Hellfire II missile with a metal augmented charge (i.e., thermobaric) warhead with a fixed delayed fuse setting for enhanced lethality against buildings and soft targets
- **AGM-114N4:** Point defense missile system, or P+DMS, optimized missile with an inertial measuring unit and a metal augmented charge warhead with a fixed delayed fuse setting
- **AGM-114N5:** Hellfire II missile with trajectory-shaping software and a metal augmented charge warhead with a fixed delayed fuse setting
- **AGM-114P2:** Hellfire II missile with high-altitude launch trajectory gyro; a tandem shaped charge including precursor warhead for reactive armor
- **AGM-114P2A:** Hellfire II missile with high-altitude launch trajectory gyro; a tandem shaped charge with external steel blast-fragmentation sleeve for enhanced lethality against soft targets and reactive armor
- **AGM-114P4:** P+DMS optimized missile with an inertial measuring unit and a tandem shaped charge including precursor warhead for reactive armor
- **AGM-114P4A:** P+DMS optimized missile with an inertial measuring unit and a tandem shaped charge including precursor warhead for reactive armor and a shaped charge with external steel blast-fragmentation sleeve for enhanced lethality against soft targets
- **ATM-114Q/Q6:** Live training missile with an inert warhead



U.S. NAVY

AGM-114 HELLFIRE

LENGTH ..... 5.33 feet
DIAMETER ..... 7 inches
WINGSPAN ..... 12.99 inches
WEIGHT ..... 97-107 pounds
SPEED ..... Mach 1.3
RANGE ..... 5-8+ kilometers
WARHEAD ..... see bullet points
CONTRACTOR ..... Lockheed Martin Missiles and Fire Control

AGM-179 JOINT AIR-TO-GROUND MISSILE

The JAGM is a joint Army-led program designed for use in destroying high-value, stationary, moving and relocatable land and maritime targets. The JAGM, with its modular design and incremental development approach, will offer a common, multimode weapon capable of providing current and future aviation platforms with multiple targeting capabilities exceeding that of individual variants of Hellfire. The JAGM weapon system will use the synergistic effects of dual mode (semi-active laser and millimeter wave) seekers and programmable warhead fusing in Increment 1. Aircrews will be able to quickly employ the missile to meet changing mission requirements. The JAGM will replace the TOW, Hellfire and Maverick missiles.

The JAGM will provide greater aircraft survivability with fire-and-forget engagement capability against land and fast attack craft/fast inshore attack craft threats. Engineering and manufacturing development began in September 2015. Production was authorized in June 2018. Integration testing of the JAGM on the Marine Corps AH-1Z began in 2017 in support of achieving initial operational capability on that aircraft by 2021. Integration is planned on the MH-60R helicopter.

LENGTH ..... 70 inches
DIAMETER ..... 7.0 inches
WINGSPAN ..... 10.25 inches
WEIGHT ..... 115 pounds
SPEED ..... less than and equal to 40 seconds for 8 kilometers
RANGE ..... 8 kilometers
PROPULSION ..... E5 rocket motor
WARHEAD ..... integrated blast fragmented sleeve warhead; shaped main charge with shaped precursor warhead
CONTRACTOR ..... Lockheed Martin Missiles and Fire Control

AGM-176A GRIFFIN

The Griffin is a small, short-range, precision-guided missile developed for U.S. Special Operations Command. It can be launched by various unmanned aerial vehicles as well as special operations aircraft. The Griffin is employed on the Marine Corps KC-130J Harvest HAWK, which provides close-air and intelligence, surveillance and reconnaissance support to ground commanders.

LENGTH ..... 43 inches
DIAMETER ..... 5.5 inches
WEIGHT ..... 33 pounds
SPEED ..... maximum, 1,000 meters per second
RANGE ..... 1,500-5,000 meters
PROPULSION ..... solid-propellant rocket motor
WARHEAD ..... 14-pound high-explosive
CONTRACTOR ..... Raytheon Missile Systems

AGR-20A ADVANCED PRECISION-KILL WEAPON SYSTEM II

The APKWS II is a semi-active laser guidance section that is combined with existing unguided 2.75-inch rocket system components (fuse, warhead and rocket motor) to provide a low-yield, precision-kill capability against soft and lightly armored/hardened targets. Full-rate production has been ongoing since 2012 in support of U.S. Department of Defense and foreign military sales production requirements. The APKWS II has been integrated on the UH-1Y, AH-1W/Z, MH-60S, MH-60R, AV-8B, F-16 and A-10 aircraft and, in April 2018, on Marine Corps' F/A-18A-D. Integration of the APKWS II onto additional airborne platforms is ongoing. In December 2019, the Air Force demonstrated the capability of the APKWS to shoot down small drones. In 2020, BAE test-fired the APKWS from a ground vehicle, and in 2021, it tested the missile against a Group 2 UAS.

LENGTH ..... APKWS II guidance section only: 18.5 inches; APKWS II all-up-round: 73.77 inches
WINGSPAN ..... 9.55 inches
DIAMETER ..... 2.75 inches
WEIGHT ..... APKWS II guidance section only: 9.8 pounds; APKWS II all-up-round: 32.6 pounds
SPEED ..... maximum, 1,000 meters per second
RANGE ..... rotary wing: 1,500-5,000 meters; fixed wing: 2,000-9,000 meters
PROPULSION ..... Mk66 Mod 4 rocket motor
WARHEAD ..... M151 or Mk 152 10-pound high-explosive warhead
CONTRACTOR ..... BAE Systems

AIR-TO-AIR MISSILES

AIM-9 SIDEWINDER



NAVAIR

AIM-9X SIDEWINDER

The Sidewinder is a supersonic, short-range air-to-air missile carried on a wide range of modern tactical aircraft. Various versions of this heat-seeking missile have been produced since 1956 and are in service with more than 30 nations. The missile's main components are an infrared homing guidance section, an active optical target detector, a high-explosive warhead and a rocket motor. The infrared guidance head enables the missile to home in on target aircraft engine exhaust. An infrared unit costs less than other types of guidance systems and can be used day or night and in conditions involving electronic countermeasures. The infrared seeker also permits the pilot to launch the missile and then leave the area or take evasive action while the missile guides itself to the target.

The AIM-9X Sidewinder is the latest of the Sidewinder family of short-range air-to-air missiles. It features a high off-boresight focal-plane array seeker mounted on a highly maneuverable airframe with a greatly improved infrared counter-countermeasures feature. The AIM-9X incorporates many AIM-9M components, but its performance far exceeds the legacy Sidewinder. Unlike previous AIM-9 models, the AIM-9X can be used against targets on the ground.

The AIM-9X Block II is the most advanced short-range air-to-air missile in the U.S. inventory, capable of using its data link, thrust vectoring maneuverability and advanced imaging infrared seeker to hit targets behind the launching fighter. The AIM-9X Block II, which achieved initial operational capability in March 2015, is in full-rate production for the Navy and Air Force. The Block II+ began production in 2019 and has a reduced radar cross section.

The Sidewinder (both AIM-9M and AIM-9X) is the most widely used missile in the U.S. weapons inventory, employed on F/A-18, AV-8B, AH-1, F-16, F-15, F-22, F-35 and A-10 aircraft.

LENGTH ..... AIM-9M: 9.4 feet; AIM-9X: 9.9 feet
DIAMETER ..... 5 inches
WINGSPAN ..... AIM-9M: 24.75 inches; AIM-9X: 17.6 inches
SPEED ..... supersonic, Mach 2.5 for AIM-9M
RANGE ..... 10-18 miles for AIM-9M
WARHEAD ..... annular blast fragmentation
CONTRACTOR ..... Raytheon Missile Systems

AIM-120 ADVANCED MEDIUM-RANGE AIR-TO-AIR MISSILE

The AMRAAM has an all-weather, beyond-visual-range capability and is scheduled to be operational beyond 2020. As a follow-on to the AIM-7 Sparrow, it is faster, smaller and lighter and has improved capabilities against low-altitude targets. It incorporates active radar, in conjunction with an inertial reference unit and microcomputer system, that makes the missile less dependent on the fire-control system of the launching aircraft. Once the missile closes in on a target, its active radar guides it to intercept.

AMRAAM-equipped fighters can aim and fire several missiles simultaneously at multiple targets. Pilots may then perform evasive maneuvers while the missiles guide themselves to their targets. The AIM-120 was first deployed with F/A-18 Hornets in 1993. The AIM-120C series began deliveries in 1996. Joint procurement of the AMRAAM continued starting in fiscal 2006 with the AIM-120D version, which features improved navigation, kinematics, lethality and hardware and software updates that enhance its electronic protection capabilities against more capable threats. The AIM-120D initial operational capability was declared in January 2015.



NAVAIR

AIM-120 AMRAAMS ON A F/A-18

LENGTH ..... 12 feet
DIAMETER ..... 7 inches
WINGSPAN ..... AIM-120C/D: 19 inches; AIM-120A/B: 21 inches
WEIGHT ..... AIM-120C5/6/7: 356 pounds; AIM-120A/BC/C-4: 348 pounds; AIM-120D: 358 pounds
SPEED ..... classified
RANGE ..... classified
PROPULSION ..... solid-fuel rocket motor
WARHEAD ..... blast fragmentation
CONTRACTOR ..... Raytheon Missile Systems

GUIDED BOMBS

AGM-154 JOINT STANDOFF WEAPON

The JSOW precision-strike weapon is a 1,000-pound air-to-surface missile that carries several lethal packages. The standoff range of 12 to about 70 nautical miles allows JSOW to remain outside the threat envelopes of enemy point defenses while effectively engaging and destroying targets. The JSOW is integrated on F/A-18C/D/E/F, F-16, F-15E, B-52, B-1B and B-2 aircraft. Integration is underway on the F-35 Lightning II and AV-8B Harrier II.

The JSOW family consists of multiple weapon variants. The AGM-154A configuration is used to attack soft targets. A modified version, the AGM-154A-1, includes a BLU-111 warhead. The AGM-154A was employed by Navy F/A-18s against targets in Afghanistan during Operation Enduring Freedom and in Iraq during Operation Iraqi Freedom. More than 400 AGM-154As have been used in combat.

The AGM-154C variant incorporates a 1,000-pound-class broach blast/fragmentation/penetrator warhead effective against fixed-point targets. This variant uses an uncooled, long-wave imaging infrared seeker with autonomous target acquisition for precise targeting. The JSOW-C reached initial operational capability in February 2005.

The latest variant, the JSOW C-1, is the Navy's first air-to-ground, network-enabled weapon capable of attacking stationary land and moving maritime targets. It retains the GPS/inertial navigation system guidance, terminal infrared seeker, payload and standoff of JSOW-C while incorporating a Link 16 weapon data link and moving maritime target algorithms.

The JSOW C-1 achieved initial operational capability in June 2016 and full operational capability in August 2017.



RAYTHEON

JSOW

LENGTH	13.3 feet
WINGSPAN	8.9 feet
WEIGHT	approximately 1,065 pounds
RANGE	low-altitude: 12 nautical miles; high-altitude: about 70 nautical miles
WARHEADS	AGM-154A/145: BLU-97 combined-effects bomblets; AGM-154A-1: 500-pound BLU-111 warhead; AGM-154B: six P3I BLU-108 sensor-fused-weapon submunitions; AGM-154C and C-1: BROACH multistage warhead
CONTRACTOR	Raytheon Missile Systems

GBU-31/32/38/54 JOINT DIRECT ATTACK MUNITION

The JDAM is a GPS-aided inertial navigation system guidance kit. When paired with general purpose or penetrator bomb bodies, it converts the unguided free-fall bombs into precision-guided "smart" munitions.

The JDAM improves the accuracy of unguided bombs in any weather condition. It can be employed from every Navy and Marine Corps fighter attack aircraft.

There are five JDAM configurations: GBU-31 with a 2,000-pound Mk84 or BLU-117 blast-fragmentation warhead; GBU-31 with a 2,000-pound BLU-109 hard-target penetration warhead; GBU-32 with a 1,000-pound Mk83 or BLU-110 blast-fragmentation warhead; GBU-38 with a 500-pound Mk82, BLU-111 blast-fragmentation warhead or BLU-126 low-collateral-damage warhead; and the Laser JDAM (GBU-54) that incorporates a precision laser guidance set with a 500-pound Mk82, BLU-111 blast-fragmentation warhead or BLU-126 low-collateral-damage warhead.

Aircraft employing integrated JDAM weapons are capable of prosecuting ground targets with great accuracy. The JDAM utilizes an inertial navigation system and GPS equipment combined with a proportional navigation control system for guidance. Target coordinates can be loaded into the aircraft before takeoff, manually after takeoff and automatically through target designation with onboard sensors. This information is passed from the aircraft to the weapon during prelaunch transfer alignment.

The JDAM can be launched from very low to very high altitudes in a dive, toss or loft and in straight and level flight with an on-axis or off-axis delivery. The JDAM enables multiple weapons to be directed against single or multiple targets on a single pass. Once released, the JDAM navigates to the target autonomously. In its most accurate mode, when GPS data is available, the JDAM system will have an area of error of less than 5 meters (about 17 feet).

The GBU-54 Laser JDAM significantly enhances operational flexibility by adding a field-installed semi-active laser to the standard JDAM configuration. The Laser JDAM retains JDAM's capability to engage fixed targets in any weather condition while adding a clear-weather capability to engage fast-moving and maneuvering targets.

The JDAM and Laser JDAM are integrated with B-1B, B-2A, B-52H, AV-8B, A-10, F-15E, F/A18A+/C/C+/D/E/F, F-16C/D and F-22A aircraft. Select JDAM configurations are integrated on F-35A/B/C; however, follow-on integration efforts are underway to evaluate full configuration suite compatibility with F-35A/B/C aircraft and MQ-9 Reaper unmanned aerial vehicles. The Navy delivered a GBU-56, 2,000-pound JDAM penetrator with precision laser guidance to the fleet in 2022.

The Navy developed a field-installed semi-active laser to the standard GBU-31 with a 2,000-pound BLU-109 hard-target penetration warhead to make a GBU-56(v)4. The GBU-56(v)4 will provide better JDAM performance in a GPS contested environments.



U.S. NAVY

JDAM ON F/A-18

LENGTH	GBU-31(V)2/B: 12.7 feet; GBU-31(V)4/B: 12.4 feet; GBU-32(V)2/B: 9.95 feet; GB-38/B: 7.7 feet; GBU-54: 8 feet
WEIGHT (average)	GBU-31(V)2/B: 2,085 pounds; GBU-31(V)4/B: 2,162 pounds; GBU-32(V)2/B: 1,031 pounds; GB-38/B: 590 pounds; GB-38/B: 581 pounds
CONTRACTOR	Boeing Co.

GBU-10/12/16/24/51 LASER-GUIDED BOMB

Navy and Marine Corps strike aircraft employ MK80/BLU-series bombs and BLU-109/116 penetrator warheads configured with laser guidance kits. The computer control group and laser detector fitted to the nose of the bomb respond to illumination of the target by a laser-targeting pod and send flight control inputs to the bomb's fins to adjust trajectory. The Navy developed the BLU-126/B warhead, a low-collateral-damage bomb, to use in close-air support situations to avoid civilian casualties. Navy F/A-18s first dropped LCDBs in combat in Iraq in July 2007.

LGBs currently in inventory include the GBU-10: Mk84/BLU-117 2,000-pound bomb or BLU-109 penetration warhead with Paveway II laser guidance kit; GBU-12: Mk82/BLU-111 500-pound bomb with Paveway II laser guidance kit; GBU-16: Mk83/BLU-110 1,000-pound bomb with Paveway II laser guidance kit; and GBU-24: Mk84/BLU-109 hard target penetration warhead or BLU-116 hard target penetration warhead with Paveway III laser guidance kit. The inventory also includes the GBU-51/B: Mk82/BLU-111 500-pound-class bomb using the BLU-126 warhead (reduced explosive material) with Paveway II laser guidance kit.

GBU-53/B STORMBREAKER

The Stormbreaker — formerly known as Small-Diameter Bomb II — is a 250-pound-class precision-guided munition being developed for the Navy, Marine Corps and Air Force. The Stormbreaker is designed to engage stationary and moving targets at standoff range using a multimode seeker. The weapon uses Link 16 or ultra-high-frequency data link to provide in-flight target updates from own-ship or third-party targeting and control. Terminal guidance is provided by a tri-mode seeker with millimeter wave, imaging infrared and semi-active laser capability incorporated into a single all-up-round.

Low-rate initial production was approved in 2015 for Air Force quantities. Developmental testing was completed in April 2018. The Stormbreaker fielded on F-35B aircraft with limited capability and achieved initial operational capability on both Navy F-35 variants in 2022 with full capability expected in 2025. The weapon will achieve initial operational capability on F/A-18E/F aircraft in 2024.



RAYTHEON MISSILES AND DEFENSE

GBU-53/B STORMBREAKER

LENGTH.....5.8 feet
DIAMETER.....7 inches, body
WEIGHT.....208 pounds
WINGSPAN.....5.5 feet (extended)
RANGE.....40+ nautical miles
WARHEAD.....95 pounds, shaped jet charge and blast-fragmentation
CONTRACTOR.....Raytheon Missile Systems

AIRCRAFT GUNS AND CREW-SERVED WEAPONS

GAU-16/A MACHINE GUN

The GAU-16/A is a recoil-operated, fully automatic, belt-fed machine gun. It fires from a closed-bolt position and can be set up for right- or left-hand feed. This weapon provides suppression fire for offensive and defensive purposes. The spade grip and trigger assembly are integrated into a platform-specific mount.

PLATFORMS.....MV-22
CALIBER.....50 caliber
LENGTH.....56.3 inches
WEIGHT.....65 pounds
RATE OF FIRE.....650-950 rounds per minute
CONTRACTOR.....FN Herstal

GAU-17/A MACHINE GUN

The GAU-17/A minigun is a six-barrel, air-cooled, electrically driven rotary machine gun. The multibarrel design helps prevent overheating and allows for a greater capacity at a high firing rate. All Navy and Marine Corps systems are configured to use 28VDC A/C electrical power and cycle at a steady state, sustaining 3,000 revolutions per minute.



U.S. MARINE CORPS

GAU-17 MACHINE GUN

PLATFORMS.....UH-1Y, MV-22
CALIBER.....7.62 mm
LENGTH.....33 inches
WEIGHT.....44 pounds
RATE OF FIRE.....3,000 rounds per minute
CONTRACTOR.....General Electric/Dillon Aero

GAU-21 MACHINE GUN

The GAU-21 is a short-recoil-operated, air-cooled automatic weapon. An evolution of the M3 .50-caliber heavy machine gun, it produces 1,173 rounds per minute cyclic rate of fire through use of open-bolt operation and a dual-recoil buffer system. Operating independent of either electrical or hydraulic power sources, the GAU-21's unique soft mount system enhances weapon accuracy and minimizes the firing vibration transmitted to the airframe. The GAU-21 is replacing the XM-218, GAU-16 and GAU-18 (Air Force) on all current rotary-wing assault and assault-support platforms.

PLATFORMS.....UH-1Y, MV-22, CH-53E/K, MH-53 (ramp only), MH-60R/S
CALIBER.....50 caliber
LENGTH.....66.5 inches



U.S. MARINE CORPS

GAU-21 MACHINE GUN

WEIGHT.....80 pounds
RATE OF FIRE.....1,173 rounds per minute
CONTRACTOR.....FN Herstal

M240D MACHINE GUN

The M240D is a belt-fed, gas-operated, air-cooled, left-feed automatic weapon fired from the open-bolt position, providing medium-range suppressive fire. The M240D, a variant of the M240, has two possible configurations — aircraft and egress (ground). The aircraft-configured M240D has a front and rear sight and a trigger group that accommodates the spade grip device. The ground configuration involves the installation of an egress package or "infantry modification kit" designed to provide downed aircrew personnel with increased firepower.



U.S. NAVY

M240D MACHINE GUN

PLATFORMS.....UH-1Y, MV-22, MH-60R/S
CALIBER.....7.62 mm
LENGTH.....42.3 inches
WEIGHT.....25.6 pounds
RATE OF FIRE.....650-950 rounds per minute
CONTRACTOR.....FN USA

XM-218 MACHINE GUN

The XM-218 is a recoil-operated, fully automatic, link-belt-fed machine gun. It fires from a closed-bolt position and can be set up for right- or left-hand feed. This weapon provides suppression fire for offensive and defensive purposes. Unlike the GAU-16, the XM-218 spade grip and trigger assembly is part of the weapon itself, not part of the mount.

PLATFORM.....MH-53E (door and window)
CALIBER.....50 caliber
LENGTH.....56.3 inches
WEIGHT.....68 pounds
RATE OF FIRE.....650-950 rounds per minute
CONTRACTORS.....General Dynamics, U.S. Ordnance

M197 20 MM CANNON

The M197 is a three-barrel 20 mm Gatling gun used on the AH-1W/Z and MH-60S. The M197 supports the use of bulk ammunition on the AH-1W/Z and linked ammunition on the MH-60S. The M197 is chin-mounted on AH-1W/Zs and pylon-mounted on the MH-60S.

PLATFORMS.....AH-1Z, MH-60S
CALIBER.....20 mm
BARRELS.....3
WEIGHT.....146 pounds
RATE OF FIRE.....300-1,500 rounds per minute
CONTRACTOR.....General Dynamics Ordnance Tactical Systems

MAU-211/A LINKLESS FEED SYSTEM

The MAU-211/A is used on AH-1W/Z helicopters with the A/A49E-7 turret system and M197 gun. The LFS replaces the aircraft ammunition and storage and feed system and was designed to increase performance and maintainability. The LFS consists of a linkless gun feeder, a flexible chute assembly and an ammunition storage unit. The LFS uses a conveyor element system to transport ammunition to the M197 gun.

PLATFORMS.....AH-1Z
GUN.....20 mm M197
BARRELS.....3
SYSTEM WEIGHT.....206 pounds
RATE OF FIRE.....650 rounds per minute
CONTRACTOR.....Meggitt Plc

A/A49E-27 20 MM AUTOMATIC GUN HELICOPTER ARMAMENT SUBSYSTEM

The A/A49E-27 is designed to provide forward firing area suppression against lightly defended targets and small boats. The A/A49E-27 consists of the aircraft gun mounting adapter, weapons ammunition handling system, gun control panel and power supply. The ammunition handling system has a storage capacity of 600 rounds of linked M-50 or PGU-series 20 mm electrically primed ammunition.

PLATFORM.....MH-60S
GUN.....20 mm M197
BARRELS.....3
SYSTEM WEIGHT.....458 pounds
RATE OF FIRE.....700 rounds per minute
CONTRACTOR.....Naval Surface Warfare Center Crane Division, Ind.

GAU-12 25 MM CANNON AND A/A49E-10 25 MM GUN SYSTEM

The GAU-12/U is a five-barreled Gatling gun used on the AV-8B platform. The gun is supported in the GAK-14/A49E-10 structural assembly, composed of two subsystems: the GAK-14 Gun Subsystem and the GFK-11 Ammunition Handling Subsystem. The subsystems are two pod-like structures mounted to the fuselage of AV-8B aircraft. The GAK-14 contains a pneumatically powered air-cooled GAU-12 25 mm Gatling gun. The AHS consists of a turnaround unit, ammunition chute crossover conveyor and the ammunition storage assembly that contains the ammunition conveyors.

PLATFORM.....AV-8B
CALIBER.....25 mm
WEIGHT.....GAU-12: 280 pounds; A49E-10: 920-1,250 pounds
RATE OF FIRE.....3,600-4,200 rounds per minute
CONTRACTOR.....General Dynamics Ordnance Tactical Systems

M61 20 MM AUTOMATIC CANNON AND A/A49A F/A-18 GUN SYSTEM

The M61 is a six-barreled Gatling gun used on F/A-18 aircraft. The M61 family of 20 mm cannons provide firing rates of up to 100 shots per second. There are two versions of the M61: the A1 and A2. The M61A2 is 50 pounds lighter but supports the same firing rate.

The M61 cannon is the heart of the A/A49A gun system on the F/A-18. The A/A49A-1 used on F/A-18A-D consists of a palletized Ammunition Handling Subsystem configured with either version of the M61. Both configurations use a standard AHS with a maximum capacity of 578 rounds of 20 mm ammunition. The A/A49A-2 used on F/A-18E/F also consists of a palletized AHS configured with an M61 but was designed to fit into the more limited space of the Super Hornet gun bay. The AHS includes an integrated cast aluminum pallet, which is 4.8 inches shorter than that of the A/A49A-1 storage drum. This system is only configured with the M61A2 cannon. As a result, the capacity was reduced to 422 rounds of 20 mm ammunition and the weight reduced to 455 pounds.

PLATFORM.....A/A49A-1: F/A-18A-D; A/A49A-2: F/A-18E/F
GUN WEIGHT.....M61A1: 252 pounds; M61A2: 202 pounds
SYSTEM WEIGHT.....A/A49A-1: 549 pounds with M61A1, 499 pounds with M61A2; A/A49A-2: 455 pounds
RATE OF FIRE.....4,000-6,000 rounds per minute
CONTRACTOR.....General Dynamics Ordnance Tactical Systems

GAU-22 25MM GUN SYSTEM

The GAU-22 is a new-design rotary cannon for F-35 aircraft. It is internally mounted on the Air Force F-35A but pod-mounted on the F-35B/C. Operation of the gun requires 3F software. Testing on all three aircraft began in 2015. The gun was deployed in combat by Marine Corps F-35Bs over Afghanistan in September 2018.

CONTRACTOR.....General Dynamics Ordnance Tactical Systems

OTHER AIR WARFARE WEAPONS

BOMBS AND ROCKETS

General purpose bombs: Navy and Marine Corps aircraft use a variety of unguided ordnance, including the MK80 series low-drag general-purpose blast-fragmentation bombs. GP bombs are rarely used when precision-guided weapons are available.

Cluster munitions: Cluster munitions are clamshell dispensers that open after release from an aircraft and distribute bomblets (Mk20 Rockeye) or mines (CBU-78 Gator) over a wide area. They are effective (depending on the version) against personnel, armored vehicles, air-defense sites, small craft, ships, submarines and aircraft on the ground.

Rockets: Two types of unguided fast-firing air-launched rockets — fired from pods — remain in use, the 2.75-inch Hydra and the 5-inch Zuni.

ASQ-235 AIRBORNE MINE NEUTRALIZER SYSTEM

The AMNS is a mine-neutralization vehicle deployed from a launch and handling system supported from an MH-60S helicopter. The system includes a control console interfaced with the helicopter's carriage, launch, stream, towing and recovery system. The LHS carries four Archerfish mine-neutralizer munitions to take out bottom and moored mines. The Archerfish are remotely controlled and equipped with sonar, a video camera and a light. Initial operational capability was achieved in November 2016.

CONTRACTORS.....LHS: Raytheon; munitions: BAE Systems

AIR-LAUNCHED NAVAL MINES

Some versions of naval mines can be laid by aircraft to disrupt enemy shipping and deter naval movements.

Mk62/63 Quickstrike: These mines, weighing 500 and 1,000 pounds, respectively, are general-purpose blast-fragmentation bombs fitted with influence target-detection devices designed for shallow water.

Mk65 Quickstrike: This bottom mine features a thin-walled casing for a 2,000-pound warhead and is fitted with target-detection devices for magnetic, seismic or pressure detonation. The Navy is adding JDAM kits guidance and wing kits to extend the delivery range of air-delivered mines — called the Quickstrike-ER — and to enable precision placement in a single pass. The mine will be able to glide 40 miles from its launching point from an altitude of 35,000 feet. Testing began in 2018.

AIR-LAUNCHED TORPEDOES/HIGH-ALTITUDE ANTI-SUBMARINE WARFARE CAPABILITY



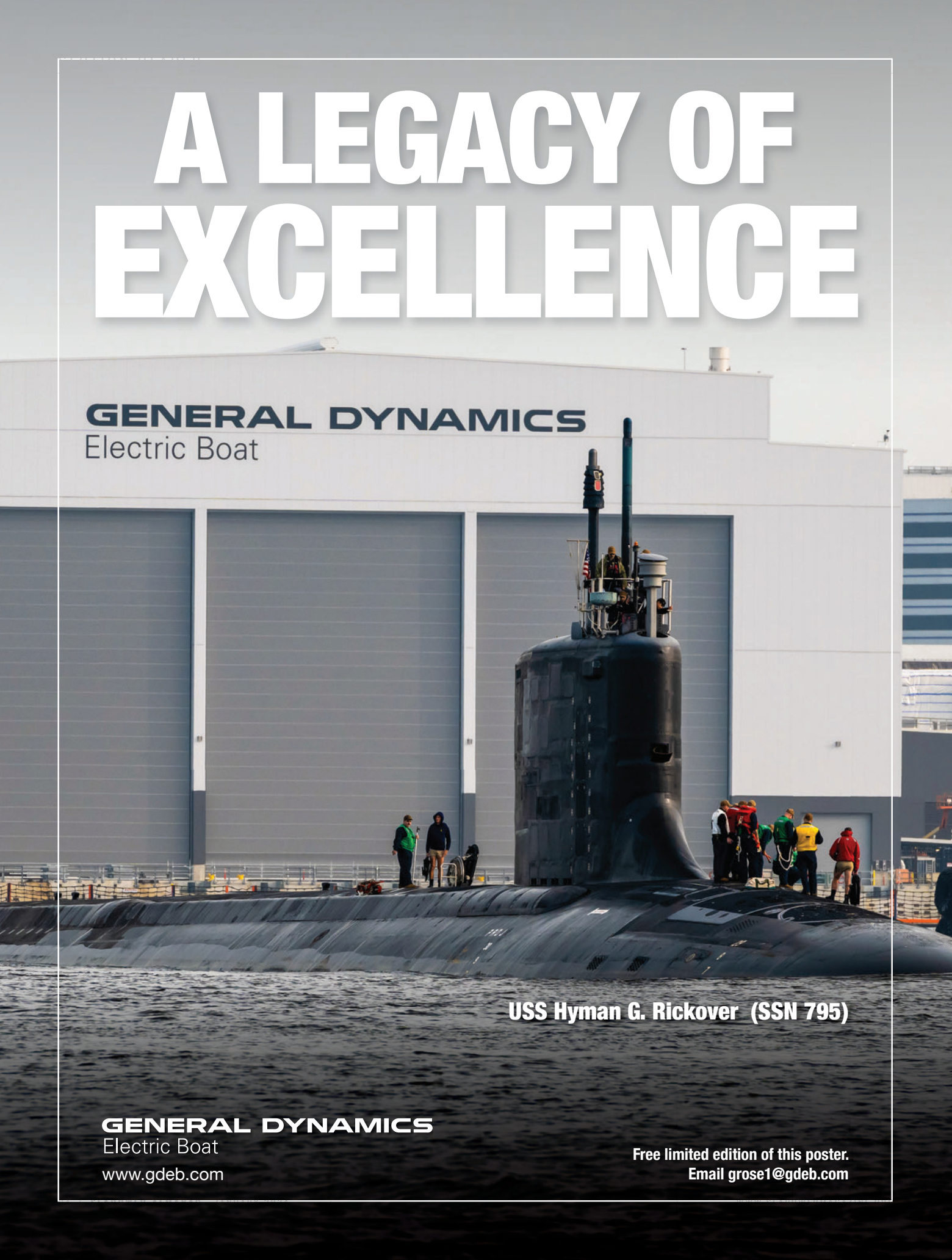
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HAAWC ILLUSTRATION

The Mk46 and Mk54 torpedoes are carried by P-8 and MH-60R aircraft for anti-submarine warfare. (See the Ship Weapons Section for descriptions.) The HAAWC is a kit that enables the Mk54 to be launched from high altitude at standoff ranges and make water entry at a programmed point. The air-launch accessory kit includes GPS guidance and a glide wing kit. The HAAWC achieved initial operational capability in November 2022. The Navy plans to add a Link 16 receiver to allow the HAAWC to receive in-flight target updates.

CONTRACTOR.....Boeing Co.

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MAJOR COMMAND AND CONTROL SYSTEMS

DEPLOYABLE JOINT COMMAND AND CONTROL SYSTEM

The DJC2 program is a Department of Defense priority transformation initiative, with the Navy as the lead entity, that is providing a standardized, integrated, rapidly deployable, modular, scalable and reconfigurable joint command and control and collaboration system to the geographic combatant commanders and joint task force commanders. It supports en route, rapid response, early entry and full JTF headquarters command and control operations.

LEAD SYSTEM INTEGRATOR.....Naval Surface Warfare Center Panama City Division

GLOBAL COMMAND AND CONTROL SYSTEM-MARITIME

The GCCS-M receives, displays, correlates, fuses and maintains geolocational track information on friendly, hostile and neutral land, sea and air forces and integrates it with available intelligence and environmental information. The GCCS-M Increment 1 (Afloat) is installed on more than 260 ships and submarines. The GCCS-M Increment 2 (Ashore) has been installed at 36 sites, including the Navy Command Center, fleet commander headquarters and various allied/NATO sites. The program is managed as an evolutionary acquisition system that facilitates rapid insertion of new functions, technologies and commercial, off-the-shelf products.

BATTLE FORCE TACTICAL NETWORK

The BFTN provides secure connectivity in a maritime operational environment to the Navy and coalition forces with a persistent internet protocol over radio frequency frequencies to counter denial of satellite connectivity. The network also provides line-of-sight and beyond-line-of-sight wireless connectivity to ships, submarines, aircraft and shore stations. L3Harris was selected in December 2019 to deliver the capability.

CONTRACTOR.....L3Harris

NEXT-GENERATION COMMAND AND CONTROL PROCESSOR

The NGC2P/Common Data Link Management System enables platforms to accurately process and exchange tactical data with naval, joint and coalition forces over any combination of tactical data links to achieve a common tactical picture. The system facilitates the exchange of data between the ship combat system and tactical data link participants in Link 11, Satellite Link 11, Link 16 and Satellite Link 16 and Joint Range Extension Applications Protocol Appendix C.

CONTRACTORS.....Northrop Grumman; Ultra Systems

INTEGRATED SHIPBOARD NETWORK SYSTEM

The ISNS provides Navy ships with reliable, high-speed, secret and unclassified local area networks as well as the network infrastructure, basic network information distribution services and access to the defense information systems network's wide-area network secure and nonsecure internet protocol router network, which are used by other hosted applications or systems. It enables real-time information exchange within ships and among afloat units, component commanders, shore sites and fleet commanders.

CONSOLIDATED AFLOAT NETWORKS AND ENTERPRISE SERVICES

CANES provides a core set of highly survivable, secure shipboard network services for afloat platforms and maritime headquarters/maritime operations centers. The CANES effort is a programmatic and technical/infrastructure consolidation of what now are separately delivered and managed networks. The goal for CANES is to field a single, collapsed network backbone for unclassified through top secret and sensitive compartmented information data, while leveraging multiple security levels and afloat core service architectures.

To address this goal, CANES will manage capability gaps through a phased incremental approach. The plan also calls for CANES to use two subprograms to address engineering for common computing environment/cross-domain solutions and afloat core service across communities of interest domains, enclaves and platforms.

CANES Increment I provides an integrated voice, video and data network infrastructure with supporting network and infrastructure services across the unclassified, secret, secret releasable and special intelligence security enclaves. This gives the Navy a single and scalable information operations/intelligence, surveillance and reconnaissance network infrastructure supporting mission area application hosting and afloat core service delivery across all tactical, tactical support and nontactical/administrative communities of interest for deployable maritime assets and designated shore elements.

In February 2012, the Navy selected Northrop Grumman to produce the initial shipsets for CANES. The first CANES installation was completed in November 2013 on the Arleigh Burke-class guided-missile destroyer USS McCampbell.

Initial operational testing and evaluation began in August 2014 onboard the guided-missile destroyer USS Higgins. Also in August 2014, the Navy selected five vendors to build and deliver subsequent shipsets. In October 2015, the Defense Department approved full deployment of CANES and transferred program oversight to the Navy.

CONTRACTORS.....Northrop Grumman; BAE Systems; General Dynamics; Global Technical Systems; Terco Inc.

DISTRIBUTED COMMON GROUND SYSTEM-NAVY

The DCGS-N is the Navy component of the new web-based, joint-services DCGS network that functions as a single enterprise system for rapidly receiving, processing, exploiting and disseminating multiservice and national space-based intelligence, surveillance and reconnaissance data. The DCGS-N is interoperable with the DCGS elements of the other services. All will share a core infrastructure called the DCGS Integration Backbone. The current focus is to align the Navy's existing programs, personnel, facilities and financial resources to achieve a single, common converged architecture that delivers an effective and sustainable DCGS-N that meets U.S. Fleet Forces Command requirements. The first two DCGS-N systems were installed in 2011 onboard the Nimitz-class aircraft carriers USS Dwight D. Eisenhower and USS George Washington.

CONTRACTORS.....BAE Systems; Lockheed Martin; Northrop Grumman; Raytheon Technologies; SAIC

MAJOR COMMUNICATIONS SYSTEMS

COMMON DATA LINK-NAVY

The CDL-N provides a real-time, full-duplex, point-to-point communications wideband data link to transmit intelligence, surveillance and reconnaissance data between national and tactical reconnaissance aircraft sensors and their associated surface processing systems. The CDL-N directly supports the combatant commander; the joint mission area communications provide critical, mission-essential data to warfighters. The CDL-N is installed on carriers, amphibious assault ships and command ships.

LINK 11

Link 11 is a secure tactical data-exchange network for sending and receiving digital track information between ships, aircraft and command sites using a standard message format. It can use high-frequency and ultra-high-frequency radio for operation. Link 11 is NATO's primary means of transmitting tactical data, such as ship and aircraft tracks, over the horizon. It is used by many classes of combatant ships and by E-2 and P-8 aircraft and some H-60 helicopters.

LINK 16

Link 16 presents an at-a-glance portrayal of targets, threats and friendly forces on a relative-position display. It provides near-real-time, jam-resistant, secure data communications, enabling transfer of combat information and relative navigation data between widely dispersed battle elements, integrating tactical data between aircraft and tactical air-control parties. Users gain situational awareness by exchanging digital data over a common communication link that is continuously and automatically updated. The major components of Link 16 are the Joint Tactical Information Distribution System and Multifunction Information Distribution System terminals that are integrated with weapons systems for all operational applications on fixed- and rotary-wing aircraft and ground-fixed, transportable, mobile and maritime platforms. Link 16 is installed on warships and F/A-18, EA-18G, F-35, AV-B, E-2, P-8, EP-3E aircraft and MH-60R/S helicopters and is being on AH-1Z and UH-1Y helicopters.

CONTRACTORS.....Data Link Solutions (joint venture of BAE Systems and Rockwell Collins); ViaSat Inc.

SRQ-4 HAWKLINK

The SRQ-4 Hawklink is a data link used by MH-60R helicopters for transmission and reception of tactical data.

CONTRACTOR.....L3Harris

NAVY TACTICAL COMMON DATA LINK

The NTCDL is a system that will enable the Navy to simultaneously transmit and receive large quantities of real-time intelligence, surveillance and reconnaissance data to and from multiple platforms. The open-architecture, reprogrammable system is modular and scalable and will incorporate advanced waveforms for networked operations using currently fielded CDL equipment. Initial production will be installed on aircraft carriers and amphibious assault ships. BAE Systems was awarded the development contract in September 2016.

CONTRACTOR.....BAE Systems; Ball Aerospace

NAVY MULTIBAND TERMINAL

The NMT is the fourth-generation satellite communications terminal for nearly 300 Navy ships, submarines and shore stations. The NMT is replacing the WSC-6 super-high-frequency terminal series and the NESP USC-38 follow-on terminal. The Navy fielded terminals for developmental testing and operational assessment in late 2009.

In October 2010, Raytheon was awarded a production contract for 22 NMT systems (15 for ships, five for submarines and two for shore terminals) of the more than 300 expected to be procured. Raytheon also received a contract to link the NMT with the Air Force's Enhanced Polar Satellite to enable communications over the polar regions.

CONTRACTOR.....Raytheon Intelligence and Space

MOBILE USER OBJECTIVE SYSTEM

The MUOS is a communications satellite equipped with a wideband code division multiple-access payload that enables a tenfold increase in capability over the previous ultra-high-frequency follow-on satellite. The MUOS provides secure channels for voice and data at high speeds with streaming capability. The five-satellite system includes an in-orbit spare. Four are operational. The fifth — the spare — was launched in 2016 and turned over to Navy control in October 2017. General Dynamics has built MUOS ground stations in Hawaii, Virginia and Australia. In August 2018, U.S. Strategic Command approved the system for expanded use. Operation and management of the MUOS has been transferred to the U.S. Space Force.

CONTRACTORS.....Lockheed Martin (prime); General Dynamics (ground station)

SHIPBOARD COMBAT SYSTEMS

AEGIS COMBAT SYSTEM



U.S. NAVY

AEGIS ASHORE

The Aegis Combat System installed on all Arleigh Burke-class guided-missile destroyers and Ticonderoga-class guided-missile cruisers is a naval air defense system and is the sea-based element of the U.S. ballistic missile defense system. It is the only operational radar and weapon system capable of simultaneous warfare against air, surface, subsurface and land targets.

The heart of the system is SPY-1 or SPY-6, advanced, automatic detect and track, multifunction phased-array radars. This high-powered radar can perform search, track and missile-guidance functions simultaneously with a track capacity of more than 100 targets. A computer-based command and decision element is the core of the Aegis Combat System, which controls advanced anti-air and anti-submarine warfare systems, the Mk41 Vertical Launching System and the Tomahawk Weapon System. The Aegis systems on 32 destroyers and cruisers are being upgraded to engage short- to intermediate-range ballistic missile threats.

The Aegis fleet modernization program encompasses a series of modifications and upgrades using commercial, off-the-shelf networking and system infrastructures. In 2007, the Navy approved installation of a

fully open-architecture Aegis system for existing cruisers and destroyers with the goal of separating software and hardware to create a networked computing environment. The combat system software also will be in component form to enable reuse on in-service and new construction ships. Installation of the open-architecture system, Advanced Capability Build 12, began in 2012. The multimission signal processor, which combines SPY-1 radar and ballistic missile defense signal processing in an open-architecture environment, is being fielded on Aegis systems.

The destroyers under the restart program incorporate technologies such as the SPY-1D(V) radar with the Multi-Mission Signal Processor, the Surface Electronic Warfare Improvement Program, Ballistic Missile Defense 5.0 and the SQQ-89(V) Anti-Submarine Warfare/Undersea Warfare Combat System.

The Aegis Combat System also formed the core of the European Phased Adaptive Approach that installed Aegis Ashore BMD systems in Romania and Poland.

In October 2018, the Baseline 9.C2/BMD 5.1 version of Aegis supported an at-sea test against a medium-range ballistic missile target. Baseline 10 is to be installed on the Flight III destroyers, in which the SPY-6(V)1 radar is being installed. Initial operational capability of Baseline 10 was achieved in fiscal 2024.

CONTRACTORS.....Lockheed Martin; Raytheon Technologies; Boeing

COOPERATIVE ENGAGEMENT CAPABILITY

The CEC provides the fleet with the defensive flexibility required to confront the evolving threat of anti-ship cruise and theater ballistic missiles. By integrating the sensor data of each ship and aircraft into a single, real-time composite track picture, the CEC improves anti-air warfare and theater air defense capabilities.

The CEC simultaneously distributes sensor measurement data on airborne threats to each CEC-equipped ship in real time or by passing the information via the combat direction system to the theater air defense information link systems within a battle group. The CEC extends the range at which a ship can engage hostile missiles to well beyond-the-horizon radar; provides significant reductions in dual tracks and track swaps; and significantly improves area, local and self-defense capabilities. Major components are the USG-2 fire-control system for shipboard use and USG-3 for the Navy's E-2 Hawkeye aircraft.

CONTRACTORS.....Raytheon Technologies; L3Harris

SQQ-89 UNDERSEA WARFARE COMBAT SYSTEM

The SQQ-89 provides all Ticonderoga-class guided-missile cruisers and Arleigh Burke-class guided-missile destroyers with a seamlessly integrated undersea warfare detection, localization, classification and targeting capability. The system presents an integrated picture of the tactical situation by receiving, combining and processing active and passive sensor data from the hull-mounted array, towed array and sonobuoys.

The SQQ-89 is integrated with the Aegis Combat System and provides a full range of undersea warfare functions. The Aegis cruisers and destroyers are being updated to the latest version, the SQQ-89A(V)15, which employs an open architecture using state-of-the-art commercial computing technology to achieve major performance gains over previous designs at reduced cost. The SQQ-89 also is the foundation of the SQQ-90 for the Zumwalt-class guided-missile destroyer and the anti-submarine warfare mission package for littoral combat ships.

CONTRACTORS.....Lockheed Martin; Advanced Acoustic Concepts Inc.

SQQ-90 INTEGRATED ACOUSTIC SENSOR SUITE

The IASS is the integrated undersea warfare system installed on Zumwalt-class guided-missile destroyers. The suite provides operators with a complete undersea warfare picture that includes the search for and detection of potential threats such as submarines, torpedoes, mines and uncrewed underwater vehicles. It also integrates all Zumwalt-class destroyer acoustic undersea warfare systems and subsystems and associated software. The SQQ-90 comprises the SQS-60 hull-mounted midfrequency sonar, the SQS-61 hull-mounted high-frequency sonar, and the SQR-20 multifunction towed array sonar and handling system. It is the first dual-frequency hull-mounted system in a Navy surface ship.

CONTRACTOR.....Raytheon Technologies

SHIP SELF-DEFENSE SYSTEM

The SSDS is a combat system that integrates and coordinates all of the existing stand-alone sensors and weapons systems aboard Navy aircraft carriers and amphibious warfare ships to provide a quick-reaction combat capability against incoming anti-ship cruise missiles by expediting the detect-through-engage sequence. Consisting of software and commercial, off-the-shelf hardware, the SSDS integrates radar systems with anti-air weapons, both hard-kill (missile systems and rapid-fire gun systems) and soft-kill (decoys). It expedites the assignment of weapons for threat engagement, providing a "recommend engage" display for operators or, if in automatic mode, initiating weapons firing, jamming, chaff decoy deployment or some combination of these. The SSDS is integrated with the Cooperative Engagement Capability.

The SSDS Mk1 was fielded in the mid-1990s and is installed on all dock landing ships. The Mk2 Mod 0 is installed on the Nimitz-class aircraft carrier USS Nimitz; Mod 1 on the aircraft carriers USS Ronald Reagan and USS Dwight D. Eisenhower; Mod 2 on the San Antonio-class amphibious transport dock ship USS San Antonio; and Mod 3 on the Wasp-class amphibious assault ship USS Makin Island.

SSDS Advanced Capability Build 20 is a combat system that will integrate such systems as the Evolved SeaSparrow Missile Block II system, the SLQ-32 Surface Electronic Warfare Program III system and the Enterprise Air-Search Radar. The upgrade features cybersecurity enhancements and fire-control loop modernization. It also will integrate the Advanced Training Domain. The SSDS ACB 20 has been installed on the aircraft carrier USS George Washington, the amphibious assault ship USS Boxer and the amphibious platform dock ships USS San Antonio and USS Fort Lauderdale.

CONTRACTORS.....Raytheon Technologies; Lockheed Martin

INTEGRATED COMBAT SYSTEM

The Integrated Combat System is envisioned as a combat system that connects all U.S. Navy and Coast Guard surface warships. The ICS will replace the Aegis Combat System and the Ship Self-Defense System. The ICS would enable the Navy to integrate new capabilities into ships more rapidly and for lower cost, particularly through software updates. Lockheed Martin was awarded a $23 million contract in September 2023 for development of the ICS. The company will leverage artificial intelligence, model-based engineering and cybersecurity from the beginning of the ICS development.

CONTRACTOR.....Lockheed Martin

BYG-1 SUBMARINE COMBAT CONTROL SYSTEM

The BYG-1 is the common combat control system for all Navy submarines, except Ohio-class ballistic missile subs. It incorporates tactical control, weapon control and tactical local area network functions into one procurement program. BYG-1 allows the submarine force to rapidly

update the ship safety tactical picture, integrates the common tactical picture into the battle group, improves torpedo interfaces and provides tactical Tomahawk cruise missile capability. BYG-1 systems are being updated continuously with hardware improvements. The BYG-1 is being installed on all attack and guided-missile submarines.

CONTRACTORS..... Raytheon; General Dynamics; Progeny Systems Corp.; Lockheed Martin

SHIPBOARD RADAR SYSTEMS

SPY-1 MULTIFUNCTION RADAR



U.S. NAVY

SPY-1 RADAR ARRAYS ON CRUISER SUPERSTRUCTURE

The SPY-1 multifunction S-band phased-array radar, characterized by its distinctive, superstructure-mounted planar-array antennas, is the heart of the Aegis Combat System onboard Navy guided-missile cruisers and destroyers. The SPY-1 is capable of long-range search, automatic detection, track and engagement of aircraft, cruise missiles and surface vessels.

The SPY-1E upgrade in selected ships has been optimized to detect, track and engage theater ballistic missiles and is incorporated in national ballistic missile defense nets. The SPY-1A/B versions are installed on the Ticonderoga-class cruisers. The fifth version of the radar, the SPY-1D(V), features improvements in capability against low-flying targets with small radar cross-sections operating in heavy clutter environments and intense electronic countermeasures. The SPY-1D(V) is installed on Flight IA and Flight II Arleigh Burke destroyers.

CONTRACTORS..... Lockheed Martin; Raytheon Missiles and Defense

DUAL-BAND RADAR SUITE: SPY-3 MULTI-FUNCTION RADAR, VOLUME-SEARCH RADAR

The DBR is the air-defense radar suite that was developed for Zumwalt-class guided-missile destroyers and Gerald R. Ford-class aircraft carriers. It combines an air search radar and precision-tracking radar into a single system, with each operating simultaneously in a different frequency band while sharing a common processing and control suite. Both are advanced, electronically steered, phased-array radars that will be the first to enter service on a Navy ship.

The S-band three-dimensional VSR searches for high-flying threats at long range and hands over targets to an X-band fire-control radar, the SPY-3. The SPY-3 searches close around the ship and rapidly out to the horizon to detect fast, low-altitude, anti-ship missiles and aircraft. The DBR is fully automatic, requiring no dedicated operator or crewed display consoles.

The DBR completed its critical design review in November 2009. In 2010, the Navy decided to install only the SPY-3 on Zumwalt-class destroyers, with software modifications to compensate for the lack of a VSR.

CONTRACTORS..... Raytheon Missiles and Defense; Lockheed Martin

SPY-6(V)1 AIR AND MISSILE DEFENSE RADAR



RAYTHEON

SPY-6(V)1 RADAR ARRAY ON GUIDED MISSILE DESTROYER

The AMDR radar system provides horizon search, precision tracking, missile communication and terminal illumination. The AMDR S-band radar provides volume search, tracking, ballistic missile defense discrimination and missile communications. A radar suite controller will integrate the radars with a ship's combat system.

In October 2013, the Navy selected Raytheon to design and build the S-band portion of the AMDR and the radar suite controller. A version of the SPQ-9B radar will fill the X-band requirement.

The first array was delivered to Pacific Missile Range Facility Barking Sands in Hawaii in July 2016 for testing. The array tracked a ballistic missile test target in March 2017 and simultaneously tracked a ballistic missile test target and multiple cruise missile test targets. A low-rate initial production contract for three ship sets was awarded in May 2017. The AMDR is being installed on Flight III Arleigh Burke-class guided-missile destroyers. The SPY-6 is in full-rate production. Initial operational capability was achieved in fiscal year 2024 onboard the USS Jack H. Lucas.

CONTRACTORS..... Raytheon Missiles and Defense (prime);
General Dynamics Advanced Information Systems

SPY-6(V)2/(V)3/(V)4 ENTERPRISE AIR SURVEILLANCE RADARS

Raytheon was awarded a contract in August 2016 for the engineering and manufacturing development of the EASR. The SPY-3(V)2 is a rotating air-surveillance radar being developed for the Nimitz-class CVNs and for America-class amphibious assault ships starting with the USS Bougainville. It also will be installed on Flight II of the San Antonio-class amphibious transport dock ships and on Constellation-class guided-missile frigates. Initial operational capability is planned for 2025.

The SPY-6(V)3 EASR is a fixed-face air surveillance radar for Gerald R. Ford-class aircraft carriers in lieu of the dual-band radar. The SPY-6(V)3 for the USS John F. Kennedy was delivered in July 2022. Initial operational capability is planned for 2025.

The SPY-6(V)4 is a planned flat-face air surveillance radar planned for backfit into 15 Flight IIA Arleigh Burke-class guided-missile destroyers.

CONTRACTOR..... Raytheon Missiles and Defense

SPQ-9B RADAR

The SPQ-9B is an X-band, high-resolution, rotating phased-array radar designed to detect and track low-altitude cruise missiles in a high-clutter environment. The pulse-Doppler track-while-scan radar allows detection and tracking at long ranges, giving a ship's combat systems time to engage an incoming supersonic missile at the maximum ranges of its defenses. The SPQ-9B is integrated with the Ship Self-Defense System

onboard aircraft carriers and amphibious assault ships and with the Aegis Combat System as part of the Cruiser Modernization Program and Destroyer Modernization Program.

CONTRACTOR.....Northrop Grumman

FUTURE X-BAND RADAR

Since summer 2020, engineers at Naval Surface Warfare Center Dahlgren Division have been using a radar prototype as a test asset and risk reduction system in support of the Navy's FXR program. The FXR is planned to replace the legacy SPQ-9B radar system, which is used on aircraft carriers, amphibious assault ships, amphibious transport dock ships, guided-missile cruisers, guided-missile destroyers and Coast Guard cutters.

SPS-48 RADAR

The SPS-48E S-band three-dimensional radar is a long-range air-detection and tracking radar installed on aircraft carriers and some amphibious warfare ships. In April 2006, the Navy awarded ITT Gilfillan a contract to develop a modernized SPS-48G(V) under the Radar Obsolescence and Availability Recovery program to cut the total cost of ownership (including maintenance) by reducing the impact of obsolescence in major subassemblies and improve operational availability. It will enable the SPS-48 to remain in service through 2050.

The first SPS-48Gs were delivered in October 2009. The SPS-48G is being installed on aircraft carriers, amphibious assault ships and amphibious transport dock ships.

CONTRACTOR.....L3Harris

SPS-49 RADAR

The SPS-49 L-band radar is a long-range, two-dimensional, air-search radar installed on many Navy ships. On Ticonderoga-class guided-missile cruisers it also complements the SPY-1 radar suite.

CONTRACTOR.....Raytheon Technologies

SPS-67/73/74 RADARS

The SPS-67 and SPS-73 are surface search and navigation radars used on many classes of surface ships. The SPS-74 is an X-band surface search radar optimized for submarine periscope detection and installed on four aircraft carriers. Further SPS-74 production was canceled in favor of the SPQ-9B with periscope-detection capability.

CONTRACTORS.....SPS-67/74: Northrop Grumman Corp.; SPS-73: Raytheon

SPS-75 RADAR

The SPS-75 is the new designation for the TRS-3D, a three-dimensional multimode radar designed to perform surveillance, fire-control, gunfire support and helicopter control. The radar is optimized to track small, fast-moving targets such as swarming small boats.

The SPS-75 is installed on Freedom-class littoral combat ships through LCS 15.

CONTRACTOR.....Airbus Defence and Space

SPS-77 SEA GIRAFFE AGILE MULTIBEAM RADAR

SPS-77 is the designation for the Sea Giraffe, a three-dimensional agile multibeam radar designed to perform surveillance, fire control, gunfire support and helicopter control. The radar is optimized to track small, fast-moving targets such as swarming small boats, anti-ship missiles and anti-radiation missiles. The Sea Giraffe is installed on Independence-class littoral combat ships and on some expeditionary sea base ships.

CONTRACTOR.....SAAB

SPS-80 RADAR

SPS-80 is the designation for the TRS-4D, a three-dimensional, software-reprogrammable, multimode C-band radar designed to perform surveillance, fire control, gunfire support and helicopter control. The rotating, active electronically scanned array radar is optimized to track small, fast-moving targets such as swarming small boats.

The TRS-4D is being installed on Freedom-class littoral combat ships and was first installed on the USS Indianapolis.

CONTRACTOR.....Hensoldt

BPS-15/16 RADARS

The BPS-15/16 radars are installed on submarines for navigation and surface surveillance. Variants are installed on all current classes of U.S. submarines. The X-band radars feature automatic radar plotting aid support for target tracking in real time, along with user configurable target symbols to assist in accurately determining past, present and future target positions. The newest version, being installed on Block III Virginia-class fast attack submarines, is the BPS-16(V)5, fully integrated with the submarine's tactical local area network.

CONTRACTOR.....Northrop Grumman

SPN-43C SHIPBOARD AIR TRAFFIC RADAR

The SPN-43C is the air traffic control radar on Nimitz-class aircraft carriers and Wasp- and America-class amphibious assault ships. The S-band two-dimensional radar was first placed in service in the 1960s.

SPN-50(V)1 SHIPBOARD AIR TRAFFIC RADAR

The SPN-50(V)1 is replacing the SPN-43 air traffic control radar on Nimitz-class aircraft carriers and Wasp- and America-class amphibious assault ships. The digital radar features improved target detection and tracking in the presence of clutter. The Navy plans to procure 25 SPN-50s through 2028. Low-rate initial production began in 2020. Delivery of the first set took place in 2022. Initial operational capability was achieved during late 2022.

CONTRACTOR.....SAAB

SHIPBOARD ELECTRONIC WARFARE SYSTEMS

AUTOMATIC IDENTIFICATION SYSTEM

The AIS is a commercially available shipboard broadcast very high-frequency maritime band transponder system that can transmit ship information, including navigation, identification and cargo. The AIS is mandated by the International Maritime Organization for all merchant vessels of more than 300 tons. Warships are exempt.

The AIS significantly increases the ability of the U.S. Navy and allied nations to distinguish between normal and suspicious merchant ships headed toward U.S. and allied ports. Navy warships using the AIS have observed dramatic increases in situational awareness, ship safety and intelligence gathering. In 2005, Navy leaders identified the AIS as an urgent capability and directed fielding of stand-alone AIS on all warships by fiscal 2006 and integrated AIS in 2007-2011. The AIS was granted rapid deployment capability authority in January 2006 and transitioned to a program of record in 2008.

CONTRACTORS.....L3Harris; General Dynamics Information Technology; Northrop Grumman

BLQ-10 ELECTRONIC SURVEILLANCE MEASURES SYSTEM

The BLQ-10 is an advanced signals intelligence surveillance system for submarines designed to support operations in the littoral or open-ocean environment. It enables detection, identification (to a specific emitter), analysis and direction finding of radar and communications signals of interest. The BLQ-10 also aids in gathering intelligence. First deployed in 2000, it is installed as a common signals intelligence suite in all operational Navy submarines.

CONTRACTOR.....Lockheed Martin

ACOUSTIC DEVICE COUNTERMEASURE

The ADC is a 3-inch-diameter expendable transponder that is ejected from a submarine's signal ejector as a decoy against homing torpedoes. The Mk3 ADC is being replaced by the Mk5.

CONTRACTORS.....Leidos; Sparton

SLQ-25 NIXIE

The SLQ-25C is a towed decoy electro-acoustic jammer designed for torpedo defense of surface ships. It emits simulated ship noise intended to draw away incoming torpedoes.

CONTRACTOR.....Boeing's Argon ST

SLQ-32 ELECTRONIC WARFARE SYSTEM/ SURFACE ELECTRONIC WARFARE IMPROVEMENT PROGRAM

The SLQ-32, introduced in the early 1980s, is the Navy's primary shipboard electronic warfare system. It has provided the capability to passively detect threat radar emissions, particularly those from radar-guided anti-ship cruise missiles, and classify the type of radar. About half of the fleet's SLQ-32s, predominantly those on larger ship classes, also have an active radar jamming capability.

The SLQ-32(V) systems are undergoing an evolutionary upgrade through the Surface Electronic Warfare Improvement Program, an incremental block upgrade and replacement program for several classes of Navy combatant ships. The Block 1A upgrades replace the original signal processor with the commercial, off-the-shelf Electronic Surveillance Enhancement processor and the display console with the Navy standard UYQ-70, both of which are integrated with improved control and display software.

Block 1B integrates a stand-alone SSX-1 Small Ship Electronic Support Measures System already in production at General Dynamics, adding a specific emitter identification capability. The Coast Guard also ordered SSX-1 systems. Block 1B3, approved for low-rate production in August 2012, provides improved situational awareness.

Lockheed Martin was selected in November 2009 to produce a preliminary design for the Block 2 phase that entails more significant improvements, including a new antenna and receiver. Block 2 was approved for low-rate production in January 2013. The Block 2 was installed on the Arleigh Burke-class guided-missile destroyer USS Bainbridge in July 2014 for operational testing. Full-rate production began in October 2016. A variant of Block 2, the SLQ-32(V)6, known as SEWIP-Lite, was developed for littoral combat ships.

Northrop Grumman was awarded a contract in October 2015 to develop Block 3 with improved electronic attack capabilities as the SLQ-32(V)7. Low-rate initial production began in January 2019. The first Block 3 engineering development model was delivered in June 2021. A future Block 4 will provide electro-optic and infrared capabilities to the SLQ-32.

CONTRACTORS.....General Dynamics; Northrop Grumman; Lockheed Martin

SLQ-59 TRANSPORTABLE ELECTRONIC WARFARE MODULE

The SLQ-59 is an electronic attack system designed to be easily installed on ships as needed to provide electronic defense against cruise missiles.

CONTRACTOR.....L3Harris

SLD-4 ELECTRONIC SUPPORT MEASURES SYSTEM

The SLD-4 is installed on littoral combat ships and provides detection and identification of emitters for integration into a ship's combat system.

CONTRACTOR.....L3Harris

WLR-1 RADAR WARNING SYSTEM

The WLR-1 is installed on many Navy ships and submarines. The latest version, the WLR-1H(V)5, features reliability improvements and is designed to perform area surveillance for electronic emitters, as well as detection, classification and targeting of emitters.

WLQ-4 ELECTRONIC SUPPORT MEASURES

The WLQ-4 is installed on Seawolf-class attack submarines. It can be operated fully automatically to detect, identify and locate radar and communications emissions and, through digital computers, correlate intercepts with other sources of intelligence.

CONTRACTOR.....GTE Sylvania

SLR-25(V)1 ADVANCED CRYPTOLOGIC CARRY-ON EXPLOITATION SYSTEM AND SLR-25(V) 2 SHIP SIGNAL EXPLOITATION EQUIPMENT

The SLR-25 is a shipboard cryptologic exploitation system used for tactical surveillance and targeting; indications and warning; and passive detection, classification and tracking. The system also provides for interpretation and reporting of intercepted signals, geographic plot and analysis, and track correlation.

The SLR-25(V)1 ACCES is a portable version of the SLR-25(V)2 SSEE for ships without a permanently installed cryptologic capability. When paired with a Transportable Radio Direction-Finding System, the ACCES provides a complete signals intelligence collection system. The ACCES is being integrated into amphibious assault ships and Arleigh Burke-class guided-missile destroyers.

DEVELOPER/MANUFACTURER.....Naval Information Warfare Center-Atlantic

SSQ-137 SHIP SIGNAL EXPLOITATION EQUIPMENT INCREMENT E/F

SSEE Increment E is an evolutionary development, spiral acquisition tactical cryptologic system whose function is to provide comprehensive tactical information warfare exploitation and electronic support measures capability to the Navy's surface platforms. SSEE Increment E, an afloat information warfare sensor, provides commanders with threat search and identification information and electronic attack options.

Increment E, an open-architecture system upgraded with software changes, replaced an array of communications intelligence systems. Increment F, which features improved receiver sensitivity, signal acquisition and direction finding, entered low-rate production in April 2010 and achieved initial operational capability in 2011.

The Navy has ordered 113 Increment F systems. In May 2014, the Navy ordered the first set of improvements under the SSEE Modifications program to improve the ability to detect, geolocate and exploit signals.

CONTRACTOR.....Boeing's Argon ST

DRONE RESTRICTED ACCESS USING KNOWN ELECTRONIC WARFARE

Originally deployed to Afghanistan and Iraq on high-mobility multipurpose vehicles as an anti-improvised explosive device system, DRAKE is now deployed on Navy surface ships. DRAKE is a jamming system that, when activated, can keep a drone from closing on the ship by jamming its signal and disconnecting the drone operator from the drone. The DRAKE's frequencies can be tailored to a specific region. The system is portable in a backpack and can be powered by battery or by a ship's electrical system.

SHIPBOARD ELECTRO-OPTIC AND INFRARED SYSTEMS

BVY-1 INTEGRATED SUBMARINE IMAGING SYSTEM

The BVY-1 ISIS provides all-weather high-definition optical and infrared search via submarine periscope. The system includes active and passive ranging, image enhancement, recording and storage of images, and image transmission capabilities.

CONTRACTOR.....Lockheed Martin

TYPE 18 PERISCOPE

The Type 18 is a hull-penetrating mast that provides optical, low-light-level television and color television imaging, as well as digital photography and electronic support measures intercept capability. It is installed on Los Angeles- and Seawolf-class submarines.

CONTRACTOR.....L3Harris KEO

PHOTONICS MAST/TYPE 20 LOW-PROFILE PHOTONICS MAST

The Photonics mast is a non-hull-penetrating periscope mast installed on Virginia-class submarines. It provides multispectral sensing, allowing for visual, infrared and low-light-level television imaging in a single mast, along with a laser rangefinder.

The LPPM has the capabilities of the original mast but has a stealthier, slimmer profile like that of a 7.5-inch-diameter Type 18 periscope. Two prototypes, one built by Ultra Electronics and one by L3 KEO, reached initial operational capability in 2015. L3 KEO was awarded a contract in May 2015 to build up to 29 Block 4 LPPMs. Deliveries began in 2017. The Type 20 is being installed on Virginia-class attack submarines and Columbia-class ballistic-missile submarines.

CONTRACTORS.....L3Harris KEO; Ultra Electronics

PATROL BOAT ELECTRO-OPTICS SYSTEM

The PB-EOS is a variant of the SeaFLIR 280-HD maritime electro-optic and infrared imaging system for Navy and Coast Guard patrol boats.

CONTRACTOR.....FLIR Systems Inc.

MX-10MS MILITARY SEALIFT COMMAND ELECTRO-OPTICAL SYSTEM

The MX-10MS is an electro-optical sensor turret for Military Sealift Command ships for situational awareness, including intelligence, surveillance and reconnaissance, coastal observation and navigation. Sensors include high-definition infrared, wide and narrow electro-optical capabalities, laser rangefinder, and Advanced Video Tracker. Systems are being delivered under a $49 million contract.

CONTRACTOR.....L3Harris Wescam

MK20 AND MK46 ELECTRO-OPTICAL SENSOR SYSTEM

The Mk20 EOSS, in production since 2005, is a shipboard system that provides targeting for naval guns. The Mk20 Mod 1 offers increased range resolution. The Mk46 EOSS is an earlier targeting system.

CONTRACTOR.....L3Harris KEO

SHIPBOARD PANORAMIC ELECTRO-OPTIC/ INFRARED SYSTEM

SPEIR will provide ships with 360-degree passive surveillance and automatic detection for defense against anti-ship cruise missiles, fast attack craft, terrorist craft and other threats. The system will be installed on aircraft carriers, destroyers, frigates and amphibious assault ships. L3Harris was selected in June 2022 as the prime contractor to provide SPEIR to the fleet.

CONTRACTORS.....L3Harris; Lockheed Martin; BAE Systems

SHIPBOARD SONAR SYSTEMS

SQQ-32 SONAR

The SQQ-32 mine-hunting high-resolution sonar is deployed on Avenger-class mine countermeasures ships to detect and classify sea mines. It can operate in a retracted mode for operations in shallow water or lowered through the hull and towed for operations in deeper water. Installation of an upgraded version, the SQQ-32(V)4 — designed to improve performance in cluttered waters, increase search rate and provide improved resolution imagery — was completed in the MCM fleet in 2015.

CONTRACTOR.....BAE Systems

SQS-53 SONAR

The SQS-53 is the digitally controlled, bow-mounted, active/passive sonar on Ticonderoga-class guided-missile cruisers (SQS-53A/B/D) and Arleigh Burke-class guided-missile destroyers (SQS-53C). The SQS-53D includes commercial, off-the-shelf processors and is replacing the SQS-53A/B on cruisers.

CONTRACTORS.....General Electric; Raytheon Technologies; ITT Corp.

CAPTAS-4 VARIABLE DEPTH SONAR

With the cancellation of the littoral combat ship anti-submarine warfare mission package and its VDS, the Navy selected the CAPTAS-4 VDS in March 2022 to equip the Constellation-class guided-missile frigate. CAPTAS-4 will be used to search for and track submarines below a sonic layer.

CONTRACTORS.....Thales; Advanced Acoustic Concepts

BQQ-5 AND BQQ-6 SONAR

The BQQ-5 active/passive sonar is a digital replacement of the BQQ-2 sonar. It includes a large spherical array that is installed in the bow of Los Angeles-class submarines. The BQQ-6 is a similar primarily passive system, with limited active capability, installed on Ohio-class ballistic missile submarines. Both sonar types are being replaced by the BQQ-10.

CONTRACTOR.....Lockheed Martin

BQQ-10 SONAR

The BQQ-10 designation has been given to the multiphase Acoustic Rapid Commercial Off-the-Shelf Insertion program to upgrade U.S. submarine sonar systems into an open-architecture common configuration.

The BQQ-10 includes the Submarine Precision Underwater Mapping and Navigation Upgrade to map the seafloor and register geographic features — including human-made objects such as mines — and display them in a three-dimensional form on a computer screen. PUMA allows a submarine to conduct covert minefield surveillance and avoidance and transmit the intelligence to other platforms. The BQQ-10's open architecture allows rapid insertion of new technologies, including the conformal array, large vertical array and advanced towed arrays now under development.

CONTRACTORS.....Lockheed Martin; General Dynamics; Advanced Research Laboratory of the University of Texas at Austin

LIGHTWEIGHT WIDE-APERTURE ARRAY

The LWAA is a passive sonar system installed on the Virginia-class fast attack submarine. The acoustic sensors are housed in conformal fairings along the hull of the submarine.

CONTRACTOR.....L3Harris

LARGE-APERTURE BOW ARRAY

The LAB is a bow-mounted sonar array installed on the Block III and subsequent blocks of Virginia-class fast attack submarines. It replaces the bow sonar sphere to allow installation of two Virginia payload tubes, achieving significant cost reductions. Initial operational capability was achieved in 2014 on the USS North Dakota.

CONTRACTOR.....Lockheed Martin

LARGE VERTICAL ARRAY

The LVA is a hull-mounted passive acoustic array developed for Block III and IV Virginia-class fast attack submarines and Ohio-class ballistic missile submarines.

CONTRACTOR.....General Dynamics Electric Boat

BQR-15 TOWED ARRAY

The BQR-15 is a passive acoustic sonar array towed by Los Angeles- and Ohio-class submarines.

CONTRACTORS.....Northrop Grumman; L3Harris

SQR-18/19 TACTICAL TOWED ARRAY SYSTEMS

The SQR-18 and SQR-19 TACTAS provide very long-range passive detection of submarines. The arrays are towed as much as a mile behind a deploying warship so that the ship's self-generated noise will not interfere with noise picked up from a target. The SQR-19 is deployed on Ticonderoga-class guided-missile cruisers and Arleigh Burke-class guided-missile destroyers.

CONTRACTOR.....Gould Electronics

TB-16 TOWED ARRAY

The TB-16 is a passive acoustic sonar array towed by Los Angeles-, Seawolf- and Ohio-class submarines. It is housed in a tube that runs along the submarine's hull. The TB-16B version, introduced in 1987, greatly reduced the self-noise of the array. The TB-16D was the first digital version, with more improvements included in the TB-16E (1989) and TB-16G (2003).

CONTRACTOR.....Lockheed Martin

TB-29 AND TB-29A TOWED ARRAYS

The submarine-towed array is a retractable cable fitted with acoustic hydrophone sensors used for passive acoustic detection and tracking. The TB-29 thin-line array replaced older TB-16D and TB-23 arrays. The TB-29A is a commercial, off-the-shelf version of the TB-29 on Los Angeles-, Seawolf- and Virginia-class submarines. The TB-29A also is installed on some surveillance surface ships as a surface towed array. The TB-29A provides a 400% to 500% increase in detection capability against quiet submarines in littoral environments. Changing requirements led to termination of procurement after 32 TB-29A systems were delivered, the last in 2005.

CONTRACTORS.....Lockheed Martin; L3Harris

TB-34X TOWED ARRAY

The TB-34X is a submarine acoustic fat-line towed array with passive receivers. It is replacing the TB-16 to search for, detect and track submarines and surface ships. It features more hydrophones than the TB-16 and has greater capability and reliability.

CONTRACTOR.....L3Harris

TL-29A TOWED ARRAY

The TL-29A, a twin-line variant of the TB-29A, is a passive, low-frequency system towed by the Military Sealift Command's ocean surveillance ships. It has been installed on five ships.

CONTRACTORS.....Lockheed Martin; L3Harris

TB-37(U) MULTI-FUNCTION TOWED ARRAY

The TB-37(U) — formerly SQR-20 — is a three-inch-diameter active and passive acoustic towed array. With its improved performance, coverage and reliability, it is replacing the SQR-19 in the fleet. It is integrated with the shipboard SQQ-89A(V)15 ASW systems. It is deployed on Ticonderoga-class guided-missile cruisers and Arleigh Burke-class and Zumwalt-class guided-missile destroyers and will be deployed on Constellation-class guided-missile frigates.

CONTRACTORS.....Lockheed Martin; L3Harris

UQQ-2 SURFACE TOWED ARRAY SENSOR SYSTEM

SURTASS is a cable-mounted array of acoustic hydrophones that provides long-range, passive detection and surveillance of quiet nuclear- and diesel-powered submarines and real-time reporting of contacts to operational commanders. SURTASS is towed by an ocean surveillance ship in a single-line array or a shorter twin-line array more suited for water as shallow as 180 feet. The TB-29A array is being installed on all SURTASS ships. The WQT-2 Low-Frequency Active upgrade includes a low-frequency active sonar transmitter, with the array serving as receiver of target echoes. Two LFA systems are in fleet use, but their operations are limited by the Marine Mammal Protection Act.

DEVELOPERS.....Lockheed Martin; General Dynamics; Johns Hopkins University Applied Physics Laboratory; Alpha Marine; Raytheon; BAE Systems; IUSS Operations Center

FIXED SONAR SYSTEMS

SOUND SURVEILLANCE SYSTEM

SOSUS is a Cold War-era network of bottom-mounted hydrophones connected to shore terminals. SOSUS has the capability to detect and track submarine and surface contacts of interest at extremely long ranges. The system has become a subsystem of the Navy's Integrated Undersea Surveillance System.

FIXED DISTRIBUTIVE SYSTEM

The FDS, designed to be an improvement of SOSUS, is a passive acoustic array surveillance system fixed on the ocean floor in deep ocean, narrow straits, choke points and shallow littoral areas. The FDS-C is an upgrade incorporating less-expensive commercial, off-the-shelf equipment to meet the fleet's needs for long-term undersea surveillance. The FDS and FDS-C are being fitted with a common processor to increase operator proficiency and reduce logistics costs.

SSQ-58A MOORED SONOBUOY

The SSQ-58A is deployed by Mobile Inshore Undersea Warfare units for harbor defense. The small, battery-powered buoys are monitored to provide warning of swimmers, divers and small boats through passive acoustic detection and transmission of information by radio to the harbor defense commander.

TRANSFORMATIONAL RELIABLE ACOUSTIC PATH SYSTEM

TRAPS is a fixed acoustic system designed to operate on the ocean floor to detect submarines at long ranges and over large areas. An array of nodes use a wireless acoustic modem to transmit acoustic information to a surface node for further transmission to a receiving platform. TRAPS originally was part of DARPA's Distributed Agile Submarine Hunting program. Leidos has delivered prototype systems to the Navy.

CONTRACTOR.....Leidos Inc.

SURFACE MINE COUNTERMEASURES SYSTEMS

AQS-20 MINEHUNTING SONAR



RAYTHEON

AQS-20

The AQS-20 is a variable-depth, underwater mine-detection sonar designed to give a strike group an organic capability to detect, classify and localize bottom, close-tethered and volume mines. The AQS-20A also is fitted with an electro-optic sensor to identify underwater objects.

The sonar is deployed while a helicopter is in a hover; the sonar is then towed undersea to scan the water in front and to the sides of the helicopter as well as the sea bottom for anti-shipping mines. The sonar and electro-optic sensor provide high-resolution images of mines and mine-like objects as well as high-precision location information. The AQS-20A is a component of the Remote Multimission Vehicle and the Airborne Mine-Neutralization System in the mine warfare mission package of littoral combat ships. It entered low-rate initial production in 2005; 25 units were delivered.

The AQS-20C features four imaging sonars and an imaging laser system that hunt for mines in the entire water column over a large area in a single pass. Classification of mines is done within the body of the system using advanced algorithms and signal processing. With the Barracuda mine neutralizer, the AQS-20C can complete the search to engage in a single pass. The AQS-20C is being integrated on the mine countermeasures uncrewed surface vehicle for mine hunting from littoral combat ships. Developmental testing began in late 2018. Delivery of 10 units began in summer 2018 and was completed in January 2020. Initial operational capability was achieved in late 2018. Developmental testing with the LCS was completed in 2019. Raytheon is upgrading 10 AQS-20A units to the AQS-20C configuration.

CONTRACTOR.....Raytheon Technologies

AQS-24 MINEHUNTING SONAR



NORTHROP GRUMMAN

AQS-24B

The AQS-24 is an active sonar winched and towed through the water by an MH-53E mine countermeasures helicopter or by a mine countermeasures uncrewed surface vehicle. It is designed to detect mines for further investigation by mine warfare forces. The AQS-24A uses sonar simultaneously with a laser line scanner to provide precision optical identification of underwater mines. Japan has also ordered the sonar for use on its minesweeping helicopters.

The AQS-24A is being upgraded to the AQS-24B, which features improved synthetic aperture sonar imaging — with three times the resolution of the AQS-24A — and increased speed of real-time sonar processing. The first of three lots of AQS-24B upgrade kits were delivered in September 2016. Two more lots were delivered by 2017. The AQS-24B also will be integrated on mine countermeasures uncrewed surface vehicles for mine hunting from littoral combat ships and from an MH-53E helicopter. The AQS-24C volume-search sonar, tested to depths exceeding 400 feet, was delivered to the fleet in 2020. The Navy is integrating machine learning for automatic target recognition.

CONTRACTOR.....Northrop Grumman (Westinghouse)

UNMANNED INFLUENCE SWEEP SYSTEM

The UISS is a standoff, semi-autonomous system designed with the capability to counter acoustic and/or magnetic mines. It includes a magnetic cable that tows a modified Mk104 sound source towed by a mine countermeasures uncrewed surface vehicle. The Mk104 uses cavitation to create sound while the cable establishes a magnetic field to detonate mines. Developmental testing and operational assessment was completed in November 2019. Low-rate initial production was authorized in February 2020. The system's initial operational testing and evaluation was completed in June 2021. The UISS completed underwater shock tests in late 2021. Initial operational capability was announced in July 2022. The

UISS is to be deployed in the Mine Countermeasures Unmanned Surface Vehicle as part of the mine countermeasures package for littoral combat ships or from vessels of opportunity.

CONTRACTOR.....Textron

MAGNETIC AND ACOUSTIC GENERATION NEXT UNMANNED SUPERCONDUCTING SWEEP SYSTEM

The MAGNUSS system features a high-temperature superconducting magnetic source with an advanced acoustic generator, designed to defeat magnetic- and acoustic-triggered sea mines by spoofing them. The MAGNUSS system is a modular nontowed, zero-drag system that sits within an uncrewed surface vessel and basically spoofs mines through acoustics and magnetics. The MAGNUSS magnetic source is built by American Superconductor, and the advanced acoustic generator is built by General Dynamics Applied Physical Sciences.

Textron Systems was awarded a $20.8 million contract from the Office of Naval Research's Future Naval Capabilities effort for the development, fabrication and demonstration of the MAGNUSS payload, which is expected to transition to the Naval Sea Systems Command program for the Mine Countermeasures Unmanned Surface Vehicle. Textron will be working to provide a low-risk, advanced development model of the MAGNUSS system that will be put through a demonstration for the Navy using a company-owned Common USV like those the company delivered to the Navy for the UISS program.

CONTRACTORS.....Textron; American Superconductor; General Dynamics Applied Physical Sciences

SLQ-37/38 MINE SWEEPING SYSTEM

The SLQ-37 and SLQ-38 are towed by Avenger-class mine countermeasures ships. They include acoustic generators and magnetic fields to detonate mines.

SLQ-48 MINE NEUTRALIZATION VEHICLE



U.S. NAVY

SLQ-48

The SLQ-48 is a self-propelled, remotely operated, tethered vehicle used by Avenger-class mine countermeasures ships to hunt for and neutralize mines. It features a low-light television and floodlight and can carry one of two mission packages to neutralize mines: a cable cutter to release moored mines to the surface or an explosive charge to be placed to detonate a mine.

SLQ-60 SEAFOX MINE NEUTRALIZATION SYSTEM

The Seafox is a portable, tethered, semi-autonomous mine neutralization vehicle that can identify mines with its camera and detonate the moored and bottom mines with a shaped charge. The system includes a mission console and launch and recovery gear onboard the mother ship. The Seafox was deployed to the Persian Gulf in 2012.

CONTRACTOR.....Atlas Elektronik

SPU-1/W MINE NEUTRALIZATION SYSTEM

The SPU-1/W is a 30-foot, 1,000-pound metal pipe filled with plastic foam. It is magnetically charged before use; up to three can be towed in tandem in the water by an MH-53E helicopter. The pipes are used to detonate acoustic and magnetic mines.

AIRBORNE RADAR SYSTEMS

APG-81 ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR



NORTHROP GRUMMAN

APG-81 AESA RADAR

The APG-81 AESA multimode radar is primarily a combat fire-control system for F-35 aircraft, optimized for air-to-air and air-to-ground detection and targeting. The APG-81 also will be capable in its synthetic aperture mode of high-resolution air-ground radar-image mapping of terrain for reconnaissance use. The radar's inverse synthetic aperture mode will be used to detect and identify surface targets at sea.

CONTRACTOR.....Northrop Grumman

APG-79 ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

The APG-79 on the Block II version of F/A-18E/F and EA-18G aircraft is primarily an air-to-air and air-to-ground fire-control radar. The nose-mounted AESA antenna transmits directional beams in multiple modes as directed by agile electronic commands. Modes include air-to-air search and track, sea surface search, ground moving target indication

and track, synthetic aperture radar, and mapping. Planned upgrades will improve its strike and electronic attack capabilities and allow for SAR and GMTI technology to enable radar imaging of terrain for reconnaissance purposes. In January 2019, the Marine Corps selected the APG-79(V)4 version scaled for its F/A-18C/D aircraft. First flight of the (V)4 version on an F/A-18 Hornet took place in 2022.

CONTRACTOR.....Raytheon Intelligence and Space

APG-65 AND APG-73 AIR INTERCEPT RADARS

The APG-65 and APG-73 are nose-mounted radars in the Navy and Marine Corps F/A-18 A+/C/D aircraft and Block I versions of the F/A-18E/F. The APG-65 also is installed in some AV-8Bs. The APG-65 and APG-73 are all-weather, mechanically scanned, multimode, multiwaveform, search and track sensors for air-to-air and air-to-surface missions.

CONTRACTOR.....Raytheon Intelligence and Space

APS-137B(V)5 MARITIME SURVEILLANCE RADAR

The APS-137B(V)5 is a multimode maritime imaging radar installed on P-3C patrol aircraft. In the synthetic aperture radar mode, the system can detect and map targets at high resolution for intelligence and targeting. In the inverse synthetic aperture radar mode, the system can detect and classify surface contacts with resolution high enough to identify classes of ships. The radar provides locating information on contacts and can be used for periscope detection at a high scan rate. Upgrades being implemented and considered include standoff precision targeting and a maritime moving target indicator mode.

CONTRACTOR.....Raytheon Intelligence and Space

APS-147/153 MULTIMODE RADAR

The lightweight APS-147 or newer APS-153 is installed on the MH-60R multimission helicopter. With its long-range search, short-range search and inverse synthetic aperture radar modes, it is used for detection, identification, classification and tracking of surface targets. It also features a periscope detection mode. The APS-153 is a development of the APS-147 that features the automatic radar periscope detection and discrimination capability. Full-scale production of the APS-153 began in 2012.

CONTRACTOR.....Telephonics Corp.

APS-145 RADAR

The APS-145 radar is the primary surveillance system in the Navy's E-2C Hawkeye and Hawkeye 2000 carrier-based radar warning aircraft. The antenna is installed in a dorsal-mounted, dish-shaped radome that rotates when operating. The E-2C crew can monitor more than 6 million cubic miles of airspace and 150,000 square miles of ocean surface to ranges of greater than 300 miles. It can automatically detect, identify and track more than 2,000 targets, including their course, speed and altitude; simultaneously link the tracks over data networks to command centers and other units in a carrier strike group; and control friendly aircraft for intercepts.

CONTRACTOR.....Lockheed Martin

APS-154 ADVANCED AIRBORNE SENSOR

The AAS is a development of the P-3C's APS-149 for the P-8A aircraft. The AAS is solid-state, wide-aperture, active electronically scanned array radar housed in a long pod under the fuselage. The sensor is designed to provide standoff detection and tracking of moving targets and high-resolution ground mapping. Flight tests on the first P-8A test aircraft began in April 2014.

APY-9 RADAR



LOCKHEED MARTIN

APY-9 ON E-2D ADVANCED HAWKEYE

Installed on the E-2D Advanced Hawkeye, the APY-9 is an electronically scanned phased-array radar whose antenna is installed in a dorsal-mounted, dish-shaped radome. The APY-9 radar provides greatly increased capability to detect and track targets earlier and more accurately in littoral, overland and overwater environments than the APS-145. The radar retains the legacy mechanical scanning capability of the E-2C and has the capability to stop the rotodome rotation and perform electronic scanning across a sector of interest. The E-2D crew can monitor more than 6 million cubic miles of airspace and 150,000 square miles of ocean surface to ranges of greater than 300 miles. Low-rate production began in 2010.

CONTRACTORS.....Northrop Grumman; Lockheed Martin; Raytheon Intelligence and Space; L3Harris

APY-10 RADAR

The APY-10 maritime, littoral and overland surveillance radar is a multimode imaging radar supporting the P-8A aircraft. The APY-10 is a new design based on the APS-137B (V)5 radar installed on P-3C Orion aircraft and is fully integrated into the P-8A's mission control and display system. On Feb. 3, 2011, P-8A maker Boeing awarded Raytheon a low-rate initial production contract to develop six APY-10 radars plus spares for the Poseidon. Initial operational capability was achieved in December 2013 with the P-8A. An international version has been installed on Indian Navy P-8Is.

CONTRACTOR.....Raytheon Intelligence and Space

DPY-2 RADAR

The DPY-2 is a small synthetic-aperture/ground moving target indicator used on the RQ-21A Blackjack uncrewed aerial vehicle. It is based on the NSP-5 commercial radar. The DPY-2(V)1 Split Aces payload includes a communications relay package; the DPY-2(V)2 does not.

CONTRACTOR.....IMSAR LLC

ZPY-3 MULTIFUNCTION ACTIVE SENSOR

The ZPY-3 is the 360-degree long-range surveillance radar developed for the MQ-4C Triton uncrewed aerial vehicle. The X-band active electronically scanned array ZPY-3 can switch between maritime surface search, spot synthetic aperture radar, strip SAR, inverse SAR snapshot and inverse SAR high-resolution modes. Data is sent to ground stations in the

form of tracks, single-frame images and high-resolution images while maintaining 360-degree search. The ZPY-3 enables the Triton to cover more than 2.7 million square miles during a mission. Flight testing began in February 2012; the first flight on an MQ-4C took place in 2015.

CONTRACTOR.....Northrop Grumman

ZPY-8 OSPREY RADAR

In November 2017, the Navy selected the Osprey search active electronically scanned array radar for the MQ-8C version of the uncrewed aerial vehicle. The radar's flat-panel technology allows it to fit within the mold line of the helicopter rather than be housed in a pod. Five sets were ordered for test and evaluation. Flight testing on the MQ-8C began in May 2020. Initial operational capability on the MQ-8C was achieved in 2021.

CONTRACTOR.....Leonardo-Fincantieri

AIRBORNE ELECTRO-OPTIC AND INFRARED SYSTEMS

AAQ-37 DISTRIBUTED APERTURE SYSTEM

The AAQ-37 is an array of six infrared cameras on F-35 aircraft that give pilots panoramic 360-degree coverage for situational awareness for missile detection and tracking, launch point detection, navigation and weapons deployment. In June 2018, Lockheed Martin selected Raytheon to develop the second generation of the DAS, which will feature five times more reliability and two times more performance capability improvement at a lower cost.

CONTRACTORS.....Northrop Grumman; Raytheon Missiles and Defense

AAQ-40 ELECTRO-OPTICAL TARGETING SYSTEM

The EOTS, developed for F-35 aircraft, will provide detection and precision targeting of air and ground threats, as well as surveillance and battlefield situation awareness. The EOTS is the first sensor to combine forward-looking infrared with search and track functionality. The sensor views through a sapphire window in the nose of an F-35, rather than in a rotating turret. The first low-rate initial production units were delivered in November 2009. First flight of the EOTS took place in August 2010 on a test-bed aircraft.

CONTRACTORS.....Lockheed Martin; BAE Systems

ASG-34 (V)1 INFRARED SEARCH AND TRACK



U.S. NAVY

ASG-34(V)1 POD MOUNTED UNDER AN F/A-18F

The IRST is a passive infrared sensor mounted in the forward section of a centerline fuel tank that detects and tracks aerial targets at extended ranges. Its high-angle accuracy allows it to track closely spaced targets at maximum ranges. The IRST system began flight testing on F/A-18E/F aircraft in February 2014 and was approved for low-rate initial production in December 2014. Deployment began in 2017. Deployment on a carrier was noted in an F/A-18F squadron in August 2020.

Full-rate production of Block I was deferred in favor of developing an improved version, Block II, which features improved optics and processing power. Block II was first flown on an F/A-18F in late 2019 and was delivered to the fleet in 2021.

CONTRACTORS.....Boeing; Lockheed Martin

ASQ-228 ADVANCED TARGETING FORWARD-LOOKING INFRARED

The ATFLIR is an external targeting pod designed for F/A-18 aircraft. The pod features midwave infrared targeting, an electro-optic sensor, a laser rangefinder, a target designator, a laser spot tracker and a laser infrared marker. The ATFLIR provides the aircrew imagery to detect, acquire, track and identify ground targets for attack with laser-guided or GPS weapons. An infrared marker is available for identifying targets to night-vision-goggle-equipped ground forces. ATFLIR video is downlinked via the ATFLIR ROVER Data Link system and provides C-band ATFLIR video to ground forces equipped with the ROVER system. ATFLIR has been used extensively in Iraq and Afghanistan. The Navy has procured 410 ATFLIR systems.

CONTRACTOR.....Raytheon Intelligence and Space

AAQ-28(V) LITENING ELECTRO-OPTICAL SENSOR POD

The AAQ-28(V) is an external electro-optical sensor pod that enables an aircrew to detect, acquire, identify and auto-track targets at long ranges for weapons delivery. The pod is fielded with an internal data-link system to seamlessly communicate with remotely operated video-enhanced receivers and ground stations. The Marine Corps has used the system since 2000 on AV-8B and later F/A-18 and EA-6B aircraft. The Navy began in 2019 to require a replacement for the ASQ-228 ATFLIR pods for its F/A-18E/Fs and selected Northrop Grumman in 2022 to provide the AAQ-28(V).

CONTRACTOR.....Northrop Grumman

AAS-44 THERMAL IMAGING SYSTEM

The AAS-44 is a long-range thermal imaging system used for surveillance as well as targeting for laser-guided air-to-surface weapons from helicopters. The AAS-44 is installed on MH-60R, MH-60S, CH-53K helicopters.

CONTRACTOR.....Raytheon Intelligence and Space

ASX-6 MULTIMODE IMAGING SYSTEM/ASX-4 ADVANCED IMAGERY MULTISPECTRAL SYSTEM

The ASX-4 AIMS is a military variant of the commercial MX-20, a 20-inch-diameter gimbaled turret housing long-range, high-resolution, digital electro-optic and infrared sensors for maritime surveillance. It replaced the AAS-36 on the Aircraft Improvement Program versions of P-3C aircraft. The MX-20D True High Definition version is the electro-optic sensor on the P-8A. The ASX-6 MMIS, a 15-inch-diameter gimbaled turret similar to the ASX-4, is a military version of the commercial MX-15 on some P-3Cs.

CONTRACTOR.....L3Harris Wescam

AAQ-22 BRITE STAR II

The BRITE Star II sensor system is a 16-inch-diameter electro-optic and infrared navigational sensor system that includes a laser designator, laser pointer and large focal-plane array color daylight camera. Block II is replacing the AAQ-22C Star Safire and AAQ-22D BRITE Star. The Navy uses the AAQ-22D BRITE Star II for the MQ-8C uncrewed aerial vehicle, now retired. The Marine Corps uses the AAQ-22E system on its UH-1Y helicopters.

CONTRACTOR.....Teledyne FLIR

DVS-1 COASTAL BATTLEFIELD RECONNAISSANCE AND ANALYSIS

The COBRA is a mine- and obstacle-detection multispectral sensor that is a modular component of the mine warfare mission package for littoral combat ships. It is designed to detect mines from the beach through the surf zone. The COBRA is the intelligence, surveillance and reconnaissance technology component of the planned Assault Breaching System. In March 2009, COBRA Block I was rated mature enough to enter low-rate initial production. The COBRA was tested on an MQ-8B uncrewed aerial vehicle in October 2010. Initial operational capability was achieved in July 2017. Operational testing was completed in April 2018.

Block II, planned for installation on the MQ-8C, will add night operation capability and full-detection capability of mines in the surf zone out to 200 feet of water depth during a single pass with a high coverage rate. Block III will add buried-mine line-detection capability and near-real-time onboard processing capability. The Navy released a request for proposals for Block II in 2022.

CONTRACTOR.....Block I: Arete Associates; Block II: TBD

AES-1 AIRBORNE LASER MINE-DETECTION SYSTEM



U.S. NAVY

AES-1 ALMDS CARRIED BY AN MH-60S

The ALMDS is an electro-optic blue-green laser system designed to operate from the port side of the MH-60S helicopter to detect, classify and localize floating and moored sea mines near the surface using no in-water components. In flight, the laser makes a wide swath sweep through the water, collecting three-dimensional imagery of the water volume. It will provide a strike group with an organic airborne mine countermeasures capability, able to respond quickly, search a wide area and classify mines in littoral waters, straits and chokepoints.

The ALMDS is one of the airborne MCM systems that are part of the mine warfare mission package designed for littoral combat ships. The Navy awarded a low-rate initial production contract in April 2006. The first ALMDS pod was delivered in January 2007, with 12 delivered by 2014. An additional five were ordered in February 2015. The ALMDS was deployed to the Persian Gulf in July 2014 by a Helicopter Sea Combat Squadron 26 detachment. Initial operational capability was achieved in October 2016.

CONTRACTOR.....Northrop Grumman

BLACKKITE I WIDE-AREA INFRARED SENSOR

The BlackKite I (formerly Cardcounter) is a miniature wide-area infrared sensor developed for the RQ-21A uncrewed aerial vehicle. It is based on a BlackKite sensor that weighs less than 28 pounds and can image an area of 5 square miles. The sensor was first flown on an RQ-21A in April 2021. The U.S. Navy purchased four systems.

CONTRACTOR.....Logos Technologies

AIRBORNE ELECTRONIC WARFARE SYSTEMS

ALQ-99 TACTICAL JAMMING SYSTEM

The ALQ-99 is an electronic warfare system designed to jam adversary radar, communications and data-link signals. The system, deployed on EA-18G aircraft, automatically intercepts, processes and jams adversary signals. Major components include pod-mounted jamming transmitters powered by ram-air turbines. The ALQ-99 is coupled with the ALQ-218 wideband receiver system and ALQ-227 communications receiver or USQ-113 communications countermeasures set.

CONTRACTORS.....various

ALQ-249 NEXT-GENERATION JAMMER

The NGJ program is replacing the ALQ-99 Tactical Jamming system. To be used on EA-18G aircraft, the system was envisioned as a three-increment program, with each adding to the frequency range covered, each in a separate pod. Increment 1 (Mid-Band Jammer) is designed as a two-pod system, one for each wing, and addresses the capacity, capability and supportability limitations of the current system. Raytheon delivered the first Engineering and Manufacturing Development pod in August 2019 and will deliver 15 EMD pods for mission systems testing and 14 for airworthiness certification. Critical design review of Increment 1 was completed in May 2017. The Mid-Band pod made its first mission systems flight in August 2020. The first production-representative pods were delivered to the Navy in July 2022 for use in developmental and operational testing.

When the NGJ is combined with the EA-18G's comprehensive suite of radar and communications receivers, electronic warfare officers can detect, analyze and react to current and future threat systems. Australia joined the program in February 2017.

In December 2020, L3Harris was selected to develop and build Increment 2 — the Low-Band Jammer. Development of the High-Band Jammer will follow.

CONTRACTORS.....Increment 1: Raytheon Intelligence and Space;
Increment 2: L3Harris

ALQ-210 ELECTRONIC SUPPORT MEASURES

The ALQ-210 ESM system installed on MH-60R helicopters is designed to detect, classify and locate radar emitters on land, surface vessels, submarines and aircraft.

CONTRACTOR.....Lockheed Martin

ASQ-239 ELECTRONIC WARFARE SYSTEM

The ASQ-239 is designed to provide F-35 aircraft with warning and electronic support measures to increase situational awareness and survivability versus radar-guided weapons. The ASQ-239 is likely to feature some electronic jamming capability through an active electronically scanned array radar. In August 2019, BAE was awarded a contract to add 11 capabilities to the ASQ-239 under Block 4 modernization.

CONTRACTOR.....BAE Systems

ALQ-240(V)1 ELECTRONIC SUPPORT MEASURES SYSTEM

The ALQ-240(V)1 is the ESM system installed on P-8A aircraft. It features adaptive tuning, precise direction finding and geolocation capabilities. Initial operational capability was achieved in 2013.

CONTRACTOR.....Northrop Grumman

ALQ-248 ADVANCED OFF-BOARD ELECTRONIC WARFARE SYSTEM

The ALQ-248 AOEW is a self-contained active mission payload pod designed to be carried aloft by MH-60R/S helicopters to operate independently or as an extension of a ship's electronic warfare system, the SLQ-32(V)6 Surface Electronic Warfare Improvement Program Block II and eventually (V)7 Block III. The AOEW will be able to detect an incoming cruise missile, evaluate its direction and use radio frequency countermeasures to deter the missile. Lockheed Martin delivered four engineering and manufacturing development models in early 2020. Low-rate production was ordered in September 2021, and the first low-rate initial production units were delivered to the Navy in 2022.

CONTRACTOR.....Lockheed Martin

ZLQ-1 ELECTRONIC SUPPORT MEASURES SYSTEM

The ZLQ-1 is the ESM/signals intelligence system installed on the MQ-4C Triton uncrewed aerial vehicle. The digital system features specific emitter identification.

CONTRACTOR.....Sierra Nevada Corp.

MAGNETIC ANOMALY DETECTION-EXTENDED ROLE

The MAD-X is a highly sensitive magnetometer designed to detect submarines by detecting anomalies in the earth's magnetic field. The MAD-X is significantly smaller and lighter than earlier systems. Under a Phase 1 contract, the MAD-X will be installed on six MH-60R helicopters.

CONTRACTORS.....CAE; Lockheed Martin (integrator)

AIRBORNE SONAR SYSTEMS

AQS-22 AIRBORNE LOW-FREQUENCY SONAR

The AQS-22 ALFS is the primary anti-submarine warfare sensor for MH-60R helicopters. The ASQ-22 is dipped into the water by a reel on the helicopter and used to detect, track and localize a submarine. It also can be used for passive acoustic intercept, underwater communications with a submarine and collecting bathythermal information of the ocean. Low-rate initial production began in 2002 and full-rate production in 2006. The ALFS was first deployed operationally in 2009.

CONTRACTORS.....Thales; Raytheon Technologies; Lockheed Martin

AAQ-2(V)1 ACOUSTIC SYSTEM

The AAQ-2(V)1 is the acoustic processor and display system for the P-8A Poseidon maritime patrol aircraft. It interfaces with an open-architecture system and provides processing and functionality growth for the life of an aircraft. The AAQ-2(V)1 can receive, process and record 64 sonobuoy channels of passive or active sounds. The system also tracks sonobuoy positioning and multistatic active coherent capability.

CONTRACTOR.....Boeing

SONOBUOYS (AIR-LAUNCHED)



U.S. AIR FORCE

SONOBUOYS IN A P-8

Sonobuoys are used for environmental measurement and prediction prior to and during an anti-submarine warfare operation, passive and active acoustic search and localization of the submarine target, and final active acoustic fixing of the target's position. Sonobuoys are expendable sensor systems designed to be dropped from aircraft into the water, where the parachute-retarded or speed-braked cylindrical housings deploy battery-powered cables with passive acoustic hydrophones or active transducers for detecting, tracking and collecting acoustic intelligence on submarines and surface ships and radioing the information to the aircraft or a ship for processing.

The SSQ-36B bathythermograph sonobuoy is used to graph the temperature profile of a body of water. The SSQ-53F Directional Frequency Analysis and Recording System is a passive acoustic sensor for detecting, localizing and tracking a submarine. The SSQ-77C Vertical Line Array is a passive directional buoy with multiple hydrophones in a vertical column and can be used as a multistatic receiver or a passive sensor. The SSQ-62E Directional Command Activated Sonobuoy System is an active sensor used to provide terminal positioning data during the attack phase by transmitting active sound and determining range and bearing to a contact.

The SSQ-101 Air Deployable Active Receiver is a commandable, passive acoustic sonobuoy with a horizontal planar array. The SSQ-125 is the coherent source sonobuoy used in the Multistatic Active Coherent anti-submarine warfare system. It replaces the SSQ-110 used with previous impulsive multistatic systems.

The SSQ-125 produces electronic (coherent) pulses of various types and lengths that enable Doppler processing to distinguish moving targets (e.g., submarines) from stationary features of the environment (e.g., shipwrecks). This capability will enable the detection of targets in shallow water environments involving a rough ocean floor. In a planned second phase of Multistatic Active Coherent development, the power source for the SSQ-125 will be increased, enabling it to attain the long-range search

capabilities required for deep convergence zone environments. High-altitude anti-submarine warfare will integrate modified sonobuoy sensors to enhance the P-8A capability to conduct its mission at altitudes higher than traditional fixed-wing airborne anti-submarine warfare systems, thereby enabling greater communications range.

CONTRACTORS.....Sparton Corp.; Ultra Electronics' UnderSea Sensor Systems Inc.; ERAPSCO (joint venture between Sparton and Ultra)

SMALL UNMANNED UNDERWATER SYSTEMS

ADVANCED DEVELOPMENT UNMANNED UNDERWATER VEHICLE

As a risk-reduction effort for the torpedo-tube-launched 21-inch Mission Reconfigurable UUVs, the Navy awarded Lockheed Martin Maritime Systems and Sensors a contract in 2003 to design a single prototype ADUUV. It is the first Navy UUV designed to accommodate interchangeable modular mission payloads that can be swapped out at sea. The single prototype is being used as a test bed for future UUV payloads.

CONTRACTOR.....Lockheed Martin

MK18 MOD 1 SWORDFISH UNMANNED UNDERWATER VEHICLE



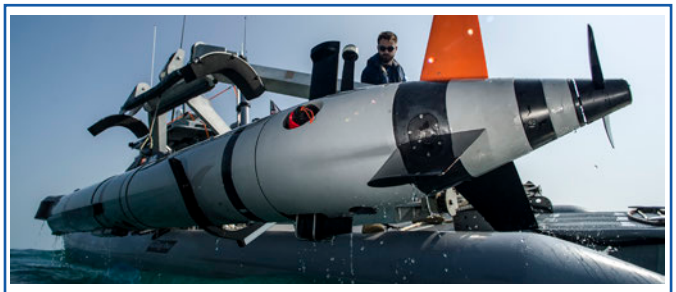
U.S. NAVY

MK18 MOD 1

The surface-launched, battery-powered Swordfish, based on the REMUS 100, is a small, autonomous, bottom-mapping UUV that can scout for mines in advance of Navy explosive ordnance disposal divers. It was used during Operation Iraqi Freedom in mine-clearance operations in the port of Umm Qasr. It is included in the mine warfare mission package for littoral combat ships.

CONTRACTOR.....HII

MK18 MOD 2 KINGFISH UNMANNED UNDERWATER VEHICLE



U.S. NAVY

MK18 MOD 2 KINGFISH

The Kingfish is a REMUS 600 UUV equipped with a side-scan sonar to detect mines and other objects underwater. It was deployed to the Persian Gulf in 2012. It can be deployed from an 11-meter rigid-hull inflatable boat. In 2021, the Navy ordered an Increment II payload upgrade for existing Kingfish.

CONTRACTOR.....HII

KNIFEFISH MINE COUNTERMEASURES UNMANNED UNDERWATER VEHICLE



U.S. NAVY

KNIFEFISH

General Dynamics was awarded a contract in November 2011 to develop the Surface MCM UUV, now called the Knifefish. The offboard system includes two 10-foot-long, 21-inch-diameter UUVs based on the Bluefin-21, plus support systems and equipment. The Knifefish UUV hunts for mines using a low-frequency broadband sonar and automatic target recognition software. Its side-scan sonar can distinguish metal objects in the water from mines. It travels a preset course at a speed of 3 knots and can operate to a depth of 900 feet.

The mine warfare mission package for littoral combat ships will include the Knifefish. Production of five engineering and development models began in November 2011. Developmental and operational testing were conducted from January through May 2019. Low-rate initial production of five Block 0 systems was approved in August 2019. In May 2021, General Dynamics was contracted to upgrade the five EDM models to the Block I configuration. The first production Knifefish was delivered in March 2021. The Navy plans to procure 30 Knifefish systems, 24 for littoral combat ships and six for vessels of opportunity.

CONTRACTORS.....General Dynamics; Bluefin Robotics

RAZORBACK UNMANNED UNDERWATER VEHICLE

The Razorback is a submarine-launched version of the HII-built Littoral Battle-space Sensing Autonomous Underwater Vehicle, a version of the REMUS 600 UUV that entered full-rate production for the Navy in 2013. Details of the Razorback's payloads and capabilities are classified, but it is capable of launch and recovery from a dry deck shelter, a compartment than can be carried on top of the hull of certain submarines. The Navy also is developing the capability to launch it from a submarine's torpedo tubes.

CONTRACTOR.....HII

HOVERING AUTONOMOUS UNDERWATER VEHICLE

The HAUV is being developed for the Explosive Ordnance Disposal Hull Unmanned Underwater Vehicle Localization System, a security system to inspect ship hulls, piers and pilings for explosive devices and other

underwater threats. The HAUV navigates along the curve of a ship's hull to detect and classify targets. Bluefin was awarded a contract in 2007 to build two HAUV prototypes.

CONTRACTOR.....Bluefin Robotics

BATTLESPACE PREPARATION AUTONOMOUS UNDERWATER VEHICLE

The BPAUV is a small, fast UUV that maps the ocean bottom near the shore to note inshore oceanographic conditions and to surveil for mines. Weighing 80 pounds, launched from a crane, propelled by a ducted propeller powered by lithium-ion batteries, the 10-foot-long BPAUV can proceed at 3 knots on a preplanned mission. It can be equipped with a side-scan sonar to detect mines but has no onboard processing capability.

CONTRACTOR.....Bluefin Robotics

WSQ-43 LITTORAL BATTLESPACE SENSING AUTONOMOUS UNDERWATER VEHICLE

The LBS-AUV is a REMUS 600 AUV equipped with sensors for oceanographic surveillance. The (V)1 version is ship-launched; the (V)2 version can be launched from the dry deck shelter of a submarine. Full-rate production began in 2013.

CONTRACTOR.....HII

LITTORAL BATTLESPACE SENSING-GLIDER SLOCUM OCEAN GLIDER (LBS-G)

The LBS-G is a long-endurance, buoyancy-driven AUV used to collect oceanographic data. The winged shape is 5 feet long and 6 inches in diameter. It operates at speeds of 0.5 knots and can dive to nearly 1,000 meters. It can operate for periods up to four months.

CONTRACTOR.....Teledyne Webb Research Corp.

REMUS 100 AUTONOMOUS UNDERWATER VEHICLE

The REMUS 100 AUV is used by the Naval Oceanographic Office for data collection. The new-generation Remus 100 features advanced electronics, a flexible navigation suite with a conformal Doppler velocity log and open architecture. The Navy has solicited proposals for a new glider AUV to collect bathymetric data.

CONTRACTOR.....HII

REMUS 300 LIONFISH AUTONOMOUS UNDERWATER VEHICLE



U.S. NAVY

LIONFISH

The REMUS 300 is a two-man-portable, 7.5-inch-diameter AUV with an operating depth of 305 meters. Its modularity allows for software updates and reconfigurable payloads, sensors and energy modules. The Navy ordered two commercial REMUS 300s in May 2021 for delivery in 2022. The Royal New Zealand Navy ordered four REMUS 300s in June 2021. In March 2022, the U.S. Navy selected the REMUS 300 as its next-generation small UAV program of record, the Lionfish.

CONTRACTOR.....HII

SEA STALKER UNMANNED UNDERWATER VEHICLE

The Sea Stalker is a large-diameter UUV — based on the Sea Horse UUV — that can be launched from and retrieved by the dry deck shelter of Ohio-class ballistic-missile submarines. Powered by a lithium battery, the UUV has an endurance of seven to 10 days and can loiter offshore, collecting intelligence with two antenna masts, and transmit and receive information via an Iridium satellite.

CONTRACTOR.....Pennsylvania State University Applied Research Laboratory

GAVIA AUTONOMOUS UNDERWATER VEHICLE

The Gavia is a two-man portable, self-propelled AUV that can carry an array of modular sensors and other payloads for undersea surveillance from vessels of opportunity. The sensors and battery can be replaced rapidly for agile mission response. The Gavia, equipped with a survey-grade inertial navigation system, is rated to depths of 1,000 meters. It uses Iridium satellites for data transfer.

CONTRACTOR.....Teledyne Instruments

DEFENDER REMOTELY OPERATED VEHICLE

The Defender ROV is a small vehicle used for very shallow-water, littoral mine countermeasures, port security and pier inspection missions.

CONTRACTOR.....VideoRay

RIPTIDE UNMANNED UNDERWATER VEHICLE

The Riptide UUV is used by the Navy and other government agencies for unspecified missions. The Riptide family consists of three types of portable small UUVs that offer performance discriminators, including being able to perform at greater depth, at longer range, with more endurance and at greater speed. The Riptide family includes a 25-pound, 4.875-inch-diameter micro UUV; a 65- to 120-pound, 7.5-inch-diameter, one-man-portable UUV; and a 120- to 240-pound, 9.375-inch-diameter two-man portable UUV. The micro UUV now features enhanced functionality. The prototypes of the one-man portable and two-man portable have been completed. A prototype of a 6,000-meter-rated UUV has been built.

CONTRACTOR.....BAE Systems

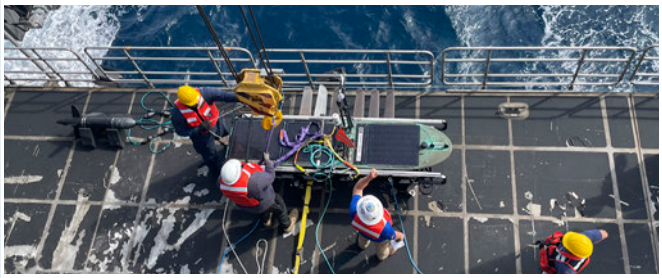
IVER 4 AUTONOMOUS UNDERWATER VEHICLE

The Iver 4 AUV was designed for support of submarines and EOD teams. The 99-inch-long, 220-pound Iver 4 has an open interface to integrate specialized sensor payloads and software. The Iver4 900 comes standard with rechargeable nickel-metal hydride battery packs supporting up to 20-hour run times of 40 nautical miles mission duration for long ingress/egress missions (40-hour run times of 80 nautical miles available with lithium-ion battery — payload and current dependent).

CONTRACTOR.....L3Harris

SMALL UNMANNED SURFACE VEHICLES

WAVE GLIDER UNMANNED SURFACE VEHICLE



U.S. NAVY

WAVE GLIDER

The Wave Glider, also known as the SHARC, or sensor hosting, autonomous remote craft, is a low-profile uncrewed surface craft powered by wave action for propulsion and solar batteries for mission systems and communication. The Wave Glider is now operational with the Navy in two modes of anti-submarine warfare surveillance. One mode is as a node in a "picket fence" anti-submarine warfare barrier. Several Wave Gliders spaced apart in an array collect acoustic data on undersea targets passing through the barrier from bottom sensors and transmit the data to a shore station via uplink to a satellite. The barrier can be repositioned remotely. The second mode is as a mobile sensor, with the Wave Glider using a towed hydrophone, able to swim, move from spot to spot in and out of areas of interest to search for or investigate contacts of interest.

CONTRACTOR.....Liquid Robotics, a Boeing company

MODULAR UNMANNED SURFACE CRAFT, LITTORAL

The MUSCL is a two-man portable unmanned surface craft designed to perform intelligence, surveillance and reconnaissance tasks for riverine forces. The MUSCL will monitor suspicious vessels, personnel and activities along shorelines, waterways, bridges and piers. The first three MUSCLs were delivered Nov. 1, 2011, to Riverine Group 1.

DEVELOPER.....PEO, Unmanned and Small Combatants

SURVEYOR M1.8 AUTONOMOUS SURFACE VEHICLE

The Surveyor M1.8 is an autonomous surface vehicle being supplied to the Office of Naval Research for its advanced autonomy research program. The 1.8-meter-long ASV is designed for use in shallow and hard-to-navigate waters. It is optimized for multivehicle collaborative behavior development. Deliveries began in 2020.

CONTRACTOR.....SeaRobotics Corp.





U.S. MARINE CORPS

The Marine Corps continues to focus on the Indo-Pacific region, to modernize its forces, and to return to its expeditionary amphibious roots as it molds itself in an era of great power competition, particularly with China and Russia. The Corps has participated in numerous exercises with allies and partners, particularly in the Pacific region, especially Australia. The Corps also stood ready to respond to crises, as it did when a Marine expeditionary unit operated in the Middle East during the Israel-Hamas War.

Navy Secretary Carlos Del Toro oversees the Marine Corps' budget and major procurement. General Eric M. Smith, confirmed in September 2023 as the 39th commandant of the Marine Corps, continues to remold the service by pressing ahead with the Force Design 2030 initiative originally introduced in March 2020 by his predecessor, Gen. David H. Berger, with its focus on modernizing the Marines Corps' force structure for the era of great power competition, accelerating the move to lighten the equipment, increasing mobility and communications agility, operating inside contested maritime spaces, and returning to the construct of the Fleet Marine Force.

Under Force Design 2030, the service is increasing its precision-strike weapons, boosting its number of High-Mobility Artillery Rocket System batteries, and procuring long-range Naval Strike Missiles and Tomahawk cruise missiles.

A second Marine Littoral Regiment, the 12th MLR, was converted from an infantry regiment on Okinawa. The first MLR to be converted, the 3rd MLR, activated in March 2022, participated in exercises in the Western Pacific. The MLRs eventually will consist of an infantry battalion, a long-range anti-ship battery an anti-air battalion and a logistics battalion. The Corps plans to activate a third MLR.

To support the MLRs, a KC-130J tanker/transport aircraft squadron was activated at Marine Corps Base Hawaii, and an MQ-9A Reaper squadron, VMU-3, achieved initial operational capability there in 2023. The service also plans eventually to double the number of unmanned aerial vehicle squadrons — equipped with MQ-9 Reapers — and increase the number of lethal unmanned air and ground systems, to enhance the Corps' ability to sense and strike.

The shift of some Marine forces from Okinawa to Guam has advanced with the establishment of Camp Blaz on the northern part of the island.

The Marine Corps continues to integrate the Amphibious Combat Vehicle into its amphibian battalions as it replaces AAV7 amphibious assault vehicles that have served since the early 1970s. The Joint Light Tactical Vehicle is steadily replacing more high mobility multipurpose wheeled vehicles, or humvees, in service. The Corps is going through the process of selecting a replacement for the Light Armored Vehicle — the Armored Reconnaissance Vehicle — and is procuring an unmanned surface vessel to support its Expeditionary Base Operations concept.

The Marine Corps now has eight operational F-35B strike fighter squadrons in service, including two forward deployed to Japan, and two F-35C squadrons. The Corps continues to add CH-53K King Stallion heavy-lift helicopters — now in full-rate production — to its forces to replace the CH-53Es. Two C-40A transports were added to the Corps in 2023 to provide organic airlift.

The Marine Corps met its recruiting goals in fiscal 2023, one of only two U.S. military services to do so. The Corps requested funding in the fiscal 2024 budget to field a force of 172,300 Marines.

SMALL ARMS AND MACHINE GUNS

M16A4 5.56 MM RIFLE

The M16A4 rifle is part of the Modular Weapon System program. The M16A4 incorporates a rail adapter system that allows rapid mounting of accessories such as day/night/thermal optics, infrared laser pointers, flashlights and the M203A2 grenade launcher. The MWS reduces the number of components required to attach accessories and allows the operator to configure it. The M16A4 entered service in 2003, replacing the M16A2.

M4 5.56 MM CARBINE



U.S. MARINE CORPS

M4 CARBINE

The M4 carbine is a shortened version — 14.5-inch barrel compared with the M16A4's 20-inch barrel — of the M16 series of weapons. The M4 is a semi-automatic and select-fire, three-round-burst weapon. The M4 incorporates a rail adapter system, which provides four moAFunting rails for the attachment of accessories, including the M203A2.

M4A1 5.56 MM CLOSE-QUARTERS BATTLE WEAPON

The M4A1 is a 5.56 mm, semi-automatic and selective-fire fully automatic carbine that accommodates a variety of detachable, mission-oriented accessories, including aiming devices and a sound suppressor. The weapon enables operators to engage targets at normal small-arms ranges. The M4A1 is accompanied by a component kit that includes various optics, aiming devices and ancillary equipment for use in close-quarters battles.

M27 INFANTRY AUTOMATIC RIFLE



U.S. MARINE CORPS

M27 IAR

The M27 IAR is a lightweight, Marine-portable, closed-bolt, 5.56 mm weapon capable of 36 rounds per minute. The IAR improves the squad automatic rifleman's maneuverability and displacement speed while providing the ability to suppress or destroy targets of most immediate concern to the fire team.

M18 MODULAR HANDGUN SYSTEM

The M18 MHS is a 9 mm, 17-round, semi-automatic, magazine-fed, striker-fire pistol first initiated by the Army in 2017. There are two variants of the 9 mm Sig Sauer MHS: the M17 (standard) and the M18 (compact). Both variants are modular with ambidextrous operating controls, multiple polymer handgrip sizes and a picatinny rail for accessories. In 2022, the Marine Corps replaced all previously fielded handguns with the M18 MHS.

MK13 MOD 7 .30-CALIBER SNIPER RIFLE

The Mk13 is the primary sniper rifle of Marine Raiders and is being adopted by infantry and reconnaissance battalions to replace the M40A6. The bolt-action Mk13 uses the .300 Winchester Magnum round and increases the range of scout snipers. The rifle features a new enhanced day optic sight with a grid reticle. Fielding began in late 2018. The Mk13 MOD 7 is being replaced by the Mk22 Advanced Sniper Rifle across the Marine Corps.

MK22 MOD 0 ADVANCED SNIPER RIFLE



U.S. MARINE CORPS

MK22 MOD 0 ADVANCED SNIPER RIFLE

The Mk22 ASR originated as a U.S. Special Operations Command-led joint Department of Defense program. In fiscal year 2021, it became a U.S. Army-led program to allow for the procurement of a common sniper rifle for the military services. The ASR is a multicaliber sniper rifle system with barrels and bolts that can be changed out at the user level. The calibers of the ASR are 7.62 mm by 51 mm NATO, .300 Norma Magnum and .338 NM. The system includes a 7x35 long-range day optic. Fielding the ASR to the Marine Corps began in fiscal year 2023.

M110 SEMI-AUTOMATIC SNIPER SYSTEM

The M110 SASS is a 7.62 mm precision rifle that allows Marine Corps scout snipers to rapidly engage multiple targets. It is employed with the variable-powered M8541A Scout Sniper Day Scope and is compatible with a quick-detach suppressor. The rifle has been fielded since 2007 within the Army, which is the lead service for the program, and since 2010 within the Marine Corps. The M110 SASS augments the M40A6 sniper rifle within infantry battalions and reconnaissance units.

M40A6 7.62 MM SNIPER RIFLE

The M40A6 is a Marine Corps-designed weapon system and is the main battle weapon of Marine Corps scout snipers. Each M40A6 is custom-built at Precision Weapons Section, Weapons Training Battalion in Quantico, Virginia. It is a heavy-barrel, bolt-action, manually operated, magazine-fed weapon. The M40A6 is employed with the variable-powered M8541 scope and compatible with a quick-detach suppressor. The original design, the M40, was first employed in the Vietnam War. The M40A1 was introduced in the early 1970s, the M40A3 in 2001 and the M40A5 in 2009. Fielding of the M40A6, and modification of M40A5 to M40A6, began in 2016 and was completed in early 2018. The M40A6 is being replaced by the Mk22 Advanced Sniper Rifle across the Marine Corps.

M107 .50-CALIBER SPECIAL APPLICATION SCOPED RIFLE

The SASR is a commercial, off-the-shelf .50-caliber sniper rifle built by Barrett Firearms Manufacturing. The weapon is effective against anti-materiel targets. The Marine Corps first fielded the M82A1 in 1989. The M82A3 configuration later was fielded to replace the M82A1 and incorporated safety and reliability improvements to extend the service life. In 2007, the Marine Corps converted to the M107, an upgraded version of the M82A3 used by the Army, to achieve commonality and long-term maintenance support goals.

M500A2 12-GAUGE SHOTGUN



U.S. MARINE CORPS

M500A2 12-GAUGE SHOTGUN

The M500A2 is a manually operated (pump), repeating shotgun capable of using 2.75-inch or 3-inch shells. This special-purpose, individual weapon is used primarily by Marines as a component of the escalation force kit, as well as by units with a breaching mission.

M1014 12-GAUGE JOINT SERVICE COMBAT SHOTGUN



U.S. MARINE CORPS

M1014 12-GAUGE SHOTGUN

The M1014 is an ambidextrous, semi-automatic 12-gauge shotgun with a collapsible stock and military-standard 1913 rail adapter system for mounting various optical sights. The shotgun is constructed of polymer material and corrosion-resistant metal components. The M1014 fires 2 3/4-inch and 3-inch magnum shells, with a magazine capacity of at least six rounds, dependent on shell size.

M249 5.56 MM LIGHTWEIGHT MACHINE GUN

The M249 is a belt- or magazine-fed, gas-operated, air-cooled light machine gun with a range of more than 1,000 yards. This weapon enhances a squad's ability to engage targets with a high volume of fire.

M240 7.62 MM MEDIUM MACHINE GUN



U.S. MARINE CORPS

M240B MEDIUM MACHINE GUN

The M240 is a belt-fed, open-bolt, air-cooled, gas-operated, crew-served, general-purpose machine gun. It has multiple fielded variants to assist infantry and support operations from fighting vehicles, tanks, vessels and aircraft.

M2A1 .50-CALIBER FIXED-HEADSPACE HEAVY-BARRELED MACHINE GUN

The M2 is a belt-fed, crew-served, heavy machine gun that has been in service since World War II. System improvements have increased performance and accuracy. The M2 is assigned to infantry and support units, providing defense against aircraft and ground vehicle threats, and can be employed from a vehicle or ground mount. The Marine Corps adopted the Army's M2A1, which included improvements such as a quick-change barrel, better barrel life, manual safety and greater reliability. The M2A1 has been in service since 2019.

MK19 MOD 3 40 MM MACHINE GUN

The Mk19 is an air-cooled, open-bolt, blowback type automatic, belt-fed, crew-served, high-velocity 40 mm grenade-launching machine gun with a range of more than 1,000 or 2,000 yards depending on the target. The Mk19 has a cyclic rate of fire of 325 to 375 rounds per minute. It is a man-portable weapon that can be fired manually from a vehicle or ground mount.

M320A1 40 MM GRENADE LAUNCHER

The M320A1 is a lightweight, compact, single-shot 40 mm grenade launcher that attaches to rifles or can be operated as a stand-alone weapon. It has improved sights that enable the operator to engage targets more rapidly. The barrel is loaded from the side, allowing for safer operation and longer munitions. The system has been in service since 2020 and has replaced the M203A2.

M32A1 MULTI-SHOT GRENADE LAUNCHER

The M32A1 is a lightweight, 40-mm, shoulder-fired, semi-automatic, revolving-action multishot grenade launcher featuring an illuminated sight for day and night engagements. The M32A1 is loaded with six 40 mm rounds and can fire several different types of grenades, including high-explosive, smoke, illumination, tactical controlled substance (tear gas), multiprojectile and practice ordnance.

EXPLOSIVES

HAND GRENADES

Marines have available for combat use a wide range of grenades for assault and other missions:

The M67 fragmentation hand grenade is a high-explosive grenade and is the primary casualty-producing grenade of the U.S. military.

Riot-control grenades produce a small thick cloud of irritant vapor/smoke that lasts 45 to 55 seconds and causes eye, throat and lung irritation.

Signaling grenades, such as the M18 colored-smoke grenade, produce clouds of green, yellow, red and violet smoke. Also useful for signaling or screening is the M83 white smoke grenade, which produces a thick cloud of white smoke that lasts 45 to 60 seconds.

The incendiary grenade, M14/thermite, burns for about 40 seconds at close to 4,000 degrees Fahrenheit and is used to melt small or large battlefield items, rendering them useless. This grenade contains a filler of aluminum and iron oxide that ignites once initiated by the grenade's fuse.

Diversionary grenades, used in urban environments to disorient combatants, produce a sound output of 183 decibels and a flash of light equivalent to about 6.4 million candlepower.

Nonlethal grenades are used in military operations other than war against noncombatants. These grenades are generally made of rubber, contain an initiation fuse and are filled with small rubber balls and/or rubber fragments. They are generally thrown by hand or are launched from a 40 mm launching device or cup that attaches to a shotgun.

MINES

Antipersonnel land mines are designed to detonate by controlled initiation, man in the loop, per the 2004 presidential policy stating that all non-self-destructing land mines were to be removed from services' inventory by 2010. The M18A1 Claymore, now designed for hand detonation only, is the sole antipersonnel mine that remains in the inventory. The M18A1 Claymore is a directional fragmentation land mine primarily used in protective minefields for the defense of outposts and bivouac areas against infiltrators. Claymores also are effective in ambush against personnel and soft-skin vehicles. When detonated by nonelectrical means, a Claymore fires a fan-shaped pattern of steel balls in a 60-degree horizontal arc at a height of about 6 feet, causing casualties within a radius of more than 100 yards. All means of electrical initiation have been removed from Claymore mines.

LINEAR DEMOLITION CHARGE FAMILY

LDCs are demolition systems capable of defeating an enemy's countermobility efforts. They provide a clear path, up to 15 yards wide by more than 109 yards long, for combat vehicles during minefield and barrier-breaching operations. They are effective against single-impulse, pressure-type and non-blast-hardened antitank mines and mechanically actuated antipersonnel mines. The Mk22, a 5-inch rocket motor, is used to propel LDCs over minefields.

ANTIPERSONNEL OBSTACLE-BREACHING SYSTEM

The APOBS, a smaller version of an LDC, provides the Marine Corps with an improved, lightweight, portable capability to quickly breach antipersonnel minefields and wire obstacles. The APOBS requires less than two minutes to set up and deploy and is launched from a standoff of about 35 yards in front of the leading edge of an obstacle or minefield.

The system is designed to clear a footpath through antipersonnel minefields and wire obstacles up to 45 yards long and 2 yards wide during combat operations. The APOBS is a self-contained, one-shot expendable system that is transported in two backpacks, each weighing about 60 pounds, and deployed by a two-person team. The APOBS uses the Mk126 Mod 1 rocket motor to propel a line charge over the obstacle, after which the line charge will detonate following an eight-second delay, clearing the obstacle or antipersonnel minefield.

SHOULDER-FIRED MISSILES AND ROCKETS

AT4



U.S. MARINE CORPS

AT4

The AT4 is an expendable, shoulder-fired weapon. It is a self-contained unit consisting of a launcher and a rocket. The 84 mm system weighs nearly 15 pounds and is 40 inches long. The projectile weighs about 4 pounds and has a muzzle velocity of more than 300 yards per second. Emerging variants have a reduced back-blast and may allow firing from confined spaces.

CONTRACTOR..... SAAB

M72 LIGHT ANTI-ARMOR WEAPON

The M72 is a portable, lightweight shoulder-fired disposable rocket launcher with a disposable tube. The M72 was superseded by the AT4 but was placed back in production in 2010 after operations in Afghanistan and Iraq proved the value of its low cost and light weight. The current M72A7 LAW features an improved, higher-velocity rocket motor to engage targets more accurately, an insensitive munitions warhead and a rail to mount a laser sight or night-vision sight.

CONTRACTOR.....Nammo Talley Inc.

M3A1 MULTI-ROLE ANTI-ARMOR ANTIPERSONNEL WEAPON SYSTEM



U.S. MARINE CORPS

M3A1

The M3A1 MAAWS is an 84 mm, direct-fire, man-portable, line-of-sight, reusable, breach-loaded, shoulder-fired recoilless rifle with an integrated fire-control system and backup reflex sight. MAAWS uses various ammunition that is unique to the weapon that provides obscuration, illumination, personnel denial, armored vehicle denial and penetration, bunker and hardened facility penetration, and soft target destruction capabilities. The system is designed to engage lightly armored targets at ranges up to 700 meters and soft targets at ranges up to 1,300 meters. MAAWS is operated by a two-person team consisting of a gunner and assistant gunner. The gunner and assistant gunner will be part of an infantry squad, combat engineer team, reconnaissance team or light armored reconnaissance team.

The MAAWS program is working to qualify and procure an updated fire-control system that will provide increased magnification and integrated night-vision capability to enhance target detection, recognition and identification. MAAWS is scheduled to achieve full operational capability by the end of fiscal year 2024.

CONTRACTOR.....SAAB

M98A2 JAVELIN MISSILE SYSTEM



U.S. MARINE CORPS

M98A2 JAVELIN

In support of Force Design and Marine Corps readiness to address littoral operations in contested environments and Indo-Pacific, the Javelin provides the U.S. Army and Marine Corps with a man-portable, fire-and-forget, medium-range anti-armor missile with enhanced situational awareness and direct-fire effects that can defeat armored vehicles, fortifications and soft targets in full spectrum operations. Javelin has a high kill rate against a variety of targets at extended ranges under adverse environments caused by day/night, weather, battlefield obscurants and multiple countermeasure conditions. The system's soft launch feature permits firing from a fighting position or from an enclosure, and the modular design allows for the evolution of both software and hardware upgrades to meet changing threats and requirements. The system consists of a reusable command launch unit with a built-in test along with a modular missile encased in a disposable launch tube assembly and includes training devices for tactical and classroom exercises. Javelin's fire-and-forget technology allows the gunner to fire without the need to track targets while providing enhanced lethality using a tandem warhead that can defeat all current armor threats. This system is effective against both stationary and moving targets and provides defensive capability against attacking/hovering helicopters. The performance improvements in the current production of Javelin Block I command launch units include an increased target identification range, increased surveillance time, increased probability of hit/kill at 2,500 meters, improved warhead lethality and reduced time of flight. The command launch unit is being used as a stand-alone surveillance and target acquisition asset.

The Javelin Lightweight Command Launch Unit is a drop-in replacement for the current Block 1 unit. The LWCLU will improve upon current capabilities and performance that reduces the Block 1 volume and weight. The objective weight and volume require the LWCLU to fit inside a Modular Lightweight Load Carrying Equipment II Assault Pack. A secondary focus of the program is to meet or exceed Block I performance capabilities to integrate modern day/night camera technology and other improvements, including a single circuit card assembly with a high-resolution display, an improved lightweight eyepiece, power supplies that will allow for multiple battery sizes and a new, more durable handgrip design. The LWCLU will also reduce gunner burden through automated image processing techniques and improved target lock-on capabilities. The LWCLU resolves Javelin Block I obsolescence issues. LWCLU is scheduled to achieve initial operational capability in mid-fiscal 2026.

CONTRACTOR.....Javelin Joint Venture (Raytheon; Lockheed Martin)

AIR DEFENSE SYSTEMS

FIM-92 STINGER



U.S. MARINE CORPS

FIM-92 STINGER

The shoulder-fired, fire-and-forget Stinger surface-to-air missile is a passive infrared/negative ultraviolet homing weapon used by the Marine Corps. It is very effective against high-speed, low-level aircraft such as jet or propeller-driven aircraft or helicopters and has limited capability against unmanned aerial systems.

CONTRACTOR.....Raytheon

MARINE AIR DEFENSE INTEGRATED SYSTEM

MADIS modernizes existing ground-based air defense systems by integrating existing systems and technologically mature capabilities into an integrated system to confront attacks from unmanned aerial systems and fixed-wing and rotary-wing aircraft while maintaining pace with maneuver forces.

MADIS consists of two vehicles that operate together: the Stinger variant (Mk1) and the Counter-UAS variant (Mk2). Together, the Mk1 and Mk2 subsystems form a complementary system of systems that is the initial building block of low-altitude air defense battalions' future ground-based air defense capability. The L-MADIS is a counter-UAS electronic attack system mounted on a Polaris MRZR all-terrain vehicle. It features a 360-degree radar, radio frequency jammers and electro-optic/infrared sensors.

CONTRACTOR.....Various

MEDIUM-RANGE INTERCEPT CAPABLITY

The MRIC, designed to counter cruise missile threats, has been under development since 2018. The MRIC uses a combination of the Marine Corps' Ground/Air Task-Oriented Radar and Common Aviation Command and Control System with selective technology from Israel's Iron Dome system. The MRIC Middle Tier of Acquisition rapid prototyping phase is expected



U.S. MARINE CORPS

L-MADIS

to culminate upon successful completion of a quick reaction assessment in fall 2024. A follow-on decision by the Marine Corps would potentially procure up to three batteries of equipment and field to low-altitude air defense battalions in fiscal years 2026, 2027 and 2028.

CONTRACTORS.....Raytheon; Rafael Systems

LOITERING MUNITIONS

ORGANIC PRECISION FIRES

OPFs will provide multiple echelons of the Fleet Marine Force with an organic, loitering, beyond-line-of-sight precision strike capability. OPFs will be employed at the tactical level to allow Marines to engage the enemy beyond the range of direct-fire weapons while reducing exposure to enemy direct and indirect fires and minimizing collateral damage. OPFs will provide the Marine Air-Ground Task Force with a more affordable precision strike capability against pacing threats. OPFs will be medium and lightweight dismounted systems fired from the ground and transported via an ultra-light tactical vehicle or backpack. The OPF program has been rescoped into OPF-Medium (mounted and dismounted) and OPF-Light (man-portable). OPF-Light is the priority effort with contract award planned in mid-fiscal year 2024. The OPF-Dismounted effort will release a request for proposal in fiscal 2024 supporting an early fiscal 2025 award.

CONTRACTOR.....TBD

HEAVY ANTI-ARMOR WEAPONS

M41A7 TUBE-LAUNCHED, OPTICALLY TRACKED, WIRE-GUIDED MISSILE SYSTEM

The M41A7 launch system includes an improved target acquisition system, an integrated far-target locator and an image enhancement function. The image enhancement capabilities include electronic focus; 2, 4 and 8 times zoom; polarity reversal; enhanced local area processing; frame integration; electronic image/scene stabilization; and a D-Zipper effect.

The family of TOW missiles includes three tactical variants: TOW-2A, TOW-2B and TOW-BB. The TOW-2A is a direct-attack (line-of-sight) missile with a tandem-warhead configuration to provide increased lethality against targets with reactive armor. The TOW-2B is a fly-over, shoot-down missile that attacks armored targets from above, firing two explosively formed penetrators through the top armor plates. The TOW-BB (bunker buster) utilizes a bulk-filled high-explosive warhead that can breach or destroy concrete walls, earth and timber bunkers, and technical targets.

CONTRACTOR.....Raytheon

ARTILLERY SYSTEMS AND MORTARS

M777A2 LIGHTWEIGHT 155 MM HOWITZER



U.S. MARINE CORPS

M777 LIGHTWEIGHT 155-MM HOWITZER

The M777A2 is a joint Marine Corps/Army program that developed, produced, fielded and sustains the towed 155 mm howitzer, used by both services. The M777A2 provides increased mobility, survivability, deployability and sustainability in expeditionary operations throughout the world. The M777A2 is a direct- and general-support artillery system that replaced the M198 155 mm medium-towed howitzer in both services and started fielding in 2005. It has incorporated innovative design technologies to overcome deficiencies inherent in the M198.

The M777A2 is the first ground combat system whose major structures are made of high-strength titanium alloy. The system makes extensive use of hydraulics to operate the breech, loading tray, recoil system and wheel arms. The combination of titanium structures resulted in a weight savings of more than 6,700 pounds from the M198 system. The M777A2 operates faster and more efficiently than its predecessor did. Marines can load and fire the M777A2 faster than they could with the M198. The M777A2 emplaces in less than three minutes and displaces in three minutes. The M777A2 is towed by the medium tactical vehicle replacement and can be airlifted by CH-53E/K CH-47D helicopters and the MV-22B Osprey tilt-rotor aircraft into remote high-altitude locations.

The basic M777 howitzer was developed using conventional optical fire control to locate and aim the weapon. The M777A1 integrated a digital fire-control system that uses GPS, an inertial navigation unit and a vehicle motion sensor to accurately locate and orient the weapon to deliver greater accuracy and responsiveness. The system integrates radios for voice and digital communications and a chief-of-section display that can be mounted into the cab of the prime mover for use as a navigation aid during towing. The system's mission computer processes fire missions and outputs pointing information to onboard gunners, assistant gunners' displays and chief-of-section displays.Upgrades to the system include a precision-strike capability by incorporating hardware and software modifications to allow for firing the M982 Excalibur projectile and the M1156 precision-guided kit. A software upgrade that supports onboard ballistic computations was released in 2015 and has been fielded. The M777A2 can fire unassisted high-explosive projectiles using conventional and modular propellants. Current and ongoing improvements include the replacement of the steel M776 cannon tube with a new M776C full-bore chrome cannon tube. These tubes have been fully tested and proofed to reduce spiral wear and extend tube life beyond the current value of the previous steel tubes.

The M777A2 can fire precision-guided Excalibur munitions with sufficient accuracy, reducing the chance of noncombatant casualties and enabling supporting fire to be delivered much closer to friendly troops.

The Marine Corps has procured its fully approved acquisition objective. In 2020, the Marine Corps announced its intention to reduce its howitzer units as part of its Force Design 2030 plan.

CONTRACTOR.....BAE Systems

M142 HIGH-MOBILITY ARTILLERY ROCKET SYSTEM



U.S. MARINE CORPS

HIMARS

The HIMARS is a C-130 transportable, wheeled, indirect-fire rocket/missile system capable of firing all current and future rockets as well as missiles in the multiple-launch rocket system family of munitions. The HIMARS launcher consists of a fire-control system, carrier (automotive platform) and launcher-loader module that performs all operations necessary to complete a fire mission. The basic system includes one launcher, two resupply vehicles and two resupply trailers. The HIMARS addresses an identified, critical warfighting deficiency in Marine Corps' fire support. The system employs the guided multiple launch rocket system to provide precision fire in support of the Marine Air-Ground Task Force. The HIMARS also is a transformational, general-support response, general-support reinforcing and precision indirect-fire weapon system. The system accurately engages targets with high volumes of lethal precision fire in all weather conditions and throughout all phases of combat operations ashore. Initial operational capability was achieved in 2008.

CONTRACTOR.....Lockheed Martin

M224A1 60 MM MORTAR



U.S. MARINE CORPS

M224A1 60 MM MORTAR

The M224A1 60 mm mortar is a smoothbore, muzzle-loaded, crew-served weapon providing indirect fire in support of company-level operations that can be fired from a pit emplacement or in hand-held mode. The complete mortar in the conventional mode weighs 35.4 pounds; in the hand-held mode, it weighs 16.6 pounds. It can be fired at the rapid rate of 30 rounds per minute for four minutes and continue firing at the sustained rate of 20 rounds per minute indefinitely.

M252A2 81 MM MORTAR



U.S. MARINE CORPS

M252A2 81 MM MORTAR

The M252A2 81 mm mortar is a crew-served, smoothbore, muzzle-loaded, high-angle-fire weapon providing indirect fire in support of battalion-level operations. The system weighs 77.7 pounds. It can be fired at the rapid rate of 30 rounds per minute for two minutes and continue firing at the sustained rate of 15 rounds per minute indefinitely.

STRIKE MISSILE SYSTEMS

NAVY MARINE EXPEDITIONARY SHIP INTERDICTION SYSTEM

NMESIS is a vehicle-mounted missile system armed with the RGM-184A Naval Strike Missile. The system is designed to enable the Marine Corps to support naval operations against enemy shipping. The system is installed on an unmanned chassis, known as the Remotely Operated Ground Unit for Expeditionary Fires vehicle.



U.S. MARINE CORPS

NMESIS

CONTRACTORS.....Oshkosh Defense; Raytheon

LONG-RANGE FIRES LAUNCHER

The LRFL is a vehicle-mounted missile system armed with the Tomahawk cruise missile that provides an agile, mobile, land-based system to complement surface- and subsurface-launched missiles. As a complement to NMESIS, the LRFL provides a long-range and higher-explosive missile and varied methods of attack to the integrated naval force.

CONTRACTORS.....Oshkosh Defense; Lockheed Martin

COMBAT VEHICLES

AAV7A1 ASSAULT AMPHIBIOUS VEHICLE



U.S. MARINE CORPS

AAV7A1

The AAV7A1 reliability, availability, maintainability/rebuild-to-standard, or RAM/RS, initially fielded in 1971, remains the primary general-support armor personnel carrier for Marine infantry. The AAV family of vehicles consists of the AAVP7A1 APC and two supporting mission-role variants: the AAVC7A1 RAM/RS command variant and the AAVR7A1 RAM/RS recovery variant. The AAV7A1 RAM/RS family of vehicles provides ship-to-shore-to-objective mobility and direct-fire support with organic weapons. The AAV7A1 RAM/RS family of vehicles will continue to serve the Marine Corps until the Amphibious Combat Vehicle is completely fielded.

The AAV modification line maintains operational relevance and ensures communication and weapons commonality with the ACV. The AAV modification line is a critical component to sustain the 45-year-old legacy fleet of assault amphibians. Specific focus areas include safety upgrades and modernization, replacement of obsolescent components and improvements to interoperability, reliability, maintainability and availability.

Recent upgrades include the emergency egress lighting system, automatic fire sensing and suppression systems, tactical communication modernization, common remotely operated weapon station and waterborne egress capability.

CONTRACTOR.....BAE Systems

AMPHIBIOUS COMBAT VEHICLE

The ACV program is designed to provide an advanced-generation armored amphibious combat vehicle to replace the AAV7A1 family of vehicles. The ACV is the primary means of tactical mobility for Marine infantry battalions at sea and ashore. The ACV possesses ground mobility and speed like the M1A1 tank during sustained operations ashore and has the capability to provide organic, direct-fire support to dismounted infantry in the attack.

The ACV transports foot-mobile infantry units, their equipment and supplies within motorized and mechanized formations. The ACV is armed to be sufficiently lethal to protect itself and its mounted infantry during movement and then provide precision support by fire for infantry units. The ACV units are attached to or placed in support of a ground combat element commander to provide protected tactical mobility and communications to the supported force. The ACV networked communications provide supported units with high levels of situational awareness and an ability to receive tasking and share information with higher and adjacent units in real time. The ACV, as an integral part of the Marine Air-Ground Task Force, enables joint force commanders to achieve a wide range of military operational outcomes. Designed to meet 30% improved surfaces and 70% unimproved surfaces mission profile, the ACV provides the level of tactical mobility required to be effective with main battle tanks, AAV7A1 vehicles and light armor reconnaissance units while carrying its assigned payload.

The ACV Milestone C decision was approved in June 2018. BAE manufactured 26 ACV-P (personnel carrier) low-rate initial production Lot 1 vehicles and is currently manufacturing the final two lots of LRIP vehicles (86 vehicles). The LRIP Lot 1 vehicles underwent initial operational testing and evaluation and full-up system level testing that led to a full-rate production decision in November 2020. Initial operational testing and evaluation was completed in September 2020. LRIP Lot 2 vehicles were delivered to an operational unit in October 2020.

Future variants include the ACV-C (command and control), ACV-R (recovery) and ACV-30 (armed with a Kongsberg Remote Weapons System with a 30 mm cannon), all being developed by a $67 million contract awarded in June 2019. Full-rate production of the ACV was approved Dec. 8, 2020. A third full-rate production batch was ordered in March 2023.

The Marine Corps ordered a study of incorporating the Advanced Reconnaissance Vehicle command, control, communication and computers/unmanned aerial systems mission payload onto an ACV variant. The ACV C4/UAS variant was delivered to the Marine Corps in January 2023 for testing.



U.S. MARINE CORPS

ACV

CONTRACTORS.....BAE Systems; Iveco Defence Vehicles

LIGHT ARMORED VEHICLE



U.S. MARINE CORPS

LAV WITH ANTI-TANK WEAPON SYSTEM

The LAV supports light armored reconnaissance Marines in performing all-weather, sustained reconnaissance, counter-reconnaissance and security operations. Seven configurations of the family of LAV are in service, including the LAV-25, armed with an M242 25 mm chain gun; LAV-Anti-Tank Weapon System, armed with the antitank modernization turret and

TOW missile; LAV-Command and Control, equipped with a communications suite; LAV-Logistics; LAV-Mortar, equipped with the 81 mm mortar system; LAV-Recovery; and LAV-Mobile Electronic Warfare.

A series of modernization requirements have been made to the LAV fleet to keep it relevant and ready.

CONTRACTORS.....LAV-Reset: General Dynamics Land Systems-Canada
LAV-ATWS: Raytheon

ADVANCED RECONNAISSANCE VEHICLE

A key Fleet Marine Force modernization initiative, the ARV command, control, communications, and computers/unmanned aerial systems will host a suite of C4 equipment and sensors and operate both tethered and untethered UAS. The ARV C4/UAS will employ an effective mix of reconnaissance, surveillance, target acquisition and C4 systems to sense and communicate. These systems will enable ARV to serve as the crewed hub of a human-machine team and deliver next-generation, multi-domain, mobile reconnaissance capabilities. The Marine Corps is working to validate the ARV requirement to serve as a mobile protected hub of crewed capability with the C4 to effectively operate robotic autonomous systems-enabled teams through a competitive prototyping effort with multiple industry partners. Two candidate ARVs built by Textron Systems and General Dynamics Land Systems completed initial evaluation. A Milestone B decision is planned in the first quarter of 2026.

M1A1 TANK

The M1A1 tank was retired from Marine Corps use in 2020 as part of the Force Design 2030 initiative.

SUPPORT AND LOGISTICS VEHICLES

MEDIUM TACTICAL VEHICLE REPLACEMENT

The MTVR replaced the Vietnam-era 5-ton trucks with commercial automotive technology. The unarmored MTVR has an increased payload of 7.1 tons off-road and 15 tons on-road, a high-performance suspension, traction control, central tire inflation system, automatic transmission and corrosion technology upgrades.

There are several variants of the MTVR, including a cargo variant in both standard and extended length wheelbase, or XLWB, configurations, dump truck, wrecker and tractor. The dump truck and wrecker variants maintain maximum commonality with the basic MTVR cargo chassis. The tractor variant serves as the prime mover for the Marine Corps' MK 970 5,000-gallon aviation and bulk-haul refueling trailer. The Navy also uses MTVR vehicles for construction battalion (Seabee) operations. The HIMARS resupply vehicle is an MTVR XLWB cargo variant that was procured with an associated trailer as part of the HIMARS artillery resupply system.

MTVR armor provides 360-degree protection as well as overhead and underbody protection for the crew compartment. MTVR armor protects against small-arms fire, improvised explosive devices and mines. It includes upgraded suspension, an air-conditioning system, a removable armored personnel carrier (with ballistic glass) for cargo variants, machine gun mounts and the Marine Corps Transparent Armor Gun Shield. The armor is a permanent modification to the vehicle. The "reducible height" armor configuration allows for removal of the cab roof to accommodate Maritime Pre-positioning Force space requirements. Armor is to be installed on all MTVR variants deployed to hostile environments.

The MTVR's Medium and Heavy Tactical Vehicle Program Management Office has continued to improve MTVR armor in response to urgent universal needs statements — adding increased underbody blast protection, fuel tank fire-protection kits and 300-amp alternator kits, as well as developing the reducible height armor configuration. In addition, live-fire testing has resulted in armor upgrades for nonreducible height armored MTVRs and the armored troop carrier. The PMO developed additional safety upgrades, such as transportability improvements and emergency egress windshields, in response to urgent universal needs statements and operational force input. The PMO worked with the Office of Naval Research under the Future Naval Capabilities program to develop a fuel economy upgrade kit, currently being fielded on armored MTVRs. This capability provides for a 10% savings in fuel consumption.

The approved acquisition objective of the MTVR has been met. More than 1,000 MTVRs have served in Iraq, Afghanistan or both. With a 70% off-road mission profile and highly survivable armor package, the MTVR has been heavily used in theater for logistics and humanitarian missions. The Marine Corps recently extended the life of the MTVR from 2022 to 2042.

CONTRACTOR.....Oshkosh Defense

LOGISTICS VEHICLE SYSTEM REPLACEMENT



U.S. MARINE CORPS

LOGISTICS VEHICLE SYSTEM REPLACEMENT

The LVSR replaced the Marine Corps Logistics Vehicle System's heavy tactical wheeled vehicle. The LVSR cargo variant transports several cargoes: bulk liquids (fuel and water); ammunition; standardized containers; and bulk, break-bulk, palletized cargo and bridging equipment. The LVSR has wrecker and tractor variants. The vehicle base design includes factory-installed armor and is designed to accept an add-on armor kit for increased crew protection.

The all-wheel-drive vehicle is equipped with an independent suspension system for superior off-road mobility in the most severe environments. The LVSR features an on-road payload capacity of 22.5 tons and an off-road capacity of 16.5 tons. Four-axle steering increases maneuverability and vehicle capabilities. The LVSR is equipped with an advanced electronics system for in-cab diagnostics of critical systems.

The LVSR has a 600-horsepower C15 engine and uses a single-source lubrication system for easier maintenance. The LVSR can operate over increased distances with greater payloads to meet the demands of expeditionary maneuver warfare. The LVSR includes a self-loading/unloading capability to reduce dependence on external material handling equipment and to transport supplies, equipment and logistics into remote areas where Marines routinely operate.

Add-on armor can be applied in the field by maintenance activities. The program has been fully fielded and declared full operational capability in July 2014.

CONTRACTOR.....Oshkosh Defense

MINE-RESISTANT AMBUSH-PROTECTED VEHICLES

MRAP vehicles were designed and fielded through an accelerated acquisition process that employed concurrent production, testing and fielding to meet urgent requirements identified during Operation Iraqi Freedom and Operation Enduring Freedom. The vehicles' V-shaped hull,

high ground clearance and high hardened armor make them uniquely qualified for improvised explosive device high-threat operations. The approved acquisition objective of the MRAPs has been obtained, comprising three vehicle platforms: the MRAP All-Terrain Vehicle, the Cougar and the Buffalo.

The Cougar platform consists of Category I and Category II variants. Category I vehicles primarily are intended for operations in the urban combat environment and explosive ordnance disposal. Category II vehicles are capable of supporting security, convoy escort, troop/cargo transport, medical, armored utility, explosive ordnance disposal and combat engineer operations. The Category III Buffalo is a six-wheel, six-passenger vehicle developed to conduct route clearance operations. The MRAP-ATV is designed to operate in rugged terrain and provides better overall mobility characteristics than other MRAP platforms. It supports mounted patrols, reconnaissance, security, convoy protection, data interchange and command and control functions.

The Marine Corps' enduring requirement was developed based on expected future threats and the service concept of operations. It positions a small quantity of vehicles in the operating forces and supporting establishment with most of the vehicles in pre-positioned locations. The Marine Corps' MRAP vehicles are slated to remain in service through the end of 2024.

CONTRACTORS.....General Dynamics Land Systems-Force Protection; Oshkosh Defense

HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE

The unarmored 1 1/4-ton HMMWV entered service in the mid-1980s, followed by the HMMWV A1 variant, procured in the early 1990s. Because of the fleet's service during the 1991 Persian Gulf War, additional mission requirements led to modifications to enhance performance and reliability, which were the catalysts for the procurement of the HMMWV A2 variant. The A2 provided a 2 1/4-ton hauling capability, an advanced corrosion protection package, a more powerful drivetrain and increased vehicle reliability. The HMMWV A2 fleet consists of six variants, including the M1123 troop/cargo carrier, M1097A2 shelter carrier, M1043A2 armament carrier, M1045A2 TOW missile carrier, M1035A2 soft-top two-litter ambulance and the M997A2 four-litter ambulance. The HMMWV A2 provides a mobile capability for infantry; air defense; command, control and communication; and maintenance personnel through authorized modification/configuration of each mission-essential variant to meet the needs of the operational forces. The Expanded Capacity Vehicle HMMWV variant is the fourth-generation HMMWV design. The ECV replaced the aging fleet of base variant A1s and some A2s. ECV system upgrades included vehicle armor, a more powerful 6.5-liter turbo engine, an electrical starting system, improved corrosion prevention and access panels to facilitate vehicle maintenance. Because of these vehicle enhancements, the ECV provides an increased payload and towing capacity as well as increased reliability. The ECV fleet is comprised of five variants, including the M1114 and M1151 armament carriers, M1152 shelter and troop transport variant, M1165 command and control variant and the M1167 TOW/Saber variant.

CONTRACTOR.....AM General

JOINT LIGHT TACTICAL VEHICLE

The JLTV is a joint Army/Marine Corps program procuring the next generation of Light Tactical Vehicles and companion trailers. The JLTV entered service in 2019, achieving initial operational capability in August 2019. The JLTV program reduces servicewide operations and maintenance costs by maximizing vehicle commonality, which provides increased reliability and better fuel efficiency. The JLTV consists of two base vehicle models that can be configured to support multiple mission packages: the four-door combat tactical vehicle and the two-door combat support vehicle. The commonality of components, maintenance procedures and training among all vehicle configurations minimizes total ownership costs. The four-door combat tactical vehicle is configured as a general-purpose, heavy guns carrier or close combat weapons carrier while the two-door combat support vehicle is configured as a utility vehicle. All of these vehicles serve a variety of mission roles on their own as well as in support of over 50 integrating capabilities.



U.S. MARINE CORPS

JLTV

The JLTV is being fielded to replace the High Mobility Multipurpose Wheeled Vehicle in the Marine Corps as part of the service's ground equipment modernization efforts. The JLTV's performance characteristics exceed those of the armored HMMWV Expanded Capacity Variant, thereby ensuring the additional protection and mobility required by the operational forces. The JLTV features increased protection with scalable armor solutions while returning light tactical vehicle payloads, maneuver capacity through expeditionary mobility and increased vehicle performance and reliability lost to the HMMWV fleet due to the increased weight of armoring efforts.

The Marine Corps has a requirement for 12,500 JLTVS and 4,000 JLTV trailers, of which 3,759 JLTVs and 402 trailers had been fielded as of November 2023. Upon full operational capability, the Marine Corps will both JLTV A1 and A2 vehicles.

CONTRACTORS.....JLTV A1: Oshkosh Defense; JLTV A2: AM General

UTILITY TASK VEHICLE



U.S. MARINE CORPS

UTILITY TASK VEHICLE

The UTV is a logistics support vehicle for active-component infantry battalions and reconnaissance units. It provides motorized logistics sustainment support and casualty evacuation to deployed infantry forces. The diesel-powered off-road vehicle can carry up to four Marines or 1,500

pounds of payload. The back seats on the UTV can be reconfigured into a cargo bed for transportation of bulk items, ammunition and litter transport for casualty evacuation. The vehicle can be transported internally by CH-53E Super Stallion helicopters or MV-22B Osprey tilt-rotor aircraft. The Marine Corps completed delivery of the UTVs in March 2018.

CONTRACTOR.....Polaris Government and Defense

ULTRALIGHT TACTICAL VEHICLE

The ULTV is a logistics support vehicle for active-component infantry battalions, reconnaissance units and the maritime littoral regiments. The ULTV is the replacement platform for the Utility Task Vehicle. The ULTV provides increased capability from the UTV in horsepower, payload, fording and range. The cargo area in the ULTV can be configured to support litter transport and casualty evacuation. The vehicle can be transported internally by CH-53E Super Stallion helicopters or MV-22B Osprey tilt-rotor aircraft. The ULTV capability will mitigate infantry and reconnaissance battalion support gaps, proving infantry units with the ability to operate in remote, rural regions where currently fielded ground mobility platforms may be unsuitable due to size, weight and transportability concerns. The range of military operations to which the ULTV contributes is far-reaching and includes distributed operations, littoral operation in a contested environment, expeditionary advanced based operations and humanitarian assistance and disaster relief. The ULTV provides a lightweight, highly mobile capability for potential intelligence, surveillance and reconnaissance operations and forward arming and refueling points. The Marine Corps began fielding the ULTV in June 2023.

CONTRACTOR.....Polaris Government and Defense

WATER CRAFT

F470 COMBAT RUBBER RAIDING CRAFT



U.S. MARINE CORPS

RUBBER RAIDING CRAFT

The CRRC is the Marine Corps' primary means of accomplishing amphibious raids. It is a 15-foot inflatable craft capable of carrying six combat-loaded Marines and their equipment from amphibious ship to shore for low-visibility insertion in sea state three. It is capable of being launched and recovered from ships, submarines and helicopters.

CONTRACTOR.....Zodiac

LONG-RANGE UNMANNED SURFACE VESSEL



U.S. MARINE CORPS

LRUSV

The LRUSV is designed to be a semi-autonomous uncrewed surface vessel capable of multidomain sensor collections in support of the Naval Expeditionary Force's maritime domain awareness and sea denial efforts.

CONTRACTOR.....Metal Shark

OTHER MARINE CORPS VEHICLES

The Marine Corps operates small numbers of vehicles with a variety of special uses. These include the following:

P-19R AIRCRAFT CRASH AND STRUCTURE FIREFIGHTING TRUCK REPLACEMENT.....rescue and firefighting

AVIATION REFUELING CAPABILITY.....aviation refueling

DIVER PROPULSION DEVICE.....underwater delivery

M60A1 AVLB.....assault vehicle landing bridge

M93A1 FOX.....nuclear, biological and chemical reconnaissance

ROUGH TERRAIN CONTAINER HANDLER.....cargo handling

FIXED-WING AIRCRAFT

F-35B/C LIGHTNING II



U.S. MARINE CORPS

F-35C LIGHTNING II (FOREGROUND) WITH F/A-18 HORNET

The F-35 Lightning II program is designed to field transformational fifth-generation strike fighter aircraft for the U.S. Navy, U.S. Marine Corps, U.S. Air Force, seven international partners and six foreign military sales customers. This advanced air system includes next-generation sensors and weapons systems, low observable design and a high level of mission systems commonality among the three F-35A/B/C variants. All F-35 variants are powered by the world's most powerful fighter-sized engine, the F135.

The F-35B is replacing the Marine Corps' F/A-18C Hornet and AV-8B Harrier aircraft. It has an engine, software and avionics in common with the F-35A and C variants. The F-35 features an internal weapons bay to maintain the low observable cross section of the aircraft. However, the F-35B's internal weapons bay is slightly smaller to accommodate the lift fan used for vertical flight. If required, the F-35 can also be configured to carry external stores. (See the Navy Aircraft section for additional specifications of the F-35C.)

The F-35B first flew June 8, 2008, and vertical lift operations began in January 2009 at the Lockheed Martin Aeronautics facility in Fort Worth, Texas. The first F-35B arrived at Naval Air Station Patuxent River, Maryland, in December 2009 to begin short takeoff, vertical landing flight testing. It was joined in 2010 by three other test aircraft, including the first with a full mission system installed. In October 2011, the F-35B completed sea trials aboard the amphibious assault ship USS Wasp.

In 2012, the U.K. Royal Navy reversed its 2010 decision to purchase F-35Cs in lieu of F-35Bs. Other nations procuring the F-35B include Italy, Japan and the Republic of Korea.

The Marine Corps' fleet replacement training squadron for the F-35, Marine Fighter Attack Training Squadron (VMFAT) 501, stood up in April 2010. The first F-35B was delivered to Eglin Air Force Base, Florida, in January 2012. F-35B training began at Eglin in mid-2012 and moved to Marine Corps Air Station Beaufort, South Carolina, in 2014. Another fleet replacement squadron, VMFAT-502, was activated in Beaufort in June 2020.

Initial operational capability was achieved July 31, 2015. The developmental test III phase was conducted aboard the amphibious assault ship USS America in late 2016. Initial operational testing and evaluation began in December 2018.

The Marine Corps' first operational F-35 squadron, Marine Fighter Attack Squadron (VMFA) 121 at MCAS Yuma, Arizona, completed transition to the F-35B in 2013 and deployed to Iwakuni, Japan, in January 2017. It took the F-35B on its first patrol with the 31st Marine Expeditionary Unit aboard the Wasp. A second squadron, VMFA-211, completed transition to the F-35B in 2017 and deployed in 2018 aboard the amphibious assault ship USS Essex. VMFA-211 flew the first U.S. F-35 combat missions, conducted Sept. 27, 2018, supporting Operation Enduring Freedom over Afghanistan. VMFA-122 began flights in the F-35B in March 2018, and VMFA-242 completed transition in 2021, followed by VMFA-225 in 2021, VMFA-214 in 2022, with VMFA-225, VMFA-542 and VMFA-533 in transition.

In September 2018, U.S. F-35Bs supported first flights from the U.K. Royal Navy's aircraft carrier HMS Queen Elizabeth. In August 2021, VMFA-211 deployed on the carrier for a joint deployment with Royal Navy F-35Bs as part of Carrier Strike Group 21 and the U.K. Operation Fortis. During the deployment, U.S. and U.K. F-35Bs supported combat operations in the U.S. Central Command area of responsibility and joint exercises in European Command, Central Command and Indo-Pacific Command areas of responsibility.

In October 2021, Marine Corps F-35Bs from VMFA-242 supported a demonstration of shipboard suitability aboard JS Izumo. In 2022, three F-35B squadrons operated from the America-class amphibious assault ship USS Tripoli in a "Lightning Carrier" concept demonstration.

In 2011, the U.S. Marine Corps decided to procure 353 F-35Bs and 67 F-35Cs. The service plans to equip four fighter attack squadrons with F-35Cs to augment Navy Carrier Air Wings. VMFA-314, the Marine Corps' first F-35C squadron, began transitioning in June 2019, was designated safe for flight in December 2020 and deployed aboard the Nimitz-class aircraft carrier USS Abraham Lincoln in early 2022. (See the Navy Aircraft section for a description of the F-35C.)



U.S. NAVY

F-35B LIGHTNING II

DATA APPLIES TO F-35B

WINGSPAN	35 feet
LENGTH	51.3 feet
WEIGHT	empty, 32,300 pounds
MAX WEIGHT	takeoff, 60,000 pounds
SPEED	Mach 1.6
RANGE	900 nautical miles unrefueled; radius, 469 nautical miles
POWER PLANT	1 Pratt & Whitney F135 turbofan engine
ARMAMENT	laser-guided bombs, JDAMs, AIM-120, AIM-9X, GAU-22
CREW	1 pilot
CONTRACTORS	Lockheed Martin; Pratt & Whitney; Northrop Grumman; BAE Systems; Rolls-Royce

F/A-18 HORNET

The F/A-18A-D Hornet is a twin-engine, midwing, multimission tactical aircraft. Introduced in 1978, it eventually replaced the F-4 Phantom II and A-6E Intruder in the U.S. Navy and U.S. Marine Corps and the Navy's A-7 Corsair II. The primary design missions are fighter escort and interdiction, with fleet air defense and close air support as additional roles. The single-seat F/A-18A and two-seat F/A-18B became operational in 1983.

The F/A-18 is equipped with a digital, fly-by-wire flight control system



U.S. MARINE CORPS

F/A-18C HORNET

that provides exceptional maneuverability and allows pilots to concentrate on operating weapons systems. A solid thrust-to-weight ratio and superior turn characteristics, combined with energy sustainability, enable the Hornet to hold its own against any adversary. The F/A-18 was the Navy's first tactical jet to incorporate digital-bus architecture for the entire avionics suite, making it relatively easy to upgrade.

Following a production run of 421 Navy/Marine Corps F/A-18A/Bs, deliveries of the single-seat F/A-18C and two-seat F/A-18D began in October 1987. The F/A-18C/Ds incorporated provisions for employing updated missiles and jamming devices against enemy ordnance. They are armed with the AIM-120 Advanced Medium Range Air-to-Air Missile and the infrared-imaging version of the AGM-65 Maverick air-to-ground tactical missile.

The two-seat F/A-18D performs tactical and forward air control missions in addition to all-weather attack missions. In 1999, with the delivery of the Advanced Tactical Air Reconnaissance System, the F/A-18D assumed the tactical reconnaissance mission. The ATARS permits transmission of real-time imagery to joint commanders via digital data link.

The F/A-18 Hornet is employed in Marine Corps fighter attack squadrons, in Navy support squadrons, and in the air forces of Canada, Finland, Kuwait, Malaysia, Spain and Switzerland. A total of 1,503 F/A-18A-D Hornets were produced. The last Hornet, an F/A-18D, rolled off the Boeing production line in August 2000.

The service-life extension program of record continues. The majority of operating F/A-18A-D Hornets will receive modifications to extend their service lives beyond 8,000 flight hours; most will be modified to attain the 10,000 flight-hour goal. In addition to modifications, all fleet aircraft will need to incorporate the high-flight-hour inspection suite prior to exceeding 8,000 hours to ensure safety of flight and airworthiness.

Starting in 2014, retrofits began for the F/A-18C/D Electronics Warfare systems, resulting in integration of sophisticated systems that include the AN/ALR-67(V)3 Radar Warning Receiver, AN/ALQ-214(V)5 Airborne Jammer and AN/ALE-47 countermeasures dispensing system (chaff and flares).

Of the 61 F/A-18As upgraded to the A+ configuration, 56 were upgraded to F/A-18A++ (F/A-18C capability). The service replaced the A++ aircraft as they reached service-life limits with F/A-18Cs equipped with Link 16, color cockpit displays, a moving-map display, AN/ALE-47 countermeasures dispensers, the Naval Aircrew Common Ejection Seat and the Joint Helmet-Mounted Cueing System. In 2022, a radar upgrade from the AN/APG-73 to the AN/APG-79(V)4 was initiated for fleet squadrons and is currently under development. Marines will continue to operate the F/A-18C/D variants until they are replaced by the F-35 Lightning II Joint Strike Fighter.

As of October 2023, the Marine Corps and Navy had 196 F/A-18C/D aircraft (124 C, 72 D) in operational service and in test roles. The Marine Corps has four active squadrons flying F/A-18C/D aircraft, a reserve squadron flying F/A-18C aircraft and a fleet replacement detachment squadron flying F/A-18C/D aircraft.

In 2021, VMFA-323 completed the last Hornet carrier deployment in the Department of the Navy and the final tactical aircraft integration deployment for Marine F/A-18s. Marine aircraft groups continue to source Hornet combat capability to the Indo-Pacific in support of the unit deployment program, and as required in support of dynamic force employment.

WINGSPAN	40.4 feet
LENGTH	56 feet
HEIGHT	15.3 feet
WEIGHT	51,900 pounds maximum takeoff
SPEED	Mach 1.7+
CEILING	approximately 50,000 feet
RANGE	Hi-Lo-Lo-Hi profile radius with 3 330-gallon external fuel tanks and 4 1,000-pound bombs: 369 nautical miles
POWER PLANT	2 General Electric F404-GE-402 enhanced-performance engines, 18,000 pounds static uninstalled thrust; 2 GE F404-GE-400 engines, 16,000 pounds static uninstalled thrust
ARMAMENT	1 M61A1/M61A2 20 mm gun; 14,000 pounds of external stores; general bombs; GPS/laser-guided bombs; air-to-air and air-to-ground missiles; various other types of pods and mines
CREW	F/A-18A and C: 1 pilot; F/A-18B and D: 2 pilots or 1 pilot and 1 weapons systems officer
CONTRACTOR	Boeing

AV-8B HARRIER II+



U.S. MARINE CORPS

AV-8B HARRIER II+

The AV-8B Harrier II+'s primary tasks are to conduct fire support, close air support, air interdiction, suppression of enemy air defenses and air-to-air operations. Its short-takeoff, vertical-landing capability provides greater basing flexibility and sortie-generation rates than any other tactical jet aircraft. The Harrier can perform a short takeoff using as little as 300 to 1,200 feet of ground/shipboard distance and then return from the mission to perform a vertical landing.

The AV-8B Harrier II+ program greatly increased the capabilities of the AV-8B by converting 74 day-attack variants to the radar/night-attack standard by adding the APG-65 radar, a navigational forward-looking infrared sensor, a digital moving map and fully integrated, night-vision-goggle-compatible cockpit and also by tripling the capacity for expendable countermeasures.

In 2002, the AV-8B added the Litening targeting pod to its capabilities. It was the lead platform in the introduction of the Litening video downlink capability that revolutionized close air support, time-sensitive targeting and intelligence, surveillance and reconnaissance operations. This system greatly increased the aircraft's lethality and survivability and reduced

potential for fratricide, collateral damage and time to kill. The version currently in use is the Litening G4.

Growth for the AV-8B was seen in the 2000s with the installation of OSCAR, or the Open-System Core Avionics Requirement, which introduced to the aircraft an advanced mission systems computer and a new warfare-management computer. OSCAR provided Joint Direct Attack Munition capability and the necessary modular open systems architecture to rapidly streamline integration of AIM-120 Advanced Medium Range Air-to-Air Missile, Dual-Mode Laser-Guided Bomb, Laser JDAM, Anti-Jam/Anti-Spoof GPS Receiver, upgraded Tactical Aircraft Moving Map capability and an upgraded self-protection countermeasure expendable system. The two-seat TAV-8B trainer variant was also modified with the OSCAR capability, a more powerful F402-RR-408 engine and a night-vision-goggle-compatible cockpit.

In the 2010s, the AV-8B saw capability growth in the 5.0, 6.0, 6.1 and 6.2 Block upgrades. The 5.0 Block Upgrade accommodated carriage of the Litening pod on the centerline weapon station, which allows for precision placement of high explosives on time-critical targets and greater weapons carriage on wing stations. The 6.0 Block Upgrade integrated the BRU-70 Digital Improved Triple Ejector Rack, ALE-47 Countermeasure Dispensing System, APG-65 radar 23X software for improved radar performance and other system improvements. The 6.2 Block Upgrade enabled the installation of Link 16 on the AV-8B at the end of 2018, Identification of Friend or Foe Mode 5 and required navigation performance/area navigation capabilities.

In the 2020s, the 7.0, 7.1 and 7.2 Block upgrades will enable additional Link 16 messages, integration of the AIM-9X and Joint Standoff Weapon, incorporation of the Litening Advanced Tactical Data Link, and IFF and air traffic management improvements through the integration of Mode S and automatic dependent surveillance broadcast-out, respectively.

Providing critical firepower to the Marine Air-Ground Task Force, the AV-8B operates close to, or from, the battlefield and littoral waters with Marine ground combat elements and has provided the fastest response time of any fixed-wing aircraft. The two East Coast AV-8B attack squadrons continue to deploy to support overseas contingency operations aboard amphibious assault ships.

The AV-8B took part in operations Iraqi Freedom, Enduring Freedom and Odyssey Dawn/Unified Protector and in operations against Islamic State extremists, including Operation Odyssey Resolve in Libya in late 2016 and Operation Inherent Resolve in Iraq and Syria.

As of Oct. 1, 2023, two Marine attack squadrons are equipped with the AV-8B, and 51 aircraft remain in service (46 AV-8B Harrier II+ and five TAV-8Bs). The out-of-service date for AV-8B Harrier II+ is the first quarter of fiscal 2027.

WINGSPAN	30.3 feet
LENGTH	47.4 feet
HEIGHT	11.6 feet
WEIGHT	empty, 14,800 pounds
MAX WEIGHT	short takeoff, 32,000 pounds; vertical takeoff, 20,700 pounds
SPEED	Mach 0.85
FERRY RANGE	1,600 nautical miles unrefueled
POWER PLANT	1 Rolls-Royce F402-RR-408 Pegasus turbofan engine
ARMAMENT	General-purpose bombs; JDAM, LJDAM, DMLGB, JSOW, AIM-120, AIM-9/9X, AGM-65, AGR-20B, 2.75- and 5-inch rockets; 300-round 25 mm cannon
CREW	AV-8B: 1 pilot; TAV-8B: 2 pilots
CONTRACTORS	Boeing; BAE Systems; Rolls-Royce; Northrop Grumman

KC-130J HERCULES



U.S. MARINE CORPS

KC-130J HERCULES

The KC-130J, which entered Marine Corps service in 1961, is an assault support/aerial refueling aircraft that provides support to the Marine Air-Ground Task Force and expeditionary operations by providing air-delivered ground refueling of aircraft and tactical vehicles at forward operating bases and air-to-air refueling of fixed-wing, rotary-wing and tilt-rotor aircraft. The aircraft can transport 92 combat-loaded ground troops or 64 paratroopers and equipment, as well as more than 42,000 pounds of weapons, equipment or other supplies. It can be configured to transport up to 74 patients on litters, provide battlefield illumination, and operate in and out of unimproved landing zones, day or night under all weather conditions.

The KC-130J is equipped with Rolls-Royce engines and six-bladed composite-material propellers and has replaced the legacy KC-130F/R/T. The current production baseline includes the Block 8.1 upgraded cockpit and the AAQ-24 Large Aircraft Infrared Countermeasures system.

Ten KC-130J aircraft have been modified post-production with the Harvest Hercules Airborne Weapons Kit to provide the MAGTF a persistent multi-sensor imagery reconnaissance and close air support capability with the MX-20 electro-optical/infra-red imaging system and AGM-114P Hellfire and AGM-176 Griffin missiles.

As of October 2023, the Marine Corps inventory included 70 KC-130Js assigned to four active and one Reserve component Marine aerial refueler transport squadrons and one Navy test and evaluation squadron. The Navy's Flight Demonstration Squadron "Blue Angels" accepted a C-130J in August 2020 that was procured from the United Kingdom and is now operated by a Marine crew for flight demonstrations and logistics support. The KC-130J inventory objective is 86 aircraft.

WINGSPAN	132.6 feet
LENGTH	97.75 feet
HEIGHT	38.25 feet
WEIGHT	maximum gross takeoff, 175,000 pounds
SPEED	normal cruise speed, 320 knots
RANGE	with maximum payload and allowance for 30 minutes at sea level, 2,046 nautical miles; with maximum fuel and 20,000-pound payload, 4,460 nautical miles
POWER PLANT	4 Rolls-Royce AE 2100D3 turboprop engines; GE/Dowty 6-bladed composite propellers
ARMAMENT	10 AGM-176 missiles; Harvest HAWK only: 4 AGM-114P missiles
CREW	2 pilots, 1 crew master
PRIME CONTRACTORS	Lockheed Martin; GE Aviation Systems Rolls-Royce; Sierra Nevada Corp.

UC-35D CITATION ENCORE

The UC-35D is a Federal Aviation Administration-certified multipurpose low-wing, twin-engine business jet with a pod-mounted engine on each side of the aft fuselage. It is crewed by a pilot and co-pilot and has accommodations for up to eight passengers, cargo or a combination of the two. The UC-35D fleet of 10 aircraft is located at multiple sites around the United States and overseas and is capable of rapid-response transport for high-priority resupply and movement of key personnel to remote sites. The UC-35Ds entered service from 2001 to 2006.

CONTRACTORS.....Amentum; Textron (Cessna); Pratt & Whitney

C-12 HURON



U.S. MARINE CORPS

C-12 HURON

The Marine Corps operates UC-12 F/M/W aircraft. (See Navy section for UC-12F/M.) The UC-12W is an Federal Aviation Administration-certified military variant of the King Air 300 series aircraft. The Huron is a low-wing, fully pressurized, multifunction T-tail monoplane with two turboprop engines. The aircraft is certified to operate on unimproved runways and in extreme weather conditions and is equipped with the latest FAA mandates for operations in and outside the continental United States. The cabin can be configured to accommodate passengers, cargo or both.

The current Marine Corps inventory is four UC-12Fs, two UC-12Ms and nine UC-12Ws. The more capable UC-12Ws are equipped with extended-range fuel tanks, additional aircraft survivability equipment, night-vision compatible lighting and satellite phone communications. The UC-12W program of record is 30 aircraft.

CONTRACTOR.....Textron Aviation

C-20G GULFSTREAM IV

BRIEFING: The C-20G is a military version of the Gulfstream IV aircraft. C-20 aircraft are capable of all-weather, long-range, high-speed, nonstop transoceanic flights. The Marine Corps operates two C-20G aircraft based at Marine Corps Base Hawaii.

CONTRACTOR.....Gulfstream Aerospace Corp.

C-40A CLIPPER

The Marine Corps procured two used Boeing 737-700Cs in 2018 and converted them to C-40As. One was delivered to Marine Transport Squadron (VMR) 1 in May 2023, and the second was delivered in December 2023. (See the Navy Aircraft section for a description.)

CONTRACTORS.....Boeing; AAR Corp.



U.S. MARINE CORPS

C-40A CLIPPER

OTHER FIXED-WING AIRCRAFT

The Marine Corps operates a small number of the following aircraft for special missions. Inventory numbers are listed inside the parentheses. (See the Navy Aircraft section for descriptions of these aircraft.)

F-5F/N TIGER II .....Reserve adversary aircraft (1/11)

T-34C TURBOMENTOR .....Target spotting for F/A-18 training (3)

TILT-ROTOR AIRCRAFT

MV-22 OSPREY



U.S. MARINE CORPS

MV-22B OSPREY

The V-22 Osprey is the world's first tilt-rotor aircraft combining rotary- and fixed-wing capabilities, developed by the Bell-Boeing Joint Project Office for the U.S. Marine Corps, U.S. Air Force, U.S. Navy and Japan Ground Self-Defense Force.

The MV-22B is a highly capable military aircraft and remains the most demanded aircraft in the Marine Corps' inventory, serving as the workhorse of the Marines' assault support community.

The MV-22 replaced CH-46E and CH-53D helicopters as the service's medium-lift aircraft with a primary mission of providing the amphibious/vertical assault support for the Marine Corps, including transport of troops, weapons, equipment and supplies. The MV-22 is a force multiplier due to its ability to fly faster, higher and longer and carry more cargo than the platforms it replaced. Designed to carry combat-equipped troops, the MV-22 complements the range of military operations.

The first operational MV-22 Osprey squadron, Marine Medium Tiltrotor Squadron (VMM) 263, was activated in March 2006 to begin the fleet transition from the CH-46E to the MV-22. Initial operational capability was reached in June 2007, and VMM-263 took the MV-22B into combat

on a deployment to Iraq in September 2007. VMM-263 deployed the Osprey to sea in 2009 aboard the amphibious assault ship USS Bataan. VMM-261 took the MV-22B on its first deployment to Afghanistan in late 2009. The MV-22B Block C configuration, which provided mission enhancements, primarily in the areas of environmental control systems upgrades and mission systems improvements, was first delivered in January 2012. In July 2012, the first overseas squadron, VMM-265, stood up in Okinawa, Japan, and V-22s were delivered to Marine Helicopter Squadron (HMX) 1 to support the presidential executive transport mission in May 2013.

As of October 2023, there were 15 active and two reserve Marine medium tilt-rotor squadrons. In addition, there is one Marine medium tilt-rotor training squadron.

The V-22 Joint Program Office continually integrates new technology onboard the aircraft and within ground maintenance systems to ensure long-term sustainability and align with the Marine Corps Force Design 2030 objectives. For the Marines, this includes digital interoperability upgrades, degraded visual environment landing improvements and reliability improvements.

The V-22 program total quantity requirement is 464 aircraft (360 Marine Corps MV-22s, 56 Air Force CV-22s and 48 Navy CMV-22s). Additionally, under the first foreign military sales case for the V-22, Japan procured 17 MV-22s.

The V-22 variants, across all militaries, will remain ready, relevant and reliable for generations to come, with service projection through the 2050s.

WINGSPAN	83.10 feet
LENGTH	57.3 feet
HEIGHT	22.1 feet
WEIGHT	maximum gross: 60,500 pounds (self-deployment); STOL: 57,000 pounds; VTOL: 52,600
MAX SPEED	150 knots
CEILING	10,000 feet (without supplemental oxygen)
MAX MISSION RADIUS	134 nautical miles with 32 troops at 3,000 feet
POWER PLANT	2 AE-1107C Rolls-Royce turboshaft engines
PAYLOAD	internal: 20,000 pounds; external: 12,500 pounds
TROOP SEATS	24
LITTERS	12
ARMAMENT	1 GAU-17 or 1 M240D 7.62 mm machine gun/ GAU-16/GAU-18 .50-caliber machine gun
CREW	2 pilots, 1 crew chief
CONTRACTORS	Bell-Boeing Joint Project Office; Raytheon; Rolls-Royce

HELICOPTERS

AH-1Z VIPER

The AH-1Z helicopter's primary roles are to provide fire support and security of forward and rear area forces; conduct point-target/anti-armor and anti-helicopter operations; provide armed escort, control and coordination for assault support operations; control, coordinate and provide terminal guidance for supporting arms including artillery, mortars, naval surface fire support and close air support; and conduct armed and visual reconnaissance.

The H-1 platform is ballistically tolerant with integrated threat detection and warning systems for battlefield survivability, includes a fully integrated state-of-the art sensors and weapons system and is designed for reliability and supportability in extreme and austere environments. The AH-1Z features a new, four-bladed composite rotor system, transmission, four-bladed tail rotor, upgraded landing gear and a fully integrated glass cockpit.

The first low-rate initial production AH-1Z was delivered in 2007 followed by full-rate production in 2010, and initial operational capability in February 2011. Since 2015, the AH-1Z steadily replaced the AH-1W; the last active-component AH-1Ws returned from deployment in 2020, and the last reserve AH-1W was retired in November 2020.

AH-1Zs have participated in combat operations since 2007 in operations Iraqi Freedom and Enduring Freedom. The AH-1Z first deployed in October 2011 with a detachment from Light Attack Helicopter Squadron (HMLA) 367 (later transferred to HMLA-267) as part of the 11th Marine Expeditionary Unit. HMLA-267 was the first squadron to complete the transition to AH-1Zs. Transition of the active-component light attack helicopter squadrons was completed in 2020, and transition of the reserve squadrons was completed in 2021. In October 2022, the H-1 program office completed the domestic program of record of AH-1Z, delivering the 189th aircraft. Production continues with international variants for Bahrain and the Czech Republic.



U.S. MARINE CORPS

AH-1Z VIPER

FUSELAGE LENGTH	44.25 feet
OVERALL LENGTH	58.25 feet
ROTOR DIAMETER	48 feet
HEIGHT	14.33 feet
WEIGHT	12,300 pounds; maximum takeoff and landing, 18,500 pounds
SPEED	maximum, 200 knots; cruising, 142 knots
CEILING	20,000 feet
RANGE	125 nautical miles with attack payload
POWER PLANT	2 General Electric T700-GE-401C engines, 1,800 hp each
ARMAMENT	1 20 mm cannon; AGM-114 and AIM-9 missiles; 2.75- or 5-inch rockets
CREW	1 pilot, 1 co-pilot/gunner
CONTRACTOR	Bell Textron

UH-1Y VENOM

The UH-1Y's primary tasks are to provide airborne command and control for command elements; provide armed escort for assault support operations; conduct combat-assault transport of troops, supplies and equipment; provide fire support and security for forward and rear area forces; and provide terminal guidance for supporting arms, including close air support, artillery, mortars and naval surface fire support.

The H-1 platform is ballistically tolerant with integrated threat detection and warning systems for battlefield survivability, includes a fully integrated state-of-the art sensors and weapons system and is designed for reliability and supportability in extreme and austere environments. The

UH-1Y features a new, four-bladed composite rotor system, transmission, four-bladed tail rotor, upgraded landing gear and a fully integrated glass cockpit.

The last UH-1N Iroquois, or "Huey," helicopters, which entered Marine Corps service in 1971, were retired in September 2014, having been replaced by the UH-1Y Venom. The last HH-1N Hueys, serving as a utility and search and rescue helicopter for air station coverage at Marine Corps Air Station Yuma, Arizona, were retired in March 2020.

The UH-1Y achieved initial operational capability in August 2008. A Light Attack Helicopter Squadron (HMLA) 267 detachment joined Medium Helicopter Squadron (HMM) 163 and took the UH-1Y on its first operational deployment in January 2009. HMLA-367, the first full squadron to make the transition from the UH-1N, deployed to Afghanistan in October 2009.

All active-duty operational light attack helicopter squadrons completed transition to the UH-1Y by 2013, and the reserve squadrons completed transition in mid-2014, bringing a closure to the UH-1N legacy fleet. Delivery of 160 UH-1Ys to the Marine Corps was completed in April 2018. The Czech Republic has ordered eight UH-1Ys.



U.S. MARINE CORPS

UH-1Y VENOMS

FUSELAGE LENGTH	44 feet
OVERALL LENGTH	58.33 feet
ROTOR DIAMETER	48 feet
HEIGHT	14.58 feet
WEIGHT	empty, 11,840 pounds; maximum takeoff, 18,500 pounds
SPEED	maximum, 164 knots; cruise, 135 knots
CEILING	20,000 feet
RADIUS	129 nautical miles with 2,182 pounds
POWER PLANT	2 GE T-700-GE-401C turboshaft engines, 1,800 shp each
ARMAMENT	2.75-inch rocket pods, 7.62 mm Gatling gun (GAU-17), M240D 7.62 mm machine gun, 12.7 mm GAU-21 machine gun
CREW	1 pilot, 1 co-pilot, 1 crew chief, 1 gunner, 8 combat-equipped Marines
CONTRACTOR	Bell Textron

VERTICAL TAKEOFF AND LANDING FAMILY OF SYSTEMS

The VTOL family of systems program will develop a weapon system or systems that fills capability and performance gaps identified by the Marine Corps. The VTOL family of systems will be designed for optimal manning and for human-machine teaming with the Marine Air-Ground Task Force unmanned aircraft system-expeditionary capability. Additionally, it will include a common mission system architecture to enable interoperability across the MAGTF. The Marine Corps' driving requirement is attached escort in tomorrow's battlespace during distributed expeditionary operations from the sea. Speed, maneuver envelope, all-weather capability and survivability will facilitate full integration of this aircraft into the MAGTF. To meet these goals, the VTOL family of systems will operate above legacy helicopter performance attributes like airspeeds, combat range, altitude and endurance with a full payload. The VTOL family of systems program will require a comparable mission radius and loiter time to match MV-22Bs, as well as time on station to support distributed air combat element operations.

The VTOL family of systems will have a greater capability to employ a more diverse set of weapon systems and operate in a larger spectrum of environments by using fused, onboard sensor data and terrain avoidance systems. Amphibious operations and shipboard compatibility will be a key attribute to this air vehicle. The Marine Corps' future vertical lift analysis of alternatives concluded in 2019. The data generated from this event lays the groundwork needed to enter analysis and develop the capability development document.

The Marine Corps issued a request for information from the industry in September 2019 and a broad agency announcement for the introduction of advanced technologies in model-based systems engineering and condition-based maintenance plus in 2020.

CH-53E SUPER STALLION



U.S. MARINE CORPS

CH-53E SUPER STALLION

The CH-53E is the Marine Corps' primary heavy-lift helicopter. It is capable of rapidly transporting troops and equipment from ship to shore to launch amphibious assaults, facilitate logistics and maintenance, provide sustainment and supplies, and equip warfighters for mission success. The CH-53E incorporates GPS, forward-looking infrared radar and aviator's night-vision imaging system head-up display sensors and carries three .50-caliber guns (as a mission kit). Communications include ultra-high-frequency/very high-frequency/high-frequency radios, secure communications capability and identification, friend or foe. The aircraft can seat 55 passengers.

The helicopter's T-64-GE-416/416A engines have been upgraded to the T-64-GE-419 configuration to increase lift capability at higher altitudes and temperatures. The current fleet of CH-53Es is continuing to be modified with the smart multifunction color display, integrating the Blue Force Tracker, moving map, and forward-looking infrared and hover symbology on a single display and increasing pilot situational awareness and overall safety of the helicopter in all flight regions to include landing in brownout conditions.

The CH-53E was one of the first Defense Department assets to receive full U.S. permission to fly using automatic dependent surveillance. Modifications continue to provide the entire fleet with these capabilities.

As of October 2023, the Marine Corps was operating 129 CH-53Es in six active Marine heavy helicopter squadrons, one Marine heavy helicopter training squadron and one Marine reserve heavy helicopter squadron.

Each 16-helicopter squadron is based on an eight-aircraft "mother squadron" and two four-aircraft detachments. The CH-53E has been used extensively in operations in Afghanistan, Iraq and Syria. Currently out of production, the CH-53E is going through a rolling period of rebuilding, upgrading and increasing safety, reliability and capabilities, called a reset, which will ensure the CH-53E maintains required mission capability until it is replaced by the CH-53K King Stallion.

FUSELAGE LENGTH.....73.3 feet
OVERALL LENGTH.....99 feet
HEIGHT.....28.3 feet
WEIGHT.....73,500 pounds (with external load)
MAX SPEED.....150 knots
MAX MISSION RADIUS.....134 nautical miles with 32 troops at 3,000 feet
POWER PLANT.....3 General Electric T64-GE-416 turboshaft engines (4,380 shp each)
CREW.....1 pilot, 1 co-pilot, 1 crew chief, 1 mechanic/gunner
CONTRACTOR.....Sikorsky

CH-53K KING STALLION



SIKORSKY

CH-53K KING STALLION

The CH-53K is the U.S. Marine Corps' heavy-lift replacement for the CH-53E. The most powerful helicopter in the Department of Defense, the CH-53K will be the long-range logistic support backbone for the Marine Corps. It is a new-build helicopter that will expand the fleet's ability to move more materiel more rapidly throughout an area of responsibility using proven and mature technologies.

The CH-53K is designed to lift nearly 14 tons (27,000 pounds) at a mission radius of 110 nautical miles in high and hot environments. It can lift almost triple the baseline CH-53E capability in a high hot environment. It is also designed to have a smaller shipboard footprint, lower operating costs per aircraft and fewer direct maintenance man hours per flight hour.

Once fielded, the CH-53K is expected to externally lift two up-armored high mobility multipurpose wheeled vehicles, light armored vehicles and dual joint light tactical vehicles. It features a cabin section 12 inches wider than the CH-53E that can internally load two AMC 463L pallets or five AMC 463L half-pallets or internally load a HMMWV. The CH-53K leverages a next-generation glass cockpit Common Avionics Architecture System open-architecture design; uses triple redundant fly-by-wire flight controls adding additional survivability, safety and maintenance improvements; includes fourth-generation high-efficiency composite rotor blades with swept anhedral tips; and leverages a low-maintenance elastomeric rotor head.

A ground test vehicle and two static test articles were built. Four prototype CH-53K engineering development models were contracted in May 2013. Testing of the GTV began in January 2014. The first flight of the CH-53K took place October 17, 2015. Low-rate initial production began in September 2017. Delivery of the first CH-53K occurred May 16, 2018. Sea trials began in June 2020. The first CH-53K built at the Stratford, Connecticut, facility was delivered in October 2021.

The Marine Corps' program of record for the CH-53K is 200 aircraft. There are 71 CH-53Ks on contract for the Marine Corps. As of November 2023, 11 CH-53Ks had been delivered to Marine Operational Test and Evaluation Squadron (VMX) 1 and Marine Heavy Helicopter Squadron (HMH) 461 at Marine Corps Air Station New River, North Carolina. The CH-53K program completed initial operational testing and evaluation in April 2022, and initial operational capability was declared the same month. The Marine Corps plans to stand up 5.75 active-duty squadrons, one training squadron and two reserve squadrons to support operational requirements.

The Israeli government has procured 12 CH-53Ks with an option for six more to replace its CH-35Ds. Deliveries are scheduled to begin in 2027.

OVERALL LENGTH.....99.5 feet
HEIGHT.....28.3 feet
WEIGHT.....max gross, 88,000 pounds (with external load)
DESIGN AIRSPEED.....170 knots
CEILING.....9,520 feet MSL (HIGE 88,000 pounds)
POWER PLANT.....3 T408-GE-400 turboshaft engines rated at 7,468 shp
CREW.....2 pilots, 1-3 aircrewmen (mission dependent)
CONTRACTOR.....Sikorsky

VH-3D SEA KING

Marine Helicopter Squadron (HMX) 1 operates 10 VH-3D helicopters for transportation for the president of the United States and other government executives. The VH-3Ds are transportable in C-5 and C-17 aircraft. A former Navy UH-3H, redesignated UH-3D as a crew trainer, was retired in 2023.

CONTRACTOR.....Sikorsky

VH-60N WHITE HAWK/UH-60N BLACK HAWK

Marine Helicopter Squadron (HMX) 1 operates seven VH-60N helicopters for transportation for the U.S. president and other government executives. The VH-60Ns are transportable in C-5 and C-17 aircraft. HMX-1 also operates a former Navy MH-60S, redesignated UH-60N, for crew training.

CONTRACTOR.....Sikorsky

VH-92A PRESIDENTIAL HELICOPTER



SIKORSKY

VH-92A

In 2014, the Navy selected Sikorsky to develop the VH-92A (formerly VXX) to replace the VH-3D and VH-60N helicopter fleet used to transport the U.S. president and other government executives. The May 2014 engineering and manufacturing development contract procured two test aircraft and four production aircraft.

The program completed its Milestone C review May 30, 2019, and received the acquisition decision memorandum June 7, 2019, authorizing the program to enter the production and deployment phase. The low-rate initial production Lot I option for six VH-92A aircraft, spares and support equipment was exercised June 10, 2019. Six more aircraft were ordered under Lot II on Feb. 20, 2020, for delivery in 2022. Five Lot III aircraft were ordered Feb. 5, 2021. Initial operational testing and evaluation was completed in April 2021. Total inventory will be 23 aircraft, comprised of 21 operational fleet aircraft and two test aircraft. As of October 2023, 17 aircraft had been delivered to HMX-1 while two remained test articles. Initial operational capability was declared in December 2021.

CONTRACTOR.....Sikorsky

UNMANNED AERIAL SYSTEMS

MQ-9A REAPER



U.S. MARINE CORPS

MQ-9A REAPER

The MQ-9 is a single-engine, turboprop remotely piloted aircraft designed to operate over the horizon at medium to high altitude for long-endurance sorties. The aircraft is designed primarily to prosecute critical emerging time-sensitive targets using radar, electro-optical/infrared and laser designator-based attack sensors while performing intelligence, surveillance, reconnaissance and target acquisition. The aircraft employs fused multispectral sensor information to find, fix and track ground targets and assesses post-strike results. The MQ-9 can carry multiple mission payloads, including EO/IR, Lynx Multi-mode Radar, multimode maritime surveillance radar, electronic support measures, laser designators and various weapons packages.

The Marine Corps operates the MQ-9 under the remote split operations concept using a dual control mobile ground control station located at the mission control element at Marine Corps Air Station Yuma, Arizona, to support forward operating units outside the continental United States. A launch and recovery element GCS outside the continental U.S. allows for servicing, systems check, maintaining, launching and recovering aircraft under line-of-sight control. The launch and recovery element transfers control of the aircraft to the mission control element pilot for mission execution. The GCS functions as the aircraft cockpit and can control the aircraft from either within line of sight or beyond line of sight via a combination of satellite relay and terrestrial communication architectures.

Marine Unmanned Aerial Vehicle Squadron (VMU) 1 had used contractor-owned, contractor-operated MQ-9s in combat in Afghanistan, and other operational areas in the U.S. Central Command area of responsibility, since September 2018. Marine operators in VMU-1 completed their first flight of a Reaper in March 2020. Naval Air Systems Command awarded a procurement contract for two aircraft in June 2020 that were contractor-owned Reapers, and their GCSs transferred to VMU-1 on Oct. 15, 2021. Eight MQ-9A Extended-Range Reapers were ordered in May 2022. The Marine Corps plans to procure up to 10 more MQ-9As in fiscal years 2022-2024. The Reapers will equip two operational squadrons (VMU-1 and VMU-3) with six to eight aircraft each and a Fleet Replacement Squadron (Unmanned Aerial Vehicle Training Squadron 2), and Air Test and Evaluation Squadron 24. In fiscal year 2023, the Marine Corps initiated acquisition program efforts to develop and field additional payload/sensor capabilities for employment on the Reaper that will support Force Design 2030.

CONTRACTORS.....General Atomics-Aeronautical Systems Inc.; Raytheon; L3Harris

RQ-20B PUMA



U.S. MARINE CORPS

RQ-20 B PUMA being hand-launched.

The RQ-20B is a 13.5-pound, all-environment, hand-launched, reconnaissance, surveillance and target acquisition drone employed at the company level. It is well-suited to develop pattern of life, perimeter security and persistent surveillance of targets and areas of interest. The system uses an integrated digital data link and gimbaled electro-optical/infrared sensor with laser illumination payload. Each system contains three air vehicles and one ground control station.

CONTRACTOR.....AeroVironment Inc.

RQ-21A BLACKJACK

The RQ-21A unmanned aerial system has been retired from the Marine Corps but remains in service with the Navy. (See the Navy Aircraft section for a description.)

CQ-24A K-MAX CARGO RESUPPLY UNMANNED AERIAL SYSTEM

The CQ-24A consists of a single system based on two unmanned K-Max helicopters, main operating base and forward operating base ground control stations, and associated ground support equipment and spares. The Marine Corps conducted evaluations of the K-Max to fill an urgent requirement for an unmanned ability to deliver/retrograde cargo to forward operating bases while avoiding the use of convoys over dangerous routes.

In November 2011, the Marine Corps deployed the CQ-24A as a government-owned, contractor-operated system into Afghanistan for a six-month evaluation in combat conditions. The deployment was extended through May 2014. The two K-Max aircraft, along with the rest of the system, were delivered to Marine Operational Test and Evaluation Squadron 1 in 2016 to support further cargo unmanned aircraft experimentation and concept of operations development. In April 2019, Kaman was awarded a contract to replace the avionics in the CQ-24s with the Titan system and return them to flight status.

CONTRACTORS.....Lockheed Martin; Kaman Corp.

R80D SKYRAIDER



U.S. MARINE CORPS

R80D SKYRAIDER

The R80D SkyRaider is equipped with long-range, high-resolution electro-optical/infrared imaging sensors providing day and night situational awareness. It can detect and classify objects, perform semiautonomous flights and thrive in environments that lack either GPS or communications thanks to its advanced edge-of-network processing. The SkyRaider supports payloads specific to U.S. government operations while incorporating enhanced cybersecurity measures that help operational security. It can carry external loads up to 4.4 pounds.

CONTRACTOR.....Teledyne

FLIRPD-100 BLACK HORNET 3

The PD-100 Black Hornet 3 micro vertical takeoff and landing system fulfills an urgent need for the Marine Corps. The system provides immediate reconnaissance, surveillance and target acquisition capability. The pocket-sized drone can be airborne within one minute, is nearly inaudible and provides both electro-optical and infrared capabilities, making it a versatile tool in complex and urban environments. A system consists of two air vehicles, a single-handed controller with base station and a 7-inch, sunlight-readable display unit.

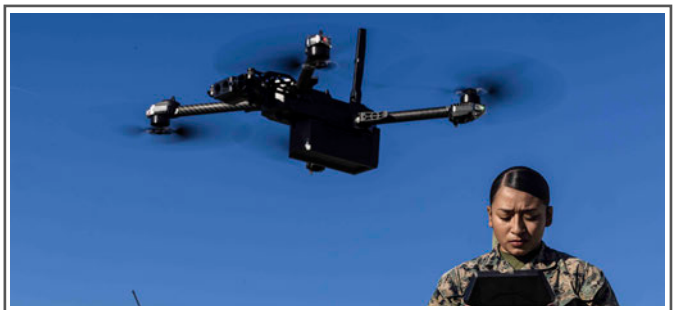
CONTRACTOR.....Teledyne

FLIRSCOUT

The Scout is a 3D-printed small drone system designed by a Marine corporal that costs about $613. A system includes two drones and a control system. Manufacturing has been assigned to the MITRE Corp.

CONTRACTOR.....MITRE Corp.

SKYDIO X2D



U.S. MARINE CORPS

SKYDIO X2D

Skydio X2D is a vertical takeoff and landing drone that is ruggedized and portable for quick, reliable deployment, weighing 3 pounds. It has artificial intelligence-driven autonomous flight that enables obstacle avoidance, autonomous tracking, GPS-denied navigation and complete workflow automation. Each system is equipped with six obstacle avoidance cameras and a gimbaled electro-optical/infrared camera.

CONTRACTOR.....Skydio

STALKER VXE30

The Stalker VXE30 is a portable, self-contained drone capable of carrying up to 5 pounds of payload for day and night video imagery; reconnaissance, surveillance and target acquisition; electronic warfare; or drop missions. At 8 feet long, a wingspan of 16 feet and endurance up to eight hours, the drone's open-architecture configuration is designed to seamlessly integrate multimission payloads. The system uses a gimbaled electro-optical camera, an EO/infrared sensor and an HD zoom EO/IR camera.

CONTRACTOR.....Lockheed Martin

TRV-150C TACTICAL RESUPPLY UNMANNED AIRCRAFT SYSTEM

TRUAS provides an autonomous, organic logistics capability, primarily in distribution of critical supplies for the last tactical mile. TRUAS can transport up to 120 pounds of cargo in various configurations commonly found in company, platoon or squad resupply operations through a 12-kilometer combat radius via automated launch, waypoint navigation and automated landing.

CONTRACTOR.....SURVICE Engineering Co.

KARGO UNMANNED AIRCRAFT SYSTEM

Kaman Air Vehicles has been selected to build a logistics UAS prototype for the Marine Corps. Kaman will build a funded military version of its KARGO UAV, a purpose-built autonomous medium-lift logistics vehicle. The KARGO UAV can carry up to 800 pounds of payload and is designed to operate in austere environments.

KARGO UAV offers rugged design optimized for expeditionary employment. The system will fit in a standard shipping container and is designed to be unloaded and operated by as few as two people. Once the prototype is constructed, KARGO UAV will complete a field user capability assessment conducted in an operationally relevant test environment.

CONTRACTOR.....Kaman Air Vehicles

XQ-58A VALKYRIE



U.S. MARINE CORPS

XQ-58A VALKYRIE

The XQ-58A Valkyrie is a highly autonomous, low-cost tactical unmanned air vehicle used for development of the Marine Corps' Penetrating Affordable Autonomous Collaborative Killer – Portfolio (PAACK-P) program. The first of two XQ-58As completed its first test flight on October 3, 2023. Future test flights will inform requirements for the Marine Air-Ground Task Force Unmanned Aerial System Expeditionary Tactical Aircraft.

CONTRACTOR.....Kratos

SQUADRON	NICKNAME	AIRCRAFT TYPE	TAIL CODE	BASE
Marine Medium Tiltrotor Squadrons (VMM)				
VMM-161	Greyhawks	MV-22B	YR	MCAS Miramar, Calif.
VMM-162	Golden Eagles	MV-22B	YS	MCAS New River, N.C.
VMM-163	Evil Eyes	MV-22B	YP	MCAS Miramar, Calif.
VMM-164	Knightriders	MV-22B	YT	MCB Camp Pendleton, Calif.
VMM-165	White Knights	MV-22B	YW	MCAS Miramar, Calif.
VMM-261	Raging Bulls	MV-22B	EM	MCAS New River, N.C.
VMM-262	Flying Tigers	MV-22B	ET	MCAS Futenma, Okinawa, Japan
VMM-263	Thunder Chickens	MV-22B	EG	MCAS New River, N.C.
VMM-265	Dragons	MV-22B	EP	MCAS Futenma, Okinawa, Japan
VMM-266	Fighting Griffins	MV-22B	ES	MCAS New River, N.C.
VMM-268	Red Dragons	MV-22B	YQ	MCAS Kaneohe Bay, Hawaii
VMM-362	Ugly Angels	MV-22B	YL	MCAS Miramar, Calif.
VMM-363	Red Lions	MV-22B	YZ	MCAS Kaneohe Bay, Hawaii
VMM-364	Purple Foxes	MV-22B	PF	MCB Camp Pendleton, Calif.
VMM-365	Blue Knights	MV-22B	YM	MCAS New River, N.C.
VMM-764**	Moonlight	MV-22B	ML	MCAS Miramar, Calif.
VMM-774**	Wild Goose	MV-22B	MQ	MCAS New River, N.C.
Note: VMM-774 moved from Naval Station Norfolk, Virginia, to Marine Corps Air Station New River, North Carolina, in July 2022.				
Marine Medium Tiltrotor Training Squadron (VMMT)				
VMMT-204*	Raptors	MV-22B	GX	MCAS New River, N.C.
Marine Heavy Helicopter Squadrons (HMH)				
HMH-361	Flying Tigers	CH-53E	YN	MCAS Miramar, Calif.
HMH-461	Ironhorse	CH-53K	CJ	MCAS New River, N.C.
HMH-462	Heavy Haulers	CH-53E	YF	MCAS Miramar, Calif.
HMH-464	Condors	CH-53E	EN	MCAS New River, N.C.
HMH-465	Warhorse	CH-53E	YJ	MCAS Miramar, Calif.
HMH-466	Wolfpack	CH-53E	YK	MCAS Miramar, Calif.
HMH-772(-)**	Hustlers	CH-53E	MT	JB McGuire-Dix-Lakehurst, N.J.
Note: HMH-366 was deactivated Dec. 16, 2022, as part of Force Design 2030.				
Marine Heavy Helicopter Training Squadron (HMHT)				
HMHT-302*	Phoenix	CH-53E	UT	MCAS New River, N.C.
Marine Light Attack Helicopter Squadrons (HMLA)				
HMLA-167	Warriors	AH-1Z, UH-1Y	TV	MCAS New River, N.C.
HMLA-169	Vipers	AH-1Z, UH-1Y	SN	MCB Camp Pendleton, Calif.
HMLA-267	Stingers	AH-1Z, UH-1Y	UV	MCB Camp Pendleton, Calif.
HMLA-269	Gunrunners	AH-1Z, UH-1Y	HF	MCAS New River, N.C.
HMLA-369	Gunfighters	AH-1Z, UH-1Y	SM	MCB Camp Pendleton, Calif.
HMLA-469	Vengeance	AH-1Z, UH-1Y	SE	MCB Camp Pendleton, Calif.
HMLA-773**	Red Dogs	AH-1Z, UH-1Y	WG	JB McGuire-Dix-Lakehurst, N.J.
HMLA-773 Det. A**	Nomads	AH-1Z, UH-1Y	MM	NAS-JRB New Orleans
HMLA-775(-)**	Coyotes	AH-1Z, UH-1Y	WR	MCB Camp Pendleton, Calif.
Notes: HMLA-367 was deactivated April 22, 2022, as part of Force Design 2030 but was reactivated Dec. 22, 2022, at Camp Pendleton. HMLA-269 was deactivated Dec. 9, 2022, as part of Force Design 2030.				
Marine Light Attack Helicopter Training Squadron (HMLAT)				
HMLAT-303*	Atlas	AH-1Z, UH-1Y	QT	MCB Camp Pendleton, Calif.
Marine Helicopter Squadron (HMX)				
HMX-1	Nighthawks	VH-3D, VH-60N MV-22B, UH-60N, VH-92A	MX	MCAF Quantico, Va.
Marine Operational Test and Evaluation Squadron (VMX)				
VMX-1	Flying Lions	MV-22B, CQ-24A AH-1Z, UH-1Y	MV	MCAS Yuma, Ariz.
VMX-1 Det.		CH-53E/K	MV	MCAS New River, N.C.
VMX-1 Det.		F-35B	MV	Edwards AFB, Calif.
Marine Attack Squadrons (VMA)				
VMA-223	Bulldogs	AV-8B+	WP	MCAS Cherry Point, N.C.
Fleet Replacement Detachment*		AV-8B+, TAV-8B	WP	
VMA-231	Ace of Spades	AV-8B+	CG	MCAS Cherry Point, N.C.
Note: VMA-311 was deactivated Oct. 15, 2020, and reactivated and redesignated VMFA-311 on April 14, 2023, for transition to the F-35C.				

SQUADRON	NICKNAME	AIRCRAFT TYPE	TAIL CODE	BASE
Marine Fighter-Attack Squadrons (VMFA)				
VMFA-112**	Cowboys	F/A-18C/C+	MA	NAS-JRB Fort Worth, Texas
VMFA-121	Green Knights	F-35B	VK	MCAS Iwakuni, Japan
VMFA-122	Flying Leathernecks	F-35B	DC	MCAS Yuma, Ariz.
VMFA-211	Wake Island Avengers	F-35B	CF	MCAS Yuma, Ariz.
VMA-214	Black Sheep	F-35B	WE	MCAS Yuma, Ariz.
VMFA-225	Vikings	F-35B	CE	MCAS Yuma, Ariz.
VMFA-232	Red Devils	F/A-18C/D	WT	MCAS Miramar, Calif.
VMFA-242	Bats	F-35B	DT	MCAS Iwakuni, Japan
VMFA-311	Tomcats	F-35C	WL	MCAS Miramar, Calif.
VMFA-312	Checkerboards	F/A-18C/D	DR	MCAS Beaufort, S.C.
VMFA-314	Black Knights	F-35C	VW	MCAS Miramar, Calif.
VMFA-323	Death Rattlers	F/A-18C	WS	MCAS Miramar, Calif.
Fleet Replacement Detachment*		F/A-18C/D		
VMFA-533	Hawks	F-35B	ED	MCAS Beaufort, S.C.
VMFA-542	Tigers	F-35B	WH	MCAS Cherry Point, N.C.
Notes: VMFA squadrons assigned to carrier air wings normally use the tail codes of the carrier air wings to which they are assigned. VMFA-251 was inactivated April 23, 2020, to await reactivation as an F-35 squadron. VMA-311 was deactivated Oct. 15, 2020, and reactivated at MCAS Miramar and redesignated VMFA-311 on April 14, 2023, for transition to the F-35C. VMFA(AW)-533 was redesignated VMFA-533 on Oct. 1, 2023, for transition to the F-35B. VMFA-115 was deactivated at MCAS Beaufort, S.C., Nov. 9, 2023, for eventual transition to the F-35.				
Marine All-Weather Fighter-Attack Squadrons (VMFA(AW))				
VMFA(AW)-224	Bengals	F/A-18D/C	WK	MCAS Beaufort, S.C.
Note: VMFA(AW)-533 was redesignated VMFA-533 on Oct. 1, 2023, for transition to the F-35B.				
Marine Fighter-Attack Training Squadrons (VMFAT)				
VMFAT-501*	Warlords	F-35B	VM	MCAS Beaufort, S.C.
VMFAT-502*	Nightmares	F-35B	WF	MCAS Miramar, Calif.
Note: VMFAT-101 was deactivated Sept. 29, 2023.				
Marine Fighter Training Squadron (VMFT)				
VMFT-401**	Snipers	F-5F/N	LS	MCAS Yuma, Ariz.
Marine Aerial Refueler Transport Squadrons (VMGR)				
VMGR-152	Sumos	KC-130J	QD	MCAS Iwakuni, Japan
VMGR-153	Hercules	KC-130J	KB	MCAS Kaneohe Bay, Hawaii
VMGR-234**	Rangers	KC-130J	QH	NAS-JRB Fort Worth, Texas
VMGR-252	Otis	KC-130J	BH	MCAS Cherry Point, N.C.
VMGR-352	Raiders	KC-130J	QB	MCAS Miramar, Calif.
Notes: VMGR-153 was activated Jan. 13, 2023, at MCAS Kaneohe Bay, Hawaii. VMGR-452 was deactivated Dec. 2, 2022.				
Marine Unmanned Aerial Vehicle Squadrons (VMU)				
VMU-1	Watchdogs	MQ-9A	WG	MCAS Yuma, Calif.
VMU-3	Phantoms	MQ-9A	SV	MCAS Kaneohe Bay, Hawaii
Note: VMU-2 was redesignated VMUT-2 on July 14, 2023.				
Marine Unmanned Aerial Vehicle Training Squadron (VMU)				
VMUT-2*	Night Owls	MQ-9A	FF	MCAS Cherry Point, N.C.
Note: VMU-2 was redesignated VMUT-2 on July 14, 2023.				
Marine Transport Squadrons and Detachments (VMR); Headquarters and Headquarters Squadrons (H&HS)				
VMR-1**	Roadrunners	C-40A		NAS-JRB Fort Worth, Texas
VMR Det. Belle Chase**		UC-12F/W	EZ	NAS-JRB New Orleans
VMR Det. Andrews**		UC-35D		JB Andrews-NAF Washington, Md.
H&HS Kaneohe Bay		C-20G		MCAS Kaneohe Bay, Hawaii
H&HS Beaufort	Swamp Fox	UC-12M		MCAS Beaufort, S.C.
H&HS Cherry Point		UC-35D		MCAS Cherry Point, N.C.
H&HS Futenma		UC-12W, UC-35D		MCAS Futenma, Okinawa
H&HS Iwakuni		UC-12W		MCAS Iwakuni, Japan
H&HS Miramar		UC-12W, UC-35D		MCAS Miramar, Calif.
H&HS New River		UC-12F/W		MCAS New River, N.C.
H&HS Yuma		UC-12F		MCAS Yuma, Ariz.
H&HS Camp Pendleton		UC-12W		MCAS Camp Pendleton, Calif.

** Fleet replacement squadron | ** Reserve component squadron | Compiled by Senior Editor Richard R. Burgess and Tom Kaminski.*

MAJOR C4ISR SYSTEMS

DISTRIBUTED COMMON GROUND/SURFACE SYSTEM — MARINE CORPS GEOSPATIAL INTELLIGENCE

The DCGS-MC GEOINT informs and provides commanders at all echelons the ability to anticipate and react quickly to evolving situations and support fires to accurately identify, locate and prosecute targets within the area of operations. The DCGS-MC GEOINT aggregates organic, theater and national intelligence, surveillance and reconnaissance data providing the foundation for the Family of Integrated Targeting and Exploitation to conduct advanced analytical processes that the DCGS-MC GEOINT is the core capability of technical applications and geospatial algorithms that process, exploit, analyze and produce geophysical information, products and services that establish the geospatial foundation and common frame of reference for battlespace awareness, planning and enhanced decision-making.

DEVELOPER.....Naval Information Warfare Center Atlantic, Charleston, S.C.; various contractors

DISTRIBUTED COMMON GROUND/SURFACE SYSTEM — MARINE CORPS ALL SOURCE

The DCGS-MC All Source provides an all-source fusion, analysis and dissemination of intelligence from the Marine Expeditionary Force down to the company level. The Marine Corps Common Intelligence Server is employed at MEF intelligence battalions, Marine Corps Intelligence Activity and division levels. The Marine Corps Tactical Processing Node will be at the regimental to company echelons. The Marine Corps Common Intelligence Workstation is the user workstation at all levels. Advanced Analytics Technical Solution is both server and user application software that enables the processing, exploitation, analysis, interpretation and presentation of intelligence data. The AATS capabilities are hosted on the MCCIW and MCCIS. The Marine Corps Common All Source Server Application is the suite of virtual machines that provide intelligence analysts the situational awareness, database fusion and enterprise federation of the intelligence data. The MCCASSA capabilities are hosted on the MCCIS.

DEVELOPER.....Naval Information Warfare Center Atlantic, Charleston, S.C.; various contractors

THEATER BATTLE MANAGEMENT CORE SYSTEMS

The TBMCS is a joint, mandated and integrated set of air command and control systems that enables air component commanders to plan, direct and control all theater air operations and to coordinate with land, maritime and special operations elements. The TBMCS interfaces with the Common Aviation Command and Control System and the U.S. Air Force's theater-specific Air Operations Center. The TBMCS-Marine Corps provides the Marine Corps the ability to perform air battle management within a component and/or joint construct.

DEVELOPER.....Lockheed Martin Rotary and Mission Systems

MAGTF SECONDARY IMAGERY DISSEMINATION SYSTEM

The MSIDS provides a Marine Air-Ground Task Force commander ground perspective imagery collection and reporting from forward-deployed reconnaissance, surveillance and target acquisition Marines over tactical radios to the operations center. The Tech Refresh program provides updated laptops for Windows compliance and the Mobile User Objective System waveform integration.

DEVELOPER.....Naval Information Warfare Center Atlantic, Charleston, S.C.; various contractors

TACTICAL REMOTE SENSOR SYSTEM

The TRSS enables remote surveillance using unattended, hand-emplaced measurement and signature intelligence sensors allowing persistent, remote surveillance in near and deep areas of a commander's area of concern.

DEVELOPER.....Naval Information Warfare Center Atlantic, Charleston, S.C.; various contractors

COMPOSITE TRACKING NETWORK

The CTN is an adaptation of the Navy's Cooperative Engagement Capability for Marine Corps sensors, weapons and command and control systems. The CTN distributes composite tracking data and fire-control quality data to command and control nodes and weapon systems in the network. The CTN also improves the defense-in-depth of the fleet and Fleet Marine Force to meet Force Design 2030 requirements and enable Expeditionary Advanced Base Operations. Full operational capability was achieved in 2016. The CTN program reentered production in fiscal 2023 after being in sustainment due to an increase in the Authorized Acquisition Objective.

SYSTEM INTEGRATOR.....Naval Surface Warfare Center Crane Division, Ind.
DESIGN AGENT.....Collins Aerospace
PRODUCTION CONTRACTOR.....L3Harris

COUNTERINTELLIGENCE AND HUMAN INTELLIGENCE EQUIPMENT PROGRAM

The CIHEP is comprised of computer, imagery, communications and surveillance capability sets to provide support for counterintelligence, human intelligence and force protection operations.

DEVELOPER.....Naval Information Warfare Center Atlantic, Charleston, S.C.; various contractors

COMMON AVIATION COMMAND AND CONTROL SYSTEM

The CAC2S is an Acquisition Category I Major Automated Information System program in the operations and support acquisition phase of its life cycle. The CAC2S Increment 1 capability provides a Marine Air-Ground Task Force commander with the mission-critical support system required to integrate aviation and ground combat operations in support of Marine Corps operational objectives. The CAC2S processes, fuses, displays and distributes air and ground data from sensors, other command and control nodes, and aircraft to provide the information needed to effectively execute Marine, naval and joint aviation operations. The CAC2S integrates sensors and shooters to contribute to the naval force and joint integrated fire control to enable the kill chain. The CAC2S supports Navy amphibious ship integration via a memorandum of agreement with Naval Sea Systems Command for the CAC2S afloat capability and provides the Marine Corps air traffic control modernization via an MOA with Naval Air Systems Command. The CAC2S received several new capability requirements, including Small Form Factor, Automatic Dependent Surveillance-Broadcast, Naval Integrated Fire Control, and MIL-STD-6016F, as part of Marine Corps Force Design 2030 initiatives. The requirements will result in planned engineering change proposal updates to the CAC2S product baselines.

DEVELOPERS.....Raytheon Solipsys; Ultra Electronics; Ternion
IN-SERVICE ENGINEERING ACTIVITY.....Naval Surface Warfare Center Crane Division, Ind.

TPS-80 GROUND/AIR TASK-ORIENTED RADAR



NORTHROP GRUMMAN

G/ATOR

The TPS-80 is a three-dimensional, expeditionary, short/medium-range, multirole radar capable of detecting low-observable, low-radar-cross-section targets such as rockets, artillery, mortars, cruise missiles and unmanned aerial systems. G/ATOR is being developed and fielded in three blocks and will be employed by the Marine Air-Ground Task Force across the range of its capabilities. The capability blocks will cover aviation and ground missions, replacing five legacy radar systems with a single MAGTF solution.

The G/ATOR program began low-rate initial production in the first quarter of fiscal 2015 and concluded in fiscal 2021. G/ATOR Block 1 completed an operational assessment in October 2017 and achieved initial operational capability in February 2018. Initial operational testing and evaluation for Block 1 was completed in October 2018. G/ATOR Block 2 completed an operational assessment in September 2018 and its initial operational testing and evaluation in December 2018. Block 2 reached initial operational capability to the ground combat element in March 2019. Full-rate production began in June 2019, when the Marine Corps awarded a $958 million contract for 30 G/ATORs. Delivery of the full-rate production units began in fiscal 2021. In September 2023, the Marine Corps awarded an additional eight G/ATORs to the full-rate production contract for a total of 53 systems. Full operational capability is planned for fiscal 2027.

CONTRACTOR.....Northrop Grumman

TPQ-46B FIREFINDER GROUND WEAPONS — LOCATING RADAR

The TPQ-46B Firefinder is designed to rapidly detect and compute the location of hostile short- and medium-range mortars, identify artillery and rocket launchers, and enable friendly forces to return fire. G/ATOR Block 2 will replace the Firefinder, which will be phased out between fiscal 2019 and 2025.

CONTRACTOR.....Thales: Raytheon Systems

TPQ-49 LIGHTWEIGHT COUNTER — MORTAR RADAR

The TPQ-49 LCMR provides a short-range mortar detection capability and can slew cueing intelligence to the Firefinder via the TSQ-267 target processing set. The LCMR was procured and fielded under an abbreviated acquisition program as a solution for an approved urgent universal needs statement. The Marine Corps is undergoing a technology refresh that addresses diminishing manufacturing sources and material shortages.

CONTRACTOR.....Syracuse Research Corp.

TSQ-267 TARGET PROCESSING SET

The TSQ-267 TPS is the command and control node of the family of target acquisition systems capability, providing radar deployment orders, support functions and target data to the counterfire/countermeasure-servicing agent. The TPS uses the Advanced Field Artillery Tactical Data System as its primary communication and command and control tool.

CONTRACTOR.....Naval Surface Warfare Center Crane Division, Ind.

NEXT-GENERATION HIGH-FREQUENCY RADIO FAMILY OF SYSTEMS

The HFR II is the next generation of high-frequency, nondevelopmental item radios. The HFR II meets the Marine Corps requirement for an over-the-horizon, long-haul, wideband high-frequency communications system.

CONTRACTOR.....L3Harris

MARINE CORPS WIDEBAND SATCOM — LIGHT/HEAVY

The MCWS-L is a modular, man-portable cased, multiband satellite communications terminal. The MCWS-L variant will provide an adequate transmission capability to support battalion and smaller-sized deployed forces. Systems addressed under this variant will be able to operate as a spoke in a hub-spoke configuration and as a terminal in a point-to-point configuration. The MCWS-H is a modular, multichannel, multiband satellite communications terminal that supports the flexible nature of Marine Corps missions. The MCWS-H variant will be designed and provisioned to provide adequate transmission capability to support regiment and larger-sized deployed tasks forces. Systems addressed under the heavy variant will be able to support and manage hub-spoke, full-mesh and point-to-point configurations and provide dual-shot capability. MCWS-L/H systems will provide the Marine Air-Ground Task Force an integrated, secure, reliable and long-range communications capability that will complement existing military networks and be capable of supporting large numbers of geographically dispersed units.

CONTRACTOR.....Lite Coms

VERY SMALL APERTURE TERMINAL FAMILY OF SYSTEMS

The VSAT family of systems supports the Marine Corps' operational concepts such as ship-to-objective maneuver and operational maneuver from the sea through its capability of providing over-the-horizon satellite communications. The VSAT family of systems can support large numbers of geographically dispersed users with high-bandwidth voice, video and data applications to support the exchange of command and control, intelligence, and logistics information throughout the operational environment.

CONTRACTOR.....General Dynamics: TSC-181C, VSAT-Large; TSC-180B, VSAT-Medium; and TSC-186A, VSAT-Small

MARINE CORPS WIDEBAND SATCOM — EXPEDITIONARY

The MCWS-X is a man-packable, multiband, multi-waveform satellite communications terminal capable of being transported by one Marine. The MCWS-X provides an integrated, secure, near-real-time, reliable and long-range communications capability that complements existing military networks and can support large numbers of geographically dispersed users in support of Marine Air-Ground Task Force operations.

CONTRACTOR.....L3Harris: TSC-260(V)1

HIGH-BANDWIDTH SPECIAL INTELLIGENCE — PALLETIZED TERMINAL

The HBSI-PT system supports Marine Air-Ground Task Force intelligence operations by providing a dedicated long-haul capability using existing communications networks and the service provider up to the top secret/sensitive compartmented information level. The HBSI-PT system supports fast-paced, flexible and distributed operations by providing commanders with mission-critical voice and data connectivity. The HBSI-PT enables global access to tactical, theater and national intelligence data stores, facilitating functions that include tasking, reporting and dissemination by elements ranging from small teams to the Marine Expeditionary Force command element.

CONTRACTORS.....Cubic; GATR Technologies Inc.

SENSITIVE COMPARTMENTED INFORMATION KIT

The SCIK is a team-portable satellite communications system packaged in lightweight transit cases. It supports fast-paced, flexible, dispersed and distributed operations by providing commanders with mission-critical information via voice, video and data transfer. The SCIK is capable of short-notice, worldwide deployments and is employed by small, initial-entry Marine Corps elements or teams requiring beyond-line-of-sight communications in support of Marine Corps/joint task force expeditionary missions. The SCIK gives teams the capability of reach-back communication to various network operations centers using equipment with a minimal footprint. The Sensitive Compartmented Information Communications Mobility Pack is expected to replace the SCIK at the team level.

CONTRACTORS.....L3Harris: AN/TSC-205A(V)2; Cubic and DTECH Labs: Networking Package

SENSITIVE COMPARTMENTED INFORMATION COMMUNICATIONS MOBILITY PACK

The SCI Comms Mobility Pack provides a rapid response, expeditionary, man-packable communication path to transfer data up to the top-secret/sensitive-compartmented-information level from collectors and intelligence teams to the Marine Corps Intelligence Agency, National Security Agency and other national-level resources. It is capable of short-notice, worldwide deployments and supports fast-paced, flexible, dispersed and distributed operations by providing commanders and teams with mission-critical information via voice, video and data transfer. This provides timely, reliable and secure dissemination of intelligence information from and to the intelligence community in a back-packable form that can be powered by battery, vehicle and traditional power supplies. The SCI Comms Mobility Pack allows teams to insert or extract with this system clandestinely via land, air or ground transportation.

CONTRACTORS.....L3Harris: MCWS-X; Cubic and DTECH Labs: Networking Package

GLOBAL BROADCAST SERVICE

The GBS is a satellite communications broadcast service designed to meet the ever-increasing warfighter demand for large volume data. The GBS provides high-capacity, smart-push- and user-pull-based broadcast capability for video, high-quality imagery, data and other information to warfighters. The GBS supports training and military exercises, special activities, crisis operations, battlefield awareness, weapons targeting, and intelligence, surveillance and reconnaissance requirements. The essential functions of the GBS include broadcast planning, broadcast management, content delivery and content reception. The GBS architecture is a content priority-based broadcast. This ensures the most critical information is delivered first. The GBS is a joint program led by the U.S. Space Force with participation from the Air Force, Army, Navy and Marine Corps.

CONTRACTORS.....AQYR Technologies: AN/PRS-11; General Dynamics: AN/TSR-11

SECURE MOBILE ANTI-JAM RELIABLE TACTICAL — TERMINAL

The SMART-T is a joint program managed under the Army Systems Acquisition Review Council and the Joint Requirements Oversight Council. It is a U.S. Army Military Strategic and Tactical Relay advanced satellite terminal program that enables commanders at brigade and higher levels to operate in an electronic warfare threat environment.

CONTRACTOR.....Raytheon

TRC-245 NEXT-GENERATION TROPOSCATTER SYSTEM

The AN/TRC-245 NGT is a transit case-based, beyond-line-of-sight communications system that provides improved transportability and increased data rate performance and supports internet protocol/ethernet-based architectures currently employed by the Marine Corps.

CONTRACTORS.....Cubic; GATR Technologies Inc.

TRC-238(V)5 LINE-OF-SIGHT RADIO SYSTEM

The AN/TRC-238(V)5 is a multichannel, multiband, point-to-point and point-to-multipoint, software-defined radio system that provides full duplex secure digital wideband communication to support Navy and Marine Corps forces.

CONTRACTOR.....Ultra Electronics TCS Inc.

MULTICHANNEL RADIO FAMILY OF SYSTEMS

The MCR family of systems consists of multiple systems that provide warfighters with the flexibility to meet a wide range of operational scenarios. At the core of these systems are software-defined multichannel radio transceivers in packable and handheld forms. The Multi-channel Manpack is a multichannel, software-defined radio that allows the simultaneous use of channels across the entire frequency range.

CONTRACTORS.....Various

SECURE COMMUNICATION CONTROLLER

The SCC is a handheld or manpack system that provides a cross-connection of disparate audio communication links. The SCC provides connectivity for up to three disparate radio networks as well as connection of additional assets within reach on the Internet Protocol network. The SCC allows Marines across the Marine Air-Ground Task Force to share seamless communications with foreign military, remote users and first responders while using their organic radio assets. Radios used with the SCC can employ different encryptions and use different waveforms. The SCC may be powered with an alternating current power supply, BA-5590 battery or eight AA batteries. The SCC is applicable only to voice, taking analog output from one radio and sending it to another radio.

CONTRACTOR.....Trident Systems Inc.

NETWORKING ON-THE-MOVE — GROUND COMBAT VEHICLE

The NOTM-GCV provides the Marine Air-Ground Task Force with a robust, beyond-line-of-sight, digital command and control combat capability while on the move and at the halt. The NOTM-GCV enables commanders and staff to execute digital command and control anywhere on the battlefield through access, collaboration and exchange of tactical voice, full motion video and data. The NOTM-GCV is satellite-communications-based and supports three external network enclaves (SIPR, NIPR and coalition).

PRIME INTEGRATOR.....Naval Information Warfare Center Atlantic; various contractors

NETWORKING ON-THE-MOVE — AIRBORNE

The NOTM-A is an airborne, satellite-communications-based command and control capability employed on MV-22 Osprey and KC-130J Super Hercules aircraft to enable beyond-line-of-sight network connectivity for the Marine Air-Ground Task Force. The systems provide access to SIPR/NIPR email, chat, voice, full motion video and web browsing. The services are supported by the ViaSat global network and are contracted by the Command, Control, Communications and Computers branch.

PRIME INTEGRATOR.....Naval Information Warfare Center Pacific;
Naval Information Warfare Center Atlantic; various contractors

NETWORKING ON-THE-MOVE — ULTRA LIGHT TACTICAL VEHICLE

The NOTM-ULTV is a satellite-communication-based gateway that facilitates beyond-line-of-sight and over-the-horizon network connectivity, allowing commanders and staff personnel the ability to build and maintain situational awareness, continue collaborative planning and share information while in forward-deployed locations. The NOTM-ULTV will give MV-22s an internally transportable on-the-move command and control system.

PRIME INTEGRATOR.....Naval Surface Warfare Center Crane Division, Ind.; various contractors

MAJOR AIRBORNE SENSORS

AAQ-28(V) LITENING ELECTRO-OPTICAL SENSOR POD

The AAQ-28(V) is an external pod developed by Rafael Advanced Defense Systems and flown on Marine Corps F/A-18 Hornet and AV-8B Harrier II aircraft. The pod enables aircrews to detect, acquire, auto-track and identify targets at long ranges for weapon delivery or nontraditional intelligence, surveillance and reconnaissance missions. The AAQ-28(V) is fielded with an internal data-link system to seamlessly communicate with remotely operated video-enhanced receivers and ground stations. The Marine Corps procured more than 230 pods.

CONTRACTOR.....Northrop Grumman

ALQ-231(V) INTREPID TIGER II POD



U.S. MARINE CORPS

ALQ-231(V) INTREPID TIGER II POD

The ALQ-231(V) is designed to increase the electronic warfare capability and capacity available to the Marine Air-Ground Task Force while reducing dependency on low-density/high-demand assets. First deployed in 2012 in support of Operation Enduring Freedom, the ALQ-231(V) was designed to provide an airborne electronic attack capability against communications targets. The pod can be controlled from the cockpit or remotely by a ground operator and incorporates a rapidly reprogrammable, open-architecture design that provides a capability against today's threats and against future targets as they emerge. The ALQ-231(V)1 variant is deployed with land-based F/A-18 Hornet and KC-130J Super Hercules aircraft as well as AV-8B Harrier II aircraft deployed with Marine expeditionary units. Integration on Marine Corps rotary-wing aircraft began in fiscal 2014 with a first early operational capability deployment of the ALQ-231(V)3 during fiscal 2015 on the UH-1Y Venom helicopter. The ALQ-231(V)4 has been flown on an MV-22B Osprey aircraft and is planned for initial operational capability on that aircraft in 2024 with a total of 42 systems.

ADVANCED TACTICAL AIR RECONNAISSANCE SYSTEM

The ATARS is deployed in Marine Corps' F/A-18D Hornet aircraft. The system is mounted in the nose of the aircraft, replacing the 20 mm cannon. The ATARS collects, records and can transmit electro-optical, infrared and synthetic-aperture radar imagery from the aircraft's APG-73 radar in real time in day or night conditions. Imagery is collected from up to 5 miles on either side of the aircraft's flight path. The ATARS was deployed extensively in support of operations in Afghanistan, Iraq and Syria.

CONTRACTOR.....BAE Systems



U.S. COAST GUARD

The U.S. Coast Guard is one of the nation's six armed services — the only one residing outside the Department of Defense — and serves as a maritime military and law enforcement force within the Department of Homeland Security.

Admiral Linda Fagan is serving her second year as commandant of the Coast Guard, the first woman to command a U.S. armed service. Her stated top priority is to transform the workforce through talent management, looking at all human-resource policies "with a view toward making it easier for people not only to join the service but to stay in the service and serve."

During 2023, the Coast Guard increased its operations in areas of the world outside the Americas and continued to modernize its forces deployed overseas. The icebreaker USCGC Polar Star completed another Antarctic deployment in early 2023 and began another before year's end. The icebreaker USCGC Healy deployed again to the Arctic Ocean. National security cutters deployed to the Western Pacific Ocean and conducted freedom-of-navigation operations in the Taiwan Strait.

Fast-response cutters continued having an increasing impact on Coast Guard operations overseas, with six forward deployed to the Persian Gulf, where they conduct support of maritime security patrols, highlighted by successful interdictions of contraband. The three FRCs based in Guam have enabled the Coast Guard to increase maritime resource patrols to support partner nations in Oceania. The service operates from newly established Coast Guard Base Guam. The service continued to execute drug-and migrant interdiction operations along the approaches to the United States.

The Coast Guard rescues thousands of mariners, boaters and others each year and works with agency partners in rescue and recovery operations during and after hurricanes. The Coast Guard also is on the frontlines of migrant interdiction and fisheries enforcement. During fiscal 2022, the service interdicted at sea 12,521 undocumented noncitizens at sea attempting to reach U.S. shores. The Coast Guard saved 4,848 lives in search-and-rescue cases; interdicted 335,710 pounds of cocaine and 60,266 pounds of marijuana; and responded to more than 10,959 pollution incident reports.

Because of a shortfall in recruiting, the Coast Guard was short 3,500 junior non-rated personnel at the end of fiscal 2023. The service decided in November 2023 to lay up some ships and patrol boats, including three medium-endurance cutters, two fast response cutters and seven patrol boats, and to temporarily crew five harbor tugs if needed for icebreaking.

For fiscal 2024, the Coast Guard requested $13.45 billion for the service, with $1.2 billion for cutter construction, including funds for to the sixth offshore patrol cutter and long-lead materials for the seventh; long-lead materials for the third polar security cutter; and detail design and construction of the first of 30 planned waterways commerce cutters — river buoy tenders and inland construction tenders — to replace the service's obsolete fleet of inland waterways tenders.

The 10th planned Legend-class national security cutter was delivered in October 2023 as construction continued on the last NSC. The first of 25 planned Heritage-class offshore patrol cutters was launched in October. The service has commissioned 54 of the planned 65 Sentinel-class fast-response cutters.

The first flight of the missionized HC-27J Spartan aircraft, the first of 14 to be modified, took place in 2023. The service also continues to acquire and modernize more HC-130J aircraft as it retires some older HC-130Hs. Full-rate conversion of the MH-65D helicopter to the MH-65E is underway. The service received the first of 42 "hulls" as it proceeds with service-life extension of its MH-60T helicopter fleet to support its growing fleet of larger cutters.

CUTTERS

NATIONAL SECURITY CUTTERS (WMSL)

The 418-foot Legend-class NSCs are the Coast Guard's most capable ships. They feature modern command, control, communications, computers, intelligence, surveillance and reconnaissance systems, including the SPQ-9B fire-control radar, Mk46 electro-optical/infrared sensor and SLQ-32 electronic warfare system. The main armament is the Mk110 57 mm gun, also installed on the Navy's littoral combat ship.

NSCs can launch and recover helicopters up to the size of the H-60 and can service H-65 helicopters in their hangars. Contractor-owned and operated ScanEagle UAVs are deployed from NSCs for ISR. A stern ramp is fitted on NSCs to launch and recover two classes of rigid-hull inflatable boats: the 35-foot Long-Range Interceptor and the 26-foot Cutter Boat Over-the-Horizon. NSCs can carry a total of three boats: one long-range interceptor and two over-the-horizon cutter boats.

The first NSC, the USCGC Bertholf, entered service in 2008. The USCGC Calhoun, the 10th NSC, was delivered Oct. 13, 2023. Fabrication of the USCGC Friedman, the 11th and last NSC, began May 11, 2021.

Legend Class



HII

KIMBALL | Legend Class

DISPLACEMENT	4,500 tons full load
LENGTH	418 feet
BEAM	54 feet
SPEED	28 knots
POWER PLANT	1 gas-turbine engine, 2 diesel engines
RANGE	12,000 nautical miles at economical speed
ARMAMENT	1 Mk110 57 mm gun, 1 Phalanx Mk15 Close-In Weapon System (CIWS), 4 M2 .50-caliber machine guns
AIRCRAFT	2 MH-65 or 1 MH-60 helicopters, or 2 uncrewed aerial vehicles
COMPLEMENT	126
BUILDER	Ingalls Shipbuilding, a division of HII

HOMEPORT

WMSL 750 Bertholf	Alameda, Calif.
WMSL 751 Waesche	Alameda, Calif.
WMSL 752 Stratton	Alameda, Calif.
WMSL 753 Hamilton	Charleston, S.C.
WMSL 754 James	Charleston, S.C.
WMSL 755 Munro	Alameda, Calif.
WMSL 756 Kimball	Honolulu
WMSL 757 Midgett	Honolulu
WMSL 758 Stone	Charleston, S.C.
WMSL 759 Calhoun	Charleston, S.C.
WMSL 760 Friedman	(under construction) future: Charleston, S.C.

MEDIUM-ENDURANCE CUTTERS (WMEC)

The 13 270-foot Famous-class and 13 210-foot Reliance-class cutters form the two primary classes of WMECs and support a variety of missions. One unique WMEC, the USCGC Alex Haley, is in service in Alaska.

The Famous-class cutters, which began entering service in 1983, are equipped with a shipboard command and control system that permits maximum operational effectiveness with reduced crews. They are fitted with a weapons and sensor suite. The Famous class and the Alex Haley can land, support and hangar one H-65 helicopter and can land H-60 helicopters. The Reliance-class cutters do not have hangars, but each can support one H-65 helicopter.

The service-life extension program for the 270-foot Famous class involves targeted upgrades or replacements to the electrical power generation and distribution system as well as the main propulsion engines and other systems. The work addresses system reliability, supportability, obsolescence and interoperability issues. The program will facilitate continued operations of the cutters during the service's transition to the offshore patrol cutter by extending their service lives by approximately 10 years. Work has commenced on the two prototype vessels. The USCGC Decisive (WMEC 629) was decommissioned March 2, 2023. The USCGC Steadfast (WMEC 623) is set to be decommissioned in March 2024.

Famous Class



U.S. COAST GUARD

TAHOMA | Famous Class

DISPLACEMENT	1,820 tons full load
LENGTH	270 feet
BEAM	38 feet
SPEED	19.5 knots
POWER PLANT	2 diesels, 2 shafts, 7,300 bhp
RANGE	9,900 nautical miles at 12 knots
ARMAMENT	1 Mk75 76 mm gun, 2 .50-caliber machine guns, 2 Super Rapid Bloom Offboard Countermeasures launchers
AIRCRAFT	1 H-65 or H-60 helicopter
COMPLEMENT	100
BUILDERS	WMECs 901-904: Tacoma Boatbuilding Co. 905-913: R.E. Derecktor Shipyards

HOMEPORT

WMEC 901 Bear	Portsmouth, Va.
WMEC 902 Tampa	Portsmouth, Va.
WMEC 903 Harriet Lane	Honolulu

WMEC 904 Northland.....Portsmouth, Va.
WMEC 905 Spencer.....Portsmouth, Va.
WMEC 906 Seneca.....Portsmouth, Va.
WMEC 907 Escanaba.....Portsmouth, Va.
WMEC 908 Tahoma.....Newport, R.I.
WMEC 909 Campbell.....Newport, R.I.
WMEC 910 Thetis.....Key West, Fla.
WMEC 911 Forward.....Portsmouth, Va.
WMEC 912 Legare.....Portsmouth, Va.
WMEC 913 Mohawk.....Key West, Fla.

Reliance Class



U.S. COAST GUARD

CONFIDENCE | Reliance Class

DISPLACEMENT.....1,100 tons full load
LENGTH.....210.5 feet
BEAM.....34 feet
SPEED.....18 knots
POWER PLANT.....2 diesels, 2 shafts, 5,000 bhp
RANGE.....6,100 nautical miles at 12 knots
ARMAMENT.....1 Mk38 25 mm machine gun, 2 .50-caliber machine guns
AIRCRAFT.....1 H-65 helicopter
COMPLEMENT.....76
BUILDERS.....WMECs 615-617: Todd Shipyards; 618: Christy Corp.
621-627: American Shipbuilding
619, 620, 628, 629, 630: Coast Guard Yard, Baltimore

HOMEPORT

WMEC 615 Reliance.....Pensacola, Fla.
WMEC 616 Diligence.....Pensacola, Fla.
WMEC 617 Vigilant.....Port Canaveral, Fla.
WMEC 618 Active.....Port Angeles, Wash.
WMEC 619 Confidence.....Port Canaveral, Fla.
WMEC 620 Resolute.....St. Petersburg, Fla.
WMEC 621 Valiant.....Mayport, Fla.
WMEC 623 Steadfast.....Astoria, Ore.
WMEC 624 Dauntless.....Pensacola, Fla.
WMEC 625 Venturous.....St. Petersburg, Fla.
WMEC 626 Dependable.....Little Creek, Va.
WMEC 627 Vigorous.....Little Creek, Va.
WMEC 630 Alert.....Astoria, Ore.

Alex Haley Class



U.S. COAST GUARD

ALEX HALEY | Haley Class

DISPLACEMENT.....3,100 tons full load
LENGTH.....282 feet
BEAM.....52 feet
SPEED.....16 knots
POWER PLANT.....4 Caterpillar diesels,
2 shafts/controllable-pitch propellers, bow thruster
RANGE.....10,000 nautical miles at 13 knots
ARMAMENT.....2 Mk38 25 mm machine guns, 2 .50-caliber machine guns
AIRCRAFT.....1 H-65 or H-60 helicopter
COMPLEMENT.....101
CONVERSION.....Coast Guard Yard, Baltimore

HOMEPORT

WMEC 39 Alex Haley.....Kodiak, Alaska

OFFSHORE PATROL CUTTERS (WMSM)

The OPC is designed to replace the current fleet of WMECs, which are between 30 and 59 years old. The OPC will provide the backbone of the Coast Guard's offshore fleet, enabling a capability bridge between the national security cutter and the fast-response cutter. Each OPC will feature a flight deck and advanced command, control, communications, computers, intelligence, surveillance and reconnaissance systems, increased seakeeping, speed and endurance. The service plans to acquire 25 OPCs.

In September 2016, Eastern Shipbuilding Group of Panama City, Florida, was awarded the detail design and construction contract with options for up to nine cutters. In October 2018, Hurricane Michael — a Category 5 storm — made landfall near Panama City, severely damaging ESG's production facility and impacting the regional labor market. Following the storm, ESG petitioned for "extraordinary contract relief," under Public Law 85-804, and in October 2019, the Department of Homeland Security modified the contract to provide limited extraordinary relief for up to four ships, thus limiting the award to ESG.

The Coast Guard conducted a new full and open competition, known as "Stage 2," to acquire the remaining ships in the program of record. The contract for detail design and production of the USCGC Pickering with options for 10 Stage 2 OPCs (hulls 5-15) was awarded to Austal USA on June 30, 2022.

Construction of the first OPC, the USCGC Argus, was delayed by a variety of factors, and the ship was launched Oct. 27, 2023, with a planned delivery date of September 2024.

Heritage Class



LEONARDO DRS

HERITAGE CLASS (ARTIST'S CONCEPT)

DISPLACEMENT....4,320 long tons
LENGTH....360 feet
BEAM....54 feet
SPEED....22.5 knots
POWER PLANT....Fairbanks Morse marine diesel engines
RANGE....10,200 nautical miles at 14 knots
ARMAMENT....Mk110 deck gun, Mk38 Mod 3 machine gun system, Browning .50-caliber crew served weapons
AIRCRAFT....1 H-65 or H-60 helicopter and 1 uncrewed aerial vehicle
COMPLEMENT....accommodations for up to 126
BUILDERS....Stage 1: Eastern Shipbuilding Group; Stage 2: Austal USA

HOMEPORT

WMSM 915 Argus....(under construction) future: San Pedro, Calif.
WMSM 916 Chase....(under construction) future: San Pedro, Calif.
WMSM 917 Ingham....(under construction) future: Kodiak, Alaska
WMSM 918 Rush....(under construction) future: Kodiak, Alaska
WMSM 919 Pickering....(named)
WMSM 920 Icarus....(named)
WMSM 921 Active....(named)
WMSM 922 Diligence....(named)
WMSM 923 Alert....(named)
WMSM 924 Vigilant....(named)
WMSM 925 Reliance....(named)

POLAR ICEBREAKERS (WAGB)

The Coast Guard owns two heavy icebreakers and one medium icebreaker. The heavy icebreakers, the USCGC Polar Star and the USCGC Polar Sea, were commissioned in 1976 and 1978, respectively, and are capable of continuous progress through ice 6 feet thick at a speed of 3 knots. The Polar Sea suffered an engine casualty in 2010 and has been nonoperational since then. A decision was made in February 2017 that repair and reactivation of the Polar Sea would be cost-prohibitive. The ship is stored at Seattle as a spare-parts asset. The Polar Star's annual voyage to Antarctica was canceled in 2020 due to COVID-19 pandemic-related safety concerns; the icebreaker deployed to the Arctic in 2020–2021 instead. The Polar Star resumed annual voyages to Antarctica in 2021. In 2022, the Polar Star completed the second phase of a five-year phased service-life extension program. The work will extend the cutter's service life until the arrival of the polar security cutters.

The USCGC Healy began operations in 2000 and is configured to support oceanographic research operations. In 2021, the Healy circumnavigated North America via the Northwest Passage and the Panama Canal. In 2022, the Healy reached the North Pole unassisted.

Polar Class



U.S. COAST GUARD

POLAR STAR | Polar Class

DISPLACEMENT....13,194 tons full load
LENGTH....399 feet
BEAM....83.5 feet
SPEED....20 knots
POWER PLANT....3 gas turbines, 6 diesels, 3 shafts, 60,600 shp
DESIGNED ICEBREAKING CAPABILITY....6 feet at 3 knots continuous, 21 feet backing and ramming
RANGE....28,000 miles
ARMAMENT....small arms
AIRCRAFT....2 H-65 or 1 H-60 helicopters
COMPLEMENT....134 Coast Guard and up to 35 science research crew
BUILDER....Lockheed Shipbuilding Co.

HOMEPORT

WAGB 10 Polar Star....Seattle
WAGB 11 Polar Sea....Seattle (inactive)

Healy Class



U.S. COAST GUARD

HEALY | Healy Class

DISPLACEMENT....16,400 tons full load
LENGTH....420 feet
BEAM....82 feet

SPEED.....17 knots
POWER PLANT.....4 diesels, 2 shafts, AC/AC drive, 30,000 shp
DESIGNED ICEBREAKING CAPABILITY.....4.5 feet at 3 knots continuous, 8 feet backing and ramming
RANGE.....16,000 miles
ARMAMENT.....small arms
AIRCRAFT.....2 H-65 helicopters or 1 H-60 and 1 H-65
COMPLEMENT.....83 Coast Guard and up to 45 science research crew
BUILDER.....General Dynamics Avondale Industries

HOMEPORT

WAGB 20 Healy.....Seattle

POLAR SECURITY CUTTER (WMSP)



U.S. COAST GUARD

ARTIST'S CONCEPT | Polar Security Cutter

On April 23, 2019, the Coast Guard awarded a $745.9 million detail design and construction contract to Halter Marine Inc. of Pascagoula, Mississippi, for the PSC. The contract included detail design, as well as long lead-time materials and construction of the first cutter with options for two more PSCs.

The Coast Guard plans to procure up to three PSCs to support growing national security interests and to replace the service's only operating heavy icebreaker, the Polar Star. TAI Associates is teamed with Halter Marine Inc. as the lead PSC designer.

The PSCs will support a wide range of Coast Guard missions, including search and rescue, maritime law enforcement, environmental response and national defense. Seattle will be the homeport of the PSC program of record.

Bollinger Shipyards in November 2022 acquired Halter Marine and assumed management of the PSC program. The Halter Marine yard in Pascagoula was renamed Bollinger Mississippi Shipbuilding. Delivery of the first PSC is expected no earlier than 2028.

NOTIONAL CHARACTERISTICS

DISPLACEMENT.....33,000 long tons
LENGTH.....460 feet
BEAM.....88 feet
POWER PLANT.....Diesel-electric drive, 45,200+ shp
DESIGNED ICEBREAKING CAPABILITY.....threshold: 6 feet; objective: 8 feet; ridged: 21 feet
ARMAMENT.....Mk38 30 mm machine gun system, .50-caliber machine guns, small arms
AIRCRAFT.....2 helicopters of size of H-60
COMPLEMENT.....137 +/- 7% excluding detachments of up to 50 personnel
BUILDER.....Bollinger Mississippi Shipbuilding

HOMEPORT

WMSP 21 Polar Sentinel.....(under construction) future: Seattle
WMSP 22.....(unnamed)
WMSP 23.....(unnamed)

FAST-RESPONSE CUTTERS (WPC)

The 154-foot Sentinel-class FRCs are designed to operate independently to conduct missions such as security for ports, waterways and coastal areas; fishery patrols; drug and illegal migrant law enforcement; and search and rescue and national defense operations. The FRCs are replacing the Island-class patrol boats and feature a high degree of interoperability with the national security cutters and future offshore patrol cutters, including Command, Control, Communication, Computer, Cyber and Intelligence Service Center integration.

The cutters are built at Bollinger Shipyards to a design based on the Damen Stan Patrol 4708 vessel from Dutch shipbuilder Damen Shipyards Group. The production contract for the first FRC was awarded in September 2008. The first FRC, the USCGC Bernard C. Webber, was delivered in February 2012. As of October 2023, the Coast Guard had taken delivery of 54 FRCs. The 65th and last FRC was ordered from Bollinger on Aug. 9, 2022, completing the program of record. Six cutters currently operate in the Persian Gulf, where they replaced Island-class cutters in support of U.S. Central Command operations.

Sentinel Class



U.S. COAST GUARD

DOUGLAS DENMAN | Sentinel Class

DISPLACEMENT.....353 metric tons full load
LENGTH.....153.5 feet
BEAM.....25.4 feet
SPEED.....28-plus knots
POWER PLANT.....2 MTU diesel engines, bow thruster
RANGE.....2,500 nautical miles
ARMAMENT.....1 Mk38 Mod 2/3 25 mm gun, 4 M2 .50-caliber machine guns
AIRCRAFT.....none
COMPLEMENT.....24
BUILDER.....Bollinger Shipyards Inc.

HOMEPORT

WPC 1101 Bernard C. Webber.....Miami Beach, Fla.
WPC 1102 Richard Etheridge.....Miami Beach, Fla.
WPC 1103 William Flores.....Miami Beach, Fla.
WPC 1104 Robert Yered.....Miami Beach, Fla.

WPC 1105 Margaret Norvell.....Miami Beach, Fla.
WPC 1106 Paul Clark.....Miami Beach, Fla.
WPC 1107 Charles David Jr.....Key West, Fla.
WPC 1108 Charles Sexton.....Key West, Fla.
WPC 1109 Kathleen Moore.....Key West, Fla.
WPC 1110 Raymond Evans.....Key West, Fla.
WPC 1111 William Trump.....Key West, Fla.
WPC 1112 Isaac Mayo.....Key West, Fla.
WPC 1113 Richard Dixon.....San Juan, Puerto Rico
WPC 1114 Heriberto Hernandez.....San Juan, Puerto Rico
WPC 1115 Joseph Napier.....San Juan, Puerto Rico
WPC 1116 William Griesser.....San Juan, Puerto Rico
WPC 1117 Donald Horsley.....San Juan, Puerto Rico
WPC 1118 Joseph Tezanos.....San Juan, Puerto Rico
WPC 1119 Rollin Fritch.....Cape May, N.J.
WPC 1120 Lawrence Lawson.....Cape May, N.J.
WPC 1121 John McCormick.....Ketchikan, Alaska
WPC 1122 Bailey Barco.....Ketchikan, Alaska
WPC 1123 Benjamin Dailey.....Pascagoula, Miss.
WPC 1124 Oliver Berry.....Honolulu
WPC 1125 Jacob Poroo.....Pascagoula, Miss.
WPC 1126 Joseph Gerczak.....Honolulu
WPC 1127 Richard Snyder.....Atlantic Beach, N.C.
WPC 1128 Nathan Bruckenthal.....Atlantic Beach, N.C.
WPC 1129 Forrest Rednour.....San Pedro, Calif.
WPC 1130 Robert Ward.....San Pedro, Calif.
WPC 1131 Terrell Horne.....San Pedro, Calif.
WPC 1132 Benjamin Bottoms.....San Pedro, Calif.
WPC 1133 Joseph O. Doyle.....San Juan, Puerto Rico
WPC 1134 William C. Hart.....Honolulu
WPC 1135 Angela McShan.....Cape May, N.J.
WPC 1136 Daniel Tarr.....Galveston, Texas
WPC 1137 Edgar Culbertson.....Galveston, Texas
WPC 1138 Harold Miller.....Galveston, Texas
WPC 1139 Myrtle Hazard.....Apra Harbor, Guam
WPC 1140 Oliver Henry.....Apra Harbor, Guam
WPC 1141 Charles Moulthrope.....Manama, Bahrain
WPC 1142 Robert Goldman.....Manama, Bahrain
WPC 1143 Frederick Hatch.....Apra Harbor, Guam
WPC 1144 Glenn Harris.....Manama, Bahrain
WPC 1145 Emlen Tunnell.....Manama, Bahrain
WPC 1146 John Scheuerman.....Manama, Bahrain
WPC 1147 Clarence Sutphin.....Manama, Bahrain
WPC 1148 Pablo Valent.....St. Petersburg, Fla.
WPC 1149 Douglas Denman.....Ketchikan, Alaska
WPC 1150 William Chadwick.....Boston
WPC 1151 Warren Deyampert.....Boston
WPC 1152 Maurice Jester.....Boston
WPC 1153 John Patterson.....Boston
WPC 1154 William Sparling.....Boston
WPC 1155 Melvin Bell.....(ordered) future: Boston
WPC 1156 David Duren.....(ordered) future: Astoria, Ore.
WPC 1157 Florence Finch.....(ordered) future: Astoria, Ore.
WPC 1158 John Witherspoon.....(ordered) future: Kodiak, Alaska
WPC 1159 Earl Cunningham.....(ordered) future: Kodiak, Alaska
WPC 1160 Frederick Mann.....(ordered) future: Seward, Alaska
WPC 1161 Olivia Hooker.....(ordered)
WPC 1162 Vincent Danz.....(ordered)
WPC 1163 Jeffrey Palazzo.....(ordered)
WPC 1164 Marvin Perrett.....(ordered)
WPC 1165.....(ordered)

PATROL BOATS (WPB)

Patrol boats support a variety of Coast Guard missions. The 110-foot Island-class cutters are high-speed vessels with a range of nearly 3,300 nautical miles, capable of interdicting maritime drug smugglers.

Island-class patrol boats are being decommissioned as the Coast Guard receives delivery of new Sentinel-class fast-response cutters. Following the decommissioning of two Island-class patrol boats — the USCGC Orcas and the USCGC Anacapa in 2024 — three Island-class patrol boats will remain in service.

The 87-foot Marine Protector class features an integrated electronic bridge system and a stern-launched rigid-hull inflatable boat for safer, more rapid deployment of boarding crews. Four Marine Protectors were built specifically to protect Navy ballistic-missile submarines transiting in and out of Kings Bay, Georgia, and Bangor, Washington. Production was completed in 2009. The Coast Guard has decommissioned some of this class of ships as response boat-mediums and FRCs enter service.

Island Class



U.S. COAST GUARD

LIBERTY | Island Class

DISPLACEMENT.....154 tons full load
LENGTH.....110 feet
BEAM.....21 feet
SPEED.....29.5-plus knots
POWER PLANT.....2 Paxman Valenta diesel engines
RANGE.....3,300 nautical miles
ARMAMENT.....1 Mk38 25 mm machine gun, 2 .50-caliber machine guns
COMPLEMENT.....16
BUILDER.....Bollinger Shipyards Inc.

HOMEPORT

WPB 1310 Mustang.....Seward, Alaska
WPB 1311 Naushon.....Homer, Alaska
WPB 1327 Orcas.....Coos Bay, Ore.
WPB 1334 Liberty.....Valdez, Alaska
WPB 1335 Anacapa.....Port Angeles, Wash.

Marine Protector Class



U.S. COAST GUARD

FLYING FISH | Marine Protector Class

DISPLACEMENT.....91 tons full load
LENGTH.....87 feet
BEAM.....19 feet
SPEED.....25 knots
POWER PLANT.....2 MTU 8V diesel engines
RANGE.....600 nautical miles
ARMAMENT.....2 .50-caliber machine guns
COMPLEMENT.....11
BUILDER.....Bollinger Shipyards Inc.

HOMEPORT

WPB 87301 Barracuda.....Eureka, Calif.
WPB 87302 Hammerhead.....Woods Hole, Mass.
WPB 87303 Mako.....Cape May, N.J.
WPB 87305 Stingray.....Mobile, Ala.
WPB 87307 Osprey.....Port Townsend, Wash.
WPB 87310 Tarpon.....Atlantic Beach, N.C.
WPB 87311 Cobia.....Woods Hole, Mass.
WPB 87312 Hawksbill.....Monterey, Calif.
WPB 87314 Finback.....Jonesport, Maine
WPB 87315 Amberjack.....Abbeville, La.
WPB 87317 Blackfin.....Santa Barbara, Calif.
WPB 87319 Yellowfin.....Charleston, S.C.
WPB 87320 Manta.....Corpus Christi, Texas
WPB 87321 Coho.....Atlantic Beach, Fla.
WPB 87322 Kingfisher.....Montauk, N.Y.
WPB 87323 Seahawk.....Virginia Beach, Va.
WPB 87324 Steelhead.....Atlantic Beach, N.C.
WPB 87325 Beluga.....Highlands, N.J.
WPB 87326 Blacktip.....Oxnard, Calif.
WPB 87327 Pelican.....South Padre, Texas
WPB 87328 Ridley.....Panama City, Fla.
WPB 87330 Manowar.....Dania, Fla.
WPB 87331 Moray.....Gulfport, Miss.
WPB 87332 Razorbill.....New London, Conn.
WPB 87333 Adelie.....Port Angeles, Wash.
WPB 87335 Narwhal.....Corona del Mar, Calif.
WPB 87336 Sturgeon.....Boston
WPB 87337 Sockeye.....Bodega Bay, Calif.
WPB 87338 Ibis.....Tybee Island, Ga.
WPB 87339 Pompano.....Virginia Beach, Va.
WPB 87340 Halibut.....Marina del Rey, Calif.
WPB 87341 Bonito.....Montauk N.Y.
WPB 87342 Shrike.....St. Petersburg, Fla.
WPB 87343 Tern.....San Francisco
WPB 87344 Heron.....Atlantic Beach, Fla.
WPB 87345 Wahoo.....Port Angeles, Wash.
WPB 87346 Flying Fish.....Fort Pierce, Fla.
WPB 87347 Haddock.....San Diego
WPB 87350 Petrel.....San Diego
WPB 87352 Sea Lion.....Bellingham, Wash.
WPB 87353 Skipjack.....Cape Canaveral, Fla.
WPB 87354 Dolphin.....Mobile, Ala.
WPB 87355 Hawk.....Galveston, Texas
WPB 87356 Sailfish.....Virginia Beach, Va.
WPB 87357 Sawfish.....Gulfport, Miss.
WPB 87358 Swordfish.....Port Angeles, Wash.
WPB 87359 Tiger Shark.....Gulfport, Miss.
WPB 87360 Blue Shark.....Everett, Wash.
WPB 87361 Sea Horse.....Fort Pierce, Fla.
WPB 87362 Sea Otter.....San Diego
WPB 87365 Pike.....Petersburg, Alaska
WPB 87366 Terrapin.....Bellingham, Wash.
WPB 87367 Sea Dragon*.....Kings Bay, Ga.
WPB 87368 Sea Devil*.....Bangor, Wash.
WPB 87369 Crocodile.....Fort Meyers Beach, Fla.
WPB 87370 Diamondback.....St. Petersburg, Fla.
WPB 87371 Reef Shark.....Auke Bay, Alaska
WPB 87372 Alligator.....Galveston, Texas
WPB 87373 Sea Dog*.....Kings Bay, Ga.
WPB 87374 Sea Fox*.....Bangor, Wash.

*Navy-owned, Coast Guard-operated

ICEBREAKING TUGS (WTGB)



U.S. COAST GUARD

PENOBSCOT BAY | Bay Class

The Bay-class multimission cutters are specially configured for icebreaking on the Great Lakes, as well as coastal waterways and rivers. They incorporate an advanced hull design and engineering plant along with a "bubbler" hull air-lubrication system for effective icebreaking and winter flood-re-

lief operations. Missions include maritime safety, protection of natural resources and maritime security. Two tugs, the USCGC Bristol Bay and the USCGC Mobile Bay, are augmented by 120-foot barges to service navigational aids on the Great Lakes. As of 2019, all nine tugs have completed renovations as part of the In-Service Vessel Sustainment program. These renovations included upgrades to propulsion and electrical systems, replacement of the boat-launching davit and habitability improvements. The upgrades add 15 years to the tugs' original planned service lives.

Bay Class

DISPLACEMENT.....662 tons full load
LENGTH.....140 feet
BEAM.....37.5 feet
SPEED.....14.7 knots
POWER PLANT.....diesel-electric, 1 shaft, 2,500 hp
DESIGNED ICEBREAKING CAPABILITY.....22 inches at 3 knots continuous; 3 feet backing and ramming
RANGE.....4,000 nautical miles
ARMAMENT.....2 M240 machine guns on East Coast cutters; small arms
COMPLEMENT.....17; 27 for cutters with barges
BUILDERS.....WTGBs 101-106: Tacoma Boatbuilding
107-109: Bay City Marine

HOMEPORT

WTGB 101 Katmai Bay.....Sault Ste. Marie, Mich.
WTGB 102 Bristol Bay.....Detroit
WTGB 103 Mobile Bay.....Sturgeon Bay, Wis.
WTGB 104 Biscayne Bay.....St. Ignace, Mich.
WTGB 105 Neah Bay.....Cleveland
WTGB 106 Morro Bay.....Cleveland
WTGB 107 Penobscot Bay.....Bayonne, N.J.
WTGB 108 Thunder Bay.....Rockland, Maine
WTGB 109 Sturgeon Bay.....Bayonne, N.J.

GREAT LAKES ICEBREAKER (WLBB)

Commissioned in 2006, the USCGC Mackinaw is a state-of-the-art, multimission vessel that serves as a buoy tender and icebreaker and conducts law enforcement boardings. The Mackinaw uses Azipod propulsion and is fitted with advanced navigational and shipboard systems.

Great Lakes Class



U.S. COAST GUARD

MACKINAW | Great Lakes Class

DISPLACEMENT.....3,500 tons full load
LENGTH.....240 feet
BEAM.....58.6 feet
SPEED.....15 knots
POWER PLANT.....3 4,200-bhp diesel generators; 2 3,350-kW Azipod propulsors
DESIGNED ICEBREAKING CAPABILITY.....32 inches at 3 knots continuous; 42 inches backing and ramming
RANGE.....4,000 nautical miles at 12 knots
COMPLEMENT.....60
BUILDER.....Fincantieri Marinette Marine

HOMEPORT

WLBB 30 Mackinaw.....Cheboygan, Mich.

SEAGOING BUOY TENDERS (WLB)

The Juniper-class buoy tenders are equipped with a single controllable-pitch propeller as well as bow and stern thrusters and incorporate a GPS-linked dynamic positioning system that fixes the ship's position within a 2-meter accuracy and allows it to approach, maneuver and automatically maintain position within a radius of 10 meters. The cutters were built to American Bureau of Shipping Standards. Thirteen of 16 Juniper-class cutters have completed major maintenance availabilities at the Coast Guard Yard through the In-Service Vessel Sustainment program.

Juniper Class



U.S. COAST GUARD

JUNIPER | Juniper Class

DISPLACEMENT.....2,000 tons full load
LENGTH.....225 feet
BEAM.....46 feet
SPEED.....15 knots
POWER PLANT.....diesel reduction gear, 1 shaft, 6,200 bhp
DESIGNED ICEBREAKING CAPABILITY.....14 inches of freshwater ice at 3 knots;
36 inches backing and ramming
RANGE.....6,000 nautical miles at 12 knots
ARMAMENT.....2 .50-caliber machine guns
COMPLEMENT.....48
BUILDER.....Fincantieri Marinette Marine

HOMEPORT

WLB 201 Juniper.....Honolulu
WLB 202 Willow.....Charleston, S.C.
WLB 203 Kukui.....Sitka, Alaska
WLB 204 Elm.....Astoria, Ore.
WLB 205 Walnut.....Pensacola, Fla.
WLB 206 Spar.....Duluth, Minn.
WLB 207 Maple.....Atlantic Beach, N.C.

WLB 208 Aspen.....Homer, Alaska
WLB 209 Sycamore.....Newport, R.I.
WLB 210 Cypress.....Kodiak, Alaska
WLB 211 Oak.....Newport, R.I.
WLB 212 Hickory.....Baltimore (future: Apra Harbor, Guam)
WLB 213 Fir.....Cordova, Alaska
WLB 214 Hollyhock.....Baltimore (future: Honolulu)
WLB 215 Sequoia.....Baltimore (future: Port Huron, Mich.)
WLB 216 Alder.....San Francisco

COASTAL BUOY TENDERS (WLM)

The 175-foot Keeper-class buoy tenders use a twin Z-drive system aided by a bow thruster for propulsion. The cutters are equipped with a GPS-linked dynamic positioning system and were built to American Bureau of Shipping Standards. The cutters also are used for light icebreaking operations. A major maintenance availability program for the Keeper class has been approved.

Keeper Class



U.S. COAST GUARD

WILLIAM TATE | Keeper Class

DISPLACEMENT.....840 tons full load
LENGTH.....175 feet
BEAM.....36 feet
SPEED.....12 knots
POWER PLANT.....diesel reduction gear, twin Z-drive, 2,040 bhp
RANGE.....2,000 nautical miles
COMPLEMENT.....24
BUILDER.....Fincantieri Marinette Marine

HOMEPORT

WLM 551 Ida Lewis.....Newport, R.I.
WLM 552 Katherine Walker.....Bayonne, N.J.
WLM 553 Abbie Burgess.....Rockland, Maine
WLM 554 Marcus Hanna.....South Portland, Maine
WLM 555 James Rankin.....Baltimore
WLM 556 Joshua Appleby.....St. Petersburg, Fla.
WLM 557 Frank Drew.....Portsmouth, Va.
WLM 558 Anthony Petit.....Ketchikan, Alaska
WLM 559 Barbara Mabrity.....Mobile, Ala.
WLM 560 William Tate.....Philadelphia
WLM 561 Harry Claiborne.....Galveston, Texas
WLM 562 Maria Bray.....Atlantic Beach, Fla.
WLM 563 Henry Blake.....Everett, Wash.
WLM 564 George Cobb.....San Pedro, Calif.

INLAND BUOY TENDERS (WLI)

Inland buoy tenders service fixed and floating short-range aids to navigation along the coastal and inland waterways. The USCGC Bayberry was placed into "in commission, special" status in June 2023 with an anticipated decommissioning in fiscal 2024.

100-Foot Class

DISPLACEMENT.....174 tons full load
LENGTH.....100 feet
BEAM.....24 feet
SPEED.....10.5 knots
POWER PLANT.....diesel reduction gear, 2 shafts, 660 bhp
RANGE.....2,700 nautical miles
COMPLEMENT.....15
BUILDERS.....WLI 313: Birchfield Boiler Co.; 642: Mobile Ship Repair

HOMEPORT

WLI 313 Bluebell.....Portland, Ore.
WLI 642 Buckthorn.....Sault Ste. Marie, Mich.

65-Foot Class

DISPLACEMENT.....70 tons full load
LENGTH.....65 feet
BEAM.....17 feet
SPEED.....10 knots
POWER PLANT.....diesel reduction, single shaft, 250 bhp
RANGE.....1,300 nautical miles
COMPLEMENT.....8
BUILDERS.....WLI 65400: Reliable Welding Works; 65401: Dubuque Boat and Boiler

HOMEPORT

WLI 65400 Bayberry.....Oak Island, N.C.
WLI 65401 Elderberry.....Petersburg, Alaska

RIVER BUOY TENDERS (WLR)

The Coast Guard's 18 river buoy tenders are designed to service short-range aids to navigation on the inland rivers. They are paired with push barges equipped with deck cranes and other equipment used to set, relocate and recover buoys to mark the ever-changing river channels and facilitate the flow of commerce. The buoy tenders also establish and maintain lighted and unlighted floating and fixed aids.

65-Foot Class

DISPLACEMENT.....145 tons full load
LENGTH.....65 feet
BEAM.....21 feet
SPEED.....11 knots
POWER PLANT.....diesel, 2 shafts, 600 bhp
RANGE.....3,500 nautical miles
COMPLEMENT.....16
BUILDERS.....WLRs 65501, 65502: Platzer Shipyard
65503-65506: Gibbs Shipyard

HOMEPORT

WLR 65501 Ouachita ..... Chattanooga, Tenn.
WLR 65502 Cimarron ..... Paris Landing, Tenn.
WLR 65503 Obion ..... Owensboro, Ky.
WLR 65504 Scioto ..... Keokuk, Iowa
WLR 65505 Osage ..... Sewickley, Pa.
WLR 65506 Sangamon ..... Peoria, Ill.

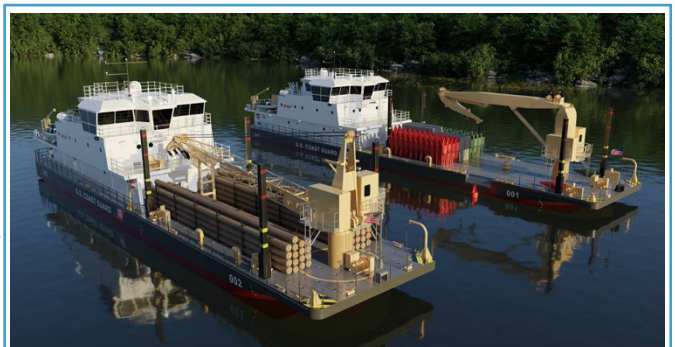
75-Foot Class

DISPLACEMENT ..... 141 tons full load
LENGTH ..... 75 feet
BEAM ..... 22 feet
SPEED ..... 10 knots (12 knots for 75500, 75501)
POWER PLANT ..... diesel, 2 shafts, 660 bhp (1,000 bhp for 75500, 75501)
RANGE ..... 3,100 nautical miles
COMPLEMENT 16
BUILDERS ..... WLR 75307: Sturgeon Bay Shipbuilding
75401: St. Louis Shipbuilding and Drydock
75402-75405: Maxon Construction
75406-75409: Halter Marine
75500, 75501: Avondale Industries

HOMEPORT

WLR 75307 Wedge ..... Demopolis, Ala.
WLR 75401 Gasconade ..... St. Louis
WLR 75402 Muskingum ..... Sallisaw, Okla.
WLR 75403 Wyaconda ..... Dubuque, Iowa
WLR 75404 Chippewa ..... Buchanan, Tenn.
WLR 75405 Cheyenne ..... St. Louis
WLR 75406 Kickapoo ..... Vicksburg, Miss.
WLR 75407 Kanawha.. ..... Pine Bluff, Ark.
WLR 75408 Patoka ..... Greenville, Miss.
WLR 75409 Chena ..... Hickman, Ky.
WLR 75500 Kankakee ..... Memphis, Tenn.
WLR 75501 Greenbrier ..... Natchez, Miss.

WATERWAYS COMMERCE CUTTER



BIRDON AMERICA, INC.

RENDERING OF WATERWAYS COMMERCE CUTTER VARIANTS | Inland Construction Tender (left) and River Buoy Tender (right)

The Waterways Commerce Cutter program is designed to replace the Coast Guard's inventory of 35 river buoy tender (WLR), inland construction tender (WLIC) and inland buoy tender (WLI) cutters with new versions. The current inventory of ships is on average more than 50 years old. The Coast Guard released draft specifications in October 2019 for the river buoy tender and inland construction variants of the new cutters. In April 2021, the Coast Guard released a request for proposals for 27 river buoy tenders and inland construction tenders. A contract was awarded Oct. 5, 2022, to Birdon America for the detail design and construction of the first new river buoy tender and first inland construction tender; the contract includes options for the construction of a total of 16 river buoy tenders and 11 inland construction tenders in Lockport, Louisiana. The new river buoy tenders and inland construction tenders are designed to military standards and are expected to provide up to 11 days of accommodation and habitability for up to 19 mixed-gender crew members. The inland buoy tenders will be designed and procured separately from the river buoy tenders and inland construction tenders in partnership with the Army Corps of Engineers; a total of three inland buoy tenders are planned.

NOTIONAL CHARACTERISTICS

LENGTH ..... WLI: 120 feet; WLIC: 160 feet; WLR: 180 feet
BEAM ..... 35 feet
POWER PLANT ..... Two Z-Drive Propulsion units
COMPLEMENT ..... WLI: 14; WLIC: 17; WLR: 17

CONSTRUCTION TENDERS (WLIC)

Three classes of construction tenders are in service for the construction, repair and maintenance of fixed aids to navigation within inland waterways along the Eastern Seaboard and Gulf of Mexico. They are the only Coast Guard platform with the capability to drive and remove piles, erect towers and effect major structural changes. Their equipment includes pile drivers, cranes and jetting equipment. The USCGC Smilax, the oldest cutter in service, was commissioned in November 1944.

160-Foot Class

DISPLACEMENT ..... 411 tons full load
LENGTH ..... 160 feet
BEAM ..... 30 feet
SPEED ..... 11 knots
POWER PLANT ..... diesel, 2 shafts, 1,000 bhp
RANGE ..... 1,200 nautical miles
COMPLEMENT 14
BUILDER ..... Coast Guard Yard, Baltimore

HOMEPORT

WLIC 800 Pamlico ..... New Orleans
WLIC 801 Hudson ..... Miami Beach, Fla.
WLIC 802 Kennebec ..... Portsmouth, Va.
WLIC 803 Saginaw ..... Mobile, Ala.

100-Foot Class

DISPLACEMENT ..... 218 tons full load
LENGTH ..... 100 feet
BEAM ..... 24 feet
SPEED ..... 10 knots
POWER PLANT ..... diesel reduction, 2 shafts, 660 bhp
RANGE ..... 1,241 nautical miles
COMPLEMENT 16
BUILDER ..... Dubuque Boat and Boiler

HOMEPORT

WLIC 315 Smilax ..... Atlantic Beach, N.C.

75-Foot Class

DISPLACEMENT.....140 tons full load
LENGTH.....75 feet
BEAM.....22 feet
SPEED.....11 knots
POWER PLANT.....diesel, 2 shafts, 673 bhp
RANGE.....1,287 nautical miles
COMPLEMENT.....14
BUILDERS.....WLICs 75301, 75302: Gibbs Shipyard
75303-75305: McDermott Shipbuilding
75306: Sturgeon Bay Shipbuilding
75309, 75310: Dorchester Shipbuilding

HOMEPORT

WLIC 75301 Anvil.....Charleston, S.C.
WLIC 75302 Hammer.....Atlantic Beach, Fla.
WLIC 75303 Sledge.....Baltimore
WLIC 75304 Mallet.....Corpus Christi, Texas
WLIC 75305 Vise.....St. Petersburg, Fla.
WLIC 75306 Clamp.....Galveston, Texas
WLIC 75309 Hatchet.....Galveston, Texas
WLIC 75310 Axe.....Morgan City, La.

HARBOR TUGS, SMALL (WYTL)

The primary missions of the Coast Guard's small harbor tugs are domestic icebreaking, port security, search and rescue, and law enforcement operations on rivers and near-shore areas. They are capable of breaking ice up to 12 inches thick.

65-Foot Class

DISPLACEMENT.....72 tons full load
LENGTH.....65 feet
BEAM.....19 feet
SPEED.....10 knots
POWER PLANT.....1 500-hp diesel
RANGE.....850 nautical miles
COMPLEMENT.....6
BUILDERS.....WYTLs 65601, 65602, 65604: Gibbs Shipyard
65607-65612: Barbour Boat Works
65614, 65615: Western Boatbuilding

HOMEPORT

WYTL 65601 Capstan.....Philadelphia
WYTL 65602 Chock.....Baltimore
WYTL 65604 Tackle.....Rockland, Maine
WYTL 65607 Bridle.....Southwest Harbor, Maine
WYTL 65608 Pendant.....Boston
WYTL 65609 Shackle.....South Portland, Maine
WYTL 65610 Hawser.....Bayonne, N.J.
WYTL 65611 Line.....Bayonne, N.J.
WYTL 65612 Wire.....Saugerties, N.Y.
WYTL 65614 Bollard.....New Haven, Conn.
WYTL 65615 Cleat.....Philadelphia

TRAINING CUTTER (WIX)

The three-masted sailing barque USCGC Eagle, a former German training ship built by Blohm+Voss of Hamburg, Germany, in 1936, is the seventh cutter to bear the name in a line dating back to 1792. Acquired after World War II as war reparations from Germany, the Eagle arrived at its homeport of New London, Connecticut, in 1946 to begin duty as a training ship for the Coast Guard Academy. The barque has a sail area of 21,351 square feet. In April 2018, the Eagle completed a four-year, four-phased service-life extension project at the Coast Guard Yard with the work being accomplished over successive winters to keep up the barque's training schedule.

Eagle

DISPLACEMENT.....1,816 tons full load
LENGTH.....295 feet
BEAM.....39 feet
SPEED.....10 knots under power; 18 knots under sail
POWER PLANT.....diesel, 1 shaft, 1,000 bhp
RANGE.....5,450 nautical miles, under power
COMPLEMENT.....35 permanent crew and up to 150 trainees
BUILDER.....Blohm+Voss

HOMEPORT

WIX 327 Eagle.....New London, Conn.

BOATS

The Coast Guard operates about 1,700 boats, including vessels under 65 feet in length that operate near shore, on inland waterways or are carried by cutters. Some of the more numerous or prominent types are listed below.

MOTOR LIFEBOAT

The 47-foot MLB is the Coast Guard's standard surf and heavy weather and search and rescue platform. MLBs are built to withstand the most severe sea conditions, being self-bailing, self-righting and almost unsinkable. MLBs are capable of operations in 30-foot seas, 20-foot breaking surf and 50-knot winds. There are 117 47-foot MLBs in the Coast Guard inventory. In August 2019, the Coast Guard awarded a contract to Birdon America Inc. of Denver to complete a service-life extension work package on 107 of the service's 47-foot MLBs. The program will extend the 25-year service life by an additional 20 years.

47-Foot Motor Lifeboat



U.S. COAST GUARD

47-FOOT MOTOR LIFEBOAT

DISPLACEMENT.....approximately 20 tons, full load
LENGTH.....48.9 feet (including fending)
BEAM.....15 feet
SPEED.....25 knots
RANGE.....200 nautical miles

POWER PLANT ..... 2 Detroit Diesel electronically controlled 6V92 diesel engines, 870 bhp
ARMAMENT ..... 1 mount for a M240 machine gun
COMPLEMENT 4
BUILDER ..... Textron Marine Systems

RESPONSE BOAT-MEDIUM

The 45-foot RB-Ms operate in inland waterways and up to 50 nautical miles offshore. The twin-diesel RB-Ms can operate in seas up to 10 feet, feature excellent maneuverability and are equipped with a modern navigation system and mounts for light machine guns. The first RB-M was delivered to Coast Guard Station Little Creek, Virginia, in April 2008. All 174 RB-Ms were delivered between April 2008 and March 2015.

45-Foot RB-M



U.S. COAST GUARD

45-FOOT RESPONSE BOAT MEDIUM

DISPLACEMENT ..... 18.35 tons
LENGTH ..... 44.6 feet
BEAM ..... 14.8 feet
SPEED ..... 40+ knots
RANGE ..... 250 nautical miles at 30 knots
POWER PLANT ..... 2 diesel engines with water jet propulsion, 1,650 hp
ARMAMENT ..... 2 mounts for M240 machine guns
COMPLEMENT 4
BUILDERS ..... Marinette Marine, Kvichak Marine Industries

TRANSPORTABLE PORT SECURITY BOAT

The 32-foot TPSB is operated primarily by port security units. It is designed for high speed and maneuvering in demanding operational environments. TPSBs are equipped with ballistic protection and shock-mitigating seating for five personnel. Current inventory is 58 boats.

32-Foot TPSB

LENGTH ..... 32.5 feet
BEAM ..... 8.2 feet
SPEED ..... 43+ knots
RANGE ..... 238 nautical miles
POWER PLANT ..... 2 Yanmar 6V diesel inboard engines, 630 hp
ARMAMENT ..... 4 mounts for M240 machine guns
COMPLEMENT 4
BUILDER ..... Kvichak Marine Industries

RESPONSE BOAT-SMALL

The second-generation RB-S entered service in 2012, replacing approximately 350 first-generation RB-Ss. As the RB-S reached the end of its 10-year service life, the Coast Guard began procuring the RB-S II from Metal Shark Aluminum Boats. The last of 370 RB-S IIs was delivered in December 2019.

29-Foot RB-S II



U.S. COAST GUARD

29-FOOT RESPONSE BOAT SMALL II

DISPLACEMENT ..... 8,300 pounds
LENGTH ..... 28.8 feet
BEAM ..... 8.5 feet
SPEED ..... 45 knots
RANGE ..... 150 nautical miles at cruising speed
POWER PLANT ..... 2 Honda outboard gasoline engines, 450 hp
ARMAMENT ..... 2 machine gun mounts
COMPLEMENT 4
BUILDER ..... Metal Shark Aluminum Boats

CUTTER BOAT OVER-THE-HORIZON

The 24-foot CB-OTH is a rigid-hull inflatable boat that can be launched from a cutter to observe, identify, track, pursue and prosecute "go-fast" boats well in advance of the cutter being detected. There are two earlier CB-OTH versions with a fiberglass (Mk-II) or aluminum (Mk-III) hull, with eight Mk-IIs and seven Mk-IIIs in the inventory.

24-Foot CB-OTH

DISPLACEMENT ..... 5,415 pounds
LENGTH ..... 24.75 feet
BEAM ..... 9 feet
SPEED ..... 42+ knots
RANGE ..... 250 nautical miles at 26 knots
POWER PLANT ..... 1 Yanmar diesel engine, 318 hp
ARMAMENT ..... 1 mount for M240 machine gun
COMPLEMENT ..... up to 5
BUILDERS ..... Zodiac North America, Zodiac Hurricane Technologies

CUTTER BOAT OVER-THE-HORIZON IV

The 26-foot CB-OTH-IV is deployed on national security cutters, fast-response cutters and other legacy vessels, including medium-endurance cutters, with 121 boats delivered.

26-Foot CB-OTH-IV

DISPLACEMENT.....7,400 pounds
LENGTH.....26.4 feet
BEAM.....8.5 feet
SPEED.....40 knots
RANGE.....227 nautical miles at 25 knots
POWER PLANT.....1 Cummins diesel engine, 480 hp jet outdrive
ARMAMENT.....1 mount for M240 machine gun
COMPLEMENT.....up to 5
BUILDER.....SAFE Boats International

CUTTER BOAT OVER-THE-HORIZON V

The Coast Guard awarded a 10-year CB-OTH V contract to Inventech Marine Solutions in June 2021 to replace the CB-OTH IVs as they reach the end of their service lives. The CB-OTH V will be deployed on national security cutters, fast-response cutters, offshore patrol cutters and other legacy vessels, including medium-endurance cutters, with a projected fleet of up to 194 boats. The first CB-OTH V was delivered April 18, 2023.

26-Foot CB-OTH-V

DISPLACEMENT.....7,433 pounds
LENGTH.....25.5 feet
BEAM.....8.5 feet
SPEED.....38 knots
RANGE.....208 nautical miles at 28 knots
POWER PLANT.....1 Cummins diesel engine, 480 hp jet outdrive
ARMAMENT.....1 mount for M240 machine gun
COMPLEMENT.....up to 5
BUILDER.....Inventech Marine Solutions

CUTTER BOATS

Cutter boats are rigid-hull inflatable boats used to transport boarding teams, interdict migrants, respond to environmental disasters, pursue drug-trafficking go-fast boats and service navigational aids. In August 2018, the Coast Guard awarded a contract to MetalCraft Marine for up to 36 22-foot CB-Ls (210/225). The new CB-L replaced the 24-foot aluminum chambered boats in service onboard 210-foot medium-endurance cutters, 225-foot seagoing buoy tenders and the USCGC Alex Haley and the USCGC Mackinaw. The boats support operations on the East, West and Gulf coasts, as well as in Hawaii, Guam and Alaska. All 36 CB-Ls have been delivered. The service also operates 20-foot CB-Ls built by Zodiac onboard 270-foot medium-endurance cutters. The 17-foot CB-M is deployed on 110-foot and 87-foot patrol boats.

22-Foot CB-L (210/225)

DISPLACEMENT.....4,631 pounds
LENGTH.....22 feet
BEAM.....8.5 feet
SPEED.....35+ knots
RANGE.....200 nautical miles at 24 knots
POWER PLANT.....1 Volvo diesel engine, 220 hp
COMPLEMENT.....up to 10
BUILDERS.....MetalCraft Marine US

LONG-RANGE INTERCEPTOR II

The LRI-II provides high-speed interdiction and law enforcement capabilities to expand the mission reach of national security cutters. It features increased passenger-carrying capability, improved dynamic stability and higher speeds than the over-the-horizon cutter boats. Eleven LRI-IIs have been delivered to support the national security cutters. A third-generation LRI-III variant is being procured under a $31.3 million contract awarded May 23, 2023, to MetalCraft Marine; the contract includes options for a potential total of 17 craft to replace LRI-IIs as those craft reach the end of their service lives.

35-Foot LRI-II

LENGTH.....35.9 feet
BEAM.....11.3 feet
SPEED.....35+ knots
RANGE.....227 nautical miles at 25 knots
POWER PLANT.....2 Cummins QSB 6.7 diesel engines, 480 hp
2 UltraJet 305 waterjets
COMPLEMENT.....up to 15
BUILDERS.....MetalCraft Marine

SPECIAL PURPOSE CRAFT-SCREENING VESSEL

The SPC-SV escorts high-value Navy ships to and from port. With 10 shock-mitigating seats in the pilothouse, a mess deck and berthing for five, the SPC-SV has sufficient room for two separate crews, allowing for extended operation. A remote-controlled weapon on the bow and extensive ballistic protection allows the SPC-SV to be particularly well-suited for establishing and maintaining security zones. The Navy procured 12 SPC-SVs, which entered service in 2009 and are operated by Coast Guard crews at Maritime Force Protection Units.

64-Foot SPC-SV

DISPLACEMENT.....46.5 tons
LENGTH.....71.9 feet
BEAM.....21.7 feet
SPEED.....30+ knots
RANGE.....300 nautical miles at 23 knots
POWER PLANT.....2 MTU diesel engines driving Hamilton waterjets; 2,720 hp
ARMAMENT.....1 remotely operated machine gun
COMPLEMENT.....5
BUILDER.....Gladding-Hearn/Duclos

SPECIAL PURPOSE CRAFT-LAW ENFORCEMENT

The SPC-LE can carry out pursuit and intercept operations in seas up to 8 feet. The boat features a climate-controlled cabin and shock-mitigating seats to support the four-person crew. There are 49 SPC-LEs operating across the country. The Coast Guard awarded a contract to Silver Ships in 2022 to replace 37 SPC-LEs. Four are currently in the inventory.

33-Foot SPC-LE

DISPLACEMENT.....13,700 pounds
LENGTH.....39.7 feet
BEAM.....10 feet
SPEED.....45+ knots

RANGE.....250+ nautical miles at 35 knots
POWER PLANT.....3 300-hp Mercury Verado outboard engines
ARMAMENT.....2 mounts for M240 machine guns
COMPLEMENT.....4
BUILDER.....SAFE Boats International

SPECIAL PURPOSE CRAFT-LAW ENFORCEMENT II

The SPC-LE II is the second-generation of the SPC-LE. The SPC-LE II will be a multimission craft designed and built primarily for counterdrug and migrant missions along the U.S. maritime border.

33-Foot SPC-LE II

DISPLACEMENT.....16,718 pounds
LENGTH.....39.9 feet
BEAM.....10 feet
SPEED.....49 knots
RANGE.....260 nautical miles at 32 knots
POWER PLANT.....3 300-hp Mercury Verado outboard engines
ARMAMENT.....2 mounts for M240 machine guns
COMPLEMENT.....4
BUILDER.....Silver Ships

SPECIAL PURPOSE CRAFT-BOARDING TEAM DELIVERY

The SPC-BTD is a rigid-hull inflatable boat that can carry an armed boarding party and crew up to 50 miles offshore at speeds approaching 40 knots in up to 8-foot seas. Two were delivered in 2010 to the Maritime Security Response Team in Chesapeake, Virginia.

36-Foot SPC-BTD

LENGTH.....36 feet
BEAM.....10.7 feet
SPEED.....57 knots
RANGE.....210 nautical miles at 40 knots
POWER PLANT.....3 300-hp Mercury Verado outboard engines
ARMAMENT.....2 mounts for M240 machine guns
COMPLEMENT.....3 crew and 12 boarding team members
BUILDER.....Zodiac International

SPECIAL PURPOSE CRAFT-SHALLOW WATER

The second-generation 27-foot SPC-SW, built by RECONCRAFT, is designed for search and rescue where the water depth restricts access of a deeper draft boat. These boats replaced the 24-foot SPC-SW from Metal Shark Aluminum Boats, with 46 fielded in 2008. Forty-three boats are in operational service.

DISPLACEMENT.....6,212 pounds
LENGTH.....27.5 feet
BEAM.....8.5 feet
SPEED.....35+ knots
RANGE.....150 nautical miles at 30 knots
POWER PLANT.....2 150-hp Yanmar diesel jet drive engines
ARMAMENT.....1 mount for M240 machine gun
COMPLEMENT.....4 plus 6 passengers
BUILDER.....RECONCRAFT

SPECIAL PURPOSE CRAFT-ICE RESCUE TRANSPORT

The SPC-IRT from Dynamarine Performance Boats began replacing the 22-foot airboat in 2018. The boat is designed primarily for search and rescue missions as a long-range ice rescue platform. Its enclosed, watertight cabin can accommodate seven people.

DISPLACEMENT.....5,000 pounds
LENGTH.....23.5 feet
BEAM.....8.5 feet
SPEED.....30 knots (in water); 15 knots (on hard surfaces)
RANGE.....75 nautical miles at 15 knots
POWER PLANT.....1 820-hp engine
COMPLEMENT.....3
BUILDER.....Dynamarine Performance Boats

SPECIAL PURPOSE CRAFT-TRAINING BOAT

The Coast Guard procured 16 SPC-TBs from Metal Shark Aluminum Boats for training boat operators. The SPC-TB entered service in 2010. The boats are used at the Coast Guard's training center in Virginia and for aviation training support at two aids-to-navigation teams in Alaska. Fifteen remain in inventory.

LENGTH.....40.8 feet
BEAM.....10.9 feet
SPEED.....38 knots
RANGE.....260 nautical miles at 24 knots
POWER PLANT.....2 300-hp Mercury Verado outboard engines
COMPLEMENT.....8
BUILDER.....Metal Shark Aluminum Boats

AIDS-TO-NAVIGATION BOATS

The Coast Guard operates several classes of ANBs to maintain navigation aids in inland waters. These include three 64-foot ANBs, two 55-foot ANBs, 26 49-foot stern loading buoy-servicing boats, 89 26-foot and five 17- to 23-foot transportable boats, six ANBs small and 26 ANB skiffs.

AIRCRAFT

HC-130H HERCULES/HC-130J SUPER HERCULES



LOCKHEED MARTIN

HC-130J SUPER HERCULES

The Coast Guard operates a long-range turboprop aircraft fleet consisting of four HC-130H Hercules and 15 HC-130J Super Hercules. The HC-130 provides a versatile platform capable of serving as an on-scene command and control platform with extended loitering capabilities as well as performing various missions, including maritime patrol, law enforcement, search and rescue, disaster response, scientific research support, and cargo and personnel transport.

As a surveillance platform, the HC-130 provides the critical means to detect, classify and identify targets. For each of these missions, the information is shared with operational forces capable of interdicting drugs or migrants, protecting living marine resources; and enforcing economic, safety and security zones. The HC-130 uses a powerful multimode surface search radar and a nose-mounted electro-optical/infrared device combined with an airborne tactical workstation and military satellite communications capability to improve mission effectiveness.

HC-130Hs are reaching the end of their useful service lives. The Coast Guard has begun to phase out its HC-130Hs. In addition to the four Hercules the Coast Guard operates, one is available for support, and seven are being transferred to the California Department of Forestry and Fire Protection. The phaseout plan for the HC-130H fleet includes retiring four operational aircraft in fiscal year 2024 and retiring or transferring the remainder to CALFIRE following Fire Retardant Dispersal System installation.

As the HC-130Hs are retired, the Coast Guard will continue acquiring the more capable and cost-effective HC-130Js. To date, the Coast Guard has ordered 19 aircraft and accepted delivery of 15 missionized aircraft; two more are undergoing or awaiting missionization by L3Harris. Two airframes are in production at Lockheed Martin Aeronautics in Marietta, Georgia. All 15 operational aircraft in the fleet are configured with the Minotaur mission system. In February 2020, the testing of the first HC-130J with the Lockheed Martin Block 8.1 upgrade was completed. The Block 8.1 upgrade is a series of avionics and navigation improvements.

The Coast Guard is currently transitioning a third air station in Barbers Point, Hawaii, to HC-130Js.

HC-130H

WINGSPAN	132.7 feet
LENGTH	99.7 feet
HEIGHT	38.8 feet
WEIGHT	maximum gross takeoff, 155,000 pounds
SPEED	cruise 280 knots/maximum 315 knots
RANGE	up to 3,500 nautical miles, depending on mission configuration
POWER PLANT	4 Allison T56-A15 turboprop engines
CREW	2 pilots, 1 flight engineer, 1 navigator, 1 radio operator, 1 dropmaster or 1 loadmaster, 1 or 2 sensor operators
CONTRACTOR	Lockheed Martin Aeronautics Co.

HC-130J

WINGSPAN	132.7 feet
LENGTH	97.9 feet
HEIGHT	38.11 feet
WEIGHT	maximum gross takeoff, 164,000 pounds
SPEED	cruise 320 knots/maximum 362 knots
RANGE	up to 5,100 nautical miles, depending on mission configuration
POWER PLANT	4 Rolls-Royce AE2100D3 turboprop engines
CREW	2 pilots, 1 loadmaster, and 1 basic aircrew; additional aircrew depending on mission
CONTRACTOR	Lockheed Martin Aeronautics Co.

HC-144A/B OCEAN SENTRY



EADS NORTH AMERICA

HC-144 OCEAN SENTRY

A medium-range maritime patrol version of the Airbus Defense and Space CN235-300M cargo aircraft, the HC-144 is one of two Coast Guard medium-range surveillance aircraft serving as an on-scene command platform and executing surveillance, search and rescue, transport missions, and homeland security operations.

The HC-144 is equipped with a command, control, communications, computers, intelligence, surveillance and reconnaissance suite; radar; and an electro-optical/infrared sensor.

The Ocean Sentry provides extended on-scene loitering capabilities while also being capable of performing maritime patrol, law enforcement, search and rescue, disaster response, and cargo and personnel transport missions. The Ocean Sentry also can maintain secure communications with the Department of Defense, Department of Homeland Security and allied forces.

The Coast Guard is upgrading its HC-144A fleet to improve mission effectiveness and situational awareness through the Ocean Sentry Refresh project. Each aircraft is receiving a new cockpit control and display unit, which serves as the primary avionics computer for communication control, navigation and equipment monitoring. The aircraft is redesignated as an HC-144B following project completion. The Coast Guard also is integrating Minotaur mission system architecture across its fixed-wing aircraft fleet. The Minotaur and Ocean Sentry Refresh modifications were combined into one conversion process in fiscal 2019. Fourteen HC-144 aircraft had completed both conversion processes as of January 2023. HC-144s is currently operating at four of the service's air stations.

WINGSPAN.....84.7 feet
LENGTH.....70.2 feet
HEIGHT.....26.8 feet
WEIGHT.....maximum gross, 36,380 pounds
SPEED.....cruise, 215 knots/maximum, 243 knots
RANGE.....up to 2,200 nautical miles, depending on cargo or maritime patrol configuration
CEILING.....25,000 feet
POWER PLANT.....2 1,750-shp General Electric CT7-9C3 turboprop engines
CREW.....2 pilots, 4 mission crew
CONTRACTOR.....Airbus Group; manufacturer, Airbus Military

C-27J/HC-27J SPARTAN

The Coast Guard acquired 14 surplus C-27J Spartan transport aircraft in 2014 from the Air Force. The aircraft began service at Coast Guard Air Station Sacramento in July 2016 as a medium-range surveillance maritime patrol aircraft. The Coast Guard intends to missionize the C-27J aircraft with the Minotaur mission system and a suite of sensors similar to those in its HC-130 and HC-144 aircraft, upon which the aircraft will be designated HC-27J. Prototype mission system integration on the C-27J is being completed by Naval Air Systems Command AIRWorks; deliveries began in late 2023. The first missionized HC-27J made its first flight Sept. 6, 2023.



U.S. COAST GUARD

C-27J SPARTAN

WINGSPAN.....94.2 feet
LENGTH.....74.5 feet
HEIGHT.....31.7 feet
WEIGHT.....67,241 pounds
SPEED.....cruise, 290 knots/maximum 317 knots
RANGE.....up to 2,675 nautical miles
CEILING.....30,000 feet
POWER PLANT.....2 Rolls-Royce AE2100-D2A turboprop engines
CREW.....2 pilots, 2 mission crew
CONTRACTOR.....Leonardo S.p.A

MH-60T JAYHAWK

The MH-60T Jayhawk is an all-weather, medium-range recovery helicopter crewed by two pilots, a flight mechanic and a rescue swimmer and can carry up to six seated survivors. The MH-60T is capable of limited shipboard operations as well as land-based operations out to 300 nautical miles with a 45-minute on-scene time.

The Jayhawk employs full night-vision-device capability. Primary tactical navigation is accomplished through blended GPS and inertial navigation system receivers. In addition to a rescue hoist — rated for 600 pounds — the Jayhawk is equipped with a heavy-lift external sling with a capacity of 6,000 pounds.



U.S. COAST GUARD

MH-60T JAYHAWK

Roles for the medium-range recovery helicopter include maritime patrol, drug and migrant interdiction, disaster relief, law enforcement, search and rescue, and environmental protection. All are interoperable with the Department of Defense, Department of Homeland Security and local response agencies. All MH-60Ts can be equipped with airborne use-of-force capabilities, including a door-mounted machine gun and precision-fire rifles. Other upgrades include modern electro-optical/infrared sensors and surface search radar.

The Jayhawk first flew in 1988 and has been modified through the HH-60J, MH-60J and MH-60T versions. The Coast Guard's operational fleet includes 48 MH-60Ts deployed at 10 stations throughout the United States, including Alaska and Puerto Rico. In February 2014, the sea service completed modernized glass cockpit, weather radar and integrated EO/IR sensor system upgrades.

The aircraft is in the early stages of a service-life extension program designed to keep the Coast Guard MH-60 fleet operational into the 2040s. Replacement hulls from retired U.S. Navy SH-60F/HH-60H helicopters or new builds from Lockheed Martin will be used for the MH-60T fleet service-life extension program.

LENGTH.....64.8 feet
HEIGHT.....17 feet
WEIGHT.....maximum allowable gross, 21,884 pounds
SPEED.....maximum, 180 knots; cruise, 125 knots
CEILING.....density altitude, 13,000 feet
RANGE.....radius of action, 300 nautical miles
POWER PLANT.....2 General Electric T700-401C gas turbine engines
ARMAMENT.....7.62 mm M240B machine gun, .50-caliber precision-fire weapon, 7.62 mm precision-fire weapon (mission variable)
CREW.....2 pilots, 1 to 2 crew personnel, 1 rescue swimmer (mission variable)
CONTRACTORS.....Sikorsky Aircraft Corp., Rockwell Collins, FLIR Systems Inc.
LEAD SYSTEM INTEGRATOR.....USCG Aviation Logistics Center, Elizabeth City, N.C.

MH-65D/E DOLPHIN

The MH-65 helicopter is a short-range recovery helicopter typically crewed by two pilots, a flight mechanic and a rescue swimmer and is the primary aircraft for Coast Guard shipboard operations. The MH-65 is certified for day and night operations in all weather conditions except for icing. Roles include maritime patrol, drug and migrant interdiction, disaster response, search and rescue, law enforcement, and environmental protection.

All MH-65s are interoperable with the Department of Defense, Department of Homeland Security and local response agencies. The MH-65 is equipped with airborne use-of-force capabilities, configurable to enable armed missions, with a door-mounted machine gun and precision-fire rifles.



AIRBUS

MH-65 DOLPHIN

The transition to the MH-65E began full-rate production in November 2020, with 72 aircraft conversions completed as of September 2023, with a planned conversion of 98 total aircraft. The MH-65E features the Common Avionics Architecture System — an all-glass cockpit with improved navigation capabilities, including a new flight director and radar. The MH-65E shares avionics components with the MH-60T, providing similar cockpit instrumentation and improving standardization throughout the Coast Guard rotary-wing fleet. The MH-65E also includes structural replacements as part of a service-life extension program that will allow the fleet to remain in service into the late 2030s. There are 98 H-65s in the Coast Guard's inventory at units across the United States, including Alaska and Hawaii.

LENGTH ..... 44.4 feet
HEIGHT ..... 13.4 feet
WEIGHT ..... maximum allowable gross, 9,480 pounds
SPEED ..... maximum, 175 knots; cruise, 125 knots
RANGE ..... radius of action, 150 nautical miles
POWER PLANT ..... 2 Turbomeca Arriel 2C2-CG gas turboshaft engines
ARMAMENT ..... 7.62 mm M240B machine gun, .50-caliber precision-fire weapon, 7.62 mm precision-fire weapon (mission variable)
CREW ..... 2 pilots, 1 flight mechanic, 1 rescue swimmer (mission variable)
CONTRACTOR ..... Airbus Group
LEAD SYSTEM INTEGRATOR ..... USCG Aviation Logistics Center, Elizabeth City, N.C.

C-37A/B GULFSTREAM (G-V)

The service operates two Gulfstream aircraft — a G-V (C-37A) and a G-550 (C-37B) — as its principal command and control transport for senior Coast Guard and Department of Homeland Security officials. The aircraft can carry 12 passengers and a crew of four with a range of 5,000 nautical miles. The Coast Guard took delivery of the new C-37B in June 2022.



U.S. COAST GUARD

C-37A

WINGSPAN ..... 93.5 feet
LENGTH ..... 96.4 feet
HEIGHT ..... 25.9 feet
WEIGHT ..... 90,900 pounds (C-37A); 91,400 pounds (C-37B)
SPEED ..... Mach .086, 573 knots
RANGE ..... 5,000 miles
CEILING ..... 51,000 feet
POWER PLANT ..... 2 BMW-Rolls-Royce BR710A1-10 turbofan engines (C-37A)
2 BMW-Rolls-Royce BR710C4-11 turbofan engines (C-37B)
CREW ..... 2 pilots, 2 mission crew
CONTRACTOR ..... Gulfstream Aerospace

C4ISR SYSTEMS

RESCUE 21

Rescue 21 is the Coast Guard's advanced command, control and communications system, engineered to better locate mariners in distress and save lives and property at sea. By harnessing state-of-the-market communications technology, Rescue 21 enables the Coast Guard to execute its missions with greater agility and efficiency.

The Coast Guard accepted the final tower in the Rescue 21 system Oct. 10, 2017, completing a more than 20-year design and installation process throughout the U.S. and its territories.

The Rescue 21 very high-frequency, frequency-modulated communications system replaces the legacy National Distress and Response System deployed in the 1970s. One of the most significant improvements is Rescue 21's ability to provide an approximate position of a caller in distress, thereby greatly reducing search times. This is achieved through lines of bearing to the source of the VHF radio transmission.

According to statistics supplied by the National Search and Rescue School, a training facility run by the Coast Guard, roughly 95% of all search and rescue cases take place within 20 nautical miles offshore, and the Rescue 21 system is designed to capture distress radio transmissions to a minimum of 20 nautical miles offshore. Rescue 21 infrastructure in place averages about 1,000 cases per month.

Rescue 21's improved communications capabilities upgrade playback and recording features and improve the clarity of distress calls — for repeated listening in cases of distorted, rushed or distressed transmissions. The system supports digital selective calling, which allows operators of properly registered vessels in distress to transmit their GPS position to Coast Guard stations and nearby DSC-equipped vessels.

Rescue 21 can also help restore critical communications following a disaster through the use of portable antenna towers. Additionally, the system's direction-finding and geographic display capabilities help to identify and locate hoax callers, conserving valuable search and rescue response resources.

The system's expanded frequency capacity enables greater coordination and communication between the Coast Guard, Department of Homeland Security and other federal, state and local agencies and first responders across all Coast Guard mission areas. Additionally, project activities are coordinated to share the facility and tower infrastructure with other Coast Guard command and control projects, such as the Interagency Operations Center and the Nationwide Automatic Identification System project, to improve the nation's maritime safety and security.

The system is operational along the coasts of the contiguous United States, Hawaii, Puerto Rico, Guam, the U.S. Virgin Islands, the Northern Marianas Islands of Saipan, Tinian and Rota, in parts of Alaska, and in much of the Mississippi, Missouri and Ohio rivers and their major tributaries. Because of Alaska's vast area and limited connectivity in remote locations, the Coast Guard deployed a modified Rescue 21 system tailored to factors such as population density, marine traffic, supportability, durability, accessibility, weather and terrain. In fiscal year 2021, the Rescue 21 system supported 2,615 search and rescue cases.

CONTRACTOR.....General Dynamics

SEASPRAY 7500E MULTIMODE RADAR

The 7500E multimode X-band radar is the primary surveillance sensor of the HC-130H Hercules. It uses active electronic scanned array technology to perform maritime surveillance, detecting, tracking and classifying of maritime traffic in support of all Coast Guard roles and missions; to detect and map spills of national significance; and to support all-weather global operations. It fuses Nationwide Automatic Identification System-reported targets with Selex radar targets for improved maritime domain awareness.

CONTRACTOR.....Selex Corp.

APS-143C OCEANEYE RADAR

The OceanEye is a multimode X-band radar with a 360-degree scan used for maritime target detection, tracking and classification in support of all Coast Guard roles and missions. It is an internationally employed search and rescue radar optimized for small-target detection, tracking and classification. Furthermore, its light weight makes it suitable for medium-range aircraft such as the HC-144. The (V)3 version is being installed on HC-27J aircraft.

CONTRACTOR.....Telephonics Corp.

APY-11 ELM 2022(V)3 MULTIMODE RADAR

The ELM 2022(V)3 is an X-band multimode maritime radar selected for the Coast Guard's HC-130J maritime patrol aircraft. It is optimized with a 360-degree scan for maritime surveillance, drug interdiction, fisheries enforcement and search and rescue support. It also is replacing the APS-135 Side-Looking Airborne Radar and support the International Ice Patrol mission to detect and map ice movement that presents a hazard to maritime shipping across the North Atlantic.

CONTRACTORS.....ITT Corp., ELTA Systems Electronics

MX-20 EO/IR SENSOR

The MX-20 is a 20-inch-diameter, gimbaled-turret-housing electro-optical and infrared sensor for maritime surveillance, detection, classification and identification. It is the Coast Guard equivalent of the ASX-4 sensor. It is deployed on HC-130H aircraft as part of the C-130 Airborne Sensor with Palletized Electronic Reconnaissance mission system.

CONTRACTOR.....L3Harris Wescam

AAQ-21/22 STAR SAFIRE III EO/IR SENSOR

The Star Safire III is an EO/IR sensor turret with high-powered optics and precision geo-pointing for maritime surveillance and targeting. It is deployed on HC-144A maritime patrol aircraft and supports maritime surveillance detection, tracking, classification and identification of maritime targets. The Star Safire 380-HD was selected in 2017 to equip HC-130J, HC-144B and HC-27J maritime patrol aircraft.

CONTRACTOR.....Teledyne FLIR Systems Inc.

ELECTRO-OPTICAL SENSOR SYSTEM

The ESS is an EO/IR sensor turret with high-powered optics, infrared sensor, auto-tracking and precision geo-pointing for maritime surveillance, detection, tracking, classification and identification of maritime targets. It is installed in a 9-inch turret suited for MH-60T and MH-65E helicopters. It supports airborne special missions, such as airborne use of force, enhancing day and night interdiction of smuggling vessels and other maritime threats to the United States.

CONTRACTOR.....Teledyne FLIR Systems Inc.

DF-430-F/DF-500 DIRECTION FINDER

The DF-430-F is being acquired and implemented on all operational Coast Guard aircraft, providing the capability to home in on and fly directly to distress and audio signals. The DF-430 has detected 406-megahertz Emergency Position Indicating Radio Beacon signals at

a range of more than 100 nautical miles. The DF-430-F will be upgraded to the DF-500. The DF-500 has the capability to detect the extended 406-megahertz channels that now available to 406 EPIRBs.

CONTRACTOR.....Rockwell Collins Inc.

AVS-9 PINNACLE NIGHT-VISION GOGGLES

All Coast Guard helicopters operate with ANVIS-9 Gen III night-vision goggles that allow crew members to see in nighttime conditions by amplifying low-level light imperceptible to the human eye. These systems are employed on HC-144A, HC-130H, HC-130J, MH-60 and MH-65 aircraft and are compatible with the C-27J. Over the years, night-vision goggles have been directly responsible for lives saved and allowed the safe execution of airborne missions that otherwise could not have been flown.

CONTRACTOR.....ITT Corp.

MINOTAUR MISSION SYSTEM

The Minotaur mission system, developed by Naval Air Systems Command and in use across Navy and Customs and Border Protection aircraft, allows for an operator-friendly graphical user interface that blends an enhanced tactical sensor management system with more than 20 sensors. This common design is being installed across Coast Guard fixed-wing platforms, including the HC-130J, HC-144 and HC-27J fleets.

A 2015 contract was awarded to install Minotaur on two new HC-130Js with options to convert up to seven aircraft already delivered to the Coast Guard as well as additional aircraft in or planned for production. The first HC-130J outfitted with Minotaur was delivered to the Coast Guard fleet in July 2017. The first Minotaur-equipped HC-144 was delivered in July 2017. The first Minotaur-equipped HC-27J is anticipated to be delivered in 2024. The Coast Guard has installed Minotaur on 15 HC-130J and 13 HC-144B aircraft.

CONTRACTOR.....L3Harris

SCANEAGLE UNCREWED AERIAL SYSTEM

After a demonstration/prototype phase, the Coast Guard awarded an intelligence, surveillance and reconnaissance services contract to Boeing Insitu on June 6, 2018, for contractor-owned and -operated ScanEagle UAS onboard national security cutters. The first nine NSCs have been outfitted with UAS capability; installation on the tenth is underway. UAS capability is used primarily for narcotics interdiction but is also used for search and rescue, disaster recovery and humanitarian relief efforts, and fisheries enforcement.

CONTRACTOR.....Insitu Inc., a Boeing company

SPQ-9B FIRE-CONTROL RADAR

The SPQ-9B is an X-band, high-resolution, pulse-Doppler, frequency-agile rotating shipboard radar designed to detect and track low-altitude cruise missiles in a high-clutter environment while simultaneously providing detection and tracking of surface targets and beacon responses.

CONTRACTOR.....Northrop Grumman Norden Systems Inc.

SPS-75 MULTIMODE RADAR

The SPS-75 (TRS-3D) is a multimode air and surface search and track radar installed on national security cutters. The radar uses a phased array antenna for detection and tracking of multiple surface and air targets simultaneously. (See the Navy C4ISR section for a description.)

CONTRACTOR.....EADS North America

SPS-77 SEA GIRAFFE AMB MULTIMODE RADAR

The Sea Giraffe AMB multimode radar was selected in September 2017 for the Heritage-class offshore patrol cutter program. (See the Navy C4ISR section for a description.)

CONTRACTOR.....Saab Defense and Security USA

SEA COMMANDER

The Sea Commander system is the integrated command and control baseline for national security cutters. It is based on the Aegis Combat System and includes a Link 16 data link. Sea Commander software provides real-time tactical data processing and tracking, weapons integration and sensor interfaces.

CONTRACTOR.....Lockheed Martin Corp.

SEAWATCH

The SeaWatch system is the integrated command and control baseline for fast-response cutters and 270-foot medium endurance cutters as well as future offshore patrol cutters and polar security cutters. SeaWatch integrates navigation and tactical sensors, communications and optical surveillance systems to provide superior situational awareness of the operational environment.

DEVELOPER.....U.S. Coast Guard



The U.S. Department of Transportation's (DoT) Maritime Administration (MARAD) supports the varied and complex aspects of America's maritime transportation industry — including infrastructure, supply chain resilience, mariner information, training and education, ships and shipping, port, and vessel operations.

U.S. citizen mariners, vessels, ports, and intermodal facilities are crucial for supporting our national and economic security and emergency response efforts. Auxiliary sealift provided by the U.S. Merchant Marine plays a vital role in American success in wars and international crises. MARAD's National Defense Reserve Fleet (NDRF) and its Ready Reserve Force (RRF) vessels maintain a constant state of readiness to support the initial "surge" deployment of American armed forces and equipment around the globe, while aiding the United Nations and other humanitarian missions.

The Maritime Administration oversees the U.S. Merchant Marine Academy and is responsible for its success. MARAD also maintains a vested interest in the six state maritime academies, as the success of both USMMA and its state counterparts is essential to maintaining the overall vitality of the U.S. Merchant Marine.

To support the State Maritime Academies and ensure national security and other national needs, MARAD is building five State Class National Security Multi- Mission Vessels, the first ships built by MARAD in over 60 years. These vessels will provide training vessel support to five of the six State Maritime Academies while simultaneously maintaining a five-day readiness status in the event they are required to respond to a national emergency.

MARAD also administers the Port Infrastructure Development Program, a discretionary grant program, which includes $2.25B in funds from the FY 2022 Bipartisan Infrastructure Law. This funding will help grow capacity and increase efficiency at coastal seaports, Great Lakes ports, and inland river ports.

MARITIME ADMINISTRATOR

Ann C. Phillips, Rear Admiral, US Navy (Ret) was sworn in as the 20th Administrator for the Maritime Administration on May 16, 2022. As Maritime Administrator, Phillips advises and assists the Secretary of Transportation on commercial maritime matters, to include the movement of goods and supply chain strength, maritime environmental responsibility, and compliance matters, port and waterway infrastructure, and strategic sealift. She engages public and private stakeholders in the maritime industry and oversees the U.S. Merchant Marine Academy.

Phillips leads MARAD efforts to improve and modernize the Nation's maritime network by administering the unprecedented investment in ports and waterways made possible by the Bipartisan Infrastructure Law, including $2.25 billion appropriated for fiscal years 2022 through 2025 through the Port Infrastructure Development Program. MARAD's U.S. Marine Highway Program made awards totaling nearly $12 million for eight projects in 2023.

Phillips served nearly 31-years as a naval surface warfare officer. She commissioned and commanded USS Mustin (DDG 89), and commanded Destroyer Squadron 28. During her final tour of duty, she Commanded Expeditionary Strike Group Two, including the direct oversight of 14 ships and 10 subordinate commands - all the Amphibious Expeditionary Forces on the East Coast of the United States.

Phillips earned a Master of Business Administration, with distinction, from the College of William & Mary – Raymond A. Mason School of Business - in 2016. She holds a B.A. from the University of North Carolina at Chapel Hill.

MARITIME SECURITY PROGRAM (MSP)/ VOLUNTARY INTERMODAL SEALIFT AGREEMENT (VISA)

The MSP and VISA programs make U.S.-flag commercial ships and intermodal sealift capacity available to meet the needs of the U.S. military.

MSP is the core of U.S. sustainment sealift for the Nation's armed forces. Created in 1996 and codified in 46 U.S.C. §§ 53101–53111, the program supports the active operation of the privately-owned, U.S.-flag, U.S.-crewed internationally-trading merchant fleet. In return

for an annual federal retainer payment, MSP participants make their militarily useful ships available "on-call" to support Department of Defense's (DoD) global transportation needs. MSP also provides DoD with assured access to the multibillion-dollar global network of intermodal facilities and transport systems maintained by MSP participants and their affiliates at no additional cost to the government. The MSP fleet has ship age restrictions, such that the participants must regularly invest in and maintain newer, more efficient ships. Vessels in MSP fleet average less than 14 years old, compared to the RRF fleet average vessel age of over 45 years.



U.S. ARMY

Soldiers from 3rd Battalion, 25th Aviation Regiment, and 2nd Squadron, 6th Cavalry Regiment, both assigned to 25th Combat Aviation Brigade, 25th Infantry Division and Marines from 31st Marine Expeditionary Unit prepare military equipment and vehicles Feb. 17, 2020, at Chuk Samet, Thailand. Over 700 vehicles, containers and pieces of equipment were offloaded from M/V Cape Hudson in support of exercise Cobra Gold 20.

During Fiscal Year (FY) 2023, the two product tankers in the program were transferred to the newly established Tanker Security Program and MARAD solicited for two modern roll-on/roll-off vessels to replace them. MARAD awarded one of those operating agreements to Liberty Global Logistics, LLC and the second operating agreement to Fidelio Limited Partnership. The MSP fleet now includes 28 container ships, seven geared container ships, 20 roll-on/roll-off (RO/RO) vessels, and five heavy-lift ships; all of which have been deemed militarily useful by DoD. In the National Defense Authorization Act (NDAA), FY 2020, Congress extended MSP's authorization through the end of FY 2035.

VISA is a DoT/DoD Emergency Preparedness Program established under the Defense Production Act of 1950 (50 U.S.C. § 4558) that includes nearly every vessel in the U.S.-flag oceangoing dry cargo fleet. All MSP carriers are enrolled in VISA, though not all VISA carriers are enrolled in MSP. Participants in VISA commit specific vessel capacity, intermodal equipment, and management services to the DoD for use in times of war or national emergency. In return for their capacity commitments, VISA participants receive priority consideration for the award of DoD peacetime cargoes. MSP participants form the core of VISA, as they are required to enroll 100 percent of their MSP capacity and a corresponding level of intermodal resources and services in the VISA program. As of October 1, 2023, a total of 51 shipping companies were participating in the VISA program. The program is used by DoD to preplan the availability of militarily useful commercial vessels for use in times of war or national emergency.

The MSP and VISA programs serve a critical role in U.S. defense, enabling the United States to deploy forces anywhere in the world on short notice, maintain them while they are deployed, and return them home when their mission is complete. In addition to maintaining a fleet of active, commercially viable, militarily useful, privately owned U.S.-flag vessels to meet national defense and other security requirements, they maintain a presence for America in international commercial shipping.

TANKER SECURITY PROGRAM (TSP)

The FY 2021 NDAA, with minor adjustments in the FY22 NDAA, required that the Secretary of Transportation, in consultation with the Secretary of Defense, establish a fleet of active, commercially viable, militarily useful, and privately-owned product tank vessels to meet national defense and other security requirements. Congress appropriated funding for a tenship TSP in the Consolidated Appropriations Act of 2022. In addition, the NDAA FY 2021 provided directions to approve any applications for TSP received from MSP Operating Agreement holders that operate product tank vessels under MSP. The two tank vessels previously in MSP are enrolled in the newly established TSP Program, making MSP an all dry-cargo program. All TSP operators are required to participate in the Voluntary Tanker Agreement (VTA) program, which parallels the Voluntary Intermodal Sealift Agreement (VISA) for non-tanker vessels.

MARAD published a solicitation in the Federal Register on December 9, 2022, seeking applications for enrollment in TSP from qualified companies. All applications were thoroughly evaluated by MARAD and U.S. Transportation Command. To qualify for the program, proposed vessels need to be classified as Medium Range product tankers between 30,000-60,000 deadweight tons with fuel carrying capacity of 230,000 barrels or more and be less than 10 years of age. The first three companies selected for enrollment in the TSP were Overseas Shipholding Group, Inc. (three tank vessels); Crowley-Stena Marine Solutions, LLC (three tank vessels); and Seabulk Tankers, Inc. (three tank vessels). MARAD published a second solicitation in the Federal Register on July 25, 2023, seeking applications to fill the remaining operating agreement with a qualified vessel, and selected U.S. Marine Management, LLC (one tank vessel) to fill the final TSP slot on October 17, 2023.

The TSP ensures that a core fleet of U.S.-based product tankers can operate competitively in international trade and enhance U.S. supply chain resiliency for liquid fuel products. The TSP will provide the DoD with assured access to 10 U.S.-registered product tank vessels that may be used to supply the armed forces with fuel during times of armed conflict or national emergency. All vessel operators selected for TSP are required to be enrolled in MARAD's sexual assault and sexual harassment prevention and response policy program Every Mariner Builds a Respectful Culture (EMBARC).

CABLE SECURITY FLEET (CSF)

The Cable Security Fleet (CSF) is authorized under Section 3521 of the NDAA for FY 2020 (P.L. 116-92) and is a critical national security program providing the nation with assured access to a fleet of two internationally sailing cable repair ships, active in commercial service, but available on call to meet contingency requirements. CSF vessels are capable of laying, maintaining, and repairing submarine fiberoptic cables to ensure guaranteed access by the United States in times of national emergency.



Contracted mariners aboard MV Cape Horn load 1st Marine Aircraft Wing MV-22 Ospreys assigned to Marine Medium Tiltrotor Squadron 363 (VMM-363) from Marine Corps Base Hawaii onto the Military Sealift Command ship in Apra Harbor, Guam.

MARINERS MEDALS PROGRAM/MERCHANT MARINE CONGRESSIONAL GOLD MEDAL

Under authority of 46 U.S.C. 51901 (2007), MARAD issues merchant marine medals and awards to deserving merchant mariners. The medals are awarded in recognition of a mariner's service and dedication to the merchant marine. They are symbols of courage, achievement, and proficiency. Each tells its own story of courage, sacrifice and devotion to duty, honor, and country.

The Congressional Gold Medal, which is the highest honor bestowed by the U.S. Congress, honors those whose dedication, heroism, and public service have created a lasting impact on American history. On March 14, 2020, legislation was signed into law authorizing the Congressional Gold Medal for American Merchant Mariners whose honorable deeds played a critical role in World War II (WWII).

The Merchant Mariners of WWII Congressional Gold Medal Act of 2020 authorizes MARAD to award duplicates of the medal to individuals who, between December 7, 1941, and December 31, 1946, were members of the U.S. Merchant Marine, or other related services. Surviving family members may also request duplicate medals.

READY RESERVE FORCE (RRF)

Today, the RRF provides vessels for surge and sustainment sealift capability to the Department of Defense (DoD). The RRF is the active component of MARAD's National Defense Reserve Fleet (NDRF). MARAD maintains its RRF ships in a Reduced Operating Status (ROS), available within 5-days of activation.

The RRF is comprised of 48 vessels of the following types: 42 roll-on/roll-off ships, four auxiliary crane ships, and two aviation support ships. ROS vessels are lay berthed at commercial and government facilities located throughout the continental United States. Up to five additional ships were procured from commercial sources and will be placed in service during FY24, beginning a multi-year acquisition strategy to recapitalize the RRF with former commercial vessels. The last recapitalization was in the early to mid-1990s, with many of those ships now reaching 45-years of service life and extension is no longer viable. MARAD continues to support the recapitalization plan defined in the Department of the Navy's Sealift That the Nation Needs report.

The NDRF was created after World War II as the Nation's reserve of sealift capacity, held in an inactive status, but used many times in the years leading up to 1976, when the Navy determined a need to have a higher level of sealift readiness. Thus, the RRF was created from the NDRF with planned ship readiness within five days. Ships in ROS status are crewed by up to 10 merchant mariners who perform preventive maintenance and receive training appropriate to DoD missions. Almost 400 highly skilled merchant mariners comprise the ROS crews of the RRF. When activated for a mission, vessels are brought to Full Operating Status (FOS) with approximately 29 – 34 merchant mariners onboard.

During FY 2023, seventeen of MARAD's RRF ships activated for multiple mission assignments providing over 2000-days of support for cargo missions, partnership exercises, and unit level readiness training. Recent missions included unit redeployments for Service and Combatant Command rotations, cargo shipments for the Ukraine Security Assistance Initiative (USAI), and multi-ship deployments, with one ship exceeding 300-days on assignment for Operation Pathways. Notably, these global redeployment missions included a circumnavigation and use of strategic chokepoints like the Suez and Panama Canals. To maintain readiness, 15 RRF ships activated as part of U.S. Transportation Command's TURBO Activation exercise program, providing over 173-days of service in Full Operating Status, and 12 RRF ships completed more than 100-days activation and underway service for maintenance sea trials.

FOREIGN TRANSFER (U.S.-FLAG VESSELS)

The Maritime Administration has authority to approve U.S.- Flag commercial vessel transfers, taking into account the National Security needs of the Nation and the goal of maintaining an adequate U.S. Merchant Marine. Under 46 U.S.C. § 56101, U.S.-documented vessels may not be transferred to foreign ownership, flag and/or registry without MARAD's approval. Under MARAD's regulations, vessels transferred to foreign owners are automatically approved, while transfers to foreign registry require a MARAD order approving the transfer. Vessels of 3,000 gross tons and more, and less than 25 years old, are subject to additional financial terms and conditions. MARAD requires a formal application with supporting documentation including an original Coast Guard-issued certificate of ownership. During FY 2022, 23 ships were approved for foreign transfer. Foreign transfers totaled 25 ships in FY23.

MARITIME SECURITY

As the agency within the U.S. Department of Transportation responsible for waterborne transportation, MARAD promotes a maritime transportation system that is safe, secure, environmentally - sustainable and designed to further America's national security in an increasingly globalized world.

MARAD works day and night to maintain the U.S. maritime transportation system in a way that supports national security, effective supply chains and competitiveness in international trade, at home and abroad, via a system that provides both national and economic security benefits.

COMMERCIAL STRATEGIC SEAPORTS

Commercial Strategic Seaports are ports that have been formally designated by the Commander, Military Surface Deployment and Distribution Command, to support the deployment of U.S. Armed Forces assets in the event of war, contingency, or other national defense emergency or disaster. These ports are designated, among other criteria, for their useful locations, in relation to military units and strategic rail and highway networks, and port facilities, equipment and services. The National Port Readiness Network is a cooperative of nine federal agencies and military commands that was established to facilitate coordination among the stakeholders that support deploying forces through these power projection platforms in the event of a mobilization or national defense contingency.

This coordination is vital to ensure rapid response to defense needs while minimizing disruption to commerce. There are eighteen Commercial Strategic Seaports supporting surge deployment of U.S. Armed Forces' assets in the event of war, contingency, or national emergency. These ports are Philadelphia, Pennsylvania; the Port of Virginia in Hampton

Roads, Virginia; Morehead City and Wilmington, North Carolina; Charleston, South Carolina; Savannah, Georgia; Jacksonville, Florida; Gulfport, Mississippi, Port Arthur, Beaumont and Corpus Christi, Texas; San Diego, Long Beach and Oakland, California; Tacoma and Everett Washington; the Port of Alaska in Anchorage, Alaska; and Port of Guam in Apra, Guam.

PORT INFRASTRUCTURE DEVELOPMENT

In October of 2023, the Biden Administration and MARAD announced that over $653 million would be awarded to fund port improvement projects across the nation under the Port Infrastructure Development Program (PIDP). This was in addition to the $703 million in awards announced in October 2022. The Bipartisan Infrastructure Law and additional Congressional appropriations made these robust investments in the nation and its territories possible. The PIDP funds projects that improve the safety, efficiency, or reliability of the movement of goods through ports and intermodal connections to ports. The investments help improve supply chain reliability through increased port capacity and resilience, more efficient operations, reduced port emissions, and new workforce opportunities.

The PIDP supports efforts by ports and industry stakeholders to improve port and related freight infrastructure to meet the nation's freight transportation needs and ensure our port infrastructure can meet anticipated growth in freight volumes. The program provides planning, capital funding, and project management assistance to improve ports' capacity and efficiency. The PIDP provides funding to ports in both urban and rural areas for planning and capital projects. It also includes a statutory set-aside for small ports to continue to improve and expand their capacity to move freight reliably and efficiently and support local and regional economies.

More than 40 percent of the awards will benefit ports in or near historically disadvantaged communities. Additionally, more than $120 million in awards include a focus on electrification of port equipment to reduce emissions and improve air quality. The awards also include $145 million for port projects that will advance offshore wind deployment – in support of President Biden's goal of deploying 30 gigawatts of offshore wind by 2030, which is enough to power 10 million homes with clean energy, support 77,000 jobs, and spur private investment up and down the supply chain.

The PIDP aims to improve ports and related freight infrastructure to meet the nation's freight transportation needs. The program provides funding that helps improve the capacity and efficiency of ports in both urban and rural areas to ensure America's freight transportation needs, present and future, are met.

U.S. MARINE HIGHWAY PROGRAM

The U.S. Marine Highway Program (MHP) supports the increased use of America's navigable waterways to relieve landside congestion, provide new and efficient transportation options, and increase the productivity of the surface transportation system. By working closely with public and private organizations, the MHP helps create and sustain American jobs in U.S. ports, shipyards, and aboard vessels while also improving the nation's supply chains.

In September 2023, MARAD awarded nearly $12 million in grants to eight marine highway projects across the nation under the MHP. The funding will improve the movement of goods along our navigable waterways and expand existing waterborne freight services in Alaska, Illinois, Indiana, Louisiana, Texas, Washington, and Wisconsin, which will strengthen supply chains and ultimately cut costs for consumers.

United States Marine Highway grants may be used to purchase low-emission U.S.-manufactured equipment, such as container reach stackers and cranes, with the condition that all iron, steel, manufactured products, and construction materials are produced in the United States. In addition, funds can be used to purchase intermodal equipment that can alleviate supply chain bottlenecks.



Marines assigned to 2nd Landing Support Battalion, 2nd Marine Logistics Group conduct embarkation operations of CH-53E Super Stallions from Marine Heavy Helicopter Squadron (HMH) 366 onto MSLC Cape Race, a civilian cargo ship, at Morehead City Port, N.C. on Jan. 30, 2022.

MHP exceeds the commitment of the Biden Administration's Justice40 Initiative, which set a goal of flowing 40 percent of the overall benefits of certain Federal investments to disadvantaged communities that are marginalized, underserved, and overburdened by pollution. Of the nearly $12 million in awards for 2023, $5.8 million supports projects within Historically Disadvantaged Communities.

CARGO PREFERENCE

The U.S.-flag commercial vessel fleet is critical to the nation's defense and economic security. Congress enacted statutes that require preference for the use of U.S.-flag vessels in the carriage of U.S. Government-impelled cargoes to ensure these vessels remain in continuous operation.

Military cargoes ship under the Military Cargo Preference Act of 1904 (10 U.S.C. § 2631), which requires that all items procured for, or owned by, the U.S. military must be carried exclusively on U.S.-flag vessels. Similarly, for non-military U.S. federal government agencies, the Cargo Preference Act of 1954 (46 U.S.C. § 55305), requires that they ship at least 50% of the gross tonnage generated (whether for the agency itself, on behalf of another entity, or financed by the agency) on U.S.-flag commercial vessels to the extent they are available at fair and reasonable rates for U.S.-flag commercial vessels.

MARAD ensures compliance with cargo preference laws by monitoring federal contracts, engaging frequently with over 91 federal government agencies, and educating transportation professionals. This year, MARAD recommended the non-payment of foreign ocean shipping expenses that were not authorized by DoD contracting authorities. For civilian agencies, MARAD recommended "make-up" compensatory cargo when government contract recipients did not meet the minimum U.S.-flag 50% ocean shipping gross tonnage requirement. MARAD also expanded its education and outreach programs by increasing its interaction with transportation professionals at trade shows, conferences, and meetings.

JONES ACT

The Jones Act requires that all waterborne commerce between domestic points, including inland and international waters, be conducted on vessels that are U.S. built and owned and crewed by U.S. citizens. The intent of the Jones Act is to strengthen U.S. shipbuilding and the U.S. merchant marine. These mariners may also crew federal government sealift ships activated for emergencies, thus ensuring a pool of mariners is available for this purpose. MARAD promotes the Jones Act by providing federal government agencies, shippers, and operators assistance with locating Jones Act qualified vessels for day-to-day operations and emergencies.

READY RESERVE FORCE SHIPS

EAST COAST

RO/ROS

T-AKR 5051 MV CAPE DUCATO
T-AKR 5052 MV CAPE DOUGLAS
T-AKR 5053 MV CAPE DOMINGO
T-AKR 5054 MV CAPE DECISION
T-AKR 5055 MV CAPE DIAMOND
T-AKR 5069 MV CAPE EDMONT
T-AKR 5079 MV CAPE RAY
T-AKR 9678 MV CAPE RISE
T-AKR 9960 MV CAPE RACE
T-AKR 5080 MV CAPE WASHINGTON
T-AKR 5081 MV CAPE WRATH
T-AKR 289 SS DENEBOLA
T-AKR 294 SS ANTARES
T-AKR 296 MV GARY I GORDON
T-AKR 298 MV CHARLES L GILLILAND
T-AKR 303 MV LEROY A. MENDONCA
T-AKR 306 MV ROY P. BENAVIDEZ

Aviation Maintenance Logistics Ship

(U.S. Marine Corps Aviation Logistics Support)
T-AVB 3 SS WRIGHT

Auxiliary Crane Ships

T-ACS 4 SS GOPHER STATE
T-ACS 6 SS CORNHUSKER STATE

GULF COAST

RO/ROS

T-AKR 112 MV CAPE TEXAS
T-AKR 113 MV CAPE TAYLOR
T-AKR 5082 MV CAPE KNOX
T-AKR 5083 MV CAPE KENNEDY
T-AKR 9666 MV CAPE VINCENT
T-AKR 9701 MV CAPE VICTORY
T-AKR 9711 MV CAPE TRINITY
T-AKR 288 SS BELLATRIX
T-AKR 290 SS POLLUX
T-AKR 291 SS ALTAIR
T-AKR 292 SS REGULUS

RRF RO/RO & ROCON Ships Joining FY2024:

MV CAPE ARUNDEL/MV CAPE CORTES
MV CAPE SABLE/ MV CAPE SAN JUAN/MV CAPE STARR

WEST COAST

RO/ROS

T-AKR 10 SS CAPE ISLAND
T-AKR 11 SS CAPE INTREPID
T-AKR 305 MV NELSON V. BRITTIN
T-AKR 2044 MV CAPE ORLANDO
T-AKR 5062 SS CAPE ISABEL
T-AKR 5066 MV CAPE HUDSON
T-AKR 5067 MV CAPE HENRY
T-AKR 5068 MV CAPE HORN
T-AKR 300 MV BOB HOPE
T-AKR 5076 SS CAPE INSCRIPTION
T-AKR 287 SS ALGOL
T-AKR 293 SS CAPELLA
T-AKR 301 MV FISHER

Auxiliary Crane Ships

T-ACS 1 SS KEYSTONE STATE
T-ACS 2 SS GEM STATE

Aviation Maintenance Logistics Ship

(U.S. Marine Corps Aviation Logistics Support)
T-AVB 4 SS CURTISS

State Maritime Academy Training Ships/ Training Vessels

NSMV 1, EMPIRE STATE, SUNY Maritime College
TS KENNEDY, Massachusetts Maritime Academy
TS STATE OF MAINE, Maine Maritime Academy
TS GOLDEN BEAR, California Maritime Academy
TS STATE OF MICHIGAN, Great Lakes Maritime Academy
TS GENERAL RUDDER, in retention, assigned to Beaumont Reserve Fleet
TV KINGS POINTER, U.S. Merchant Marine Academy
TV FREEDOM STAR, Harry Lundeberg School of Seamanship

NOTE: The "T-" designations are assigned by Military Sealift Command. SS is Steam Ship. MV is Motor Vessel. GTS is Gas Turbine Ship. TS/TV is training ship/vessel.

SMALL SHIPYARD GRANTS

Small shipyards are a critical component of U.S. maritime operations and economic security, employing more than 100,000 Americans, fostering communities along and near our nation's ports and waterways, and contributing tens of billions in gross domestic product. MARAD awarded $20.8 million to 27 shipyards in 20 states through its Small Shipyards Grant Program in 2023.

The program is governed by 46 U.S.C. § 54101. It is designed to support small shipyard projects that make capital and related improvements; or provide training for workers in shipbuilding, ship repair, and associated industries. Supporting these types of projects drives efficiency, competitive operations, and quality ship construction, repair, and reconfiguration across the industry.

Grants are capped at 75 percent of the project's estimated cost and are available to facilities with fewer than 1,200 production employees.

MARITIME EDUCATION AND TRAINING

MARAD supports programs to improve the education, training, recruitment, health, welfare, and safety of U.S. citizen seafarers. Federal support for mariner education helps ensure highly skilled, well-qualified personnel receive and maintain their credentials and are available to sustain the nation's pool of qualified merchant mariners. These mariners have the high-demand skills necessary to safely operate U.S.-flag vessels that contribute to the economic competitiveness of the nation and perform critical maritime-related functions during a national emergency.

MARAD operates the U.S. Merchant Marine Academy (USMMA), one of the five Federal service academies, and provides support to the six State Maritime Academies (SMAs), including providing training vessels, that provide students, from diverse socio-economic backgrounds with the education and requisite training to become U.S. Coast Guard-credentialed officers in the U.S. Merchant Marine. All seven maritime institutions directly contribute to national defense and support the nation's economic competitiveness by contributing to a viable and dynamic merchant marine workforce.

MARAD has launched several initiatives to strengthen safety aboard commercial vessels at sea to support an inclusive culture that prioritizes preventing sexual assault and harassment, improves response measures and supports survivors.

Every Mariner Builds a Respectful Culture (EMBARC), A program launched by MARAD in December of 2021 introducing new safety standards to govern the U.S. Merchant Marine Academy's Sea Year, enumerates more than 30 new safety measures that all U.S. commercial carriers are required to meet before they are approved to bring cadets onboard. These standards are now the law, part of the FY 2023 James M. Inhofe National Defense Authorization Act (NDAA) signed Dec 23, 2022. MARAD established the Office of Cadet Training At-Sea Safety in 2022 to oversee implementation of the EMBARC Standards program, including approval of ship operators prior to carrying cadets onboard and assessing shipboard compliance of the new provisions as mandated by Congress.

The MARAD Center of Excellence for Domestic Maritime Workforce Training and Education (CoE) program, established by Congress under 46 U.S.C. § 51706, recognizes maritime

Maritime Security Program Fleet (MSP) DEC 1, 2023

VESSEL NAME	AGREEMENT HOLDER	SHIP TYPE
ENDURANCE	Fidelio Limited Partnership	RO/RO
PRESIDENT CLEVELAND	APL Marine Services, Ltd.	Containership
PRESIDENT KENNEDY	APL Marine Services, Ltd.	Containership
PRESIDENT FD ROOSEVELT	APL Marine Services, Ltd.	Containership
PRESIDENT TRUMAN	APL Marine Services, Ltd.	Containership
APL EAGLE	APL Marine Services, Ltd.	Geared Containership
APL ISLANDER	APL Maritime, Ltd.	Geared Containership
PRESIDENT EISENHOWER	APL Marine Services, Ltd.	Containership
PRESIDENT WILSON	APL Marine Services, Ltd.	Containership
APL OCEANIA	APL Marine Services, Ltd.	Geared Containership
GREEN COVE	Waterman Transport, Inc.	RO/RO
GREEN BAY	Waterman Transport, Inc.	RO/RO
GREEN LAKE	Waterman Transport, Inc.	RO/RO
OCEAN JAZZ	Waterman Transport, Inc.	Heavy Lift
ALLIANCE NORFOLK	Farrell Lines Incorporated	RO/RO
ALLIANCE ST. LOUIS	Farrell Lines Incorporated	RO/RO
MAERSK OHIO	Farrell Lines Incorporated	Containership
MAERSK MONTANA	Farrell Lines Incorporated	Containership
MAERSK IOWA	Farrell Lines Incorporated	Containership
OCEAN FREEDOM	Fidelio Limited Partnership	Heavy Lift
ARC DEFENDER	Fidelio Limited Partnership	RO/RO
ARC COMMITMENT	Fidelio Limited Partnership	RO/RO
ARC INTEGRITY	Fidelio Limited Partnership	RO/RO
ARC RESOLVE	Fidelio Limited Partnership	RO/RO
PATRIOT	Fidelio Limited Partnership	RO/RO
LIBERTY PRIDE	Liberty Global Logistics LLC	RO/RO
COLORADO EXPRESS	Hapag-Lloyd USA, LLC	Containership
POTOMAC EXPRESS	Hapag-Lloyd USA, LLC	Containership
HUDSON EXPRESS	Hapag-Lloyd USA, LLC	Containership
DELAWARE EXPRESS	Hapag-Lloyd USA, LLC	Containership
MISSOURI EXPRESS	Hapag-Lloyd USA, LLC	Containership
MAERSK SENTOSA	Maersk Line, Limited	Containership
MAERSK CHICAGO	Maersk Line, Limited	Containership
MAERSK PITTSBURGH	Maersk Line, Limited	Containership
MAERSK SARATOGA	Maersk Line, Limited	Geared Containership
MAERSK DURBAN	Maersk Line, Limited	Geared Containership
MAERSK HARTFORD	Maersk Line, Limited	Containership
MAERSK DETROIT	Maersk Line, Limited	Containership
MAERSK YORKTOWN	Maersk Line, Limited	Geared Containership
MAERSK COLUMBUS	Maersk Line, Limited	Containership
MAERSK SELETAR	Maersk Line, Limited	Containership
ALLIANCE FAIRFAX	Maersk Line, Limited	RO/RO
MAERSK KENSINGTON	Maersk Line, Limited	Containership
MAERSK DENVER	Maersk Line, Limited	Containership
MAERSK KINLOSS	Maersk Line, Limited	Containership
MAERSK CHESAPEAKE	Maersk Line, Limited	Containership
MAERSK KANSAS	Maersk Line, Limited	Containership
MAERSK TENNESSEE	Maersk Line, Limited	Containership
LIBERTY PROMISE	Liberty Global Logistics LLC	RO/RO
MAERSK ATLANTA	Maersk Line, Limited	Containership
ARC INDEPENDENCE	American International Shipping, LLC	RO/RO
OCEAN GRAND	Patriot Shipping LLC	Heavy Lift
OCEAN GLORY	Patriot Shipping LLC	Heavy Lift
OCEAN GLADIATOR	Waterman Steamship Corporation	Heavy Lift
OCEAN GIANT	Waterman Steamship Corporation	Heavy Lift
SLNC SEVERN	Argent Marine Operations, Inc.	Geared Containership
LIBERTY	Fidelio Limited Partnership	RO/RO
LIBERTY PASSION	Liberty Global Logistics LLC	RO/RO
LIBERTY POWER	Liberty Global Logistics LLC	Vehicle Carrier
ARC HONOR	Fidelio Limited Partnership	Vehicle Carrier

Tanker Security Program Fleet (TSP) DEC 1, 2023

VESSEL NAME	AGREEMENT HOLDER	SHIP TYPE
OVERSEAS SANTORINI	Santorini Tanker, LLC	Tanker
OVERSEAS MYKONOS	Mykonos Tanker, LLC	Tanker
OVERSEAS SUNCOAST	Overseas Sun Coast, LLC	Tanker
TORM THOR	TSP Tankers III, LLC	Tanker
TORM THUNDER	TSP Tankers I, LLC	Tanker
TORM TIMOTHY	TSP Tankers III, LLC	Tanker
SHENANDOAH TRADER	US Marine Management, LLC	Tanker
STENA IMMACULATE	Crowley-Stena Marine Solutions, LLC	Tanker
STENA IMPERATIVE	Crowley-Stena Marine Solutions, LLC	Tanker
STENA IMPECCABLE	Crowley-Stena Marine Solutions, LLC	Tanker

Cable Security Fleet (CSF) DEC 1, 2023

VESSEL NAME	AGREEMENT HOLDER	SHIP TYPE
DEPENDABLE	SubCom LLC	Cable Repair
DECISIVE	SubCom LLC	Cable Repair

education and training institutions that excel at providing career pathways into the maritime industry. These institutions demonstrate their qualifications for the CoE designation by meeting certain eligibility requirements, selection criteria, and qualitative attributes consistent with Section 3532 of the NDAA of 2023. A grant program authorized by the FY 2023 National Defense Authorization Act, when appropriated, would serve to attract, educate, and train and retain entry level and current workers for good-paying unlicensed and licensed mariner and maritime-related jobs.

The aims and efforts of the CoE program are inherently collaborative and community-focused and will assist the maritime industry in gaining and sustaining a highly trained maritime workforce, while at the same time enhancing diversity, equity and inclusion in a sector that is vitally important for the nation's supply chains.

A CoE designation recognizes the high standard of maritime education and training provided by these institutions and helps develop and strengthen a nationwide partnership of academic centers focused on advancing the goals and efforts of the maritime industry. MARAD engages with the CoEs to support efforts to recruit, admit, and train students, recruit, and train faculty, expand, and enhance facilities, and award student credit for military service.

The CoE program is a critical tool and catalyst for advancing the nation's safety, economic, and national security requirements. The CoE designees play vital roles in our nation's maritime industry by providing students with an affordable education and the training and skills necessary to begin and advance careers afloat and ashore.

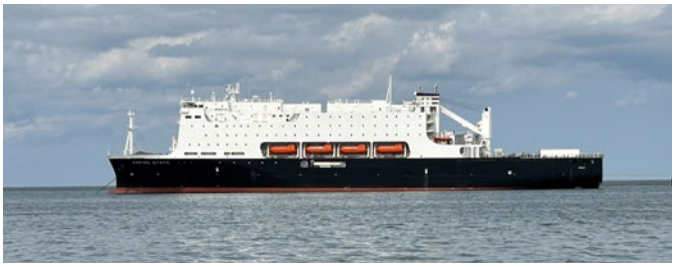
Current designees include: 18 community colleges, one technical college, two groups of community or technical colleges/maritime training centers, and six maritime training centers. An application cycle was recently completed and an announcement identifying the latest Centers of Excellence designees is expected in early 2024.

For additional information, please visit the Centers of Excellence link on the MARAD website (https://www.maritime.dot.gov/education/ maritime-centers-excellence).

NSMV

MARAD provides each State Maritime Academy (SMA) with a training ship and several types of financial support, including annual direct support, the Student Incentive Program, training ship fuel assistance payments, and training ship maintenance and repair.

Congress has appropriated funds directed for the construction of new training ships, and MARAD is now building new vessels for the first time in over 60 years. The first National Security Multi-mission Vessel (NSMV) has been delivered and replaced State University of New York Maritime College's 59-year-old training ship, TS Empire State. The second NSMV will replace Massachusetts Maritime Academy's TS Kennedy. The three remaining ships will be constructed and delivered to State Maritime Academies in Maine, Texas, and California. While the focus of the NSMV is for training future merchant mariners, the design enables several capabilities to support Humanitarian Assistance and Disaster Relief efforts, required under the National Response Framework and Emergency Support Function #1, Transportation.



Philly Shipyard, Inc. delivered the Empire State, the first of five new purpose-built, modern training vessels for America's state maritime academies on Sept. 8, 2023. The new National Security Multi-Mission Vessels (NSMVs) – were designed to provide world-class training for America's future mariners and to support humanitarian assistance and disaster relief missions in times of need. This first vessel, Empire State, was delivered to MARAD and will serve SUNY Maritime College.

The NSMV and legacy MARAD training ships are part of the National Defense Reserve Fleet (NDRF) and have been employed in disaster response for decades. These ships augment the Federal government's shipping capacity and provide the DoD or interagency use by the Federal Emergency Management Administration as a way to support humanitarian aid and response equipment or personnel to areas affected by devastation. Once moored, these vessels prove to be value- added to relief efforts by also providing power, berthing, food, and clean water to hundreds of federal first responders.

When used as a training platform, an NDRF vessel offers a realistic location that enables U.S. military, Federal, state, and local law enforcement personnel to hone the skills necessary to remain proficient in the execution of a wide range of missions such as, security, drug-interdiction, and cargo-handling.

IN HONOR OF EMILY STOVER DEROCCO

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The National Oceanic and Atmospheric Administration operates a wide assortment of hydrographic survey, oceanographic research and fisheries survey vessels. These vessels are operated by NOAA's Office of Marine and Aviation Operations.

Ships located in the Atlantic are managed by the Marine Operations Center-Atlantic in Norfolk, Virginia. Pacific ships are managed by the Marine Operations Center-Pacific in Newport, Oregon. Ships that operate from Hawaii are managed by the Marine Operations Center-Pacific Islands.

A combination of NOAA Commissioned Corps officers and civilian professional mariners operate the ships. The professional mariner workforce includes licensed masters, mates and engineers and unlicensed members of the engine, steward and deck departments. In addition, survey and electronic technicians operate or maintain the ships' mission, communication and navigation equipment. The ships' officers and crew provide mission support and assistance to embarked scientists from various NOAA laboratories as well as the academic community.

NOAA SHIPS

OCEANOGRAPHIC SHIPS

The global-class oceanographic and atmospheric research ship Ronald H. Brown is the largest vessel in the NOAA fleet. Primarily deployed in support of NOAA's Office of Oceanic and Atmospheric Research, the ship operates worldwide working to understand the relationship between oceans and climate. The vessel was originally named Researcher but was renamed prior to launch to honor the late secretary of commerce. The ship is fitted with five primary laboratories providing nearly 4,000 square feet of dedicated mission space with deck space available to support up to nine laboratory vans. Among the ship's scientific sensors are a multibeam echo sounder, sub-bottom profiler, acoustic Doppler current profiler, acoustic positioning system and Doppler radar. A dynamic positioning system allows the ship to hold its position within a 300-foot radius in seas up to 11 feet, wind speeds of 27 knots and a two-knot current, allowing the Ronald H. Brown to support remotely operated vehicles and deploy and recover deep-sea moorings. A midlife repair period began in mid-2023 to extend the ship's service life. The work includes replacement of the propulsion system with more environmentally friendly diesel generators, renewal of the propulsion motors and bow thruster, and a new switchboard, new control systems and new alarms. Ship hotel systems also are being upgraded along with navigational and tank renewals. The vessel is to return to service by 2025.

The three ships of the Oscar Elton Sette class are former U.S. Navy ocean surveillance ships converted to become oceanographic ships. The Oscar Elton Sette is the former USNS Adventurous (T-AGOS 13); the Gordon Gunter is the former USNS Relentless (T-AGOS 18); and the Okeanos Explorer was the USNS Capable (T-AGOS 16). The Oscar Elton Sette primarily operates in the central and western Pacific Ocean conducting fisheries assessments, physical and chemical oceanography research, marine mammal surveys and marine debris surveys. The Gordon Gunter is a multipurpose oceanographic research vessel primarily serving the National Marine Fisheries Services and operating in the Gulf of Mexico, Caribbean Sea and Atlantic Ocean. The Okeanos Explorer is dedicated to worldwide discovery and exploration, operating from the Atlantic to Pacific oceans and regions in between. The ship primarily maps the seafloor, explores shipwrecks and characterizes largely unknown ocean areas.

The Nancy Foster is a former Navy torpedo test vessel supporting fish habitat and population studies, seafloor mapping surveys, oceanographic studies and maritime heritage surveys. The vessel operates primarily along the U.S. Atlantic and Gulf coasts and in the Caribbean Sea and is able to tow nets, service buoys and conduct small boat operations.

Ronald H. Brown



NOAA

RONALD H. BROWN

DISPLACEMENT ..... 3,250 tons
LENGTH ..... 274 feet
BEAM ..... 52.5 feet
DRAFT ..... 19 feet
SPEED ..... 15 knots (12 knots cruising)
POWER PLANT ..... 3 1,500 kW diesel generators, 2 3,000 hp z-drive, 1 1,180 hp bow thruster
RANGE ..... 11,300 nautical miles
ENDURANCE ..... 60 days
COMPLEMENT ..... accommodations for 26 crew, 32 scientists
BUILDER ..... VT Halter Marine

HOMEPORT

R 104 Ronald H. Brown ..... commissioned July 19, 1997 ..... Charleston, S.C.

Oscar Elton Sette Class



NOAA

GORDON GUNTER

DISPLACEMENT ..... 2,301 tons (Gordon Gunter: 2,328 tons; Okeanos Explorer: 2,062 tons)
LENGTH ..... 224 feet
BEAM ..... 43 feet
DRAFT ..... 15 feet (Okeanos Explorer: 17 feet)
SPEED ..... 10 knots cruising
POWER PLANT ..... diesel-electric
RANGE ..... Sette: 17,487 nautical miles or 60 days; Gunter: 8,000 nm or 30 days; Explorer: 9,600 nm or 40 days
COMPLEMENT ..... Sette: 22 crew, 12 scientists; Gunter: 29 crew, 15 scientists; Explorer: 36 crew, 22 scientists
BUILDER ..... VT Halter Marine

HOMEPORT

R 335 Oscar Elton Sette ..... commissioned Jan. 23, 2003 ..... Honolulu
R 336 Gordon Gunter ..... commissioned Aug. 28, 1998 ..... Pascagoula, Miss.
R 337 Okeanos Explorer ..... commissioned Aug. 13, 2008 ..... Newport, R.I.

Nancy Foster



NOAA

NANCY FOSTER

DISPLACEMENT ..... 1,190 tons
LENGTH ..... 186.5 feet
BEAM ..... 40 feet
DRAFT ..... 11.2 feet
CRUISING SPEED ..... 10.5 knots
ENDURANCE ..... 3,500 nautical miles or 15 days
COMPLEMENT ..... 31 crew, 15 scientists
BUILDER ..... McDermott Inc.

HOMEPORT

R 352 Nancy Foster ..... commissioned May 10, 2004 ..... Charleston, S.C.

FUTURE OCEANOGRAPHIC RESEARCH SHIPS

NOAA is procuring two new-construction oceanographic ships, the Oceanographer and the Discoverer, under a $178 million Naval Sea Systems Command design and construction contract awarded Dec. 31, 2020, to Thoma-Sea Marine Constructors LLC of Houma, Louisiana. The new ships will support a wide variety of missions, including general oceanographic research and exploration and marine life, climate and ocean ecosystem studies. These missions include shallow coastal, continental shelf and worldwide ocean survey and data collection.

Designed as single-hull ships, the Oceanographer and the Discoverer will be built to commercial standards. They will incorporate the latest technologies, including high-efficiency, environmentally friendly U.S. Environmental Protection Agency Tier IV diesel engines, emissions controls for stack gases, new information technology tools for monitoring shipboard systems, and underwater scientific research and survey equipment.

The ships will be equipped to launch work boats, perform maintenance on buoys and moorings, deploy scientific instruments to collect weather and water column data, and conduct seafloor mapping surveys. Each vessel will operate with a crew of 20 and will be able to accommodate up to 28 scientists.

Keel-laying ceremonies for the Oceanographer and the Discoverer were held June 15 and Oct. 28, 2022, respectively. The ships are scheduled to join the NOAA fleet in 2025 and 2026, respectively.

The first Oceanographer served in the NOAA fleet from 1966 to 1996, and the first Discoverer served from 1967 to 1996.

LENGTH ..... 244 feet

HOMEPORT

Oceanographer ..... future: Honolulu
Discoverer ..... future: Newport, R.I.

HYDROGRAPHIC SHIPS

BRIEFING: Fairweather-class ships were designed to map the oceans to create and update nautical charts, aid maritime commerce, improve coastal resilience and study the marine environment. The ships are fitted with a suite of side-scan sonars and multibeam echo sounders and are equipped with hydrographic survey launches to operate in shallower water depths. The Fairweather primarily operates in Alaskan coastal waters, while the Rainier operates in Alaska and the Pacific Northwest. The ships are the oldest large vessels in the NOAA fleet.

The Ferdinand R. Hassler is a small waterplane area twin-hull hydrographic survey ship designed to map and update nautical charts for coastal waters from the Great Lakes to the Gulf of Mexico. The ship is fitted with a reconfigurable dry laboratory and a dive locker with compressor and filling station and can carry a 25-foot launch or a 20-foot science van. It also has a stern A-frame and knuckle boom crane. The Ferdinand R. Hassler has been employed in areas following a severe weather event or ocean emergency, looking for seafloor changes, underwater hazards and other disruptions to restore local operations to full capacity.

The Thomas Jefferson is the former U.S. Navy survey ship Littlehales (T-AGS 52) assigned to survey, map and update nautical charts primarily along the Atlantic and Gulf coasts and in the Caribbean Sea. The ship carries two smaller survey launches to operate close inshore. A key function of the ship is to respond to major weather events to search for dangers and expedite the resumption of normal maritime commerce and to investigate the effects of catastrophic events such as the Deepwater Horizon oil spill in 2010.

Fairweather Class



NOAA

FAIRWEATHER

DISPLACEMENT.....1,800 tons
LENGTH.....231 feet
BEAM.....42 feet
DRAFT.....15.5 feet; Rainier: 14.3 feet
SPEED.....12.5 knots cruising
POWER PLANT.....2 Electro-Motive diesel engines, twin screws, bow thruster
RANGE.....8,640 nautical miles or 30 days
COMPLEMENT.....67 crew, 6 scientists
BUILDER.....Aerojet-General Shipyards

HOMEPORT

S 220 Fairweather.....commissioned April 10, 1968.....Ketchikan, Alaska
S 221 Rainier.....commissioned Oct. 2, 1968.....Newport, Ore.

Ferdinand R. Hassler



NOAA

FERDINAND R. HASSLER

DISPLACEMENT.....744.4 tons
LENGTH.....123.7 feet
BEAM.....60.7 feet
DRAFT.....12.5 feet
CRUISING SPEED.....12 knots
RANGE.....5,700 nautical miles
ENDURANCE.....14 days
COMPLEMENT.....21 crew, 1 scientist
BUILDER.....VT Halter Marine

HOMEPORT

S 250 Ferdinand R. Hassler.....commissioned June 8, 2012.....New Castle, N.H.

Thomas Jefferson



NOAA

THOMAS JEFFERSON

DISPLACEMENT.....2,000 tons
LENGTH.....208 feet
BEAM.....45 feet
DRAFT.....15 feet
SPEED.....14 knots (11 knots cruising)
POWER PLANT.....1 General Motors EMD12-645F7B diesel engine, 1 Detroit Diesel 6V92N cruising diesel, single screw
RANGE.....19,200 nautical miles or 45 days
COMPLEMENT.....46 crew, 4 scientists
BUILDER.....VT Halter Marine

HOMEPORT

S 222 Thomas Jefferson.....commissioned July 8, 2003.....Norfolk, Va.

FUTURE CHARTING AND MAPPING SHIPS

NOAA announced in July 2023 the award of a $624.6 million contract — funded in part by the Inflation Reduction Act — to Thoma-Sea Marine Constructors LLC of Houma, Louisiana, to design and build two charting and mapping vessels, with an option to build two more.

The new ships will focus primarily on ocean mapping and nautical charting as part of NOAA's mission to deliver tools and information to help mariners safely navigate the nation's ports and harbors. The new vessels will have additional capabilities to help assess and manage living marine resources and collect data for oceanographic monitoring, research and modeling activities.

The ships will be designed to coordinate, acquire and process large data sets like those gathered from mapping the seafloor and characterizing marine habitats. They will also have the ability to deploy crewed survey work boats, scientific equipment and uncrewed systems. The ships will feature modern engines and design to reduce emissions with an eye toward achieving a net-zero fleet.

The ships will be built in Houma with expected delivery dates of 2027 and 2028, respectively.

FISHERIES SURVEY SHIPS



NOAA

OSCAR DYSON

The Oscar Dyson class of ultra-quiet fisheries survey vessels is designed to collect data on fish populations, conduct marine mammal and seabird surveys and study marine ecosystems. The class is fitted with multifrequency echo sounders to conduct acoustic surveys and meet National Marine Fisheries Services-specific data collection requirements. The ships are stern trawlers capable of conducting trawling operations to depths of nearly 6,000 feet. They are equipped with six onboard laboratories: wet lab, dry lab, electronics/computer lab, bio lab, acoustics lab and hydrographics lab. The ships have a retractable centerboard to collect data away from hull-generated noise. The Reuben Lasker is fitted with a dynamic positioning system to hold the ship in a fixed position.

The Oscar Dyson operates primarily in the Bering Sea and Gulf of Alaska, collecting data to manage one of the world's largest commercial fisheries. The Henry B. Bigelow operates along the U.S. East Coast to study and monitor fish stocks. The Pisces focuses primarily on U.S. waters from the Gulf of Mexico, the Caribbean and the South Atlantic to North Carolina on missions including surveying reef and bottom-dwelling fish, sampling seafood and water quality, and a variety of living marine resource surveys and ecosystem research projects. The Bell M. Shimada primarily studies a wide range of marine life, sea birds and ocean conditions along the U.S. West Coast. The Reuben Lasker supports fish, marine mammal, seabird and turtle surveys off the U.S. West Coast and eastern tropical Pacific Ocean.

The Oregon II primarily conducts a variety of fisheries, plankton and marine mammal surveys in the Gulf of Mexico, Atlantic Ocean and Caribbean Sea. The ship's mission includes supporting the National Marine Fisheries Services' annual bottom longline red snapper and shark survey. Using gear modeled after commercial shark fisheries, the survey has been running continuously since 1995. The Oregon II was originally built for the Department of the Interior's Bureau of Commercial Fisheries as a replacement for an earlier fishery research vessel of the same name.

Oscar Dyson Class

DISPLACEMENT	1,840 metric tons light, 2,479 metric tons full load; Reuben Lasker: 2,524 metric tons full loadLENGTH.. 208.6 feet
BEAM	49.2 feet
DRAFT	19.4 feet with centerboard raised; 30.3 feet with centerboard lowered; 29.7 feed in Bell M. Shimada and Reuben Lasker
SPEED	11-14 knots cruising
POWER PLANT	1 2.25 MW integrated diesel-electric drive system, 2 1,150-kW propulsion motors, single shaft
RANGE	12,000 nautical miles or 40 days
COMPLEMENT	accommodations for 33 crew, 15 scientists
BUILDERS	VT Halter Marine; Fincantieri Marinette Marine

HOMEPORT

R 224 Oscar Dyson	commissioned May 28, 2005	Kodiak, Alaska
R 225 Henry B. Bigelow	commissioned July 16, 2007	Newport, R.I.
R 226 Pisces	commissioned Nov. 6, 2009	Pascagoula, Miss.
R 227 Bell M. Shimada	commissioned Aug. 25, 2010	Newport, Ore.
R 228 Reuben Lasker	commissioned May 2, 2014	San Diego

Oregon II Class



NOAA

OREGON II

DISPLACEMENT	729 tons
LENGTH	170 feet
BEAM	34 feet
DRAFT	14 feet
CRUISING SPEED	11 knots
ENDURANCE	7,800 nautical miles or 33 days
COMPLEMENT	26 crew, 12 scientists
BUILDER	Ingalls Shipbuilding

HOMEPORT

R 332 Oregon II	commissioned March 12, 1975	Pascagoula, Miss.

NOAA AIRCRAFT

The National Oceanic and Atmospheric Administration operates a wide range of specialized aircraft that collect data vital to protecting lives and understanding the Earth.

NOAA's fleet of nine crewed aircraft is operated, managed and maintained by the NOAA Aircraft Operations Center, part NOAA's Office of Marine and Aviation Operations. Located at Lakeland Linder International Airport in Lakeland, Florida, the center serves as the main base for OMAO's fleet and provides capable, mission-ready aircraft and professional crews to the scientific community. The NOAA Aircraft Operations Center has more than four decades of experience developing, coordinating and safely conducting airborne environmental data-gathering missions.

KING AIR 350CER

The Beechcraft King Air 350CER is a versatile, twin-engine, extended-range turboprop aircraft. NOAA's two King Airs primarily support coastal mapping, snow and soil moisture surveys, and emergency response missions.

The King Air features two large downward-facing sensor ports that can support a wide variety of remote sensing systems, including digital cameras, multispectral and hyperspectral sensors, topographic and bathymetric LIDAR systems, and gamma radiation detectors. The aircraft is fitted with cargo doors. One of the King Airs features bubble observation windows.

Normal aircraft configuration includes seating for two pilots, a sensor operator and one to two additional crew members, depending on the amount of sensor equipment installed. With extended-range capabilities, the King Air can collect critical information while remaining airborne for seven to eight hours depending on fuel and payload.

The dual-sensor port modification allows simultaneous data collection from multiple sensors, enhancing sensor capabilities. Optical-grade glass plates in the sensor ports allow the cabin to remain pressurized. The optical plates can be removed, and the aircraft can be operated unpressurized, if required for science.



NOAA

KING AIR 350CER

WINGSPAN ..... 57.91 feet
LENGTH ..... 46.66 feet
WEIGHT ..... maximum gross takeoff, 16,500 pounds
SPEED ..... 25 knots
RANGE ..... 2,300 nautical miles
ENDURANCE ..... 8 hours
CEILING ..... 35,000 feet
POWER PLANT ..... 2 Pratt & Whitney Canada PT6A-67A turboprop engines
CREW ..... 2 pilots, 1 sensor operator, 1 to 2 additional crew members
CONTRACTOR ..... Beechcraft

DHC-6-300 TWIN OTTER

NOAA's Twin Otters are among the agency's most versatile aircraft. The Twin Otter is known for its reliability, short takeoff and landing capability, payload capacity and excellent external visibility.

With an endurance of four to six hours at survey speeds, the Twin Otter is more than capable of covering over 600-plus nautical miles of low-altitude survey in a given flight at maximum fuel loads. Known for its stability at slower speeds, the Twin Otter is capable of surveying between 90 and 140 knots over the ground, making it ideal for missions that require a slower aircraft for data collection.

These aircraft remain very busy year-round supporting airborne programs for marine mammals, hydrology, remote sensing, air chemistry and emergency response. Normal crew size is two pilots with a cabin capable of seating six people with smaller science equipment installed.



NOAA

DHC-6-300 TWIN OTTER

WINGSPAN ..... 65.00 feet
LENGTH ..... 51.75 feet
WEIGHT ..... maximum gross takeoff, 12,500 pounds
SPEED ..... 150 knots
RANGE ..... 600 nautical miles
ENDURANCE: ..... 6 hours
CEILING ..... 12,500 feet
POWER PLANT ..... 2 Pratt & Whitney Canada PT6A-67A turboprop engines
CREW ..... 2 pilots, 6 passengers
CONTRACTOR ..... De Haviland Canada

GULFSTREAM IV-SP

NOAA's single Gulfstream IV-SP jet is a high-tech, high-flying, high-speed platform used for hurricane forecasting and research. Its primary mission is to fly tropical cyclone surveillance missions to support National Hurricane Center forecasts and research by the Hurricane Research Division of NOAA's Atlantic Oceanographic and Meteorological Laboratory. This aircraft provides observational coverage at high altitudes critical for defining weather systems in the upper atmosphere.

The primary tool used for this task is a GPS dropsonde, a tube-shaped instrument released from the bottom of the aircraft. The dropsonde measures the pressure, temperature, humidity and GPS Doppler frequency shifts as it descends to Earth and transmits the data to the aircraft. The Doppler shifts are used to compute the horizontal and vertical wind components. After analysis and processing of the dropsonde data, the information is formatted and then transmitted to the National Centers for Environmental Prediction and the National Hurricane Center for inclusion into the global and hurricane model runs. This data is also provided to hurricane forecasters, providing real-time observations depicting the synoptic patterns surrounding a hurricane.

The Tail Doppler Radar mounted to the rear of the aircraft is an 8,000-watt radar system that spins slowly as the aircraft passes by a storm and looks at a storm's structure using radar to determine the intensity of tropical cyclones. The product of the TDR is similar to the layers in a slice of wedding cake. The images collected by the TDR allow forecasters and researchers to see the different layers of a storm and improve forecasting capabilities.



NOAA

GULFSTREAM IV-P

WINGSPAN.....77.83 feet
LENGTH.....87.58 feet
WEIGHT.....maximum gross takeoff, 74,600 pounds
SPEED.....460 knots
RANGE.....3,600 nautical miles
ENDURANCE.....8.75 hours
CEILING.....45,000 feet
POWER PLANT.....2 Rolls-Royce Tay 611-8 turbofan engines
CREW.....2 pilots, various sensor operators and meteorologists
CONTRACTOR.....Gulfstream (General Dynamics)

WP-3D ORION

To overcome the limitations of radar, satellites and computer models in forecasting hurricanes, NOAA operates two Lockheed WP-3D Orion four-engine turboprop aircraft to conduct low-altitude data collection to fill gaps in data not available from ground-based radar or satellite imagery. The WP-3Ds play a key role in collecting data vital to tropical cyclone research and forecasting and also support a wide variety of atmospheric and air chemistry missions.

Procured during the 1970s, the modernized and well-maintained WP-3Ds are equipped with a unique array of scientific instrumentation, radars and recording systems for measurements of the atmosphere and the Earth and its environment.

To obtain the best possible data within the storm environment, crew members deploy GPS dropsondes through a launch tube in the aircraft. (See the Gulfstream IV-SP section for a description of the dropsonde.) The aircraft can also deploy airborne expendable bathythermographs, which measure ocean temperature as a function of depth.

The WP-3Ds is also equipped with Lower Fuselage Radar and Tail Doppler Radar systems. Mounted to the belly of the aircraft, the LFR scans a storm horizontally while the TDR scans vertically. Together, these systems provide researchers and forecasters an MRI-like look at a storm, allowing them to see all the different layers and internal structure from within a storm.

The WP-3D is also equipped with a Step Frequency Microwave Radiometer. Developed by NOAA, the SFMR senses wind speed at the surface of the ocean by measuring and computing radiation emitted by seafoam that is created by the high winds at the surface. This information is critical to researchers at the National Hurricane Center for forecasting storms.

The aircraft, nicknamed "Kermit" (N42RF) and "Miss Piggy" (N43RF) have supported research worldwide, especially hurricane and tropical storm research in the Atlantic, Caribbean, Gulf of Mexico and Eastern Pacific.



NOAA

WP-3D ORION

WINGSPAN.....99.66 feet
LENGTH.....116.83 feet
HEIGHT.....33.7 feet
WEIGHT.....maximum takeoff, 135,000 pounds
SPEED.....250 knots
ENDURANCE.....11.5 hours
CEILING.....27,000 feet
RANGE.....3,800 nautical miles
POWER PLANT.....4 Allison T-56-A-14 turboprop engines (4,600 hp each)
CREW.....3 pilots, various sensor operators and meteorologists
CONTRACTOR.....Lockheed Martin Aeronautics Co.

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REAR ADMIRALS (Lower Half Selectees)

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Commander, Naval Air Warfare Center, Aircraft Division/Chief Engineer, Naval Air Systems Command

Todd S. Weeks

Program Executive Officer, Undersea Warfare Systems



Kevin R. Smith

Program Executive Office, Unmanned and Small Combatants (PEO USC)



Thomas J. Dickinson

Commander, Naval Surface Warfare Center/Commander, Naval Undersea Warfare Center



Dianna Wolfson

Fleet Maintenance Officer, U.S. Fleet Forces Command

Engineering Duty

REAR ADMIRAL (Lower Half)



Robert J. Dodson

Reserve Deputy, Naval Sea Systems Command



Michael S. Richman

Deputy Commander for Cyber Engineering, NAVSEA

Aerospace Engineering Duty

REAR ADMIRAL (Lower Half)



David R. Storr

Reserve Deputy Commander Naval Air Systems Command

Special Duty Officer (Human Resources)

REAR ADMIRALS (Lower Half)



Stuart C. Satterwhite

Director My Navy Career Center



Michael J. Schwerin

Deputy Commander Navy Personnel Command

Special Duty Officer (Public Affairs)

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Ryan M. Perry

Navy Chief of Information

REAR ADMIRAL (Lower Half)

John A. Robinson III

Vice Chief of Information

Foreign Expertise

REAR ADMIRALS (Lower Half)



Michael L. Baker

Senior Defense Official/ Defense Attaché - India

Information Warfare Community

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Commander
Naval Information Forces



Frank D. Whitworth III
Director,
National Geospatial Intelligence Agency

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John A. Okon
Director, Warfare Integration Directorate, N2/N6I, Office of the Chief of Naval Operations



Eileen H. Laubacher
Special Assistant to the Assistant to the President for National Security Affairs, National Security Council



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Commander, Fleet Information Warfare Command Pacific/Information Warfare Task Force (TF-501), Pacific



Nicholas M. Homan
Director, J-2, U.S. Central Command

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Director, National Maritime Intelligence Integration Office/Commander, Office of Naval Intelligence



Heidi K. Berg
Assistant Deputy Chief of Naval Operations for Operations, Plans, and Strategy, N3/N5B, Office of the Chief of Naval Operations

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Thomas M. Henderschedt
Director, J2, U.S. Indo-Pacific Command



Susan BryerJoyner
Deputy Director, Command, Control, Communications, and Computers/Cyber, J6, Joint Staff



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Commander,
Navy Information Force Reserve



Stephen D. Donald
Reserve Deputy Commander, 10th Fleet



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Vice Director for Intelligence, J2, Joint Staff



Ronald J. Piret
Commander, Naval Meteorology and Oceanography Command



Tracy L. Hines
Deputy Director, Command, Control, Communications and Computer Systems (C4) and Information Technology, J-6, U.S. Space Command



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Reserve Deputy Director for Maritime Information Warfare, United States Pacific Fleet



Charles M. Brown
Reserve Deputy, N2/N6,
Office of the Chief of Naval Operations

REAR ADMIRAL (Lower Half Selectees)



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Vice Director for Intelligence, J2, Joint Staff



Kurtis A. Mole
Deputy Commander, 10th Fleet

Special Duty Officer Information Warfare

REAR ADMIRAL (Lower Half Selectees)



Bryan E. Braswell

Commander, Naval Information Warfighting Development Center

Special Duty Officer Intelligence

REAR ADMIRAL (Lower Half Selectees)



Frank G. Schlereth III

Senior Defense Official/Defense Attaché – Israel

John E. Byington

Deputy Commander, Navy Space Command

Senior Health Care Executives

REAR ADMIRAL



Pamela C. Miller

Deputy Chief, Bureau of Medicine and Surgery, Reserve Policy and Integration

REAR ADMIRAL (Selectees)



Darin K. Via

Acting Surgeon General of the Navy, N093/ Chief, Bureau of Medicine and Surgery; Surgeon General of the Navy, N093/Chief, Bureau of Medicine and Surgery (nominee)



Rick Freedman

Deputy Chief, Bureau of Medicine and Surgery/Deputy Surgeon General of the Navy/Director, Medical Resources, Plans and Policy Division, N0931, Office of the Chief of Naval Operations

REAR ADMIRAL (Lower Half)



Donald Y. Sze

Commander, Expeditionary Medicine, Bureau of Medicine and Surgery



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Reserve Deputy Director, Medical Forces Atlantic



Guido F. Valdes

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David G. Malone

Reserve Deputy Director, Medical Forces Pacific



David M. Buzzetti

Deputy Chief of Staff, Reserve Component, N093, Office of the Chief of Naval Operations



Matthew Case

Commander, Naval Medical Forces Atlantic; ADDU: Director, Tidewater Market/Chief of Medical Service Corps

REAR ADMIRAL (Lower Half Selectees)



Walter D. Brafford

Commander, Naval Medical Forces Support Command 5/25/23 ADDU: Chief of Dental Corps



Robert J. Hawkins

Deputy Assistant Director, Operations Strategy, and Education and Training, Defense Health Agency, Office of the Under Secretary of Defense for Personnel and Readiness 5/31/23 ADDU: Chief of Navy Nurse Corps

Medical Corps

REAR ADMIRAL



Brian P. Monahan

Attending Physician to Congress

Judge Advocate General's Corps

VICE ADMIRAL



Darse E. Crandall Jr.
Judge Advocate General of the Navy

REAR ADMIRAL



Christopher C. French
Deputy Judge Advocate General of the Navy

REAR ADMIRALS (Lower Half)



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Commander
Naval Legal Service Command



Aaron C. Rugh
Chief Prosecutor for Military Commissions



Mark R. Myers
Reserve Deputy Judge Advocate General/ Deputy Commander, Naval Legal Service Command



Mark R. Myers
Lead Special Trial Counsel

Supply Corps

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Director
Defense Logistics Agency

REAR ADMIRALS



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Director, Logistics Operations, Defense Logistics Agency/Commander, Joint Regional Combat Support



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Vice Director, J4, Joint Staff



Jacquelyn McClelland
Vice Director, Navy Staff, Office of the Chief of Naval Operations; IMA Deputy Commander, Navy Supply Systems Command

REAR ADMIRAL (Selectees)



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Commander, Naval Supply Systems Command/Chief of Supply Corps

REAR ADMIRALS (Lower Half)



Matthew N. Ott III
Commander, Naval Supply Systems Command Weapons Systems Support



Patrick S. Hayden
Director, Readiness and Logistics, U.S. Naval Forces Europe-Africa



Dion D. English
Director, Supply, Ordnance and Logistics Operations Division, N4L, Office of the Chief of Naval Operations



Kristen Acquavella
Director, Logistics, Fleet Supply and Ordnance, N4, U.S. Pacific Fleet



Dennis E. Collins
Commander,
Navy Expeditionary Logistics



George E. Bresnihan
Director, Logistics Directorate, J-4, U.S. Africa Command



Charles Kirol

Deputy Director, Logistics, Fleet Supply and Ordnance, N4, United States Pacific Fleet

REAR ADMIRAL (Lower Half Selectees)



Brian J. Anderson

Commander, Defense Logistics Agency – Energy

Julie M. Treanor

Deputy Chief of Staff for Fleet Ordnance and Supply/Fleet Supply Officer, N41, U.S. Fleet Forces Command

David E. Ludwa

Reserve Deputy for Fleet Readiness and Logistics, N4R, U.S. Naval Forces Europe-Africa

Chaplain Corps

REAR ADMIRAL



Gregory N. Todd

Chief of Chaplains of the Navy, N097, Office of the Chief of Naval Operations; ADDU: Director of Religious Ministries

REAR ADMIRALS (Lower Half)



Carey H. Cash

Chaplain of Marine Corps/Deputy Chief of Chaplains of the Navy, N097B, Office of the Chief of Naval Operations; ADDU: Deputy Director of Religious Ministries

REAR ADMIRAL (Lower Half Selectee)

Peter K. Muschinske

Deputy Chief of Chaplains for Total Force/ Deputy Director of Religious Ministries, N097C, Office of the Chief of Naval Operations

Civil Engineer Corps

REAR ADMIRALS



Dean A. VanderLey

Commander, Naval Facilities Engineering Systems Command/Chief of Civil Engineers; Deputy Commander for Facilities and Environment, Navy Installations Command and Deputy Commander for Facilities and Environment, Marine Corps Installations Command

REAR ADMIRALS (Lower Half)



Maria L. Aguayo

Commander, Naval Facilities Engineering Systems Command Atlantic/Director, Fleet Installations and Environmental Division (N46), U.S. Fleet Forces Command; Fleet Civil Engineer (N01CE), U.S. Fleet Forces Command



Jeffrey J. Kilian

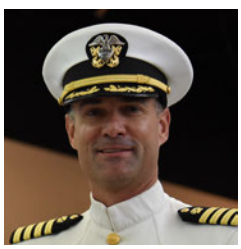
Commander, Naval Facilities Engineering Systems Command Pacific/Director, Fleet Civil Engineer, U.S. Pacific Fleet



David H. Duttlinger

Deputy for Naval Construction Force, Navy Expeditionary Combat Command

REAR ADMIRAL (Lower Half Selectee)



Marc F. Williams

Special Assistant to Commander, U. S. Pacific Fleet for Red Hill

Senior Enlisted Officer



James M. Honea

Master Chief Petty Officer of the Navy

U.S. MARINE CORPS

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Commandant of the Marine Corps



Michael E. Langley
Commander
U.S. Africa Command



Christopher J. Mahoney
Assistant Commandant
of the Marine Corps

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Commander, Marine Forces Reserve/
Commander, Marine Forces South



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Commanding General, Marine Corps
Combat Development Command;
Deputy Commandant for Combat
Development and Integration



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Commanding General,
II Marine Expeditionary Force



Matthew G. Glavy
Deputy Commandant, Information



William M. Jurney
Commander, U.S. Marine Corps Forces,
Pacific and Commanding General, Fleet
Marine Forces Pacific



Edward D. Banta
Deputy Commandant
for Installations and Logistics



Kevin M. Iiams
Commanding General
Training and Education Command



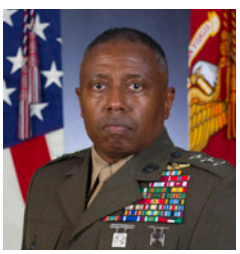
Stephen D. Sklenka
Deputy Commander
U.S. Indo-Pacific Command



James W. Bierman
Commanding General, III Marine Expedi-
tionary Force; and Commander, Marine
Forces Japan



Gregg P. Olson
Director, Marine Corps Staff,
Headquarters



Dimitri Henry
Director, J-2, Joint Staff



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Forces Command; Commanding General,
Fleet Marine Force Atlantic; and Commander,
Marine Corps Forces North



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Command/Assistant Deputy Commandant,
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Mobilization Assistant to Commander,
U.S. Indo-Pacific Command



Robert B. Sofge
Commander, U.S. Marine Corps Forces,
Europe and Africa



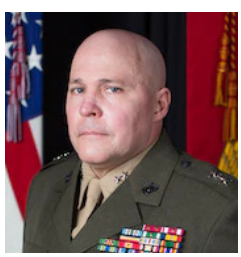
Ryan P. Heritage
Commander, U.S. Marine Corps Forces
Cyberspace Command



Christopher A. McPhillips
Commander, U.S. Marine Corps Forces
Central Command



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Commander, U.S. Marine Corps Forces
Special Operations



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Staff Judge Advocate to the Commandant
of the Marine Corps



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Director, J-5, U.S. Indo-Pacific Command



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Logistics Command



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Commanding General,
Marine Corps Recruiting Command



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Commanding General,
3d Marine Aircraft Wing



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1st Marine Aircraft Wing



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Special Projects Officer to the Assistant
Commandant of the Marine Corps



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Commanding General, Marine Corps
Installations Pacific/Commander, Marine Corps
Base Camp Butler



Sean M. Salene
Director, J-5, U. S. Central Command



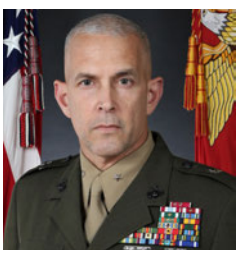
Leonard F. Anderson IV
Assistant Deputy Commandant Plans,
Policies and Operations Department



William E. Souza III
Commanding General
Marine Forces Korea



John F. Kelliher III
Commanding General
4th Marine Aircraft Wing



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Deputy Director for Current and
Integrated Operations, J-3, Joint Staff



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Commanding General
2d Marine Division



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Deputy Director, Cyber Security
for Combat Support (Joint)



William H. Swan
Assistant Deputy Commandant for Plans,
Policies, and Operations



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Deputy Commanding General, U.S.
Marine Forces Cyber, Joint Forces
Headquarters-Cyber



Marcus B. Annibale
Director, Expeditionary Warfare,
OPNAV (Frocked)



Thomas B. Savage
Commanding General, Marine Air Ground
Task Force Training Command and Marine
Corps Air Ground Combat Center (Frocked)



Brian N. Wolford
Director of Plans and Policy, United
Nations Command/Combine Forces
Command/U.S. Forces Korea (Frocked)

BRIGADIER GENERALS



Jason L. Morris
Director, Operations Division, Plans, Policies & Operations



Robert C. Fulford
Deputy Commanding General, I Marine Expeditionary Force



Melvin G. Carter
Transient



James B. Wellons
Assistant Deputy Commandant, Programs and Resources



Douglas K. Clark
Commanding General
4th Marine Division



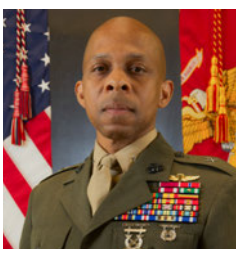
Daniel L. Shipley
Deputy Commander, U.S. Marine Corps Forces Pacific



Phillip N. Frietze
Assistant Deputy Commandant, Combat Development and Integration/Deputy Commanding General, Marine Corps Combat Development Command



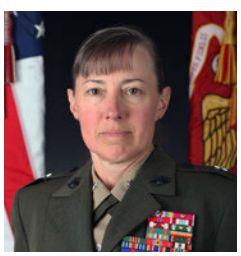
Peter D. Huntley
Commander, U.S. Special Operations Command South



Sean N. Day
Mobilization Assistant to the Deputy Commander (IMA), U.S. Space Command



George B. Rowell IV
Deputy Commander, U.S. Forces Japan



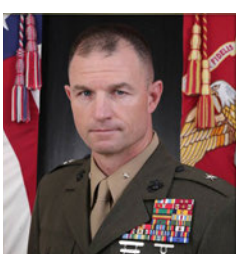
Julie L. Nethercot
Director, J-5, U.S. Southern Command



Ryan S. Rideout
Director, Manpower Management Division



Jason G. Woodworth
Commanding General, Marine Corps Installation West



Kyle B. Ellison
Commanding General, Marine Corps Warfighting Lab



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Commanding General, Training Command



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Commanding General,
3d Marine Logistics Group



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Commanding General, 5th Marine Expeditionary Brigade



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Deputy Director, Joint Strategic Planning (J-5), Joint Staff



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Commanding General,
1st Marine Logistics Group



Joseph R. Clearfield

Senior Military Assistant to the Deputy Secretary of Defense

Valerie A. Jackson

Commanding General
4th Marine Logistics Group



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Deputy Director,
ECJ-3, U.S. European Command



Walker M. Field

Commanding General, Marine Corps Recruit Depot Parris Island; Commanding General, Eastern and Recruiting Division



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Director, Strategy and Plans Division, Department of Plans, Policies and Operations, Headquarters, USMC



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2d Marine Logistics Group



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Deputy Commandant/Chief of Staff, NATO Joint Warfare Center, Allied Command Transformation



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Commander,
Marine Corps Systems Command



Garrett R. Hoffman

Director, White House Military Office



Fridrik Fridrikson

Deputy Director, J-3, U.S. Africa Command

Kevin S. Woodard

Lead Special Trial Counsel



Michael A. Brooks Jr.

Assistant Division Commander,
3D Marine Division



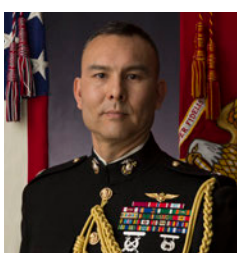
John K. Jarrard

Deputy Commanding General,
II Marine Expeditionary Force



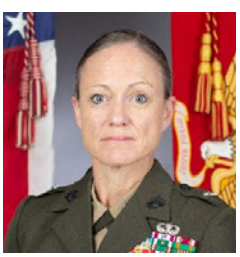
Raymond L. Adams

Commanding General,
Force Headquarters Group



Stephen J. Lightfoot

Director, Capabilities Development Directorate, Combat Development and Integration



Maura M. Hennigan

President, Marine Corps University



Robert B. Brodie

Assistant Wing Commander,
3d Marine Aircraft Wing



James A. Ryans II

Commanding General, Marine Corps Recruit Depot San Diego; Commanding General, Western Recruiting Division

REAR ADMIRALS



Andrew T. Priddy

Deputy Commanding General, II Marine Expeditionary Force; Commanding General, 2d Marine Expeditionary Brigade (Frocked)



Kevin G. Collins

Deputy Director for Operations, National Joint Operations Intelligence Center, Operations Team Three, J-3, Joint Staff (Frocked)



Pamela C. Miller

Director, Health Services/ Medical Officer to the USMC



Carey H. Cash

Chaplain of the Marine Corps/ Deputy Chief of Navy

Senior Enlisted Adviser



Carlos A Ruiz

Sergeant Major of the Marine Corps

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Secretary of Transportation



Ann M. Phillips
Administrator
Maritime Administration



Tamekia Flack
Deputy Administrator
Maritime Administration

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Interim President
California State University Maritime Academy

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Maine Maritime Academy

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Alejandro Mayorkas
Secretary of Homeland Security

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Commandant



Stephen D. Poulin
Vice Commandant

VICE ADMIRALS



Peter W. Gautier
Deputy Commandant for Operations



Kevin E. Lunday
Atlantic Area Commander



Paul F. Thomas
Deputy Commandant for Mission Support



Andrew J. Tiongson
Commander, Pacific Area

REAR ADMIRALS



Thomas G. Allen Jr.
Director of Operations – J3



Wayne R. Arguin Jr.
Assistant Commandant for Prevention Policy



David C. Barata
Commander, Eighth District



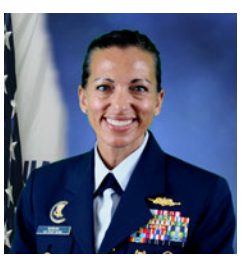
Christopher A. Bartz
Assistant Commandant for C4 & IT



Melissa Bert
Judge Advocate General & Chief Counsel



Melvin W. Bouboulis
Director of Operational Logistics



Jo-Ann F. Burdian
Assistant Commandant for Response Policy



Joseph R. Buzzella
J-7 Director of Exercises and Training



Mike E. Campbell
Director of Acquisition Programs Program Executive Officer



Michael H. Day
Commander, Fourteenth Coast Guard District



Megan Dean
Commander,
Seventeenth Coast Guard District



Laura M. Dickey
Deputy for Materiel Readiness



William G. Dwyer
Chief Prosecutor of the Coast Guard



Mark J. Fedor
JIATF South



Charles E. Fosse
Commander, Thirteenth Coast Guard District



Shannon Gilreath
Commander, Fifth Coast Guard District



Amy Grable
Assistant Commandant for Engineering and Logistics



Jon Hickey
Commander, Ninth District



Chad L. Jacoby
Assistant Commandant for Acquisition and Chief Acquisition Officer



Michael J. Johnston
Superintendent, U.S. Coast Guard Academy



Carola List
Director of Operational Logistics



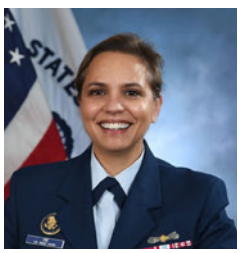
John W. Mauger
Commander, First District



Brendan C. McPherson
Deputy Commander,
Coast Guard Pacific Area



Nathan A. Moore
Deputy Commander, Atlantic Area



Rebecca Ore
Assistant Commandant for Intelligence



Brian Penoyer
Talent Management Transformation Task Force



Michael E. Platt
Military Advisor to the Secretary/U.S. Department of Homeland Security



Jeffrey K. Randall
Commander, Force Readiness Command



M.W. (Joe) Raymond
Assistant Commandant for Military Personnel



Michael P. Ryan
Deputy Commandant for Operations Policy & Capabilities



Douglas M. Schofield
Commander, Seventh District



Andrew M. Sugimoto
Commander, Eleventh District



Paul F. Thomas
Deputy Commandant for Mission Support



John C. Vann
Coast Guard Cyber Command



Will E. Watson
Director of Government and Public Affairs



Todd Wiemers
Assistant Commandant for Capability

Senior Enlisted Adviser



Heath B. Jones
Master Chief Petty Officer
of the Coast Guard

Coast Guard Reserve

REAR ADMIRAL



Miriam L. Lafferty
Assistant Commandant for Reserve

Public Health Service



Dana Thomas
Director
Health, Safety and Work-Life

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STATEMENT OF POLICY

■ We of the Navy League of the United States stand for a strong America — a nation morally, economically, and internally strong.

■ We believe that the security of our nation and of the people of the world demands a well-balanced, integrated, mobile American defense team, of which a strong Navy, Marine Corps, Coast Guard, and Merchant Marine are indispensable parts.

■ We support all Armed Services to the end that each may make its appropriate contribution to the national security.

■ We know that in a free nation an informed public is indispensable to national security and, therefore, we will strive to keep the nation alert to dangers which threaten — both from without and within.

■ We favor appropriations for each of the Armed Services, adequate for national security, economically administered.

■ We oppose any usurpation of the Congress's constitutional authority over the Armed Services.

■ We urge that our country maintain world leadership in scientific research and development.

■ We support industrial preparedness, planning, production.

■ We support efforts of our government to achieve worldwide peace through international cooperation.

■ We advocate a foreign policy which will avoid wars — if possible; if not, win them!

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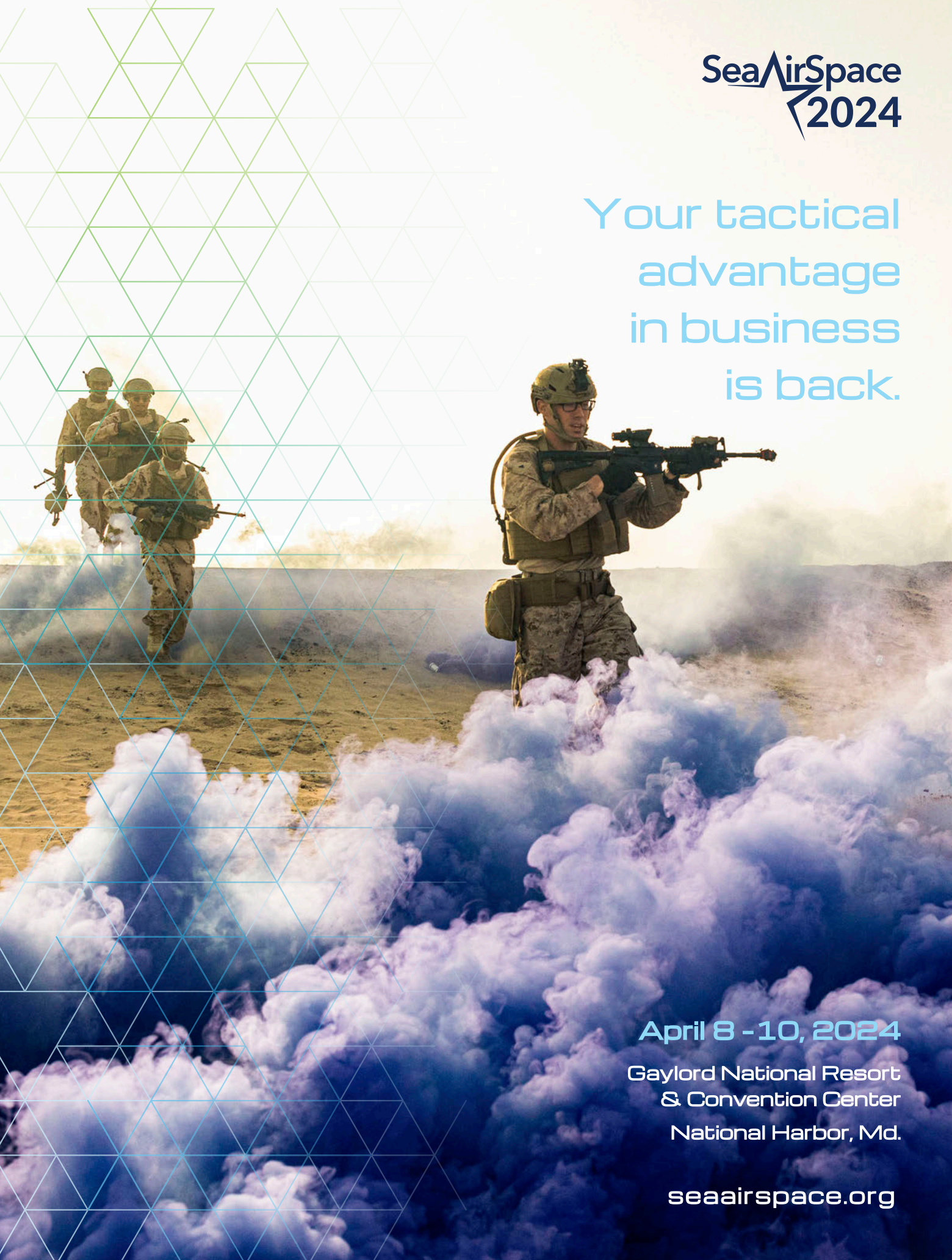
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