

U.S. Maritime Forces Arrive for UNITAS LXIII hosted by Brazil



A U.S. Marine Corps UH-1Y Venom helicopter assigned to Light Attack Helicopter Squadron (HMLA) 773 hovers above the landing pad of the San Antonio class dock landing ship USS Mesa Verde (LPD 19) in the North Atlantic Ocean, Aug. 16. HMLA 773 launched three UH-1Y Venom and two AH-1Z Viper helicopters from McGuire Air Force Base and embarked them aboard the USS Mesa Verde for transit to Brazil in support of exercise UNITAS LXIII hosted by the Brazilian Navy and Marine Corps. *U.S. MARINE CORPS / Cpl. Colton K. Garrett*

RIO DE JANEIRO, Brazil – Navy and Marine forces are set to arrive in Rio de Janeiro in support of UNITAS LXIII, the world's longest-running multinational maritime exercise scheduled to take place Sept. 8-22, the U.S. Naval Forces Southern Command / U.S. 4th Fleet said in a Sept. 1 release.

This year's exercise is hosted by the Brazilian navy and will include 20 participating nations, 19 ships, one submarine, 21 aircraft, accounting for approximately 5,500 total military personnel that will conduct operations principally off the coast of Rio de Janeiro.

UNITAS, Latin for "unity," was conceived in 1959 and has taken place annually since first conducted in 1960. This year marks the 63rd iteration. This year, Brazil will host UNITAS in conjunction and celebration of the bicentennial anniversary of both their nation's independence and navy's founding.

"This exercise is an incredible opportunity for all participating nations to come together as professional mariners on the sea, under the sea, in the air and in the littorals, to operate and grow as a team in order to strengthen our partnerships and enhance our collective maritime posture," said Rear Adm. Jim Aiken, commander U.S. Naval Forces Southern Command/U.S. 4th Fleet. "Congratulations to Brazil on 200 years of independence and excellence in the maritime domain on the sea and on the land."

In addition to the United States, UNITAS LXIII will bring together 19 nations from across Central and South America, the Caribbean, Europe, and Africa to train forces in joint maritime operations that enhance tactical proficiency and increase interoperability. Participating nations include Belize, Brazil, Cameroon, Chile, Colombia, Dominican Republic, Ecuador, France, Guyana, Jamaica, Mexico, Namibia, Panama, Paraguay, Peru, South Korea, Spain, United Kingdom and Uruguay.

"Exercise UNITAS is a highly anticipated premier training opportunity for all the participating nations' navies and marine corps in the Western Hemisphere," said Lt. Gen. David Bellon, commander of U.S. Marine Corps Forces, South and Marine Forces Reserve. "UNITAS highlights the foundation of

our partnerships and our dedication to building and sustaining the social and military relationships necessary to achieve common objectives and regional security.”

The initial in-port phase will include cultural exchanges, sporting events, community relations projects and the opportunity for UNITAS LXIII partners to participate in bicentennial events such as the Bicentennial Naval Parade scheduled for Sept. 7 along the coast of Rio de Janeiro.

Following opening ceremonies on Sept. 8, naval forces will conduct combined and joint operations as a multi-national task force, executing an event-driven scenario to train in multiple warfare areas. Ships and sailors will head to sea for maritime operation training and Marines will move inland to conduct amphibious training ranges before coming back together in support of a culminating multinational amphibious landing.

A significant focus of UNITAS LXIII is the cooperation and integration of the multinational navy forces with marine corps and naval infantries. The maritime domain includes the littorals that incorporates the ocean and the area inland from the shore which can be supported and defended directly from the sea.

U.S. forces participating in UNITAS LXIII include USS Lassen (DDG 82), USS Mesa Verde (LPD 19), USS Albany (SSN 753), Commander, Amphibious Squadron Eight (COMPHIBRON 8), Helicopter Sea Combat Squadron 22 (HSC 22), Helicopter Maritime Strike Squadron 70 Detachment 2 (HSM 70 Det 2), Patrol Squadron Sixteen (VP-16), Special Boat Team 22 (SBT 22), Mobile Diving and Salvage Unit (MDSU) Det 2, Seal Platoon from Seal Team 8, Explosive Ordnance Disposal Mobile Unit Two (EODMU-2), Beachmaster Unit Two (BMU-2), USCG Pacific Area Tactical Law Enforcement Team (PAC AREA TACLET), Commander, Destroyer Squadron 40, (COMDESRON 40), Fleet Surgical Team (FST) 8, 25th Marine Regiment, 3d Battalion 25th Marine

Regiment, 3d Force Reconnaissance Company, 4th Light Armored Reconnaissance Company (4th LAR), 4th Combat Engineer Battalion (4th CEB), 6th Engineer Support Battalion (6th ESB), 4th Air Naval Gunfire Liaison Company (ANGLICO), 4th Civil Affairs Group (4th CAG), Marine Aircraft Group 49 (MAG-49), U.S. Marine Corps Forces South (MARFORSOUTH), and USNAVS0/FOURTHFLT.

U.S. Naval Forces Southern Command/U.S. 4th Fleet supports U.S. Southern Command's joint and combined military operations by employing maritime forces in cooperative maritime security operations to maintain access, enhance interoperability, and build enduring partnerships in order to enhance regional security and promote peace, stability and prosperity in the Caribbean, Central and South American region.

U.S. Marine Corps Forces, South is the Marine Corps component to U.S. Southern Command, is responsible for planning exercises, operation, and overall Marine Corps support for the SOUTHCOM assigned area of responsibility.

**General Atomics Awarded
Contract Continuing EMALS,
AAG Evaluation for French
Carrier**



French Armaments Procurements Agency (DGA) members observe flight operations on USS Gerald R. Ford's (CVN 78) flight deck during a ship visit, April, 23, 2021. DGA executive leadership visited Ford to view the electromagnetic aircraft launch system (EMALS) and advanced arresting gear (AAG) in operation, to enable France to refine the design of the Future French Carrier. *U.S. NAVY / Mass Communication Specialist 3rd Class Dalton Lowing*

SAN DIEGO – General Atomics Electromagnetic Systems announced it has been awarded a contract by US Naval Air Systems Command to continue development and evaluation of tailored configurations of the Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG) as a potential Foreign Military Sale to the French navy for their next generation aircraft carrier, Porte-Avions Nouvelle Génération (PANG).

"We are proud to be supporting the ongoing efforts between our nations to realize the potential of integrating EMALS and AAG onboard the future flagship of the French Marine Nationale," said Scott Forney, president of GA-EMS. "For decades, France's

Charles de Gaulle and U.S. Nimitz-class carriers have provided interoperable capabilities to conduct joint operations and launch and recover aircraft on each other's ships. EMALS and AAG onboard next generation French and U.S. aircraft carriers will provide increased interoperability between our navies and greater flexibility to launch a wider range of current and future aircraft for the decades to come."

GA-EMS will continue evaluating optimal EMALS and AAG configurations for performance and document ship interfaces and impacts on the PANG. The contract will culminate in 2023 with a system requirements review and an evaluation of French suppliers for potential component manufacturing in France.

Under previous contract awards over the past two years, GA-EMS participated in carrier studies to investigate the feasibility of implementing EMALS and AAG for the future French carrier design. In December 2021, the U.S. State Department announced it approved a possible Foreign Military Sale for a two EMALS and three AAG configuration to France.

The first-in-class USS Gerald R. Ford (CVN 78) recently completed its 10,000th successful launch and arrested landing using EMALS and AAG. The systems continue to perform successfully as CVN 78 prepares for its upcoming deployment. GA-EMS is currently under contract with the Navy to support CVN 78 sustainment requirements and is delivering EMALS and AAG for the next two Ford-class carriers currently under construction, John F. Kennedy (CVN 79) and Enterprise (CVN 80). GA-EMS is also working with the Navy to determine the EMALS and AAG contract and schedule requirements for the fourth Ford-class aircraft carrier, Doris Miller (CVN 81).

Australian Navy Submariners to Train on British Nuclear Submarines



Australian submariners will train on the new U.K. submarine HMS Anson. *U.K. MINISTRY OF DEFENCE*

LONDON – Royal Australian Navy submariners will join United Kingdom crews to train on the newly commissioned Astute-class nuclear-powered attack submarine HMS Anson, the U.K. Ministry of Defence said Aug. 31.

Prime Minister Boris Johnson and Defence Secretary Ben Wallace hosted new Australian Deputy Prime Minister Richard Marles at Barrow to see the commissioning of the Anson.

The announcement came as Marles and Wallace emphasized the importance of the deep defense ties between the U.K. and Australia, following the development of the trilateral AUKUS partnership working with the United States, which was represented today by the U.S. Defense Attaché, Navy Capt. Leland.

Hosting Marles on his first official visit to the U.K. since the new Australian government came to power, the prime minister and ministers attended the commissioning of the fifth of seven new Astute-class Royal Navy submarines.

With naval capability at the center of the two powers' future

defense relationship, the visit reinforced the priorities of the Integrated Review and significance of the AUKUS partnership, which links the U.K., the United States and Australia in promoting stability in the Indo-Pacific region.

The U.K. and U.S. already have welcomed Royal Australian Navy personnel on its specialized nuclear training courses, and more will follow next year, before Australian submariners go to sea. The training and exchanges mark the beginning of a multigenerational naval partnership between the three AUKUS nations.

Marles, who is also minister for defense, visited Barrow, having also seen the Type 26 frigate shipbuilding facility in Govan, accompanied by the First Sea Lord, Adm. Sir Ben Key.

“Today is a significant milestone in the U.K. and Australia’s preparation to confront growing threats to the liberal democratic order, especially in the Indo Pacific,” said Wallace. “Not only have we progressed our defense planning but Minister Marles participated in the commissioning of our latest attack submarine, on which will Royal Australian Navy submariners will be embarked as we develop our shared capabilities in the years ahead.”

One of the most sophisticated underwater vessels ever built, HMS Anson represents £1.3 billion of U.K. investment. Capable of defending the U.K.’s interests at home and overseas, HMS Anson will be armed with up to 38 Spearfish Heavyweight Torpedoes and Block V Tomahawk land attack missiles, able to tackle targets at a range of up to 1,000 miles.

“HMS Anson is the cutting edge in submarine design and construction, ensuring operational advantage in the underwater battlespace, the last great stealth domain,” said Key. “Given the world we live in, there is no more important tool in the United Kingdom’s arsenal: silent, unseen, and a key instrument of our global, modern, ready Royal Navy.”

At 97 meters long, HMS Anson stands at around the length of two Olympic swimming pools, with 240 kilometers of cabling, enough to stretch from Barrow-In-Furness to its new home in Faslane, Scotland.

HMS Anson will remain in Barrow for the coming weeks while undergoing final checks and rigorous testing to the numerous complex systems that make up a nuclear-powered submarine, before sailing to HM Naval Base Clyde in Faslane to prepare for sea trials.

HMS Anson will join four other Astute Class submarines in service with the Royal Navy – HMS Astute, HMS Ambush, HMS Artful and HMS Audacious.

Two further boats – Agamemnon and Agincourt – are in various stages of construction at BAE Systems' Barrow-In-Furness site as part of £11.2 billion overall investment in the whole Astute-class program.

USNS Trenton Completes Gulf of Guinea Deployment



Military Sealift Command's expeditionary fast transport ship, USNS Trenton (EPF 5) gets underway from Joint Expeditionary Base Little Creek-Fort Story, Dec. 20. *U.S. NAVY / Bill Mesta*
MALAGA, Spain – The Spearhead-class expeditionary fast transport USNS Trenton (T-EPF 5) arrived in Malaga, Spain, following a two-month deployment to the Gulf of Guinea, Aug. 28, 2022, U.S. Naval Forces Europe-Africa Public Affairs said Aug. 30.

The deployment demonstrates the U.S. commitment to strengthening maritime security as well as peace and stability within the region. From July to August, Trenton conducted regional maritime presence operations and enriched valued relationships with African partners from Cabo Verde, Equatorial Guinea, Gabon, Ghana, Morocco and Sierra Leone.

"Our combined military and civilian crew executed their mission with professionalism and enthusiasm, which demonstrated the United States' steadfast commitment to our partner nations," said Cmdr. Tim Rustico, officer in charge of

Trenton.

Trenton's deployment also included tri-service maritime efforts within the U.S. Naval Forces Africa (NAVAF) area of operations. While deployed, Marines assigned to Task Force 61 Naval Amphibious Forces Europe-2d Marine Division (TF-61/2) embarked Trenton to provide in-port security assistance and to continue bolstering integrated maritime operations between the sea services.

"I'm incredibly proud of Trenton's professional execution during their deployment, where they worked with our partners, developed logistical nodes, and expanded maritime domain awareness in Western Africa," said Capt. Kenneth Pickard, commodore, Task Force 63. "Trenton's efforts laid the groundwork for continued presence and partnership in the Gulf of Guinea."

Over the last decade, the United States has steadily increased maritime security cooperation with partners on Africa's Atlantic coast to improve maritime domain awareness capability to protect their sovereign waters.

Earlier this month, NAVAF and the Royal Danish Navy jointly hosted the Maritime Operations Planning Workshop (MOPW) in Accra, Ghana for West African partners from 14 nations. MOPW allowed junior officers from African navies and coast guards to exchange operational planning experiences, develop templates for use during exercises, and plan real-world operations.

In July 2022, NAVAF participated in the Naval Infantry Leaders Symposium-Africa (NILS-A) in Dakar, Senegal with maritime partners and allies. NILS-A is a multinational, Africa-focused forum designed to bring together partner nations with Marine forces and naval infantry.

In March 2022, NAVAF hosted exercise Obangame Express, the largest multinational maritime exercise in Western Africa.

These types of exercises strengthen partnerships and allow countries to work more closely on shared transnational maritime challenges including collaborative efforts in support of the Yaoundé Code of Conduct and adherence to the rule of law.

In 2013, Gulf of Guinea coastal nations developed and signed the Yaoundé Code of Conduct, a key agreement to improve maritime interoperability. This powerful framework established objectives and improved inter-region coastal relationships and joint capabilities that have reduced illegal activities in the Gulf of Guinea.

The U.S. shares a common interest with African partner nations in ensuring security, safety, and freedom of navigation on the waters surrounding the continent, because these waters are critical for Africa's prosperity and access to global markets.

NAVAIR Orders 12 More MH-60R Helicopters for Australia



Boatswain's Mate Seaman Maria Torres signals to an MH-60R Sea Hawk helicopter attached to Helicopter Maritime Strike Squadron (HSM) 48, during flight operations aboard the guided-missile destroyer USS Nitze (DDG 94) in the Gulf of Aden Aug. 30. *U.S. NAVY / Mass Communication Specialist 2nd Class Cryton Vandiesel*

ARLINGTON, Va. – The U.S. Navy has placed on order to Lockheed Martin to procure 12 more MH-60R Seahawk helicopters for the Australian government.

The Naval Air Systems Command has awarded Lockheed Martin Corp. a \$503.7 million firm-fixed-price order for the production and delivery of the 12 MH-60Rs for the Commonwealth of Australia, an Aug. 29 Defense Department contract announcement said. Work on the order is expected to be completed by October 2026.

The sale was approved in October 2021 by the U.S. State Department. The entire sale, including the helicopters,

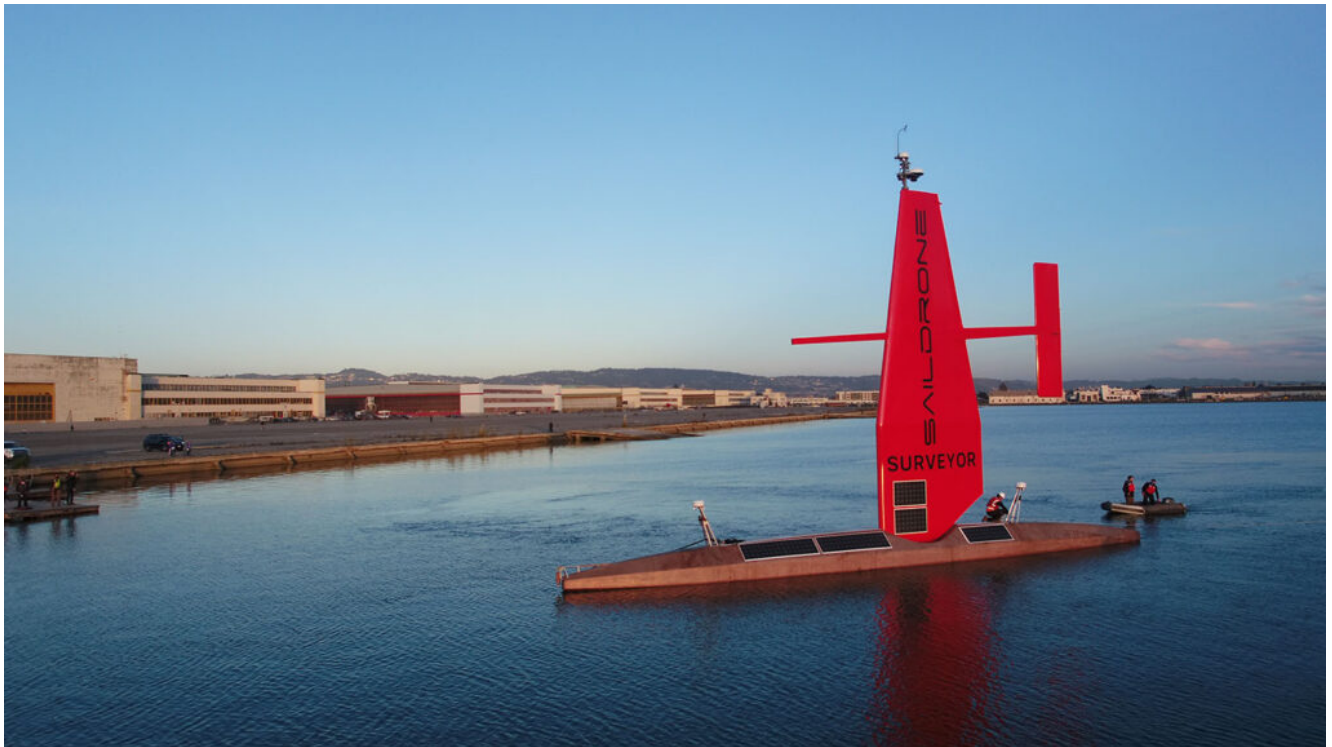
engines, mission systems, guns, spare parts, technical documentation, logistics support and other items was then estimated to total \$985 million.

Australia previously ordered 24 MH-60Rs, the last of which was delivered to the Royal Australian Navy in July 2016. One of these was lost in a mishap in the Philippine Sea in October 2021.

The Royal Australian Navy uses its MH-60Rs to perform anti-surface, antisubmarine warfare vertical replenishment, search and rescue, and communications relay missions.

In addition to the U.S. and Australian navies, the MH-60R is operated by or on order for the Royal Danish Air Force, the Royal Saudi Navy, the Republic of Korea Navy, the Indian Navy and the Hellenic Navy.

Austal USA and Saildrone Announce Strategic Partnership to Build USVs



A Saildrone Surveyor outside the company's headquarters in Alameda, California. *SAILDRONE*

MOBILE, Ala. – Austal USA and Saildrone Inc. announced Aug. 30 a strategic partnership to build cutting-edge, autonomous uncrewed surface vehicles.

This new partnership combines Saildrone's uncrewed surface vehicle technology with Austal USA's advanced manufacturing capabilities. The partnership provides the U.S. Navy and other government customers a cutting-edge solution for maritime domain awareness, hydrographic survey, and other missions requiring persistent wide area coverage.

The partnership ensures that production of the Saildrone Surveyor will accelerate to meet the rapidly growing demand for the ground-breaking technology. The Surveyor was developed and designed by Saildrone and will be manufactured exclusively by Austal USA in Mobile, Alabama.

The Saildrone Surveyor, at 65 feet (20 meters) in length, is designed specifically for deep ocean mapping and intelligence, surveillance and reconnaissance applications, both above and below the surface. As with all Saildrone vehicles, the Surveyor is autonomous and uncrewed, offering extreme

endurance, reliability and cost-effective operations. With its industry-leading expertise in aluminum shipbuilding, Austal USA is uniquely equipped to fabricate the Surveyor's aluminum hulls and ensure rapid delivery to the fleet.

"We are extremely pleased to enter into this agreement with Saildrone. It is a great fit as both of us are leaders in our respective markets and we both strive to provide leading edge solutions to the U.S. Navy," said Austal USA President Rusty Murdaugh. "With our lean manufacturing techniques and serial production capabilities, Austal USA will provide large scale fabrication of these vehicles and with our partner Saildrone rapidly get the capability to the Fleet."

Austal will begin manufacturing the first Saildrone Surveyor vehicles for the U.S. Navy in October 2022.

AeroVironment Introduces Mantis i23 D Imaging Payload



AeroVironment's new Mantis i23 D multi-sensor daytime imaging payload. *AEROVIRONMENT*

ARLINGTON, Va. – AeroVironment Inc. introduced Mantis i23 D, a multi-sensor daytime imaging payload compatible with the Raven B small unmanned aircraft systems, the company said Aug. 30.

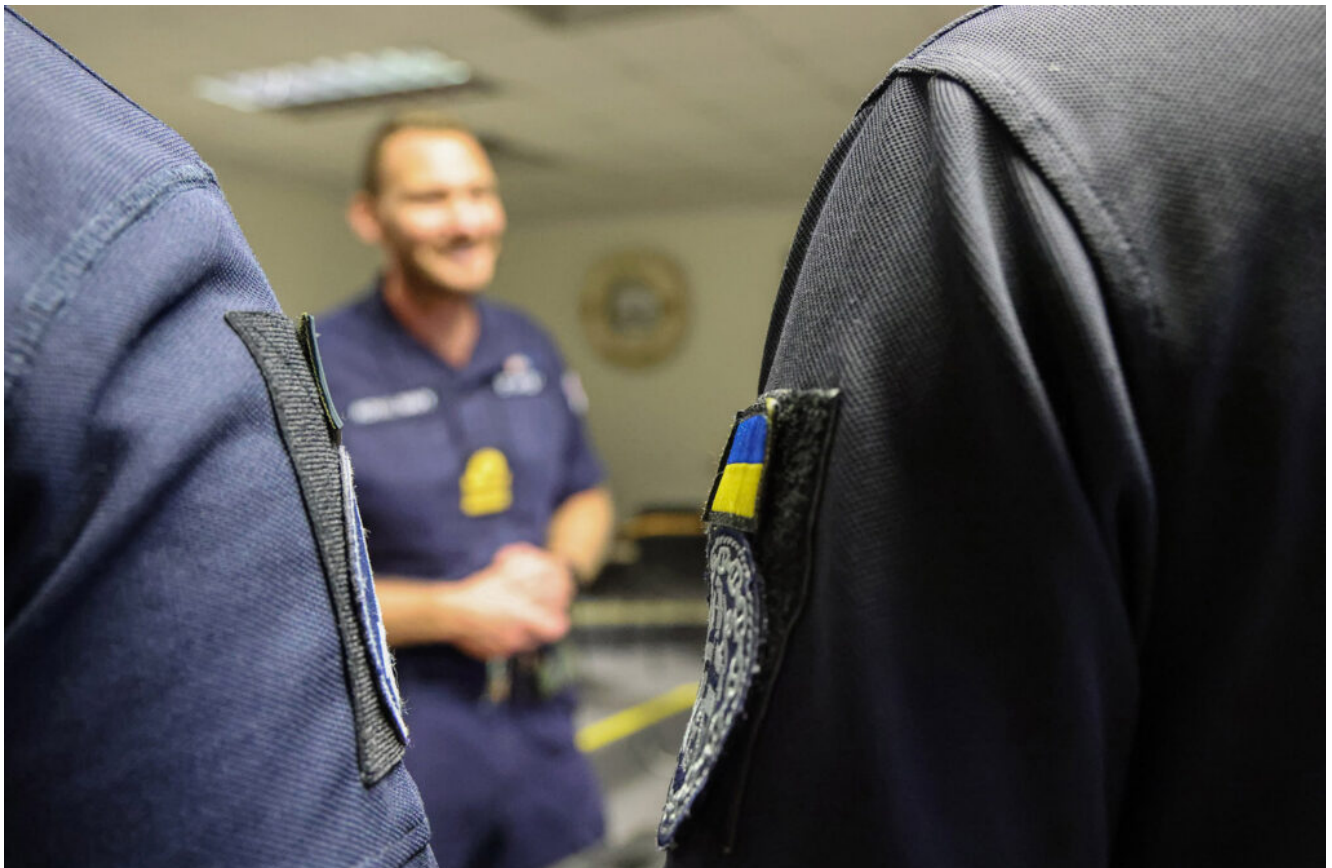
An enhanced daylight variant of its predecessor, the Mantis i23, Mantis i23 D maintains its ruggedized design and uses the same modular interface to allow for quick and simple swapping between payloads with no software updates required to the avionics or ground control systems.

At 13.4 ounces (380 grams), the imaging system features dual 18 megapixel electro-optical sensors and 24X digital zoom, providing four times improved target detection over the current Mantis i23 payload during daytime missions. Through its advanced suite of sensors, extended zoom capability, onboard processing and digital imaging stabilization, the Mantis i23 D payload allows operators to increase aircraft standoff distance without compromising image quality.

"With the introduction of the next-generation Mantis payload, we have expanded the capabilities and adoption of the combat-proven Raven SUAS," said Charles Dean, AeroVironment vice

president of global business development, sales and marketing. "Customers can now operate their Raven systems at a greater standoff distance than before, enabling eyes-on-target from several kilometers away and reducing the risk of the target detecting or hearing the SUAS overhead."

UK Donating Undersea Minehunter Drones to Help Ukraine Clear Coastline



Ukrainian navy divers in the classroom learning how to use an unmanned underwater vehicle. *U.K. ROYAL NAVY*

LONDON – Dozens of Ukrainian personnel will be taught to use the autonomous mine-hunting vehicles by the U.K. Royal Navy and its U.S. partners over the coming months, the U.K.

Ministry of Defence said in an Aug. 26 release.

The U.K. is giving unmanned underwater vehicles to Ukraine and training Ukrainian personnel in Britain to use them to clear their coastline of mines.

Six autonomous minehunting vehicles will be sent to the country to help detect Russian mines in the waters off its coast. Three of these will be provided from U.K. stocks, with a further three to be purchased from industry.

The lightweight autonomous vehicle is designed for use in shallow coastal environments, operating effectively at depths of up to 100 meters to detect, locate and identify mines using an array of sensors so the Ukrainian navy can destroy them.

Dozens of Ukrainian navy personnel will be taught to use the drones over the coming months, with the first tranche having already begun their training.

Russia has been weaponizing food by destroying Ukrainian agriculture and blockading the country's Black Sea ports to prevent exports, with devastating consequences for the world's poorest people as food prices rise.



A Ukrainian sailor operates a Royal Navy-provided UUV. *U.K. ROYAL NAVY*

A small number of ships carrying grain have left Ukraine since the United Nations brokered a deal in July to allow food exports, but efforts to get food out of the country continue to be hampered by sea mines left by Russian forces along Ukraine's coast.

"Russia's cynical attempts to hold the world's food supply to ransom must not be allowed to succeed," said Defence Secretary Ben Wallace. "This vital equipment and training will help Ukraine make their waters safe, helping to smooth the flow of grain to the rest of the world and supporting the armed forces of Ukraine as they look to defend their coastline and ports."

The Royal Navy's Diving & Threat Exploitation Group will conduct the three-week training courses, alongside the U.S. Navy's 6th Fleet. Having considerable experience using the equipment already they will conduct training at sea to operate the vessels and interpret the data they send back to identify mock mines.

“Through the expert skills being taught here, our Ukrainian allies will be able to clear their own waters of mines,” said Adm. Sir Ben Key, First Sea Lord and chief of the Naval Staff. “These weapons target shipping indiscriminately, but particularly affect civilian traffic and trade and have had a devastating impact on freedom of navigation in the Black Sea. This training is another powerful demonstration of the UK’s ongoing commitment to Ukraine in their fight to defend their country and repel Russian aggression.”

Bahrain Conducts Fifth Sentinel Shield Exercise with IMSC; Includes Saildrone USV



Royal Bahrain Naval Force patrol boat RBNS Ahmed Al-Fateh (P20) sails in the Arabian Gulf during exercise Sentinel

Shield on Aug. 23. *U.S. COAST GUARD / Electronics Technician 1st Class Jason Pickens*

MANAMA, Bahrain – Forces from Bahrain and the United States completed a joint exercise in the Arabian Gulf on Aug. 23, led by a nine-nation coalition staff based in the Middle East, NAVCENT Public Affairs said Aug. 25.

Royal Bahrain Naval Force ship RBNS Ahmed Al-Fateh (P20) and U.S. Coast Guard patrol boat USCGC Baranof (WPB 1318) participated in exercise Sentinel Shield with a Saildrone Explorer unmanned surface vessel from U.S. 5th Fleet.

Sentinel Shield is a monthly exercise series organized by the International Maritime Security Construct (IMSC) to enhance communication and coordination among partner naval forces. This month's iteration was the first designed to integrate unmanned systems.

"The continued interoperability and coordination of U.S. and Bahraini naval assets are crucial to stability in the Arabian Gulf," said Lt. Vaughn Gehman, commanding officer of Baranof. "Integration of unmanned systems is a force-multiplier for IMSC and its ability to detect and deter malign activity."

IMSC was formed in July 2019 in response to increased threats to freedom of navigation for merchant mariners transiting international waters in the Middle East. Coalition Task Force Sentinel was established four months later to deter state-sponsored malign activity and reassure the merchant shipping industry in the Bab al-Mandeb and Strait of Hormuz.

The coalition is headquartered in Bahrain under U.S. 5th Fleet and includes forces from Albania, Bahrain, Estonia, Lithuania, Romania, Saudi Arabia, the United Arab Emirates, the United Kingdom and the United States.

"I was delighted to see our host nation participating in this month's exercise, and especially pleased to again see Bahrain leading the way in unmanned systems integration," said British

Royal Navy Commodore Ben Aldous, commander of IMSC and CTF Sentinel.

In October, Bahrain was the first nation U.S. 5th Fleet partnered with after establishing a new unmanned systems and artificial intelligence task force. During a two-day training exercise, U.S. patrol craft and Bahrain Defense Force maritime assets sailed alongside Mantas T-12 unmanned surface vessels in the Arabian Gulf, marking the first time the platforms operated in regional waters.

“Incorporating unmanned systems into Sentinel Shield enables the coalition to plan for the future by developing and exercising concepts of employment that most effectively utilize this new technology to benefit the Sentinel mission and strengthen our coalition,” said Aldous.

DARPA's NOMARS Program to Build, Test, Demonstrate First Unmanned Ship



A concept design for the NOMARS Defiant unmanned ship. *DARPA* ARLINGTON, Va. – DARPA is moving into Phase 2 of the No Manning Required Ship (NOMARS) program, which seeks to build and demonstrate a revolutionary new medium unmanned surface vessel that can go to sea and perform missions with unprecedented reliability and availability, while carrying a significant payload, the agency said Aug. 22. DARPA selected Serco Inc.'s design to move forward at the conclusion of Phase 1.

NOMARS took a clean-sheet approach to ship design, holding to the requirement there will never be a human on board the vessel while it is at sea, including during underway replenishment events. By eliminating all constraints and requirements associated with humans, NOMARS opened up the design space to novel ship configurations and capabilities that could never be considered for crewed vessels.

NOMARS is also pushing the boundaries on ship reliability. Because there is no crew on board to perform maintenance, NOMARS required new approaches for power generation, propulsion, machinery line-up, and control schemes to ensure continuous functionality throughout a long mission in all weather, temperature, and sea states.

“NOMARS plans to demonstrate a next-generation completely

unmanned ship that will enable entirely new concepts of operations,” said Gregory Avicola, program manager in DARPA’s Tactical Technology Office. “We will enable methods of deploying and maintaining very large fleets of unmanned surface vessels that can serve as partners, across the globe, for the larger crewed combatants of the U.S. Navy.”

In Phase 1, Serco developed a new Design Space Exploration toolset that can evaluate spaces with a variety of parameters and outputs millions of ship designs to meet a diverse set of performance objectives and constraints. Serco used their DSX tool to create a set of ship designs ranging from 170-270 metric tons, then refined those into a single ship for the preliminary design review, which the company dubbed Defiant. In Phase 2, Serco will finalize ship design, build the ship and work through a series of rigorous testing activities before taking it to sea for a three-month demonstration event.

Defiant will be the first of its kind. The 210-metric ton medium USV-class ship aims to maximize performance, reliability, and maintenance efficiency while still carrying significant payload at tactically useful ranges. The goal is to achieve ultra-reliability objectives by integrating distributed hybrid power generation, podded propulsors and high-capacity batteries.

A key philosophy of NOMARS is “graceful degradation,” which allows individual equipment to fail over time by having enough system-level redundancy to meet full system requirements at speeds of at least 15 knots after one year at sea. The major system components of the selected design are modularized, so repairs can be conducted with equipment typically found in yacht yards worldwide. This maintenance philosophy supports rapid turnaround, allowing the ships to spend a majority of their lifetime at sea performing missions.