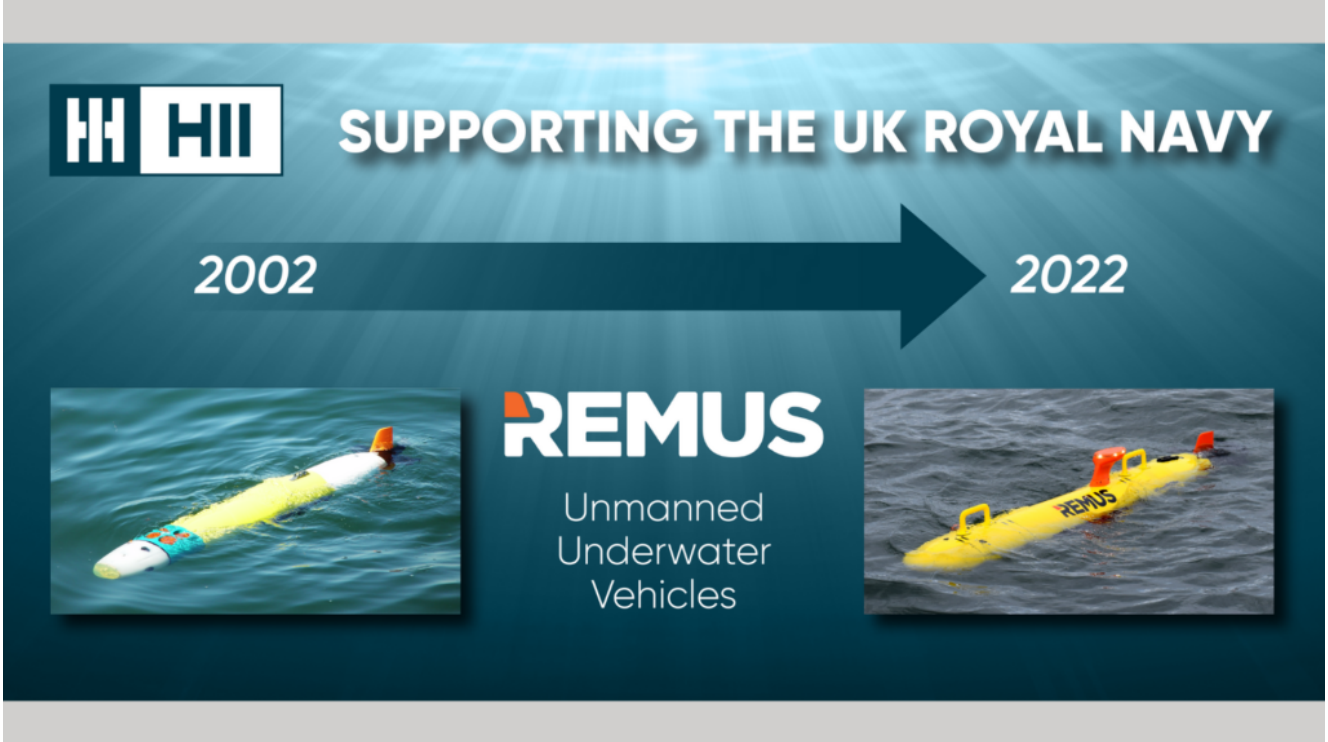
UK Royal Navy Acquires Latest Generation REMUS 100 UUVs



MCLEAN, Va. – HII announced Sept. 21 the delivery of three REMUS 100s unmanned underwater vehicles to the United Kingdom's Royal Navy. The new systems bring enhanced endurance and the latest generation of sensors and payloads, allowing for increased data quality and mission efficiency.

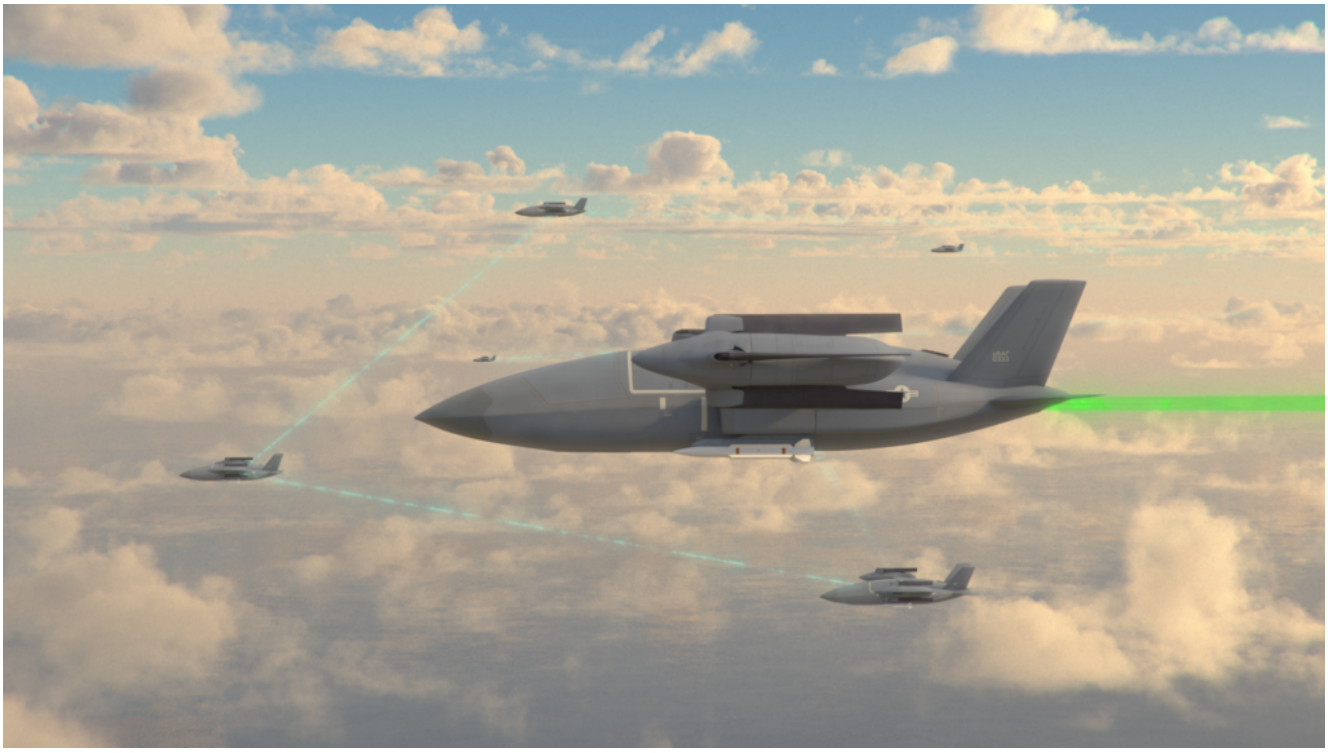
"We're proud to continue our longstanding partnership with the U.K. Royal Navy," said Duane Fotheringham, president of the Unmanned Systems business group at HII's Mission Technologies division. "Our newest REMUS 100s will bolster their existing fleet with increased capability for the U.K.'s subsea autonomous operations."

With these new systems, the U.K.'s Ministry of Defence has acquired a mix of REMUS 100s and REMUS 600s used for mine countermeasure operations over the last 20 years. The Ministry of Defence's first two REMUS 100s, acquired in 2002, are still in operation today.

“On behalf of the frontline users, I’m delighted to accept into service this refresh of REMUS 100,” said Cmdr. Rory Armstrong, mine warfare lead at the U.K. Navy Command Headquarters. “Our use of the REMUS family of vehicles over the last two decades has paved the way for a future mine countermeasures capability with autonomy at its core. These vehicles represent an exciting evolution of our existing small autonomous underwater vehicle fleet and will make a valued contribution to the Royal Navy as a force for good both in home waters and on an expeditionary basis.”

HII has sold more than 600 UUVs to 30 countries worldwide, including 14 NATO member countries like the U.K.

Bell Selects Sierra Nevada Corp. for its High-Speed VTOL Development Team



An artist’s conception of Bell Textron’s High-Speed Vertical Takeoff and Landing aircraft. *BELL TEXTRON*

National Harbor, Md. — Bell Textron Inc. has entered into a teaming agreement with Sierra Nevada Corp. for Bell’s High-Speed Vertical Takeoff and Landing aircraft, Bell announced Sept. 19. As part of the collaboration, SNC will specifically support the design and development of mission systems for HSVTOL variants.

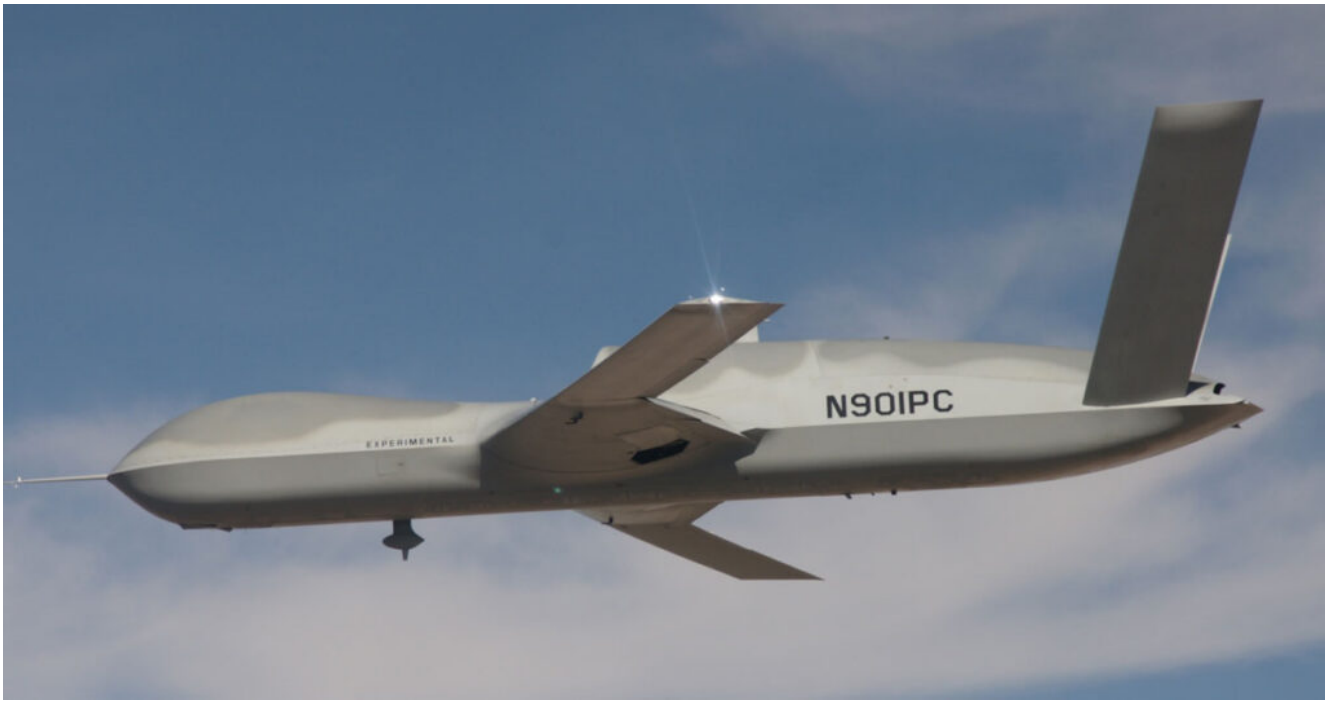
Bell’s HSVTOL vehicles blend the hover capability of a helicopter with the speed, range and survivability features of fighter aircraft, with low downwash hover capability and jet-like speeds of more than 400 knots. This family of scalable aircraft concepts is designed to carry out U.S. Air Force and Special Operations Command missions across the full spectrum of conflict and political scenarios, including personnel recovery, contested logistics and intelligence, surveillance and reconnaissance and strike.

“In an effort to advance technical maturity and deliver HSVTOL capability to warfighters sooner, Bell is assembling a team of industry-leading partners. We’re thrilled to have SNC onboard,” said Jason Hurst, vice president, Innovation, Bell.

“We’ve made significant progress in Bell’s HSVTOL technology development in 2022, and we look forward to showing this progress in the upcoming year.”

Bell is currently executing its HSVTOL risk reduction effort and participating in the AFWERX HSVTOL Concept Challenge, a crowdsourcing effort for the Air Force and Special Operations Command. Bell is one of 11 companies from more than 200 challenge entrants selected to receive market research investments aimed at advancing HSVTOL technology.

GA-ASI Flies MQ-20A Avenger UAS Completely Autonomously



An Avenger MQ-20A, which recently flew using an artificial intelligence pilot. *GENERAL ATOMICS AERONAUTICAL SYSTEMS*

SAN DIEGO — General Atomics Aeronautical Systems Inc. used a company-owned Avenger MQ-20A unmanned aircraft system to fly a military aircraft using an artificially intelligent pilot

deployed on an operationally relevant, open mission systems software stack on Sept. 12, the company said.

The Avenger's completely autonomous flight used the AI pilot for close to 30 minutes as a part of a cooperating live, virtual and constructive UAS swarm. The flight was performed as part of GA-ASI's ongoing commitment and investment into the development of advanced autonomy of AI and machine learning for UAS.

The flight made use of GA-ASI's novel Reinforcement Learning architecture to develop and validate an RL agent in an operationally relevant environment. RL agents provide a new and innovative tool for next-generation military platforms to make decisions under dynamic and uncertain real-world conditions. The team flew "chase and avoid behavior" where real-time updates were made to the flight path to avoid adversaries using live fused tracks. Live tracks were provided to the system using the Infrared Search and Track sensor network supplied by Lockheed Martin.

"The flight was a tremendous success and demonstrated a number of groundbreaking capabilities in the race to operationalize autonomy for collaborative combat aircraft," said GA-ASI Senior Director of Advanced Programs Michael Atwood. "It's exciting to see how AI can be used to advance how and where we fly unmanned systems as the complexity of the battlespace increases. Our 'chase and avoid' agent's ability to dynamically update the flight path as threats were identified is the first step towards building an ecosystem of collaborative autonomous combat aircraft."

TacIRST is a new class of multifunction, embeddable sensor system with an open architecture. It was developed by Lockheed Martin to provide a range of capabilities for both crewed and uncrewed aircraft. "We anticipated the need for passive, long-range threat detection by autonomous aircraft and are proud to see this capability integrated successfully on the Avenger,"

said Terry Hoehn, Director of Lockheed Martin's Advanced Threat Warning Systems. "We look forward to further collaboration and testing with GA-ASI."

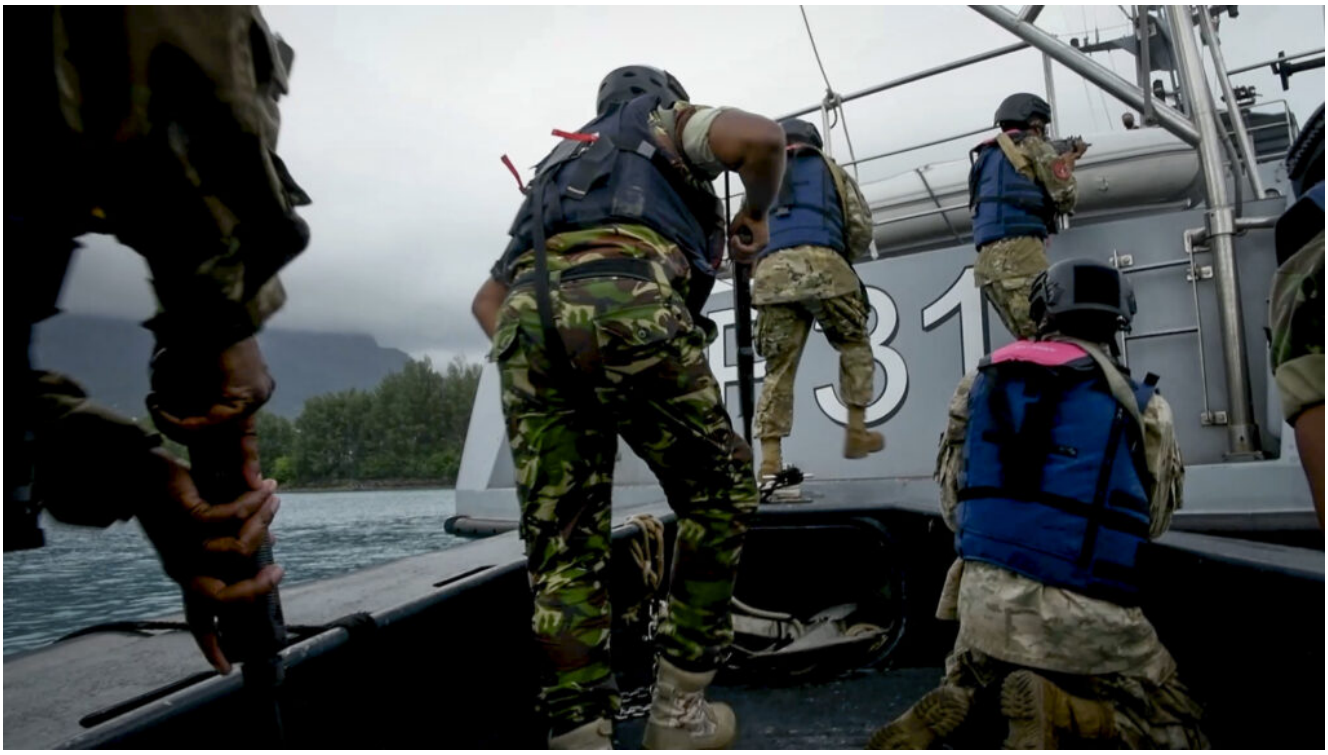
The team used a government-furnished CODE autonomy engine and the government-standard OMS messaging protocol to enable communication between the RL agent and the Tactical IRST. By utilizing government standards, such as CODE and OMS, rapid integration of autonomy for collaborative combat aircraft becomes possible.

General Dynamics Mission Systems also supplied key technologies to the flight. The mission computer used to host the OMS software is part of the Digital Backbone Node family of systems from General Dynamics Mission Systems. The DBN architecture enables rapid and secure deployment of evolving capabilities needed for CCA through application of the latest government open architectures, high-performance computing, advanced cooling, and a high-speed backplane with multi-level security to maximize battlefield collaboration between platforms.

This flight was another in an ongoing series of autonomous flights performed by GA-ASI using internal research and development funding to prove out important AI/ML concepts for advanced UAS.

International Naval Forces Partner in Seychelles to

Build Cooperation



Cutlass Express participating forces perform visit, board, search, and seizure training in Victoria, Seychelles, Feb. 15. Cutlass Express, sponsored by U.S. Africa Command and conducted by U.S. Naval Forces Africa, is designed to improve regional cooperation among participating nations in order to increase maritime safety and security in the East Africa regions. *U.S. NAVY / Mass Communication Specialist 2nd Class Daniel Charest*

MANAMA, Bahrain – The world's largest multinational naval partnership, Combined Maritime Forces (CMF), launched a two-week mission in the Indian Ocean island nation of the Seychelles with other international organizations Sept. 18 to strengthen regional collaboration and enhance operational readiness, said Combined Maritime Forces public affairs.

CMF is leading Operation Southern Readiness in partnership with the Seychelles People's Defence Force, European Union Naval Force, United Nations Office on Drugs and Crime, and India which began partnering with CMF earlier this year. This is CMF's first iteration of Operation Southern Readiness.

“Seychelles is a strong regional maritime partner and we are very grateful for them hosting this new opportunity,” said Vice Adm. Brad Cooper, commander of U.S. Naval Forces Central Command, U.S. 5th Fleet and CMF. “We are also excited to work with other international partners, including India, to train and build capacity in a vibrant way.”

Nations including Australia, Canada, France, India, Italy, New Zealand, Saudi Arabia, Seychelles, the United Kingdom and the United States are slated to participate with personnel, ships and aircraft during several training events.

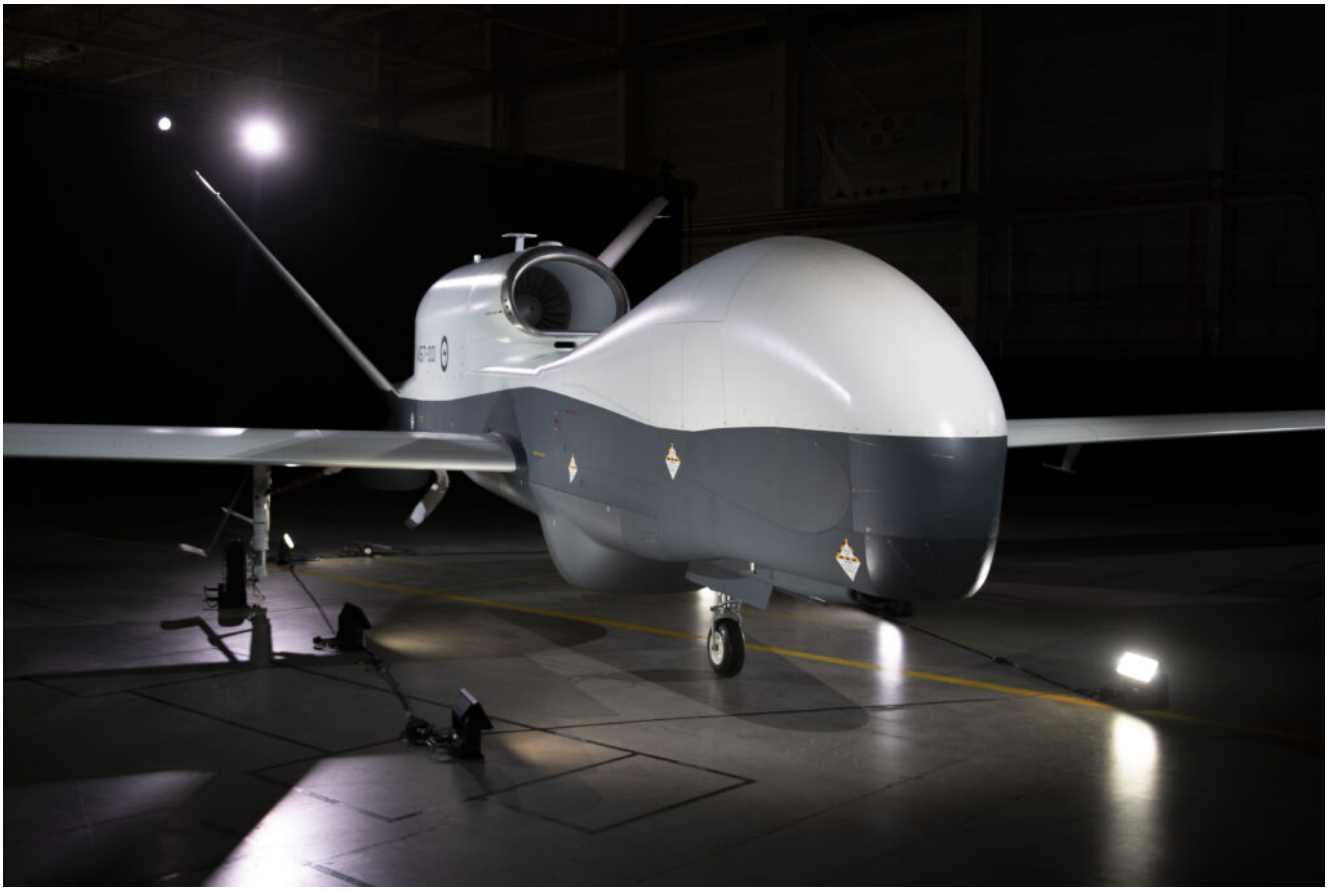
Multinational forces will conduct training on visit, board, search and seizure techniques; search and rescue operations; maritime law and information sharing.

“The training is designed to enable our partners to meet face-to-face and learn from one another and is only possible because of the teamwork and commitment from all partners,” said Royal Canadian Navy Cmdr. Alexis Dieryckx, CMF’s senior mission planner. “It’s all about building relationships because relationships are the fundamental building blocks for greater collaboration at sea.”

CMF consists of 34 member nations whose forces operate in the Red Sea, Gulf of Aden, Northern Arabian Sea, Gulf of Oman, Arabian Gulf and Indian Ocean.

CMF nations are united in upholding international rules-based order to protect the free flow of commerce, ensure regional maritime security and deter illicit activity by non-state actors.

First Australian MQ-4C Triton to Arrive in Mid-2024, Official Says



The Australian government's first MQ-4C Triton was unveiled Sept. 15 in Palmdale, California. *NORTHROP GRUMMAN*

PALMDALE, Calif. – The Australian government will receive its first MQ-4C Triton unmanned aircraft at Royal Australian Air Force (RAAF) Base Tindal in the Northern Territory in 2024, an official said at an unveiling ceremony here Sept. 15.

Air Vice-Marshal Robert Denney, the RAAF head of Air Force capability, said during the ceremony that when the RAAF receives the aircraft, it will be used for many capabilities beyond its core intelligence, surveillance, and reconnaissance functions.

"It will revolutionize the ways the Australian Defense Forces

conduct operations with our allies," he said.

The aircraft was unveiled at manufacturer Northrop Grumman's high-altitude, long-endurance aircraft production site in Palmdale. Both Australian and U.S. government officials were on hand to talk about the Triton and the ongoing cooperation between Australian and U.S. defense forces.

Australia was a cooperative program partner in the Triton program as it was being developed. As a result, they will be able to share data with the United States that is collected by both countries' Tritons.

Rear Adm. Stephen Tedford, program executive officer for Unmanned Aviation and Strike Weapons for the U.S. Navy, said during the ceremony that continued partnership between Australia and the United States will "allow both of our nations to better project military power, maintain our competitive edge, and maintain peace and stability in the region."

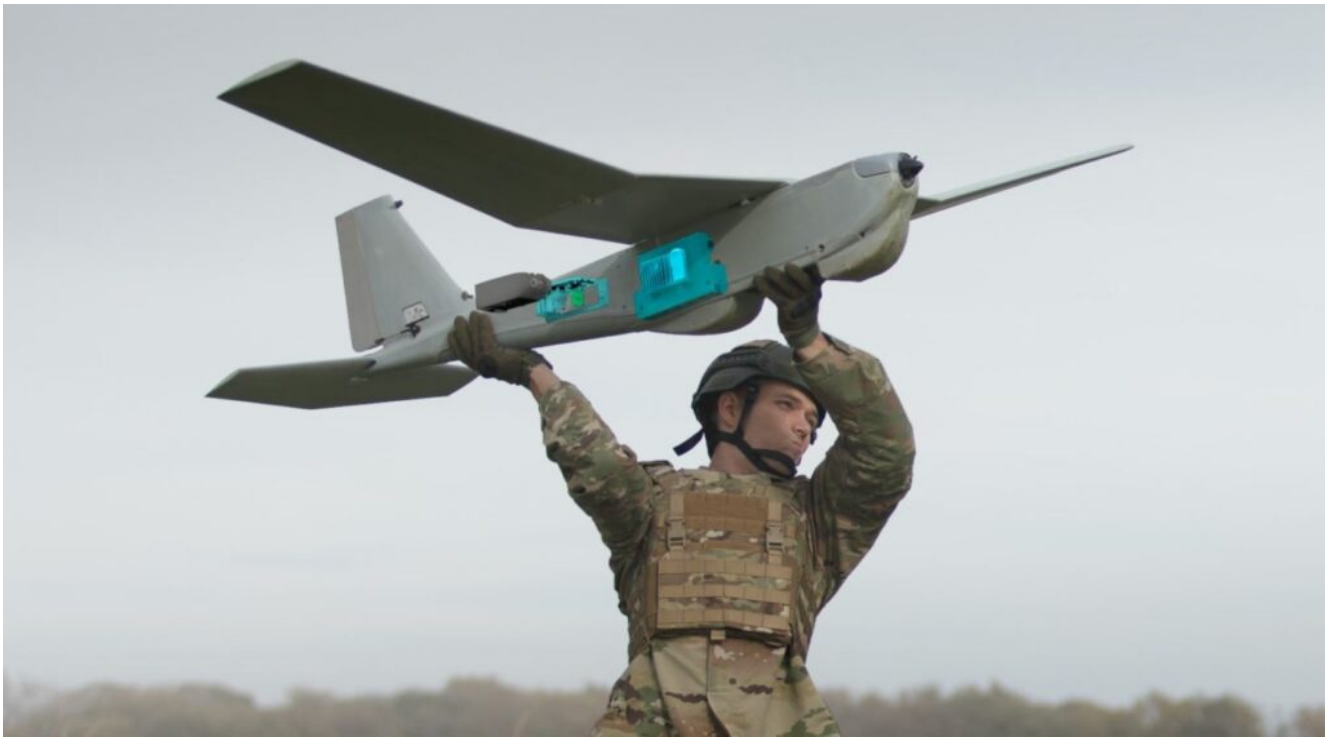
He noted that Australian personnel had been embedded in the Triton program since 2009.

"Since that time, this platform has expanded its capabilities far beyond those it started with," he said. "I am confident that our dedicated team … will work tirelessly to deliver this aircraft and many more to come."

The MQ-4C provides persistent ISR capabilities in a maritime environment, making it useful as a long-endurance surveillance platform in the Asia-Pacific region.

Northrop Grumman started building the first Australian Triton in October 2020 at its facility in Moss Point, Miss. In December 2021, the fuselage and one-piece wing were joined together in Palmdale. Production completion is planned for 2023 ahead of delivery in 2024.

AeroVironment Introduces Puma VNS, a Visual-Based Navigation System for Small UAS



An illustration of a Puma small UAS equipped with the new Puma VNS, which determines the precise location of an aircraft during flight without relying on GPS. *AEROVIRONMENT*

ARLINGTON, Va. — AeroVironment Inc. on Sept. 15 introduced Puma VNS, a visual-based navigation system for Puma 2 AE and Puma 3 AE small unmanned aircraft systems that will enable GPS-denied navigation across increasingly GPS-contested environments.

The system will provide operators with continually advanced navigation capabilities, features and functionality through anticipated software and hardware updates, the company said in

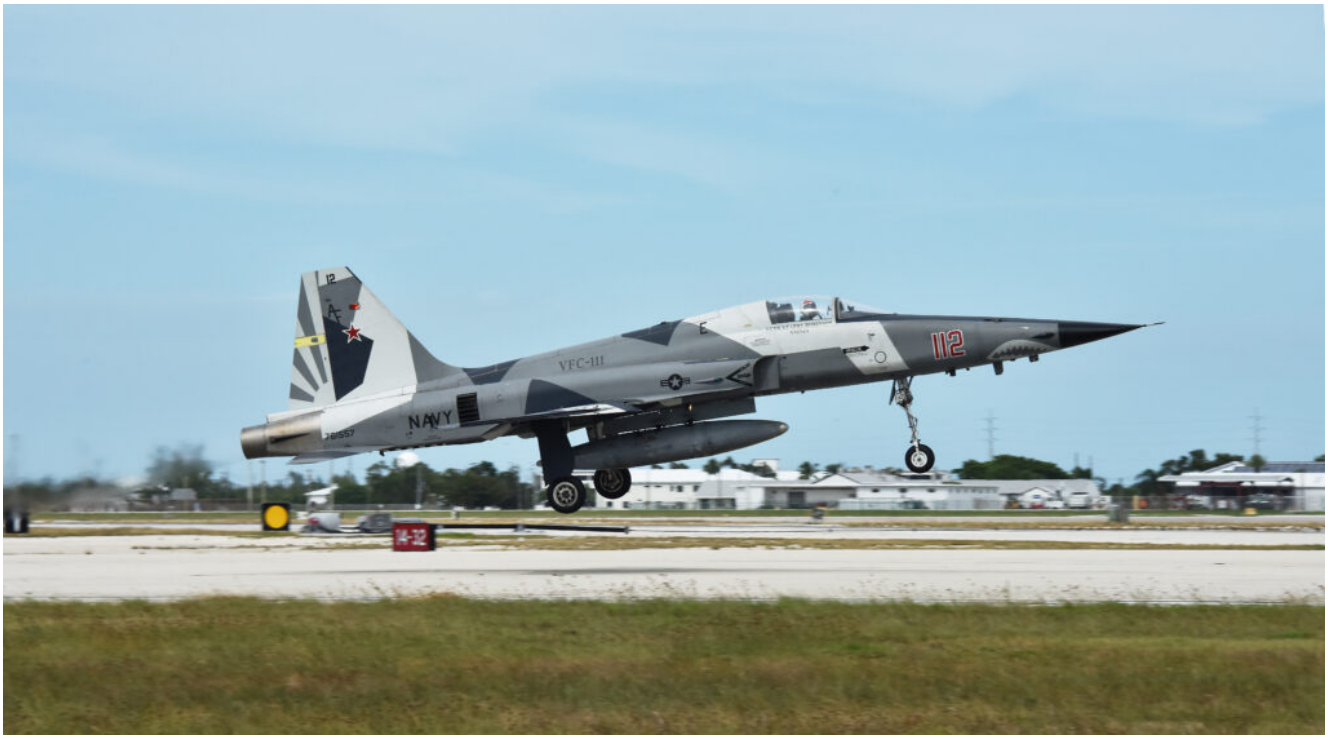
a release. The system will also enable the integration of future autonomy capabilities.

“Puma VNS gives operators an unprecedented advantage in the battlefield,” said Trace Stevenson, AeroVironment vice president and product line general manager for SUAS. “Operators now can execute missions with more confidence in GPS-contested environment with the system’s new navigational capabilities.”

The next-generation navigation system features a suite of down-looking sensors that gather imagery data and track features on the ground, as well as an embedded compute module to process and determine the precise location of an aircraft while it is in flight. Designed with the operator in mind, the system automatically transitions to and from GPS-denied navigation mode without any input from the operator.

Puma VNS is available as an add-on option for new Puma 3 AE system orders and as a retrofit kit for fielded Puma 2 AE and Puma 3 AE systems.

Garmin G3000 Selected to Modernize Navy and Marine Corps F-5 Aircraft



An F-5N Tiger-II from the "Sun Downers" of Fighter Squadron Composite 111 takes off from Naval Air Station Key West's Boca Chica Field in 2020. *U.S. NAVY / Danette Baso Silvers*

OLATHE, Kansas – Garmin International Inc. announced Sept. 13 the selection of the Garmin G3000 integrated flight deck by Tactical Air Support Inc. as part of a contract with the U.S. Department of Defense's F-5N+/F+ Avionics Reconfiguration and Tactical Enhancement/Modernization for Inventory Standardization (ARTEMIS) program.

Tactical Air first selected the Garmin G3000 for their F-5 adversary aircraft training fleet in 2018. This recent award builds upon Tactical Air and Garmin's strategic relationship now serving the DoD fleet of F-5 adversary aircraft. Garmin's commercial-off-the-shelf G3000 open architecture supports integration with a wide range of mission equipment including military sensors, helmet mounted displays and advanced electrically scanned radar systems.

"It is an honor to team with Tactical Air and have our versatile G3000 integrated flight deck chosen for the ARTEMIS contract with the Department of Defense," said Carl Wolf, Garmin vice president of aviation sales and marketing. "Garmin is proud to see our integrated flight deck technologies,

deployed now on over 25,000 aircraft, also being adopted by the U.S. military and enhancing the mission and safety capabilities of our nation’s warfighters.”

The F-5 is a supersonic, multi-role tactical fighter and attack aircraft that in this role will provide air-to-air combat training, close-air support training, tactical development and evaluation support. The upgraded F-5 Advanced Tiger will be used in an aggressor training role, and the G3000 will transform the cockpit with one large area display and two touchscreen controllers. These upgrades bring modern safety systems and new tactical capabilities to the older airframes while also solving parts obsolescence and reliability issues within the existing avionics system.

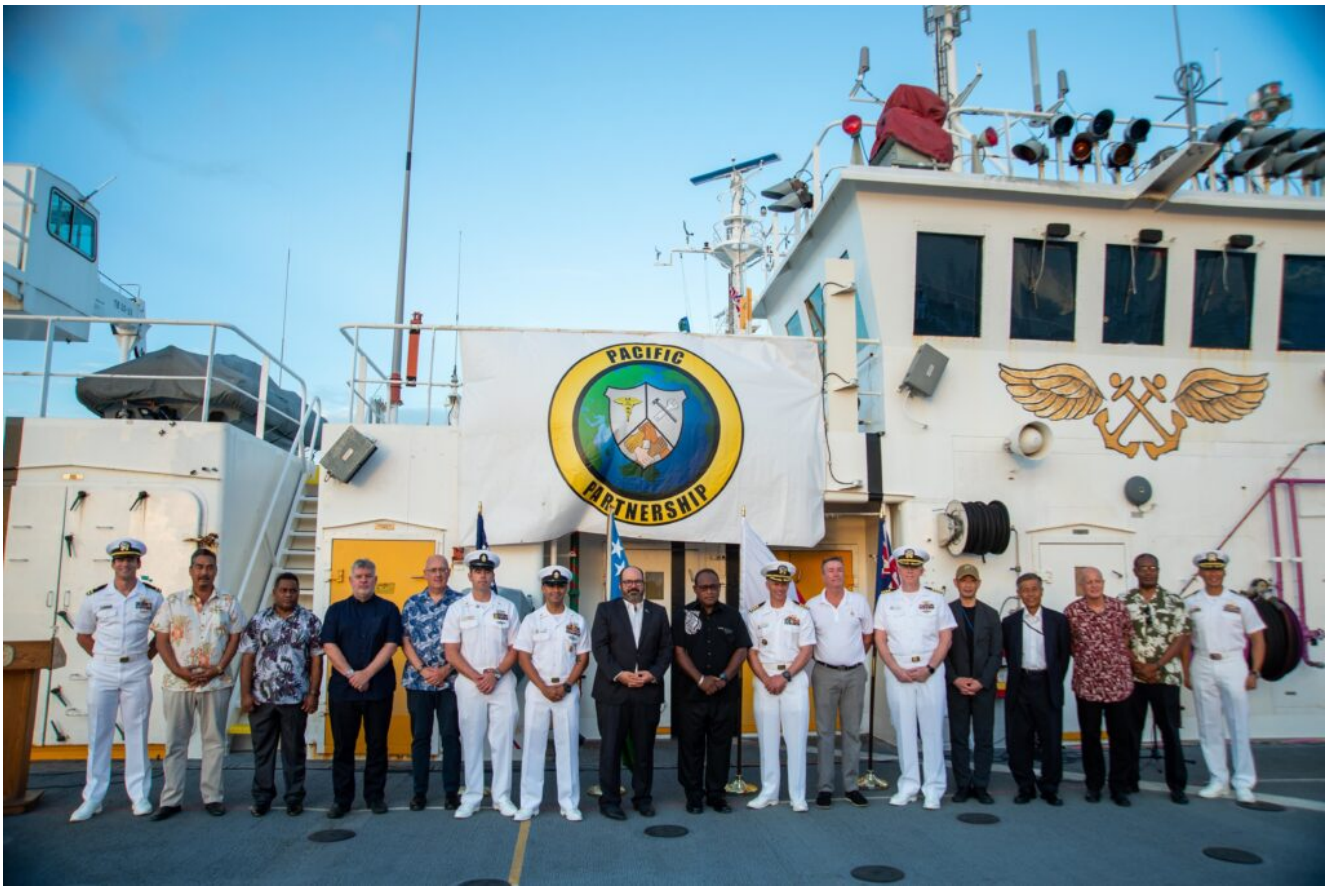
“Tactical Air is thrilled to have Garmin’s cutting edge G3000 in the F-5 AT cockpit,” said RC Thompson, Tactical Air CEO. “The Garmin integrated flight deck gave us an outstanding COTS solution to the Navy and Marine Corps’ recently purchased fleet of F-5 aircraft to make them an even more capable adversary fighter for our aviators to train against.”

The G3000 boasts a large and vibrant high-resolution flight display that seamlessly interfaces to the F-5’s existing mission computer, enabling advanced mapping, tactical radio capabilities, radar display and more. The non-proprietary interface, software-based human-machine interface and mission integration will enable the DoD to rapidly deploy new technologies in the future, while providing access to the latest in commercial Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) capabilities. Tactical Air has integrated the L3Harris ForceX mission computer along with a wide range of military sensors, communications equipment, and weapons systems into the G3000 touchscreen HMI.

In addition to night vision goggle compatibility, the G3000 contains modern, state-of-the-art synthetic vision technology

that blends an “out-the-window” view of surroundings on the large area, primary flight displays, which is particularly helpful during nighttime operations and during close air support missions. Additional features within the G3000 integrated flight deck on the F-5 include Terrain Awareness and Warning System, Traffic Collision Avoidance System and Automatic Dependent Surveillance-Broadcast (ADS-B IN) traffic.

USNS Mercy Team Concludes Pacific Partnership in Solomon Islands



Pacific Partnership 2022 leadership, Solomon Island leaders

and members of the international diplomatic corps in the Solomon Islands pose for a photo during the PP22 Solomon Islands closing ceremony aboard Military Sealift Command hospital ship USNS Mercy (T-AH 19). *U.S. NAVY / Mass Communication Specialist 2nd Class Jacob Woitzel*

SOLOMON ISLANDS – The Solomon Islands-Pacific Partnership 2022 team wrapped up two weeks of collaboration across several lines of effort during a closing ceremony on board USNS Mercy (T-AH 19), on Sept. 10, Leslie Hull-Ryde of Commander, Logistics Group Western Pacific, said in a Sept. 14 release.

Now in its 17th year, Pacific Partnership is the largest annual multinational humanitarian assistance and disaster relief preparedness mission conducted in the Indo-Pacific. This year, the hospital ship USNS Mercy (T-AH 19) serves as the PP22 mission platform.

While this year's mission marked Mercy's inaugural visit to Solomon Islands, Pacific Partnership 2022 returned to the Solomon Islands late August, continuing to build on a foundation established during the previous four PP missions here.

"It's great to bring Pacific Partnership back to Solomon Islands and continue to deepen these friendships and partnerships we hold so dear," said Capt. Hank Kim, Pacific Partnership 2022 mission commander.

Pacific Partnership is a unifying mission that fosters enduring friendship and cooperation among many nations. This year's mission in the Solomon Islands includes participants from the host nation, the United States, Japan and Australia.

"This collaborative effort amongst our partners and hosts is what this mission is all about," Kim said. "As we learn from each other and grow as professionals, we enhance our collective ability to respond to any disaster we may face. As the Pacific Partnership moto goes, 'we are preparing in calm

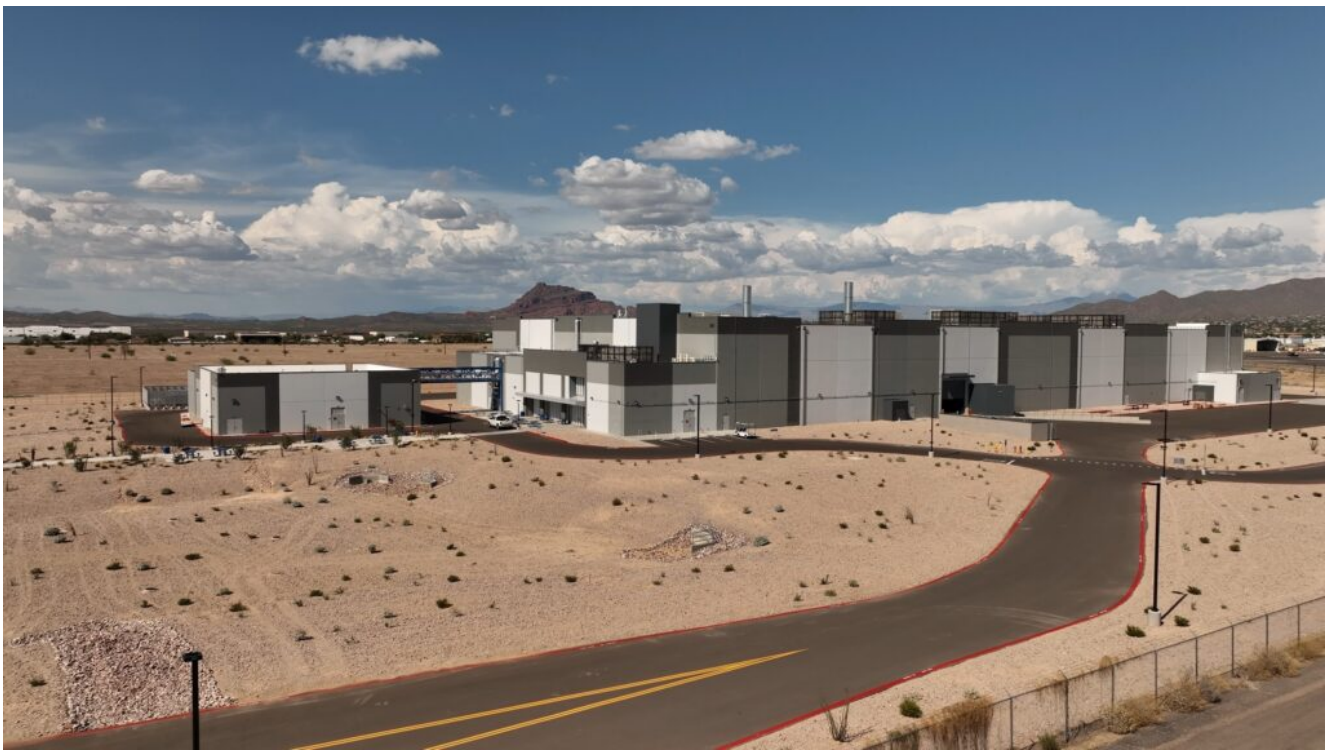
to respond in crisis’.”

PP22 events are coordinated with the host nation and are planned based on the requirements and requests of the Solomon Islands. Engagements in Honiara and beyond included medical care and exchanges, engineering projects, discussions on humanitarian assistance and disaster relief, and community outreach events, including band concerts and sporting events.

During the mission stop, the PP22 team conducted more than 5,800 medical engagements, including more than 4,500 dental procedures, distributing more than 1,000 eyeglasses, and performing more than 50 surgeries; more than 80 consultations with local pet owners; a humanitarian assistance and disaster relief workshop that included the Solomon Islands National Disaster Management Office and other first responders; 16 band concerts; and four engineering projects. In addition to events in Honiara and Guadalcanal Province, Pacific Partnership activities, to include medical knowledge exchanges, took place in Gizo and Malaita.

In addition to Solomon Islands, this year’s Pacific Partnership mission included stops in Vietnam, Palau, the Philippines and engineering engagements in Fiji and Papua New Guinea.

Boeing Reveals First of New Innovative Defense Factories



Boeing Phantom Works' Advanced Composite Fabrication Center in Mesa, Arizona, leverages the latest in digital engineering and advanced manufacturing to produce components for future advanced combat aircraft. *BOEING*

MESA, Ariz. — Boeing's Defense, Space & Security business unit unveiled on Sept. 12 its new Advanced Composite Fabrication Center, which has been purpose-built to produce advanced composite components for future combat aircraft, the company said in a release.

The new facility in Mesa, Arizona, will be a secure production facility operated by Phantom Works, BDS' proprietary research, development and prototyping division. The construction phase of the 155,000 square-foot facility is now complete, and the center is expected to be fully operational this fall.

"Boeing pioneered a new era of digital aerospace engineering on programs like the T-7, MQ-25 and MQ-28, and now we're leading the way again by digitally transforming our entire production system to build the next generation of advanced combat aircraft," said Ted Colbert, Defense, Space & Security president and CEO. "The new Advanced Composite Fabrication Center and the factories that will follow it position Boeing to deliver the most digitally advanced, simply and efficiently

produced and intelligently supported aircraft to military customers.”

Leveraging best practices from recent new-start programs like the MQ-28 Ghost Bat, MQ-25 Stingray, T-7A Red Hawk and proprietary efforts, the ACFC will enable Boeing to scale a platform-agnostic, modular and flexible digital production system across future BDS programs, providing unprecedented speed, agility and cost efficiency. Additional new factories supporting subsequent phases of production are under construction in the St. Louis region and slated to come online over the next few years.

“The ACFC capitalizes on the latest in digital engineering – from initial concept and design to the production floor and sustainment – and its capabilities are aligned directly with our customers’ need to design, build and field advanced combat aircraft on dramatically accelerated timelines,” said Steve Nordlund, Boeing Phantom Works vice president and general manager. “We are committed to a future where our platforms are more modular and adaptable, our software is more modifiable and scalable, and where our customers have a common experience across all of our products – providing disruptive advantages from seabed to space.”

HII Begins Fabrication of Amphibious Transport Dock Ship Pittsburgh

HII's Ingalls Shipbuilding division in Pascagoula, Mississippi. *HII*

PASCAGOULA, Miss. – HII's Ingalls Shipbuilding division started fabrication of the U.S. Navy's newest San Antonio-class amphibious transport dock Pittsburgh (LPD 31) on Sept. 7, the company said in a release. The start of fabrication signifies that the first 100 tons of steel have been cut for the ship.

"The start of fabrication on LPD 31 demonstrates our ability to continue manufacturing quality ships for our Navy and Marine Corps partners," said Mike Pruitt, Ingalls Shipbuilding LPD program manager. "Our shipbuilders are excited to be reaching this milestone in construction and are committed to seeing Pittsburgh serve our nation well into the future."

Ingalls has delivered 12 San Antonio-class ships to the Navy and has three more under construction, including Richard M. McCool (LPD 29), Harrisburg (LPD 30) and Pittsburgh (LPD 31), which will be the second Flight II LPD.

LPD Flight II is the next generation amphibious ship to replace Whidbey Island (LSD 41) and Harpers Ferry (LSD 49) classes of dock landing ships. Amphibious transport docks are

a major part of the Navy’s 21st century expeditionary force, deployed with a U.S. Marine Corps Air-Ground Task Force for amphibious and expeditionary crisis response operations that range from deterrence and joint-force enablement to humanitarian assistance and disaster relief.

LPD 31 is the fifth Navy vessel to be named after the historic city of Pittsburgh, Pennsylvania. The first ship was an ironclad gunboat and served during the American Civil War. Since then, the name Pittsburgh has been assigned to four vessels that have served the U.S. during conflict.