NAVAL AVIATION NEWS

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AFTER 55 YEARS, HARRIER FLIES INTO THE SUNSET

WHAT'S INSIDE

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DEPARTMENTS

FEATURES

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ON THE COVER

On the Cover: *An AV-8B Harrier II, attached to Marine Medium Tiltrotor Squadron 163 (Reinforced) rests on the flight deck elevator of amphibious assault ship USS Boxer (LHD 4), Oct. 25, 2019. The Boxer Amphibious Ready Group and 11th Marine Expeditionary Unit were deployed to the U.S. 7th Fleet area of operations to support regional stability, reassure partners and allies, and maintain a presence to respond to any crisis, ranging from humanitarian assistance to contingency operations. (U.S. Navy photo illustration by Fred Flerlage; imagery by Mass Communication Specialist 2nd Class Dale M. Hopkins)*

In this edition of Naval Aviation News*, we take a moment to reflect on the end of the 55-plus-year service of the Harrier "jump jet," a unique stalwart of Marine aviation, on* ***page 20****. On* ***page 28****, learn how Marines streamlined rearming and resupplying fixed-wing aircraft on the ground, limiting the time the aircraft would be out of the fight. The next Ford class aircraft carrier, Pre-Commissioning Unit John F. Kennedy (CVN 79), recently completed its first underway during builder trials. Read about this important operations test on* ***page 26****. And on* ***page 38****, learn how the SWIT painstakingly troubleshoots the loading and storage of munitions and equipment aboard a vessel to ensure the safety of all involved.*

On the back cover: *Sailors assigned to Patrol Squadron (VP) 1 prepare a P-8A Poseidon for flight aboard Naval Air Station Whidbey Island, Feb. 24. (U.S. Navy photo by Naval Aircrewman 2nd Class Carrie Shoemaker).*

The U.S. Navy's Oldest Periodical, Established 1917

U.S Navy photo illustration by Fred Flerlage; imagery from U.S. Marine Corps video by Cpl. Christian Cortez

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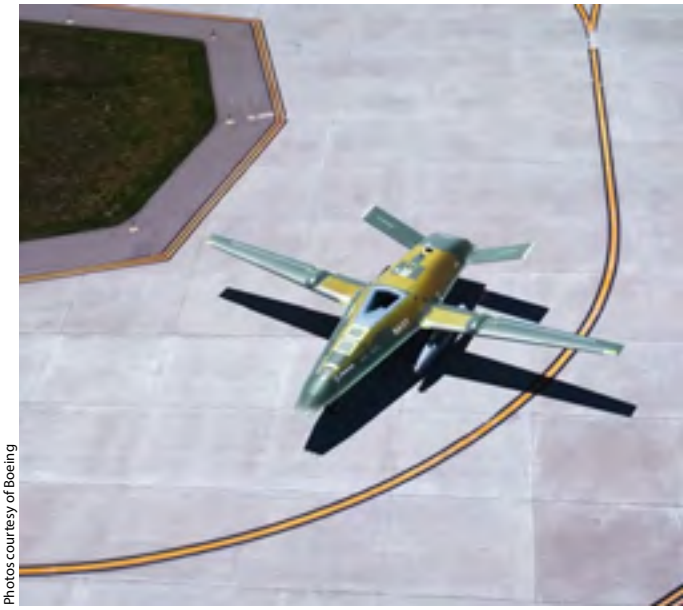
Airscoop

Compiled by Rob Perry

MQ-25A Stingray Achieves Successful First Flight, Advances Future of Naval Aviation

PATUXENT RIVER, Md.—The Navy's MQ-25A Stingray successfully completed its first test flight from Boeing's facility at MidAmerica Airport in Mascoutah, Illinois, April 25, achieving a key step for unmanned carrier operations.

The MQ-25A took off at 10:49 a.m. CDT and flew for approximately two hours. During the flight, Navy and Boeing Air Vehicle Pilots (AVPs) controlled the aircraft from the Unmanned Carrier Aviation Mission Control System MD-5 ground control station that includes Lockheed Martin's MDCX system. The AVPs executed a series of maneuvers and tests, successfully vali-



The Navy's MQ-25A Stingray takes its first flight April 25 at Boeing's facility at MidAmerica Airport in Mascoutah, Ill. The MQ-25 is the Navy's first operational carrier-based unmanned aircraft.

Photos courtesy of Boeing

dating the aircraft's basic flight controls, engine performance and handling characteristics.

"Achieving this first flight underscores the strong partnership between the Navy and our industry partners," said Rear Adm. Tony Rossi, who oversees the Program Executive Office for Unmanned Aviation and Strike Weapons (PEO (U&W)). "The MQ-25A is not just an aircraft; it's the first step in integrating unmanned aerial refueling onto the carrier deck, directly enabling our manned fighters to fly further and faster. This capability is vital to the future of Naval Aviation."

The MQ-25A Stingray is the U.S. Navy's first operational, carrier-based unmanned aircraft system, designed primarily to serve as an aerial refueling tanker. By taking over the refueling mission from crewed fighters, the MQ-25A will significantly extend the combat range and effective strike capability of the Carrier Air Wing.

"I am incredibly proud of the team for working tirelessly over the last several months to achieve this milestone," said Capt. Daniel Fucito, program manager for the Unmanned Carrier Aviation Program Office. "The successful first flight officially initiates the rigorous flight test program, which will focus on expanding the aircraft's performance envelope and verifying all mission systems."

The MQ-25A integrated test team will continue ground control station integration, expanding the flight envelope and verifying performance parameters before its ferry flight to Pax River later this year.

From the Unmanned Carrier Aviation Program Office.

P-8A Poseidon Reaches IOC with Increment 3 Block 2 Modifications

PATUXENT RIVER, Md.—The Navy declared Initial Operational Capability (IOC) for the P-8A Poseidon Increment 3 Block 2 (Inc 3 Blk 2) system in April. This significant milestone was achieved after the initial phase of Initial Operational Test performed by Air Test and Evaluation Squadron 1 (VX-1) with support from the Maritime Patrol and Reconnaissance Aircraft Program Office.

"The P-8A Inc 3 Blk 2 modifications enhance Naval Aviation's Maritime Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) capabilities—the eyes of the fleet," said Rear Adm. Michael Wosje, director of Air Warfare (OPNAV N98). "This capability enhancement is in line with the CNO Fighting Instructions and the Golden Fleet Initiative, which shifts the paradigm from platform-centric thinking to a warfighting system. We are delivering the P-8A Inc 3 Blk 2 as a high-end, networked and rapidly adaptable platform."

The P-8A is the Department of War's only long-range, full-spectrum anti-submarine warfare (ASW), cue-to-kill platform, with substantial armed anti-surface warfare and networked intelligence, surveillance and reconnaissance (ISR) capabilities. Inc 3 Blk 2 provides a significant upgrade to the P-8A airframe and avionics systems, and includes new airframe racks, radome, antennas, sensors and wiring. The modification incorporates a new combat systems suite with improved computer processing, higher security architecture, a wideband satellite communication system, an ASW signals intelligence capability, a track management system, and additional communications and acoustics systems to enhance search, detection and targeting capabilities.

"The recent deployment of P-8A Increment 3 Block 2 marks the culmination of a spiral development strategy that delivers winning capability to the fleet and ensures that the P-8A will remain agile, relevant and lethal for decades to come," said Rear Adm. Craig Mattingly, Commander, Patrol and Reconnaissance Group (CPRG), responsible for the manning, training and equipping of the Maritime Patrol and Reconnaissance fleet of aircraft for the Navy.

The Maritime Patrol and Reconnaissance Aircraft Program Office has advanced P-8A's capabilities through a phased, incremental acquisition strategy using Engineering Change Proposals (ECPs). This approach began with Increment 1, which reconstituted the capabilities of the legacy P-3C Orion and continued with further upgrades in Increment 2.

"I am extremely proud of the dedicated and focused acquisition team that is delivering this capability to the fleet," said Capt. Erik Thomas, program manager. "The P-8A Increment 3 Block 2 modifications could not have come at a better time in our current state of evolving threats. The Poseidon is the cornerstone of sophisticated and lethal global maritime patrol and reconnaissance forces, and this enhanced capability ensures we sustain the core pillar of world-class maritime intelligence, surveillance, reconnaissance and targeting (ISR&T) and remain ready for our current and future fights."

The Maritime Patrol and Reconnaissance Aircraft Program Office is responsible for the acquisition, sustainment and continuous modernization of the P-8A Poseidon, ensuring it remains the world's premier multi-mission maritime patrol and reconnaissance aircraft.

CPRG works with the Joint Force allies and partners to find things beneath or on the sea and destroy them. Everything else is in support.

From the Maritime Patrol and Reconnaissance Aircraft Program Office.

Photo courtesy of Boeing

Increment 3 Block 2 provides a significant upgrade to the P-8A airframe and avionics systems and includes new airframe racks, radome, antennas, sensors and wiring.

U.S. Navy Photo by Erik Hildebrandt

A CH-53K from Air Test and Evaluation Squadron 21 (HX-21) performs a recovery rigging evaluation of a CH-53K Engineering Development Model without engines, most gearboxes and tail pylon. This expansion of the aircraft's capabilities, including understanding the flight characteristics and load dynamics in such a heavy lift, ensures the Marine Corps can safely execute a Tactical Recovery of Aircraft and Personnel (TRAP) mission in the future.

CH-53K Expands Capabilities with CH-53K-to-CH-53K Recovery Test

PATUXENT RIVER, Md.—In a striking demonstration of power and precision, the CH-53K King Stallion helicopter successfully lifted another CH-53K during an April test led by the H-53 Heavy Lift Helicopters Program Office. Conducted by Air Test and Evaluation Squadron 21 (HX-21), the test marked a major milestone in the aircraft recovery rigging evaluation, a critical step aimed at expanding future operational capabilities and procedures for the Marine Corps' newest heavy-life platform.

Col. Kate Fleeger, program manager, emphasized both the rarity and importance of the capability.

"This is a capability we hope will never be needed in the fleet," Fleeger said. "However, the continued expansion of the aircraft's capabilities ensures a faster response to emerging requirements and highlights its ability to perform."

The evaluation focused on validating the specialized rigging and procedures required to safely recover a downed or disabled CH-53K, procedures not yet standardized in the Navy's official salvage manuals. The test allowed engineers and pilots to study flight characteristics, load dynamics and the handling qualities associated with such a heavy lift, ensuring the Marine Corps can safely execute future tactical recovery of aircraft and personnel (TRAP) missions.

Fleeger noted the insights and data gathered will directly inform updates to the Aircraft Salvage Operations manual, standardizing dual-point external lift procedures for the fleet. The aircraft lifted during the test was an engineering development model (EDM) from the King Stallion's initial test program. To reduce weight, the team removed the aircraft's three engines, most gearboxes and the tail pylon, bringing the aircraft to approximately 28,000 pounds, still well within the CH-53K's current external lift envelope of 36,000 pounds.

The EDM's service isn't over. It will soon transfer to Marine Heavy Helicopter Training Squadron 302 at New River, North Carolina, where it will support ground operations training for the next generation of King Stallion aircrew and maintainers.

The H-53 Heavy Lift Helicopters Program Office oversees the full lifecycle of the H-53 family, from procurement and development to fleet support, fielding and eventual disposal, ensuring the Marine Corps' heavy-lift community remains ready, capable and forward-focused.

From the H-53 Heavy Lift Helicopters Program Office.

Navy Completes Final Flight Test for Harpoon Block II Obsolescence Update

U.S. Navy photo

An F-15 carries a Harpoon Block II during a test Jan. 16 off the coast of California.

PATUXENT RIVER, Md.—The Navy successfully completed the third and final planned flight test of the Harpoon Block II Update (HIIU) Obsolescence Update program Jan. 16, marking a key milestone in modernizing and sustaining the weapon system.

The Precision Strike Weapons Program Office, in partnership with Boeing, conducted the test at Naval Air Weapons Station China Lake and the Point Mugu Sea Range in California. The event demonstrated a successful coastal target suppression mission against a representative land target, with all test objectives met based on preliminary assessments.

"This milestone reflects the strength of the integrated government and industry team and their commitment to delivering reliable, relevant capability to the fleet," said Capt. Sarah Abbott, Precision Strike Weapons program manager.

During the mission, the missile executed multiple altitude changes to simulate a coastal engagement. After launching from an F-15 Eagle at approximately 12,000 feet above ground level, the missile descended to an initial waypoint altitude of 5,000 feet, then proceeded to the target area and performed a steep terminal dive before impact.

The HIIU flight test series consisted of three events designed to progressively validate system performance across mission sets. The first test verified guidance and aerodynamic performance, the second demonstrated engagement of a moving maritime surface target, and the final event confirmed effectiveness against a land-based target—highlighting the weapon's operational versatility.

Following this event, system-level flight testing for the HIIU Obsolescence Update is nearly complete, with initial deliveries planned for later this year.

HIIU builds on the Harpoon's 50-plus-year legacy by addressing obsolescence items and preparing the weapon to extend production around the world. The Navy and more than 30 foreign partners use the Harpoon in support of anti-ship and land-strike missions.

From the Precision Strike Weapons Program Office.

Navy Awards Contract for Next-Generation Fixed-Wing Helmet System

PATUXENT RIVER, Md.—The Navy recently awarded a $22.6 million contract to Gentex Corporation to deliver more than 5,000 Next-Generation Fixed-Wing Helmet (NGFWH) systems and spares to support the fielding of these systems across all Navy fixed-wing aircraft.

The firm-fixed-fee, indefinite-delivery/indefinite-quantity contract is intended to streamline and modernize life-support capabilities for fixed-wing aircrews and will eventually replace the aging HGU-55/P and HGU-68P legacy helmets, which have served as the fleet standard for decades.

"The NGFWH is a leap forward in aircrew ergonomics. By utilizing a lighter, more balanced carbon-fiber shell, we are significantly reducing the long-term physical toll on our aviators," said Capt. Joseph Kamara, Naval Aircrew Systems program manager. "This isn't just a piece of safety gear; it's a modular platform that allows us to rapidly integrate the next generation of digital cockpit technology without needing to field an entirely new helmet every few years."

The NGFWH provides several critical upgrades designed to improve both aircrew health and combat effectiveness. Its advanced carbon-fiber construction significantly reduces head-borne weight, while an optimized center of gravity mitigates the chronic neck and back strain often caused by long-duration missions and heavy flight gear. The system's internal liner ensures the helmet remains secure during high-G maneuvers, preventing the displacement of critical night vision sensors or flight data displays when precision is most vital.

Beyond physical protection, the system's modular design ensures long-term operational relevance. This modularity allows for the rapid integration of emerging head-mounted displays and enhanced communication systems without the need for a full equipment overhaul. The design creates a flexible, combat-ready system capable of addressing changing operational requirements, ensuring that Navy and Marine Corps aviators flying the F/A-18, EA-18G and other fixed-wing platforms remain compatible with evolving technology well into the future.

The Naval Aircrew Systems Program Office is responsible for the lifecycle management of all equipment worn or used by aircrews, including helmets, oxygen masks, flight suits and survival equipment, ensuring the safety and mission effectiveness of Navy and Marine Corps air crew.

From the Naval Aircrew Systems Program Office.

A Navy aircrewman wears the Next-Generation Fixed-Wing Helmet (NGFWH). The Navy recently awarded a $22.6 million contract to Gentex Corporation to deliver more than 5,000 NGFWH systems and spares to support the fielding of these systems across all Navy fixed-wing aircraft.

U.S. Navy photo

H-60 'MAGIC CARPET' Success: Navy Demonstrates New Precision Landing Tech in Flight

PATUXENT RIVER, Md.—The Navy's Low-Speed Precision Control (LSPC), an assistive landing technology modeled after the tactical aviation Precision Landing Mode known as MAGIC CARPET, completed its first successful flight demonstration Feb. 27, marking a major step toward bringing augmented landing capability to the military's H-60 helicopter fleet.

Developed by engineers at the Naval Air Warfare Center Aircraft Division (NAWCAD), LSPC is designed to reduce pilot workload and improve safety during the most hazardous phase of rotary-wing flight: landing in degraded, low-visibility environments or on pitching decks of ships at sea.

NAWCAD Commander Rear Adm. Todd Evans called the milestone a meaningful advancement.

"Low-Speed Precision Control is an important step forward in advancing aviator safety and operational readiness," Evans said. "This milestone reflects NAWCAD's commitment to delivering solutions that address the most challenging conditions our warfighters face."

Landing an H-60 in dust, fog or snow or on the moving deck of a ship has historically been one of the most dangerous tasks for helicopter pilots. While newer aircraft like the CH-53K King Stallion feature built-in augmented landing

Because Low-Speed Precision Control is modular, it can be rapidly installed across all H-60 variants for the Navy, Army, Coast Guard and allied forces.

U.S. Navy video still frames by NAWCAD Visual Information

Test

"Rotary-wing testers at Air Test and Evaluation Squadron (HX) 21 will continue evaluating LSPC through the summer, gathering data to validate performance and assess operational impact before the system moves closer to fleet introduction."

technology via fly-by-wire designs, legacy platforms across the services have lacked similar technology, contributing to several Class A mishaps over the years.

LSPC aims to change that. The modular hardware and software system integrates directly into cockpit controls, improving flight stability and precision during shipboard landing or shore-based landings. The system's modular design allows for rapid installation across all H-60 variants, making it a versatile, scalable upgrade for joint and allied operators.

Rotary-wing testers at Air Test and Evaluation Squadron (HX) 21 will continue evaluating LSPC through the summer, gathering data to validate performance and assess operational impact before the system moves closer to fleet introduction.

NAWCAD, based in Paxtuent River with major sites in St. Inigoes, Maryland; Lakehurst, New Jersey; and Orlando, Florida, supports test, evaluation, research, development and sustainment for all Navy and Marine Corps aviation platforms.

From the Naval Air Warfare Center Aircraft Division, Patuxent River, Md.

U.S. Navy photo

An iconic VH-3A Sea King returns to the skies after a modernization by Adversary and Specialized Aircraft Program Office and industry partners. Now, this historic aircraft is ready to continue its service with the Egyptian Air Force, strengthening a decades-long alliance.

Historic Helicopter Returned to Service, Strengthening Alliance

PATUXENT RIVER, Md.—In a powerful demonstration of its commitment to international partners, the Adversary and Specialized Aircraft Program Office successfully returned a historically significant VH-3A Sea King to the skies for the Egyptian Air Force. The project, completed in February, modernizes a key aviation asset and reinforces a strategic partnership built on decades of cooperation.

The effort, managed by the program office's H-3 Integrated Product Team in partnership with Naval Air System Command's Security Cooperation Office and industry partner Clayton International, successfully merged a legacy airframe with modern technology.

"This milestone is a testament to the teamwork and dedication of our program office, contracting teams and industry partners," said Capt. Jason Pettitt, program manager. "Together, we've delivered a modernized aircraft that strengthens our partnership with the Egyptian Air Force and highlights the value of collaboration with our allies."

The aircraft itself, BuNo 150615, has a rich history. It was originally delivered to the Marine Corps to support presidential missions for John F. Kennedy, Lyndon B. Johnson and Richard Nixon. Its role shifted from executive transport to diplomatic symbol during Nixon's 1974 visit to Egypt, when he gifted the helicopter to Egyptian President Anwar Sadat as a gesture of goodwill.

The recent refurbishment included installing a revitalized electrical backbone and a modern "glass panel" avionics suite, alongside upgraded communication and navigation systems. On Feb. 2, the Egyptian Air Force conducted an acceptance check flight, validating the aircraft's renewed performance.

"The Egyptian Air Force's active involvement and commitment to quality were key to the success of this program," Pettitt said.

Following the final installation of a custom VIP interior, the aircraft will be prepared for transport back to Egypt, where it will resume service as a flying symbol of an enduring partnership.

From the Adversary and Specialized Aircraft Program Office.

Navy Expeditionary Forces Advance Joint Refueling Capability for Distributed Operations

JACKSONVILLE, Fla.—Navy Expeditionary Warfighting Development Center (NEXWDC) and Navy Expeditionary Logistics Support Group (NAVELSG) forces conducted a limited objective experiment (LOE) at Naval Air Station Jacksonville, Florida, to evaluate expeditionary refueling solutions supporting P-8A Poseidon operations in austere environments, April 21 to May 1.

Led by NEXWDC, whose mission is to develop and strengthen the Navy's expeditionary force, the experiment brought together Navy Cargo Handling Battalion (NCHB) 1 and 2nd Navy Expeditionary Logistics Regiment to validate refueling operations and operational constraints in expeditionary settings where traditional infrastructure may be limited or unavailable.

"Fleet and joint commanders were asking for a capability that could 'bring the fuel to the fight' under contested conditions, rather than forcing platforms to withdraw to fixed refueling points," said Capt. Joseph "Karl" Haywood, commanding officer, NEXWDC. "The limited objective experiment was designed to test whether the Navy's expeditionary force could meet that demand with sufficient speed, survivability and scalability."

The effort was designed to examine how expeditionary logistics forces can integrate into a joint environment to support specialized aircraft, extend operational reach and improve the endurance and utility of aviation platforms in theater. It also served as a testbed for NAVELSG to evaluate how expeditionary refueling solutions can be incorporated into the organization's evolving force design and future operational capabilities.

"Our crew adapted extremely well throughout the LOE with all teams involved, which was very important in validating the evolution," said Chief Aviation Boatswain's Mate (Fuel) Tony Patterson, the LOE fuel's supervisor, NCHB-1. "This opportunity also provided our expeditionary refueling team hands-on experience with equipment and platforms we usually do not operate, which was an invaluable experience."

The P-8A Poseidon provides critical maritime patrol, reconnaissance and anti-submarine warfare capabilities. The LOE also supports the continued development of Navy Expeditionary Combat Command and NAVELSG under the Navy's evolving organizational construct.

Tactics, techniques and procedures used during the event were based on courses of action developed by Maritime Patrol and Reconnaissance Weapons School. This kept the effort aligned with fleet requirements and operational needs. The approach helped tie the experiment to real-world mission requirements and produced data to inform future doctrine, training and process improvements.

"This event represents a major step toward validating performance and shaping future Navy tactics, techniques and procedures," said Lt. Adrian Arango, the LOE lead planner, NEXWDC. "The energy, professionalism and teamwork throughout have been exceptional."

NAVELSG units played a central role in the experiment by providing the expeditionary logistics backbone necessary to execute the mission. NAVELSG provides global, rapid-response expeditionary logistics capabilities, including cargo handling,

U.S. Navy photos by CPO Jose L. Hernandez

transportation and ordnance support for Navy and joint forces, with a mission focused on sustaining combat operations and delivering logistics at the point of need.

More broadly, the event demonstrated how expeditionary Navy forces can integrate with joint and Marine Corps partners to support specialized aircraft in challenging environments while advancing logistics modernization efforts across the force to support distributed maritime operations. The results are expected to help inform future standard operating procedures and provide additional insight for refining expeditionary refueling concepts, improving interoperability and increasing readiness.

Written by Chief Petty Officer Jose Hernandez with the Navy Expeditionary Logistics Support Group.

Navy Expeditionary Warfighting Development Center, Navy Expeditionary Combat Command, Navy Expeditionary Logistics Support Group, Navy Cargo Handling Battalion 1 and 2nd Navy Expeditionary Logistics Regiment personnel conduct a Limited Objective Experiment at Naval Air Station Jacksonville, Fla., April 22.

Navy Dedicates MQ-25 Hangar to Fallen Test Pilot

U.S. Navy photo by Todd Frantom

The wife of the late Lt. Cmdr. Raymond O'Hare delivers remarks during a ceremony dedicating a new test facility in her husband's name. The hangar, which will support the MQ-25A Stingray program, honors O'Hare, a U.S. Naval Test Pilot School alumnus who died in a training accident in 2000.

PATUXENT RIVER, Md.—The Navy dedicated one of Naval Air Station Patuxent River's newest facilities, an advanced test hangar intended for future testing of the MQ-25A Stingray, on April 10 in honor of a U.S. Naval Test Pilot School (USNTPS) alumnus who died in a training accident nearly 25 years ago.

The dedication ceremony honored Lt. Cmdr. Raymond O'Hare, a student test pilot who was killed alongside his classmate, Lt. Cmdr. Gareth Rietz, when their T-38A Talon crashed on July 11, 2000.

The event, held during the annual USNTPS alumni weekend, brought together O'Hare's family, distinguished visitors and members across the aviation community to unveil a permanent memorial and officially name the facility. Naval Air Systems Command Reserve Deputy Commander Rear Adm. Shawn Denihan, a classmate of O'Hare's, presided over the ceremony.

"Dedicating this hangar is a rare honor, reserved for those like my classmate and friend, Ray O'Hare, whose character exceeded the highest standards in the Navy," Denihan said. "It is with tremendous pride for his family that this hangar—a gateway to Naval Aviation's future—makes Ray's legacy part of every mission."

The crash occurred as the two pilots were on approach to the air station. Both were members of USNTPS Class 118. In a continued effort to honor their memory, USNTPS alumni are also working to dedicate the future E-6 Mercury replacement program hangar to Rietz.

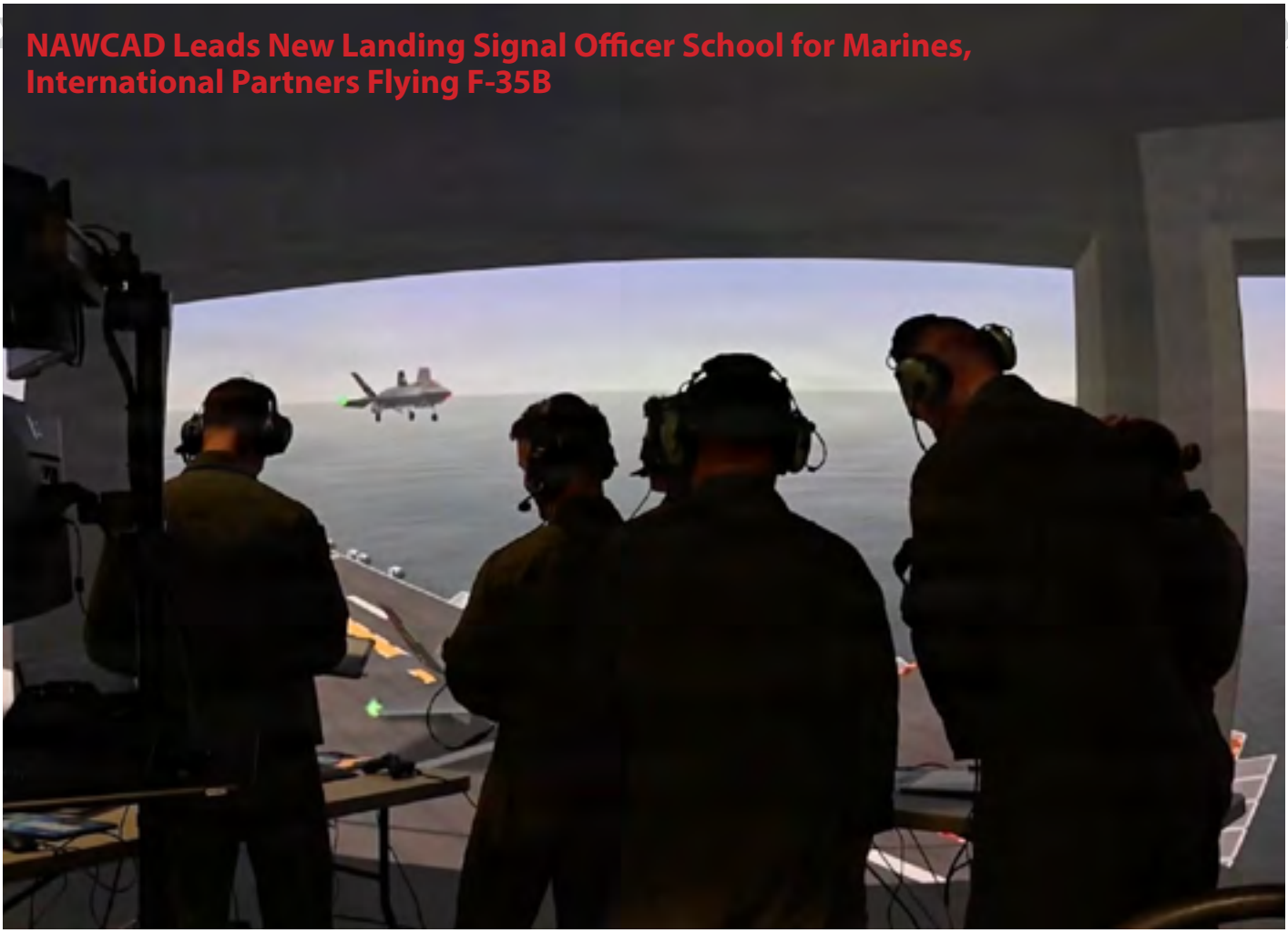
The newly dedicated hangar will be the hub for future testing of Stingray, the Navy's first carrier-based unmanned aircraft designed for aerial refueling. Capt. Daniel Fucito, Unmanned Carrier Aviation program manager, also spoke at the event, connecting the aircraft's future to Naval Aviation and the legacy of pilots like O'Hare.

"Every flight where MQ-25 takes to the skies is a testament to the enduring spirit of Naval Aviation and the memory of those like Ray who paved the way," Fucito said. "This hangar is a reminder of the courage and commitment that defines our test community."

O'Hare, a 1989 graduate of Harvard University and former F-14 Radar Intercept Officer, was 33 at the time of his death. He is survived by his wife and their three children, who were in attendance at the dedication ceremony. The permanent memorial in the hangar's foyer will serve as a reminder of O'Hare's ultimate sacrifice in the pursuit of aviation excellence.

From the Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland.

NAWCAD Leads New Landing Signal Officer School for Marines, International Partners Flying F-35B



U.S. Navy photo by Chuck Regner

Marine Corps landing signal officers monitor a simulated F-35B Lightning II recovery inside the Manned Flight Simulator at the Naval Air Warfare Center Aircraft Division in Patuxent River, Md.

PATUXENT RIVER, Md.—As global F-35B Lightning II operations expand, the Naval Air Warfare Center Aircraft Division (NAWCAD) is leading the new training pipeline for Marine Corps Short Takeoff and Vertical (STOVL) landing signal officers (LSO).

NAWCAD will serve as the interim schoolhouse until the permanent facility opens at Marine Corps Air Station Beaufort, South Carolina, in 2028.

"As the F-35B expands across the fleet and our allied partners, this school is a critical step to meet growing demand," said Lt. Col. Brian Kimmins, the school's officer in charge. "Standardizing procedures with our F-35B partner nations ensures we can operate safely and consistently from each other's ships, ultimately driving interoperability and mission success worldwide."

The program, approved by the Marine Corps' Training and Education Command in 2025, prepares officers to safely control shipboard launches and recoveries. This new school will focus on the unique procedures for the F-35B's short takeoffs and vertical landings aboard amphibious assault ships, which are distinct from the catapult and arrested-recovery operations taught at the Navy's Landing Signal Officers School. The Marines' school will expose its students to a broader range of events, including day and night emergencies and varied weather conditions.

The Patuxent River facility was selected based on its advanced simulation capabilities that provide an immediate, cost-effective solution for scenario-based STOVL LSO training until the permanent schoolhouse opens.

NAWCAD's military, civilian and contract personnel operate test ranges, laboratories and aircraft in support of test, evaluation, research, development and sustainment for all Navy and Marine Corps aviation platforms. Based in Patuxent River, Maryland, NAWCAD also has major sites in St. Inigoes, Maryland; Lakehurst, New Jersey; and Orlando, Florida.

From the Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland.

NAWCAD WOLF Innovation Ensures Radar System Readiness

U.S. Navy photo

The Navy's primary Shipboard ATC air surveillance radar system, the AN/SPN-43C.

ST. INIGOES, Md.—Innovation at the Naval Air Warfare Center Aircraft Division Webster Outlying Field (NAWCAD WOLF) Air Traffic Control and Landing Systems (ATC&LS) division is saving time and money for the warfighter by providing organic sustainment services for the Navy's primary shipboard Air Traffic Control air surveillance radar system, the AN/SPN-43C, in support of the Naval Air Traffic Management Systems Program Office.

Faced with diminishing support from the original equipment manufacturer for the aging AN/SPN-43 radar system—a cornerstone of U.S. Navy aircraft carrier operations since the 1960s—NAWCAD WOLF developed advanced in-house capabilities to repair and overhaul critical components. These efforts have addressed obsolescence challenges head-on, keeping the radar system reliable and effective in supporting complex flight operations.

"Ensuring the operational readiness of our critical systems is a top priority for the Navy, and the AN/SPN-43 radar system is no exception," said Capt. Walter Massenburg, program manager. "The innovative efforts of NAWCAD WOLF exemplify the dedication and ingenuity required to sustain mission-critical capabilities in the face of obsolescence challenges. Their proactive approach not only extends the service life of this essential system but also reinforces the Navy's commitment to maintaining mission readiness and operational excellence."

A key element of NAWCAD WOLF's initiative is the complete overhaul of the AN/SPN-43C pedestal and antenna assembly—a critical subsystem responsible for the precise rotation and stabilization of the radar antenna. Historically a major source of system downtime and maintenance challenges, the pedestal underwent a transformative process involving full disassembly, detailed inspections, repair or replacement of worn components and reassembly, followed by rigorous testing to ensure peak performance. This proactive maintenance strategy has extended the service life of the AN/SPN-43C, reduced catastrophic failures within the pedestal by 70 percent and significantly improved system reliability while lowering maintenance costs.

"We continuously refine our processes to increase project efficiency with testing and minimizing outsourcing while developing methods to keep repairs organic," said AN/SPN-43C government project lead Tom Ackerson. "With our government team providing organic in-service engineering support, we keep both the repair time and cost low."

NAWCAD WOLF also acquired, at no cost, data rights for vital radar receiver components, enabling the team to independently manufacture, repair and modify these parts. This capability mitigates the risk of obsolescence and ensures a reliable supply of spare components, further enhancing the system's sustainability.

Today, NAWCAD WOLF performs the most repair and overhaul activities for the AN/SPN-43C organically, in-house. This capability reduces reliance on external vendors, shortens turnaround times and provides greater control over quality and cost.

"The ATC&LS division serves as organic repair depot for 92 items in support of the AN/SPN-43C radar," said NAWCAD WOLF executive director Blaine Summers. "The ability to repair these items versus procuring new items provides a great cost savings to the program office and the Navy."

By sustaining the AN/SPN-43C's operational readiness, NAWCAD WOLF ensures the system remains effective until its planned replacement, the AN/SPN-50, is fully fielded in the coming years.

From the Naval Aviation Warfare Center Aircraft Division.

Honoring Legacy: TH-57 Makes Final Landing at National Naval Aviation Museum

PENSACOLA, Fla.—A significant chapter in U.S. Navy aviation history was commemorated as the Bell TH-57 "Sea Ranger" made its final landing Sept. 19, 2025, at National Naval Aviation Museum in Pensacola, Florida. The landing marked the official retirement of the TH-57, a pivotal training aircraft that has served as the cornerstone of naval rotary-wing flight training for decades.

Introduced in the late 1960s, the TH-57A was primarily used for advanced helicopter training. Its role in shaping the skills of countless naval aviators is unparalleled. Over the years, the TH-57 has been instrumental in training student pilots at Naval Air Station Whiting Field in Florida, providing them with the foundational skills required for more advanced rotary-wing aircraft in the fleet.

As part of the Navy's modernization efforts, the TH-57 is being replaced by the TH-73A "Thrasher," a next-generation training helicopter designed to enhance pilot training and skills. The TH-73 incorporates current cockpit technologies and a modernized training curriculum, ensuring that rotary-wing aviators are produced more efficiently and are better prepared to meet the challenges faced in the fleet.

"As we bid farewell to the TH-57, we honor a legacy that has shaped generations of naval aviators," said Capt. Kenneth M. Kerr, commodore of Training Air Wing 5. "This aircraft has been more than a training platform; it's been a trusted partner in building the foundation of rotary-wing excellence. While we close this chapter, we look forward with great optimism to the future as the TH-73A ushers in a new era of advanced training and capability for our students."

The National Naval Aviation Museum serves as a repository of Naval Aviation history, preserving artifacts and aircraft that tell the story of the Navy's aviation evolution. The TH-57C joins the museum's collection that includes a TH-57A and ensures that future generations will have the opportunity to learn about and appreciate the aircraft's vital role in training naval aviators.

Headquartered at Naval Air Station Corpus Christi, Texas, the Chief of Naval Air Training (CNATRA) oversees five training air wings and 17 training squadrons across Florida, Mississippi and Texas. These squadrons conduct primary, intermediate and advanced flight training for student naval aviators, naval flight officers and air vehicle pilots. CNATRA remains steadfast in its mission to train, mentor and deliver the highest quality naval aviators prepared to win in competition, crisis and conflict.

Written by Morgan Galvin with Chief of Naval Air Training, Pensacola, Florida.

U.S. Navy photos by Christy Mason

A TH-57C Sea Ranger from Training Air Wing 5 at Naval Air Station Whiting Field lands outside the National Naval Aviation Museum in Pensacola, Fla., Sept. 19, 2025. The aircraft, call sign "Lucky 106," made its final operational flight for its transfer for induction into the museum's inventory.

Cmdr. James Gelsinon, commanding officer, Helicopter Training Squadron 28, right, presents a TH-57C Sea Ranger aviation log book to Sterling Gilliam, director, Naval Aviation Museum, Sept. 19, 2025.

Marines Conduct UAS Shipboard Testing

The Marine Corps recently conducted shipboard testing with the TRV-150C Tactical Resupply Unmanned Aircraft System (TRUAS) aboard a San Antonio-class amphibious transport dock, marking a significant milestone in advancing ship-to-shore and ship-to-ship resupply solutions for Combat Logistics Battalions (CLBs).

The Portfolio Acquisition Executive for Robotics and Autonomous Systems (PAE RAS) Aircraft Management Program Office (AIR PMO), formerly known as the Navy and Marine Corps Small Tactical UAS program office, and Air Test and Evaluation Squadron (UX) 24, completed dynamic interface testing, evaluating how the system operates within the complex shipboard environment.

The effort was the culmination of engineering rigor and dedication by the TRV-150C developmental test team at UX-24, motivated by a desire to ensure the fleet has the capabilities and tools necessary to safely complete its mission. TRV-150C's first successful flight operations provide valuable insights for further development of this capability.

PAE RAS AIR PMO secured a currently deployed version of TRUAS for testing and coordinated all certifications for batteries, funding and flight clearances. UX-24 set the project schedule, refined procedures and developed the initial concept of operations (CONOPS).

During the two-week test period, the TRV-150C completed multiple launches and recoveries, proving the feasibility of unmanned cargo delivery in a maritime environment. While future CONOPS will focus on shore-to-ship missions, the team prioritized the more challenging ship-integration effort first.

"This achievement is a direct result of operating forces identifying a critical need—the ability to move parts and supplies between ships, to the shore, and back again, without relying on manned aircraft or traditional landing craft," said Lt. Col. Zacharias Hornbaker, CLB-26 commanding officer. "The PMO's response was immediate and collaborative, quickly bringing UX-24 to the table. It is a testament to how operational units, the PMO and the NAVAIR test community can unite to rapidly evolve the future of expeditionary fleet logistics and sustainment."

The proof-of-concept evaluation is the first step in a pathway to deliver this capability for current and future fleet users. PAE RAS AIR PMO and UX-24 will continue refining procedures and developing training to enable fleet use as requested by CLBs.

From the Portfolio Acquisition Executive for Robotics and Autonomous Systems Aircraft Management Program Office.

U.S. Navy photo

The Marine Corps recently conducted shipboard testing with the TRV-150C Tactical Resupply Unmanned Aircraft System (TRUAS) aboard a San Antonio-class amphibious transport dock , marking a significant milestone in advancing ship-to-shore and ship-to-ship resupply solutions for Combat Logistics Battalions.

Grampaw Pettibone

Gramps from Yesteryear: March-April 1997

Illustration by Ted Wilbur

Rotate and Roll

On a training check flight, with a student naval aviator at the controls in the left seat and the instructor in the right seat backing him up, a T-44A King Air began the takeoff roll. The student had set the power too high on the right engine, so the instructor reduced power slightly to maximum takeoff torque. The instructor intentionally withheld the rotate call at 91 knots to evaluate the student's response. When the student did not hear the rotate call as anticipated, he was unsure what the instructor expected.

At about 105 knots, the student announced, "Sir, I think I'm going to abort," and proceeded to pull the power levers back and up.

"No, rotate!" shouted the instructor, trying to push the levers forward. The power levers moved slightly and stopped—with 1,000 feet of runway remaining.

The instructor took over, saying, "I have the controls," believing the King Air was at takeoff power since the power levers were not moving. With his attention focused outside the cockpit, the instructor then sensed a loss of airspeed and moved his hand from the base to the top of the levers and now realized the power levers were not full forward. He tried to establish takeoff power but couldn't move them.

"They're stuck, they're stuck. Did you get them into reverse?" asked the instructor.

"I don't think so," said the student. "I think I only got to the detent." The instructor twice tried to free the power levers by lifting and pushed them forward while the student was pushing them forward from the base of the levers.

Barely airborne now, the aircraft lost altitude and commenced an uncommanded left roll. The left wing hit the ground and the T-44A rolled right. The landing gear were sheared off on impact with the ground. The plane then yawed left and came to rest 500 feet beyond the departure end. The flyers were unhurt, but the King Air sustained extensive damage.

Grampaw Pettibone says...

Oh, my achin' back! A perfectly good flyin' machine busted up for lack of knowledge. When the student pulled the power levers back and up to abort the takeoff, the levers were, in effect, raised at the flight idle stop. Would you believe that the mishap board conducted a poll and learned that 95 percent of the instructor pilots were UNAWARE OF RESTRICTED FORWARD POWER LEVER MOVEMENT WHEN THE LEVERS ARE RAISED AT THE IDLE STOP? You can't add power no matter how hard you push. Turns out Naval Air Training and Operating Procedures Standardization didn't address this restriction at the time. At flight idle, the pilot must allow gravity augmented by spring force tension to drop the power levers, thus permitting continued forward movement into the flight range.

The student shoulda been more decisive about the decision to abort. He felt he had missed a crucial step in the abort procedure and admitted later that he "did not want to get dinged by the instructor for rotating without a rotate call."

If the instructor had scanned the cockpit rather than focusing on matters outside of it, he mighta noticed rather than felt the setting of the power levers and got them out of the stop.

Rotatin' the bird without sufficient power has but one consequence: uncontrolled, downward and nasty flight.

AFTER 55 YEARS, HARRIER FLIES INTO THE SUNSET

Final Jet Squadrwon Celebrates End of Marine Aviation Era

By Capt. Jacob Ballard, 2nd Marine Aircraft Wing

Concluding nearly 55 years of operational history with the AV-8B Harrier II, Marine Attack Squadron (VMA) 223 hosted a public sundowning ceremony at Marine Corps Air Station Cherry Point June 3, signaling the end of an era for Marine Corps aviation as the service transitions to an all fifth-generation tactical aircraft fleet.

An AV-8B Harrier II, attached to Marine Medium Tiltrotor Squadron (VMM) 163 (Reinforced), rests on the flight deck elevator of amphibious assault ship USS Boxer (LHD 4), Oct.25, 2019.

U.S. Navy photo illustration by Fred Flerlage: imagery by MC2 Dale M. Hopkins

"The Bulldogs are extremely proud to conduct the final Harrier operations for the U.S. Marine Corps," said Lt. Col. John B. Cumbie, commanding officer of VMA-223. "As a platform that has continuously forward deployed across the globe, the Harrier will be remembered for its distinguished combat legacy, legendary vertical/short takeoff and landing (V/STOL) capability, and the Marines and sailors that made the community special."

The ceremony was attended by more than 5,000 people. Attendees included senior Marine Corps leaders, state and local officials, active-duty service members, local community members, family and friends of VMA-223, and veterans with ties to the Harrier community. The ceremony included a five-aircraft formation flight and vertical landing that showcased the Harrier's unique V/STOL capability.

"In 1971, the Marine Corps accepted the first AV-8A into its inventory. In 1985, VMA-331, stationed aboard Marine Corps Air Station Beaufort, South Carolina, became the Marine Corps' first operational AV-8B squadron."

The Harrier platform has maintained a proud and storied legacy throughout more than 55 years of service with the Marine Corps. In 1971, the Marine Corps accepted the first AV-8A into its inventory. In 1985, VMA-331, stationed aboard Marine Corps Air Station Beaufort, South Carolina, became the Marine Corps' first operational AV-8B squadron. VMA-223 began flying the AV-8B in early 1987.

U.S. Marine Corps photo by Lance Cpl. Bryan Giraldo

A U.S. Marine Corps AV-8B Harrier II with Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, passes under a water salute at Marine Corps Air Station Cherry Point, June 3.

U.S. Marine Corps photo by Lance Cpl. Orlanys Diaz Figueroa

Marine Corps AV-8B Harrier II aircraft with Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, fly over Marine Corps Air Station Cherry Point, N.C., June 3.

U.S. Marine Corps photo by Lance Cpl. Bryan Giraldo

A Marine Corps AV-8B Harrier II with Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, flies over Marine Corps Air Station Cherry Point, N.C., June 3.

U.S. Marine Corps photo by Lance Cpl. Donovan Pimentel

Marine Corps Lt. Col. John B. Cumbie, left, commanding officer of Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, and Cpl. Myles J. Howard, a fixed-wing aircraft mechanic with VMA-223, stand at attention in front of an AV-8B Harrier II at Marine Corps Air Station Cherry Point, N.C., June 3.

U.S. Marine Corps photo by Lance Cpl. Michael Robinson

Marines with Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, and families celebrate with water and champagne at Marine Corps Air Station Cherry Point, N.C., June 3.

U.S. Marine Corps photo by Lance Cpl. Bryan Giraldo

A Marine Corps AV-8B Harrier II with Marine Attack Squadron (VMA) 223, Marine Aircraft Group 14, 2nd Marine Aircraft Wing, sits in front of a crowd at Marine Corps Air Station Cherry Point, N.C., June 3.

"Colloquially known as a 'jump jet' for its ability to take off and land within short distances, the AV-8B is a V/STOL aircraft designed to support the Marine Air Ground Task Force…"

Since its inception with the Marine Corps, the Harrier has been instrumental in numerous combat operations, including Operations Desert Shield and Desert Storm, Allied Force, Enduring Freedom, Iraqi Freedom, Odyssey Dawn, Inherent Resolve, and operations during the Red Sea crisis. Time and again, the Harrier has distinguished itself as a lethal, capable and versatile tactical air platform.

Colloquially known as a "jump jet" for its ability to take off and land within short distances, the AV-8B is a V/STOL aircraft designed to support the Marine Air-Ground Task Force commander by destroying surface targets and escorting friendly aircraft. The AV-8B's lethality and V/STOL capability made it uniquely suited for deployments in support of Marine Expeditionary Units (MEUs). VMA-223's final Harrier detachment supporting a MEU returned to Marine Corps Air Station Cherry Point in May after supporting operations with the 22nd Marine Expeditionary Unit in the Caribbean.

In fiscal year 2028, VMA-223 is scheduled to reactivate as Marine Fighter Attack Squadron (VMFA) 223 and will begin flying the F-35B Lightning II. VMA-223 is the last Marine Corps squadron to operate the Harrier.

Capt. Ballard was a communication strategy and operations officer with 2nd Marine Aircraft Wing.

The Evolution of the AV-8C Harrier

Originating in Great Britain, the Hawker Siddeley Kestrel first attracted Marine Corps interest in 1966 thanks to its unique ability to take off and land vertically like a helicopter. This capability allowed Marines to operate the aircraft from makeshift airfields near the front lines or small-deck amphibious assault ships, enabling rapid, close-air-support response for ground troops.

"An aircraft which is deployed and based as simply as a helicopter, but which packs the punch of a conventional attack aircraft, is going to have a far-reaching effect on military aviation," Maj. Gen. Homer S. Hill told Congress in 1970.

That same year, the Marine Corps ordered 102 AV-8A Harriers and eight two-seat trainers (TAV-8A). These aircraft were essentially identical to their British Royal Air Force counterparts but incorporated American avionics, flight control and weapons systems. Deliveries concluded in 1976. Beginning in 1979, 47 AV-8As were upgraded to the AV-8C configuration, adding tail-mounted warning radar equipment and a flare/chaff dispenser to improve survivability on the modern battlefield.

AV-8A Harriers of Marine Attack Squadron (VMA) 513 pictured in flight.

Photos courtesy of the Naval History and Heritage Command

The AV-8C served as an interim solution until the arrival of the AV-8B Harrier II. Although similar in appearance to the earlier Harriers, the AV-8B was a fundamentally new aircraft, featuring a more powerful engine that delivered comparable speed but dramatically increased payload capacity to 9,200 pounds.

Flying a Harrier is unlike flying any other jet. The aircraft employs "vectored thrust," routing bypass air to one pair of nozzles at the wing roots and hot exhaust to a second pair. By rotating these nozzles in unison, from straight aft for forward flight to slightly forward of vertical for hover, the pilot can transition seamlessly between conventional and vertical flight. A reaction-control system using high-pressure bleed air powers small "puffers" or "puff pipes" at the nose, tail and wingtips, providing pitch, roll and yaw control when aerodynamic surfaces lose effectiveness in the hover. To the pilot, the control feels conventional, even though the aircraft is balancing on directed thrust. British Harriers proved their combat value during the Falkland Islands War in 1982, where 42 aircraft flew ground support, air defense, ship strikes and reconnaissance missions. They downed at least 20 Argentine aircraft without a single air-to-air loss.

Marine Corps Harriers entered combat nearly 20 years later. During Operation Desert Storm, 86 Harriers flew combat missions from both ship and shore, logging 3,380 sorties and 4,038 flight hours while delivering more than 5.95 million pounds of ordnance. Harriers later supported Operation Allied Force, the sustained NATO air campaign against Kosovo in 1999, and continued to fly combat missions in subsequent conflicts.

From the Naval History and Heritage Command.

Flight deck crewmen reposition AV-8C Harrier aircraft on the flight deck of the amphibious assault ship Guadalcanal (LPH 7) during Exercise AHUAS TARA II, taking place off the coast of Honduras in 1983.

AV-8C Harrier (Bureau Number 158975) pictured suspended in Hangar Bay One at the National Naval Aviation Museum, Pensacola, Fla.

The AV-8C Harrier (Bureau Number 158975) lands at Naval Air Station (NAS) Whiting Field, Milton, Fla. (left) during its service in Marine Attack Squadron (VMA) 513.

John F. Kennedy Completes Buil

By Petty Officer 1st Class Jacob Milham

Pre-Commissioning Unit John F. Kennedy (CVN 79) and her crew departed HII's Newport News Shipbuilding (NNS) and steamed to sea for the first time for Builder's Sea Trials Jan. 28. After eight days of at-sea systems, equipment and operational testing by sailors working alongside industry and government partners, the ship returned to NNS Feb. 4, marking a major milestone in the carrier's path to delivery.

"There were countless hands that contributed to this successful sea trial, both of the hard-working patriots who built this great ship and of the sailors who are now bringing her to life," said Capt. Doug Langenberg, John F. Kennedy's commanding officer. "John F. Kennedy going to sea for the first time is truly momentous. This event is a result of years of hard work and an incredible shared effort between our ship-building partners and this crew who have worked side-by-side to get to this day. I'm proud of this crew and this opportunity to finally take this ship to sea, where she belongs."

The underway is another important milestone toward John F. Kennedy's delivery to the operational fleet. John F. Kennedy remains at NNS to complete remaining construction, testing and activation work. After successful Builder's Sea Trials, acceptance trials move into focus for the crew and civilian stakeholders, but for now, sailors savor the moment.

"This has been a long time coming," said Lt. Ward Wilkinson, the officer of the deck who led John F. Kennedy as she got underway from NNS. "This is proof that hard work pays off, and to say that I had a part in this ship pulling out for the first time…the weight is not lost on me."

John F. Kennedy is the second Ford-class aircraft carrier and represents the next generation of American aircraft carriers. The platform is designed to improve survivability, increase lethality and advance key systems from the Nimitz-class aircraft carriers.

Deron Hathaway, with Fleet Power Plant Engineering, Navy Nuclear Laboratory, has been in his current role for 30 years and was impressed with the changes

Pre-Commissioning Unit John F. Kennedy (CVN 79) transits the Atlantic Ocean during Builder's Sea Trials, Jan. 28.

U.S. Navy photo by MC2 Kaitlin Young

der's Sea Trials, First Underway

he saw during his first time underway on a Ford-class aircraft carrier.

"I have been on a number of trials, but this steam plant impressed me in several ways," Hathaway said. "The overall capability, the automation, the reduced workload on watch standers is a notable improvement from [the Nimitz-class aircraft carriers]. There has been plenty of learning in [Builder's Sea Trials] and my team appreciated the hospitality from the crew and just bringing us in on this special occasion."

While John F. Kennedy's sailors trained hard leading up to Builder's Sea Trials, there is only so much that can be simulated pier-side. Personnel from Newport News Shipbuilding; the Navy's Supervisor of Shipbuilding, Conversion and Repair; Naval Sea Systems Command; and Program Executive Office Aircraft Carriers came underway for the trials. They represent only a portion of the industrial base and government team that supports building the Ford-class aircraft carriers, including the more than 2,000 businesses across 46 states that support construction.

"This is a win for America, no matter how you look at it," said Capt. Sam Morrison, John F. Kennedy's executive officer. "This underway isn't the ultimate goal, the finish line for this ship or the crew. But it is something the team has been working towards for years. Now is the time to take this momentum further and push towards joining our brothers and sisters in the fleet."

The Ford-class improves on its predecessor in numerous ways, including three times the electrical generating capacity and a larger, more flexible flight deck. As the Navy continues to innovate in aviation, the Ford-class improvements ensure the ship can support those advancements and maintain the aircraft carrier's indispensable role in U.S. power projection. Where John F. Kennedy goes, and the missions she will undertake, remain an unfinished chapter, but the crew stands ready to answer the nation's call.

Petty Officer 1st Class Jacob Milham is a public affairs specialist with Pre-Commissioning Unit John F. Kennedy (CVN 79).

THE TECH BEHIND F-35 TURNAROUN

By Lance Cpl. Fabian Ortiz

Marines with Marine Fighter Attack Squadron (VMFA) 251 recently advanced F-35 Lightning II and other fixed-wing aircraft ground operations by integrating improved communication and digital interoperability capabilities. They demonstrated these advancements during Weapons and Tactics Instructors (WTI) course 2-26 at Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) at Marine Corps Air Station Yuma, Arizona, April 13.

Marines from VMFA-251 led the effort, using training opportunities at MAWTS-1 during WTI to improve coordination between pilots and ground crews. They increased efficiency during aircraft turnaround operations by using gear from the digital interoperability (DI) kits designed for fifth-generation platforms.

The Marine Corps DI kit is a suite of hardware, software and networked devices that connects Marines across incompatible systems. This enables Marines to share situational awareness and coordinate more effectively across the Marine Air-Ground Task Force.

Marines observed communication delays and limited situational awareness on the flightline, slowing maintenance and rearming operations. Chief Warrant Officer 2 Jory D. Reed, an aviation ordnance officer with VMFA-251, spearheaded the effort, identified these gaps and pursued solutions using existing and emerging technologies.

"A lot of this came from observing how Marines execute the mission and identifying where time and effort could be streamlined," Reed said. "The goal

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Marine Corps Staff Sgt. Justin Braun, a powerline mechanic assigned to Marine Fighter Attack Squadron (VMFA) 251, 2nd Marine Aircraft Wing, Marine Corps Air Station Cherry Point, N.C., inspects an F-35C Lightning II before a mission in support of Red Flag-Nellis 25-3 at Nellis Air Force Base, Nev. July 22, 2025.

U.S. Air Force photo by Airman 1st Class Jennifer Nesbitt

"Now we can see what assets the aircraft has expended and what it will require before it even touches down. That gives us the ability to respond faster and more accurately, preparing exactly what's needed ahead of time instead of moving excess ordnance and equipment once the aircraft arrives."

Two U.S. Marine Corps F-35C Lightning II aircraft assigned to Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) fly over the Pacific Ocean during an air-to-air refueling exercise as part of Weapons and Tactics Instructor course 2-26, near Camp Pendleton, Calif., April 9.

was to make those processes both more efficient and repeatable."

VMFA-251 Marines integrated the DI equipment and enhanced situational awareness across the flight line. They integrated specialized DI hardware to securely relay Link 16 data to ground-based tablets.

Link 16, a secure tactical data link, shares real-time information, such as aircraft position, fuel status and mission data between units. By extending Link 16 to F-35 ground crews, Marines can now directly receive and send this data, improving coordination, planning and aircraft turnaround on the ground.

Chief Warrant Officer 2 Eladio Vega, avionics officer with VMFA-251, integrated the capability and translated its technical applications into operational use.

"The DI kit consolidates data from multiple communication systems onto a single platform, allowing a cohesive flow of information between different military assets," Vega said. "Using the MAGTAB [Marine Air-Ground Tablet], Marines can view aircraft location, fuel states and remaining ordnance in real time, giving ground crews advance knowledge of aircraft needs before landing, which is something we couldn't do before."

This increased awareness enables Marines to prepare precisely for incoming aircraft, reducing the need to stage excess ordnance and minimizing equipment movement on the flight line. These combined capabilities reduce Marines' physical workload and improve the speed and efficiency of rearming and refueling operations in resource-limited environments.

"Now we can see what assets the aircraft has expended and what it will require before it even touches down," Reed said. "That gives us the ability to respond faster and more accurately, preparing exactly what's needed ahead of time instead of moving excess ordnance and equipment once the aircraft arrives."

Marines also evaluated newly developed, first-of-its-kind primary support capabilities during WTI exercises. They used the F-35 Lightning II Internal Communication System (ICS), which connects maintainers directly to the aircraft and enables real-time communication with pilots without requiring them to exit the cockpit.

"Previously, maintainers relied on relayed com-

munication or were required to wait for pilots to shut down and disembark before troubleshooting could begin," Reed said. "The direct connection to the F-35 Lightning II ICS cable provides immediate coordination; this allows ground crews to diagnose and resolve problems while keeping the aircraft operational."

Marines also integrated handheld radios to expand communication across the flight line during operations. They used the radio to establish a shared frequency among pilots and multiple maintenance sections, allowing personnel across avionics, ordnance, airframes and maintenance control to monitor and communicate in real time. Marines identified a compatible frequency range, establishing a clear connection that enabled pilots to relay aircraft status and discrepancies before takeoff.

"This eliminates secondhand communication across the flight line and allows maintainers to respond immediately with the information they receive directly from the pilot," Vega said. "Now, instead of relying on a single point of contact, multiple maintenance sections can monitor the same frequency and receive information from the pilot in real time."

MAWTS-1 provided the operational environment necessary to test and validate these capabilities under realistic conditions, allowing VMFA-251 Marines to refine their approach and demonstrate its effectiveness. Chief Warrant Officer 2 Richard Wildenhain, an aviation ordnance officer and expeditionary ordnance course director with MAWTS-1, supported the integration and evaluation of the systems during training events.

"MAWTS-1 provides a venue to take concepts like this and apply them in a realistic training environment," Wildenhain said. "It allows units to test new capabilities, identify what works and determine how it can be applied, improving efficiency and lethality across the entire Marine Corps."

The collaboration between VMFA-251 and MAWTS-1 highlights how operational units can develop practical solutions by integrating existing technologies in new ways.

As F-35 operations evolve, capabilities like digital interoperability and direct communication systems will play a key role in improving coordination, increasing situational awareness and reducing the time required to generate combat-ready aircraft.

"This is about improving how we operate as a whole and trying new things with the assets we are given," Vega said. "When we can share information more effectively, we can make better decisions and execute the mission more efficiently."

Lance Cpl. Fabian Ortiz is a public affairs specialist with Program Executive Office Land Systems.

Marines assigned to Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) have a group discussion as part of Weapons and Tactics Instructor Course 2-26 at Marine Corps Air Station Yuma, Ariz., April 13. WTI is a seven-week training event hosted by MAWTS-1 that emphasizes operational integration of the seven functions of Marine aviation in support of the Marine Air-Ground Task Force, Joint and Coalition Forces.

StormBreaker Arrives:

Navy Declares Initial Operational Capability for SDB II on Super Hornet

By Jamie Cosgrove

The Navy has declared initial operational capability for the Small Diameter Bomb II on the F/A-18E/F Super Hornet, marking a significant advancement in the fleet's precision-strike technology.

The weapon, also known as StormBreaker, saw its first operational use on the Super Hornet during a limited early operational capability in 2025, providing real-world validation of the bomb's performance on the platform.

With SDB II, Super Hornets can now engage moving and stationary targets in all weather conditions and rapidly changing environments. The weapon features a tri-mode seeker that integrates infrared, millimeter-wave radar and semi-active laser guidance. This technology allows the bomb to see through

An F/A-18 conducts testing with the Small Diameter Bomb (SDB) II at Naval Air Station Patuxent River, Md. The SDB II variant includes an advanced tri-mode seeker, allowing it to engage dynamic targets in adverse conditions.

U.S. Navy photo

fog, smoke and rain. As a network-enabled weapon, it supports in-flight target updates from air or ground controllers, providing increased flexibility during dynamic missions.

"Bringing SDB II to the fleet gives our air crews a reliable way to hit targets in adverse weather conditions," said Tyler Alt, Navy SDB II program manager. "This isn't just about a new weapon; it lays the foundation for future Super Hornet weapon capabilities to provide the flexibility to update a mission in real time, even after the bomb has been released."

Led by the Air Force, the SDB II joint-interest program is already operational on the F-15E Strike Eagle. It is currently being integrated across other platforms, including the F-16C/D Fighting Falcon and F-35 Lightning II.

The Navy's portion of the program is managed by the Precision Strike Weapons Program Office. The office is responsible for delivering the Navy's air-to-ground precision guided weapons, general purpose bombs and aircraft armament equipment.

Jamie Cosgrove is a public affairs specialist with Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland.

Small Diameter Bomb II (SDB II)

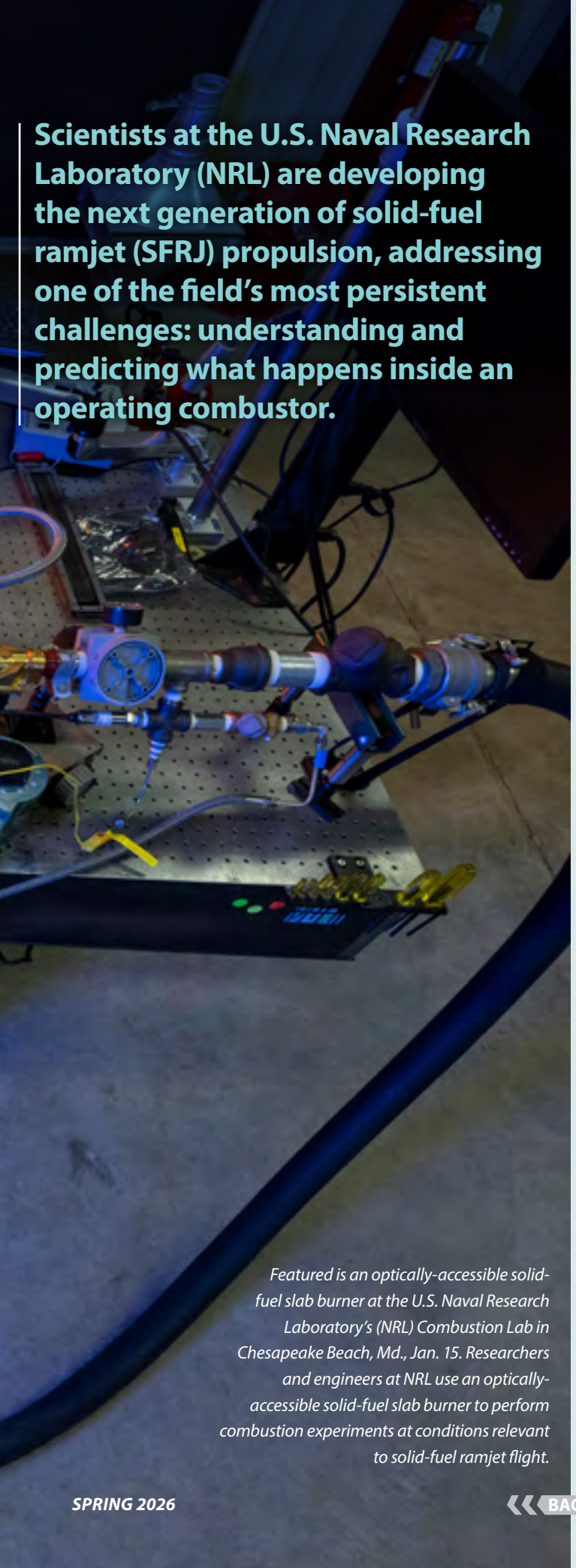
Photo courtesy of RTX

THE RAMJET REVOLUTION:

New Research Reveals the Physics Behind Tomorrow's Long-Range Weapons

By Jameson Crabtree

Scientists at the U.S. Naval Research Laboratory (NRL) are developing the next generation of solid-fuel ramjet (SFRJ) propulsion, addressing one of the field's most persistent challenges: understanding and predicting what happens inside an operating combustor.



Featured is an optically-accessible solid-fuel slab burner at the U.S. Naval Research Laboratory's (NRL) Combustion Lab in Chesapeake Beach, Md., Jan. 15. Researchers and engineers at NRL use an optically-accessible solid-fuel slab burner to perform combustion experiments at conditions relevant to solid-fuel ramjet flight.

U.S. Navy photo by Jonathan Sunderman

NRL scientists have figured out how to "see inside" one of the most extreme engines ever built, turning guesswork into knowledge and making future long-range, high-speed flight more achievable than ever before.

A SFRJ is an air-breathing engine that uses solid fuel instead of liquid fuel, offering high energy density and mechanically simpler propulsion by burning fuel with oxygen from the air to produce thrust. By drawing oxygen from the atmosphere rather than carrying oxidizer onboard, SFRJs can carry more fuel in the same space and fly farther than traditional rocket systems.

"If you replace all the oxidizer and instead use oxygen from the air to burn your fuel, you can increase range by up to 200 to 300% in the same form factor," said Brian Bojko, Ph.D., a combustion scientist at the NRL.

Despite that promise, widespread adoption has been slowed by the extreme internal environment of SFRJs, where high temperatures, soot and rapidly evolving flow structures prevent traditional probes from accessing critical data. Unlike liquid or gaseous fuels, solid fuels release energy through surface regression and often produce a complex mixture of gaseous fuel products, making it far more difficult to control burning rates and predict performance.

"In solid-fuel ramjets, you don't have direct control over the mass flow rate like you do with liquid systems," Bojko said. "The heat from combustion actually drives the gasification of the solid fuel, so pressure, temperature and airflow all feed back into how the engine behaves."

Without detailed measurements of flame temperature, fuel regression and fuel-vapor transport, designers have historically relied on trial-and-error approaches.

"A lot of the design has been kind of Edisonian," Bojko said. "You take a guess, test it and iterate. But without seeing the physics inside the combustor, it's hard to know if you're getting the right answer for the right reason."

At the same time, computational approaches such as Reynolds-Averaged Navier–Stokes (RANS), Detached Eddy Simulation (DES) and Large Eddy Simulation (LES) have been limited by a lack of high-quality experimental data for validation.

"With only a few pressure or temperature points, you can match a simulation to an experiment and still be wrong," Bojko said. "Optical access lets us validate the flame structure, recirculation zones and combustion species directly."

Seeing Flame Temperature in Real Time

To address these gaps, researchers employed optical diagnostics capable of operating in the harsh, particle-laden environment of an SFRJ combustor. Measuring flame temperature is especially important, Bojko said, because models often assume combustion efficiency rather than measure it.

"These diagnostics give us new data we simply didn't have before," said David Kessler, Ph.D., a senior computational scientist at NRL. "They allow us to measure gas-phase species and

temperatures in an environment where traditional probes just don't work."

The chemistry behind how solid fuels decompose and feed the flame is just as important as measuring the flame itself. As heat from the flame feeds back into the fuel surface, the solid polymer undergoes phase change and chemical breakdown, releasing a complex mixture of gaseous hydrocarbons that sustain combustion.

"You have this continuous feedback loop," said Brian Fisher, Ph.D., a combustion research engineer at NRL. "The flame heats the fuel, the fuel decomposes into gas-phase species, and those species then mix with the air and keep the flame going. It's a coupled thermal, chemical and fluid-dynamic process, and that's what makes solid-fuel ramjets both powerful and challenging to predict."

Mapping Fuel Regression and Validating Models

Understanding how quickly the solid fuel surface recedes—known as fuel regression—is critical because it directly governs thrust and performance. The team combined experimental diagnostics with high-fidelity simulations to resolve heat feedback to the fuel surface, a key driver of regression.

"One of the biggest things you need to capture is the heat transfer back to the solid fuel," Bojko said. "RANS can give you an OK answer, but it doesn't resolve the fundamental processes as well as DES or LES."

Visualizing Fuel Vapor Before It Burns

For the first time, researchers visualized fuel vapor released from the solid surface before ignition, revealing how complex hydrocarbon species mix and evolve before combustion. SFRJs commonly use hydroxyl-terminated polybutadiene (HTPB), a long-chain polymer that breaks down into many different gaseous species.

"When HTPB decomposes, you don't know what species are coming off the surface, and those species dictate the combustion mechanism," Bojko said. "They change with temperature, pressure and heat flux, so being able to characterize them is critical to understanding the underlying mechanisms across different flight conditions."

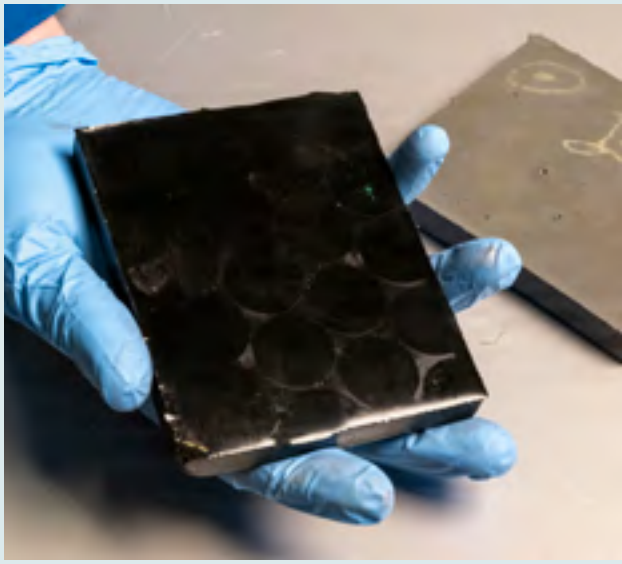
In parallel, NRL researchers are investigating advanced composite fuels designed to increase how much energy can be stored in the same volume of solid fuel.

U.S. Navy photo by Jonathan Sunderman

Clayton Geipel, Ph.D., U.S. Naval Research Laboratory (NRL) aerospace engineer, adjusts fittings on an optically-accessible solid-fuel slab burner at NRL's Combustion Lab in Chesapeake Beach, Md., Jan. 15.

U.S. Navy photo by Jonathan Sunderman

Brian Bojko (left), Ph.D., U.S. Naval Research Laboratory (NRL) mechanical engineer, and David Kessler, Ph.D., NRL director of Laboratories for Computational Physics and Fluid Dynamics, discuss SFRJ advancements in Washington, D.C., Jan. 13.



U.S. Navy photo by Jonathan Sunderman

The fuel slabs contain a polymer binder, featuring carbon black (left) to increase its absorption of radiant energy and aluminum (right) to increase its energy density. Researchers and engineers at NRL use these fuel slabs with an optically-accessible solid-fuel slab burner to perform combustion experiments at conditions relevant to SFRJ.

U.S. Navy photo by Jonathan Sunderman

Nicholas Diskerud, Ph.D., Nuclear Regulatory Commission postdoctoral research associate, focuses a high-speed camera on an optically-accessible solid-fuel slab burner at the U.S. Naval Research Laboratory's (NRL) Combustion Lab in Chesapeake Beach, Md., Jan. 15.

U.S. Navy photo by Jonathan Sunderman

Brian Fisher, Ph.D., U.S. NRL mechanical engineer, adjusts fittings on an optically-accessible solid-fuel slab burner at NRL's Combustion Lab in Chesapeake Beach, Md., Jan. 15.

U.S. Navy photo by Jonathan Sunderman

Featured is a carbon black composite fuel slab within an optically-accessible solid-fuel slab burner combustion chamber at the U.S. Naval Research Laboratory's (NRL) Combustion Lab in Chesapeake Beach, Md., Jan. 15. Researchers and engineers at NRL use an optically-accessible solid-fuel slab burner to perform combustion experiments at conditions relevant to SFRJ flight.

"We're interested in adding energetic additives, like metal particles, into polymer fuels to increase their energy density," said Clayton Geipel, Ph.D., a combustion research engineer at NRL. "As the fuel burns, those particles are released into the flame and ignite, giving you more energy from the same volume of fuel. That directly translates into greater potential range for future systems."

"You want to jam as much energy content into that block of fuel as you can while still having a reasonable rate of combustion—that's the challenge," said Albert Epshteyn, Ph.D., materials scientist at NRL.

Reducing Risk and Accelerating

Together, these diagnostics and simulations transform SFRJ combustion from a largely inferred process into a measurable, predictable system. The validated models allow researchers to conduct design iterations computationally before moving to costly experiments.

"Our main objective is to reduce risk," Bojko said. "If we have validated computational models, we can do design iterations much more efficiently in terms of cost and time and narrow down the physics before we ever go to full-scale testing."

Kessler emphasized the broader impact: "NRL is developing technologies that help accelerate the transition of solid-fuel ramjets, technology that can significantly increase the range of next-generation high-speed systems."

The team is now focused on bridging the gap between small-scale laboratory experiments and real-world propulsion systems.

"All of our work right now happens at small-scale facilities in idealized, optically accessible geometries," Geipel said. "That's what allows us to make detailed measurements, but there are still important questions about how those results apply to a full-scale, enclosed ramjet."

The next phase will extend validated tools and models to larger, more representative test configurations, an intermediate step that preserves diagnostic access while introducing greater geometric and physical realism. By integrating optical diagnostics, detailed chemistry and validated simulations across multiple scales, the research provides the propulsion community with tools to reduce uncertainty, shorten development timelines and enable future high-speed air-breathing propulsion technologies.

Jameson Crabtree is a public affairs specialist with U.S. Naval Research Laboratory, Washington, D.C.

Shipboard Weapons Integration Team Prevents

By Michael Smith

The Shipboard Weapons Integration Team (SWIT) provides independent assessments that ensure Navy ships can safely store, move and handle weapons at sea, turning new shipboard firepower into operational capability.

That work happens far from the flight deck and long before a system ever deploys. SWIT evaluates weapons facilities on new construction ships and ship modifications to confirm crews can handle ordnance safely under realistic operating conditions.

Inside the ship, new capability creates hard questions most people never think about: Where does a weapon go when the ship rolls? Can sailors move it through narrow passageways without unsafe workarounds? Can crews secure it safely alongside other ordnance?

SWIT answers those questions before a weapon is delivered.

Photo courtesy of LUCAS

New Capability Does Not Fit Ship by Default

Barry Olson, head of the Sustainment Program Management and Analysis Department, described SWIT as a reality check for weapons integration.

"These guys work with the safety board and with the fleet on what is real, how we handle stuff, how we load stuff," Olson said.

Even small ship modifications can create major problems once a ship is underway.

"Sometimes it'll be a ship mod that messes things up," Olson said. "They put a vending machine in the aisle and now you can't get weapons to fit down the aisle anymore."

By identifying those issues before a system reaches the fleet, SWIT prevents costly rework, deployment delays and potentially dangerous workarounds. Finding a blocked weapons route in port can save months of delays and costly modifications at sea.

SWIT's work spans far beyond unmanned systems. The team may be asked to plan safe storage and movement for helicopter weapons such as rockets and Hellfire missiles, ship self-defense rounds like Rolling Airframe Missiles, and even Army rocket launchers temporarily embarked on cargo ships or tankers to meet urgent fleet needs.

Independent Checks Built on Fleet Reality

Bill Ayers, SWIT lead, said the team's value comes from its role as an independent assessor.

The Office of the Chief of Naval Operations designates SWIT as the Navy's independent assessor for shipboard weapons facilities, placing the team inside magazines, weapons-handling spaces and ordnance-movement routes on new-construction and modified ships. Naval Sea Systems Command tasks SWIT to certify those spaces work as designed and that crews can safely move and secure weapons before a ship enters service.

Rather than relying on drawings alone, Ayers said the team tests ships the way sailors will use them. SWIT brings inert weapons and representative equipment aboard and moves them through intended routes to confirm safe handling.

Costly Mistakes Before Weapons Reach the Fleet

Rob Pavel, a Shipboard Weapons Integration Team logistician with Naval Air Warfare Center Weapons Division, conducts shipboard weapons integration work in support of the Low-cost Unmanned Combat Attack System (LUCAS) aboard USS Santa Barbara (LCS 32). SWIT validates that weapons systems can be safely stored, moved and handled at sea before operational use. LUCAS later launched successfully from the ship's flight deck Dec. 16, 2025, as part of Task Force Scorpion Strike operations while operating in the Arabian Gulf.

Those demonstrations matter because ships rarely match their plans. A few inches lost in a passageway or a late modification can block a weapons route and force crews into unsafe solutions.

Rapid Response for Operational Urgency

SWIT's rapid-response capability proved critical when the team deployed on short notice to support Task Force Scorpion Strike aboard USS Santa Barbara (LCS 32) during Central Command operations.

For the Low-cost Unmanned Combat Attack System (LUCAS), SWIT verified shipboard routes, identified required modifications and confirmed weapons support equipment fit the littoral combat ship's layout before the system reached the ship. The team's validation helped ensure the system could be launched safely within a narrow operational window.

On Dec. 16, 2025, Santa Barbara launched LUCAS from its flight deck while transiting the Arabian Gulf, the first shipboard launch at sea for the drone operated by Naval Forces Central Command's Task Force 59.

Validation Keeps Capability Accountable

SWIT does not install weapons; the team validates them.

"We're the independent validation," Ayers said. "The program gets to say, 'We're good to go.' The installer gets to say, 'We're good to go.' Then we come in and ask what about this, this and this."

That role becomes more important as the Navy fields new capability on compressed timelines. By identifying fixes early and testing realistically, SWIT helps ensure speed does not outrun safety or mission readiness.

When a system launches at sea, it can look simple. What sailors do not see are the months of assessments that prevented delays, avoided dangerous workarounds and ensured the ship and crew were ready when the window opened.

For Ayers, the entire process is designed for the warfighter.

"It's that 19-year-old sailor on the deck," Ayers said. "Our job is to make sure that when they have to use this equipment, it works and it's safe. That's the only thing that matters."

Michael Smith is a public affairs specialist with Naval Air Warfare Center Weapons Division.

The Engineers Behind the Next

Teaching FIRST Teams to Debug Under Pressure

By Michael Smith

Brendan Stevens is a software engineer at Naval Air Warfare Center Weapons Division, Point Mugu, California. On a Sunday in March, he stood in the pit area at FATHOMWERX, the workshop floor where teams repair and adjust robots between matches, helping students troubleshoot their own. His team had a problem.

U.S. Navy photos by Michael L. Smith

The drive team for Team 6657, the Arborbotics, operate their robot from the alliance station during a qualification match at the California District Hueneme Port Event at FATHOMWERX in Port Hueneme, Calif., March 8.

The robot was driving in the wrong direction. Controls were inverted. Forward was backward.

The cause was a gyroscope, a sensor that tracks orientation. Stevens' team powered up their robot in the staging area, then walked it around the field perimeter to its starting position. By the time it arrived, the robot had reversed its heading because the gyroscope tracked every degree. The robot thought it was still facing the staging area.

"We had been turning on our bot in the staging area," Stevens said. "We've done a 180, so by the time we're on the field, we couldn't figure out why controls were inverted. It took us three matches to figure that out."

He was not the only NAWCWD engineer there.

The 2026 FIRST Robotics Competition brought 42 teams and more than 1,400 students to FATHOMWERX, a 60,000-square-foot public-private innovation lab at the Port of Hueneme operated in partnership with Naval Surface Warfare Center, Port Hueneme Division.

The event ran March 6-8. FIRST—For Inspiration and Recognition of Science and Technology—is a nonprofit that runs student robotics programs in more than 110 countries.

Generation of Engineers

The competition challenges teams to design, build and program robots from raw materials in six weeks, with students leading the engineering.

For the engineers watching from the pits, that is the point. NAWCWD delivers warfighting capabilities through research, development, test, evaluation and sustainment. The next generation of engineers it needs has not yet entered the workforce, but some of them were on this floor.

Patrick Schuett, director of Air Wing Integration and Interoperability/Electronic Warfare Effects at NAWCWD, addressed students during Sunday's opening ceremony at FATHOMWERX. He competed in design-build competitions as a student.

"I can trace a straight line from those experiences to the job I'm in today," he said. "The lessons you've learned, the leadership skills, the technical skills, those are all things that you now have to lean on, and they will take you far."

Stevens' team cracked the gyroscope problem Saturday afternoon. The fix took seconds. They had lost three matches learning it. Stevens called it a turnaround.

With his team out of playoff contention, Stevens gave the controls to a freshman. The younger driver loved it.

Gonzalo Figueroa, a mechanical engineer, mentored the same team, Team 4711, the Flying Aces, of ACE Charter High School in Camarillo. He was there for a reason that had nothing to do with the scoreboard.

"It's just something I wish I got to do in high school myself," Figueroa said. "I wasn't aware of robotics programs. It's my way of giving back to the community, helping others pursue a path and learn more about it."

In the pit, Figueroa identified what was wrong, nudged students toward a solution and let them learn by doing.

Dan Byrd, an engineering technician at Naval

Members of The Holy Cows, a FIRST Robotics Competition team from High Tech High in San Diego, work on their robot in the pit area during the California District Hueneme Port Event at the Port of Hueneme, Calif., March 8.

"Computer-aided design, precision machining, fabrication, all performed by the students, are the same skills engineers use to develop weapons systems and test equipment at NAWCWD."

Surface Warfare Center, Port Hueneme Division, mentored Team 7327, the Metal Jackets of Oxnard High School. He watched students replace circuit boards and rewire connections between matches.

"All of this stuff you see out here was just chunks of metal in January," Byrd said. "They did everything."

Computer-aided design, precision machining, fabrication, all performed by the students, are the same skills engineers use to develop weapons systems and test equipment at NAWCWD. While the school shops are smaller, the discipline is the same.

A second event followed March 13-15 at Ventura College Sportsplex in Ventura, California. Three NAWCWD DOWSTEM-sponsored teams competed at both events.

Seventy-two qualification matches ran before the top eight teams selected alliance partners for the playoff bracket.

Jessica, a junior in her first season with Team 3512, Spartatroniks, of Orcutt Academy High School, broke down the competition as a match played out on the field beside her.

In Rebuilt, the 2026 challenge, robots scored

U.S. Navy photos by Michael L. Smith

Teams compete on the field during the Ventura College FIRST Robotics Competition at the Ventura College Sportsplex in Ventura, Calif., March 15.

game pieces called fuel into a central hub. Matches opened with a 20-second autonomous period where robots executed coded programs without driver input.

During the driver-controlled period, the active scoring hub alternated between alliances. Which side went first depended on which alliance scored more fuel in autonomous. Matches ended with robots climbing a tower for bonus points.

Teams made tradeoffs during each competition. Jessica's team removed its climbing mechanism to concentrate on scoring.

"We actually just decided to take off our climber because it was taking up too much energy out of our robot," she said. "So, we decided that it was worth just focusing on the shooter rather than the climbers."

Her team's calculation paid off. Spartatroniks finished sixth in qualification rankings, advanced to the playoff bracket and won the Quality Award.

The NAWCWD-mentored Flying Aces also reached the playoffs. They won a second-round bracket match before elimination in the third round.

Joseph Dawson teaches robotics in the Oxnard Union school district. His students include the Metal Jackets, and he makes sure they know what surrounds them.

"I tell them: This is the manufacturing mecca of the world right here in your backyard," Dawson said. "This is a place to be."

Michael Smith is a public affairs specialist with Naval Air Warfare Center Weapons Division, Point Mugu, California.

Members of Team 7327, the Metal Jackets from Oxnard High School, pose with their robot in the pit area during the California District Hueneme Port Event at FATHOMWERX in Port Hueneme, Calif., March 8.

Patrick Schuett, director of Air Wing Integration and Interoperability/Electronic Warfare Effects at Naval Air Warfare Center Weapons Division, visits the pit area of NAWCWD-sponsored Team 4711, the Flying Aces, from ACE Charter High School in Camarillo, during the California District Hueneme Port Event at FATHOMWERX in Port Hueneme, Calif., March 8.

FRCE Reduces Turnaround Time for H-53 Induction, Boosting Fleet Readiness

Fleet Readiness Center East has achieved a significant readiness milestone, reducing the turnaround time for a CH-53E Super Stallion by 14%, accelerating the aircraft's return to the fleet and strengthening support for the Marine Corps' heavy-lift community.

This accomplishment marks a significant shift in the depot's H-53 production performance, underscoring FRCE's dedication toward faster, more efficient maintenance outcomes for the platform.

During an April 20 visit to the facility, H-53 Heavy Lift Helicopters Program Manager Col. Kate

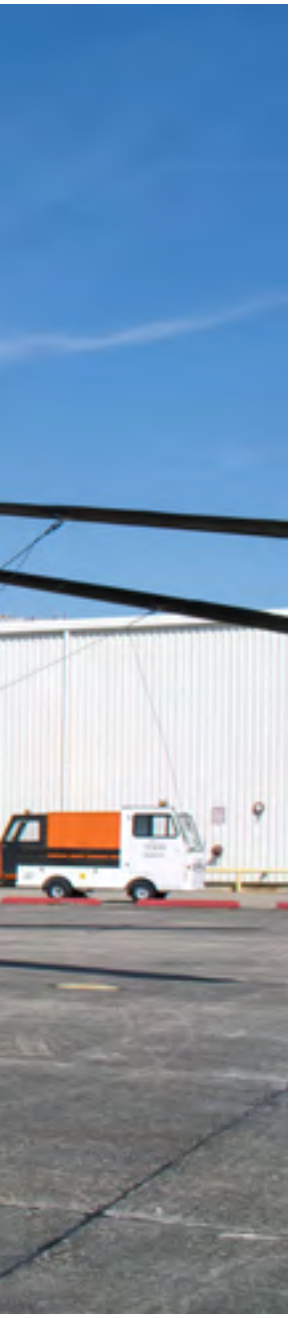
Fleet Readiness Center East (FRCE) recently improved its turnaround time for a CH-53E Super Stallion by 14%, allowing for a quicker return to the fleet. This accomplishment represents a significant turning point in the depot's support of the heavy-lift community, showcasing the FRCE's dedication to operational excellence and relentless pursuit of faster, more efficient solutions for the platform.

U.S. Navy photos

Fleeger presented a letter of appreciation to FRCE Commanding Officer Capt. Randy Berti, recognizing the H-53 production line's progress and dedication to the mission. Fleeger said shorter turnaround times maximize combat power by keeping aircraft available and mission ready.

"I would like to express my sincere appreciation for your outstanding efforts and remarkable achievements for the H-53E program," Fleeger said. "The recent data points to a clear and compelling story of a program that is not only turning a corner but is well on its way to setting a new standard of excellence. Your dedication and hard work are making a tangible difference, and it has not gone unnoticed. Thank you for your unwavering commitment to excellence and for your significant contributions to the readiness of our H-53 fleet and nation."

FRCE provides maintenance, repair and overhaul support for the CH-53E Super Stallion, MH-53E Sea Dragon and CH-53K King Stallion. The facility also overhauls, assembles and tests the T64 and T408 engines that power the heavy-lift platforms.



A Fleet Readiness Center East (FRCE) aircraft maintainer for the H-53 production line performs maintenance on an MH-53 Sea Dragon in support of the heavy-lift mission. FRCE recently achieved a 14% reduction in H-53 turnaround time.

FRCE, 2nd Marine Logistics Group Explore New Avenues for Advanced Manufacturing Collaboration

Fleet Readiness Center East (FRCE) hosted Marines from the 2nd Marine Logistics Group (2nd MLG) Feb. 12 for a deep dive into the depot's expanded advanced and additive manufacturing capabilities, an area both organizations see as key to future fleet readiness.

During the visit, Marines toured FRCE's additive manufacturing spaces, cold spray booth and aircraft production lines, gaining an in-depth, firsthand look at how the depot integrates emerging innovative technologies into maintenance operations to support the fleet.

Randall Lewis, Advanced Technology and Innovation team lead, said the visit highlighted how closely the two commands are in mission and mindset.

"It was exciting to show the Marines what FRC East has to offer in terms of advanced manufacturing, additive manufacturing and advanced technology integration," Lewis said. "Our command exists to serve as a readiness enabler and force multiplier for the warfighter and that's the same mission served by our counterparts at 2nd MLG, so we have a lot in common."

Lewis' team oversees many of the initiatives showcased during the visit, including FRCE's polymer and metal additive manufacturing programs and the Innovation Lab, a digital maker space supporting 3D printing across the depot.

As an Additive Manufacturing Center of Excellence within Commander,

U.S. Navy photos

Fleet Readiness Center East (FRCE) Planning and Operations Division Director Michael Wagoner stops at a CH-53K King Stallion undergoing maintenance as he leads a group of Marines from the 2nd Marine Logistics Group (2nd MLG) at Camp Lejeune, N.C., on a tour of the depot's H-53 aircraft production line Feb. 12.

Master Gunnery Sgt. David Smith, a Marine with 2nd Marine Logistics Group (2nd MLG) at Camp Lejeune, N.C., checks out a 3D printer at Fleet Readiness Center East (FRCE) facilities onboard Marine Corps Air Station Cherry Point, N.C., Feb. 12.

Master Gunnery Sgt. David Smith, a Marine with 2nd Marine Logistics Group (2nd MLG) at Camp Lejeune, N.C., inspects a bellows produced using additive manufacturing (commonly referred to as 3D printing) in the Fleet Readiness Center East (FRCE) Innovation Lab, located at the depot's facilities onboard Marine Corps Air Station Cherry Point, N.C., Feb.12.

Jason Jarnagan, lead engineer in the Fleet Readiness Center East (FRCE) Digital Data Center, explains to Marines from the 2nd Marine Logistics Group (2nd MLG) at Camp Lejeune, N.C., how a cross-disciplinary group of engineers and artisans works together to produce a fixture using advanced manufacturing techniques.

Fleet Readiness Centers, FRCE continues to expand its role in developing and fielding advanced manufacturing solutions for the fleet. Lewis noted that the visit gave Marines a model for how they might expand their own programs and identify areas for future collaboration and coordination with FRCE.

Based at Camp Lejeune, the 2nd Marine Logistics Group provides tactical logistic support to II Marine Expeditionary Force and task-organized logistics combat elements in support of Marine Air-Ground Task Force operations. Leaders said the scale and wide variety of FRCE's capabilities exceeded their expectations.

"Before today's visit, I was not aware of just how many capabilities FRC East provides to the Marine Corps, the other services and the Department of War—the scale of it is pretty incredible," said 2nd MLG Assistant Chief of Staff for Logistics (G4) Col. Joel Schumacher. "This command has an incredible impact on the fleet."

Schumacher said the group is focused on building its own advanced additive manufacturing capability while developing its relationships with allies and partners pursuing similar goals.

"When FRC East is just an hour's drive from us, we should be working as partners rather than trying to reinvent the wheel and do it all on our own," he said. "This has been a phenomenal visit with phenomenal people, and we're excited to see how collaboration can work to our mutual benefit moving forward."

U.S. Navy photo

Fleet Readiness Center East (FRCE) recently delivered its first non-flight-critical metal additive-manufactured aircraft parts to the fleet, boosting flight line readiness. An FRCE aircraft welder and metal additive operator showcases a sample metal additive-manufactured pylon fitting for the AH-1Z Viper that the depot's Advanced Technology and Innovation Team created for the H-1 Fleet Support Team.

FRCE Delivers First Metal 3D-Printed Aircraft Parts to Fleet

Fleet Readiness Center East (FRCE) has entered a new phase of metal additive manufacturing (AM) with the delivery of its first flight-certified, 3D-printed aluminum aircraft parts, an advancement poised to cut downtime and strengthen flight line readiness across multiple platforms.

A partnership between the Naval Air Systems Command (NAVAIR) AM Team and Fleet Support Teams has enabled FRCE's Advanced Technology and Innovation Team to develop its processes and earn certification to produce non-flight-critical metal components. Using high-powered lasers to weld thin layers of aluminum powder into solid objects, the depot has now manufactured and delivered three flight-worthy parts: an AH-1Z Viper weapons pylon fitting, a V-22 Osprey main landing gear repair fitting and a C-130 Hercules blanking plate.

The integration of metal AM marks a strategic shift in how the command supports fleet readiness. On-demand metal printing offers a more efficient, localized alternative to traditional supply chains, reducing maintenance lead times, easing procurement bottlenecks and keeping aircraft mission ready. It also aligns with FRCE's broader modernization push to expand AM across depot operations.

FRCE reached a second milestone along the way: successfully completing its rigorous, formal capability demonstration in under six months. This validation confirmed that FRCE-produced metal AM parts meet the same safety and quality standards as traditionally manufactured components.

"We were challenged to complete the qualification, production and certification processes for these parts in six months, and we not only met but exceeded that standard," said the Advanced Technology and Innovation Team lead. "This is the fastest this sort of thing has ever been done within Naval Air Systems Command, and it shows that we are competitive with industry standards."

The depot's first flight-certified metal AM aircraft part, the AH-1Z pylon fitting, is a small but important attachment point for the aircraft's weapon pylons. FRCE delivered the pylon fitting to the H-1 Fleet Support Team in early 2025, followed by the V-22 landing gear repair fitting and the C-130 blanking plate later that year. FRCE has also used the technology to produce specialized tooling and support equipment for the depot's maintainers, improving efficiency on the shop floor.

Metal AM is also proving its value in urgent fleet scenarios when a time-saving solution is vital to readiness. "If there's a fight and the fleet needs these parts tomorrow, they won't have time to wait for those parts through traditional supply chains," said the FRCE AM Team lead. "The fleet was having a hard time getting their hands on repair fittings for the V-22 main landing gear—it's basically a doorstop for the landing gear door when it comes up. They turned to additive manufacturing and asked us if it was something we could make, so we took on that part, and a few others, as part of our capability demonstration. The goal is to give the fleet what they need, when they need it, and we did just that."

Next, FRCE plans to expand into stainless steel printing, enabling production of stronger, more durable flight-critical parts and support equipment for the fleet to further increase flight line readiness.

U.S. Navy photo

FRCSW Pioneers New Era of Support with F/A-18 Landing Gear Overhaul

Fleet Readiness Center Southwest (FRCSW) has launched one of the most ambitious and groundbreaking new initiatives in the FRC enterprise: the full overhaul and recoating of F/A-18 nose landing gear (NLG) shipsets. What began in 2021 as a seemingly impossible task, one with no existing technical data, processes or playbook, has evolved into a model of innovation, teamwork and enterprise-level problem-solving that directly supports the president's National Defense Strategy.

Until recently, FRCSW repaired landing gear components individually as they came off the aircraft. Now, the command processes entire shipsets of landing gear at once, inspecting, disassembling, recoating, reassembling and returning them to the fleet as complete, tested assemblies. The overhaul cycle, performed every six to eight years, represents a fundamental transformation in how FRCSW supports readiness.

When this new workload began, no organization—not FRCSW artisans, the original equipment manufacturers (OEMs) or any other military commands—had established processes for these repairs. FRCSW engineers, artisans and leaders developed everything from scratch: technical data, tools and standard operating procedures. Every element, from how to transport the landing gear to how to reassemble it, had to be created. More than 150 new routers were generated for previously untouched parts. A router, a type of work order, is an internal document that tells personnel where a part is going and what needs to be repaired. FRCSW personnel translated complex external technical data into precise, executable steps. The team's creativity shone through on every front. Dan Doyle, FRCSW production manager, devised a colored coding system that streamlined part tracking. Angela Gutierrez, FRCSW production manager, restructured limited shop space and personnel to support the new workload. Gary Rice kept production control and logistics on track, Spencer Leonard coordinated the project to ensure visibility of every task and Aaron Wilcher engineered efficient kitting systems that cut turnaround times.

Even amid government shutdowns and logistical challenges, the team identified alternate facilities, adapted timelines and sustained mission-critical tempo.

Under the leadership of John Kucharski, F/A-18 Fleet Support Team (FST) landing gear engineer, and the materials lab, FRCSW developed a revolutionary primer-wipe technique to replace an unavailable, specialized chrome seal, a major breakthrough validated by the OEMs and now considered a huge engineering win for the Navy, Marine Corps and industry partners.

The command also leveraged the expertise of its award-winning Cold Spray team, using advanced "supersonic metal spraying" to rebuild corroded aluminum housings and bridge shortages in manufacturing new parts. This innovation is another readiness multiplier for the fleet.

FRCSW's success is rooted in strong, collaborative partnerships. The command's ongoing partnership with Boeing on NLG shipsets is now entering its second contract, with weekly meetings and a workload that has more than doubled.

Collaboration with Heroux-Devtek Incorporated, Safran and Naval Supply Systems Command ensures parts move to whichever organization can execute each part of the process most efficiently, creating a fully integrated enterprise system focused on speed, accuracy and warfighter impact.

To date, FRCSW has completed three main landing gear shipsets and one NLG shipset, with production increasing to 18 full sets per year. This is in addition to the command's established workload of more than 2,400 parts processed annually, a testament to the workforce's tireless commitment and technical mastery.

Through determination, skill and teamwork, FRCSW has set a new standard in readiness and operational support, demonstrating that when challenges arise, Americans rise higher.

FRCSW Launches Navy's First F-16 Maintenance Program in Record Time

Fleet Readiness Center Southwest (FRCSW) has officially stood up the Navy's first F-16 Viper maintenance line, an 18-month sprint that now positions the command as the service's primary depot for the aircraft's most demanding structural work.

FRCSW, working in conjunction with the Adversary and Specialized Aircraft Program Office, launched the Programmed Sustainment and Structural Repair (PSSR) line in an unprecedented 18 months, an achievement that program officials said sets a new benchmark across naval aviation. PSSR is similar to the Navy's F/A-18 High Flight Hour Inspection and is critical to ensuring the F-16 remains ready to perform its mission as an adversary for Navy pilot training exercises.

The effort began when the F-16 program office approached FRCSW with a pressing need and no other depot was able to take on the workload. FRCSW stepped forward, committing to fulfilling an operational imperative to keep the Navy's men and women who fight for the nation's security mission ready.

Building a Capability from the Ground Up

Standing up the line required procuring new equipment, designing and installing specialized tooling, and developing tailored training pipelines. One of the most notable achievements: adapting legacy F/A-18 maintenance equipment—including wing removal and installation stands—for F-16 use. Engineers validated the modifications, enabling a safe, cost-effective solution that kept the activation on schedule.

When critical hardware couldn't be sourced through the supply system, FRCSW artisans and engineers collaborated to refurbish legacy components, securing approval for continued use and preventing delays.

Engineering Breakthroughs and First-of-Their-Kind Approvals

Jake Weintraub, FRCSW's lead engineer for the F-16 program, partnered with program office engineers to approve modifications and introduce the Navy's first Local Engineering Specification (LES) for the aircraft, establishing a foundation for future sustainment work at Naval Air Station North Island, California.

Joint-Service, Industry-Backed Effort

The depot's rapid success was fueled by collaboration across services and industry:

- Hill Air Force Base in Ogden, Utah, provided hands-on training using a dedicated trainer aircraft.
- Lockheed Martin and Air Force partners supported radar-absorbent coating work and structural repair techniques.
- FRCW artisans, many with decades of F/A-18 experience, volunteered to transition to the new platform, bringing their deep technical expertise and a commitment to the fleet.

"The strategic collaboration between FRCSW and [the program office] to establish F-16 Depot Maintenance capabilities for U.S. Navy Aggressor F-16s has delivered accelerated readiness for the warfighter," said Capt. Jason Pettitt, program manager. "In just 18 months, both teams worked tirelessly to procure, train and install the necessary equipment to stand up the F-16 PSSR capability, an unprecedented pace for depot line activation. Congratulations to all team members for this successful achievement on delivering the first Navy F-16C Viper out of FRCSW."

An F-16 at North Island, Calif., benefits from advanced Uniform Have Glass coating and critical structural repairs completed by Fleet Readiness Center Southwest, enhancing both its training realism and operational safety for Navy pilots.

U.S. Navy photo

Brian Trout, FRCSW F-16 deputy program manager, echoed Pettit's enthusiasm.

"The chance to apply our skills to a new aircraft is exciting," he said. "We've spent decades working on F/A-18s, and now we get to contribute to the readiness of the Navy and Marine Corps in a new way."

First Aircraft Complete with a Growing Workload Ahead

The Viper's maintenance program is already seeing tangible results. FRCSW received its first F-16 in January 2025 and completed the first PSSR repair just one month later. The command is set to perform PSSR work on more than half of the Navy's F-16 fleet, with additional work planned, including Special Structural Inspections (SLAP/SLEP), canopy longeron repairs and Uniform Have Glass paint work for radar low-observable coatings.

The program's early success underscores FRCSW's ability to rapidly deliver new capabilities that directly enhance fleet readiness.

FRCSW Expands F-16 Capabilities with Advanced Coatings, Critical Structural Repair

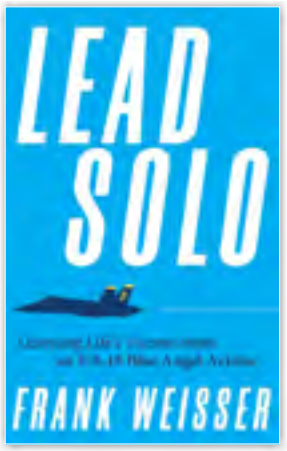
FRCSW has added two major capabilities to support the Navy's F-16 adversary fleet:

- Uniform Have Glass (UHG) is a coating that reduces the aircraft's radar cross-section, making the aircraft more challenging to adversaries for Navy pilot training. This advanced coating allows the F-16s to better simulate modern threat aircraft, providing Navy pilots with more realistic and demanding training scenarios. The coating is also highly durable, reducing long-term maintenance and corrosion control needs.
- Canopy Sill Longeron (CSL) is a structural repair line, developed with the Air Force, that supports C-model aircraft, with expansion to D-models planned later this year.

By bringing both advanced coatings and complex structural repairs in-house, FRCSW has positioned itself as a comprehensive support hub for the Navy's F-16 fleet, improving turnaround times, strengthening training realism and reinforcing joint-service readiness.

Professional Reading

By Cmdr. Peter B. Mersky, USNR (Ret.)



Lead Solo: Learning Life's Vectors from an F/A-18 Blue Angel Aviator

By Frank Weisser, Naval Institute Press, Annapolis, Md., 2025.

Over the years, we've reviewed several first-person memoirs from former Blue Angel aviators. As someone fortunate enough to have logged two flights with the Navy's flight demonstration squadron in the TA-4J (in 1975) and F/A-18B (in 1987), and having spent time with various team members while researching articles for *Naval Aviation News* and *Approach*, I can report on the pride and dedication each member develops while flying every air show, whether as a Navy lieutenant, Marine captain or Navy O-6 team leader.

"Lead Solo" is the latest autobiography by a former Blue Angel, describing two tours in which he flew as No. 5 and No. 6, the team's two solo aircraft. Cmdr. Frank Weisser explains what he learned during his decade with the Blue Angels: the people who fly and maintain the strikingly painted jets, and how those experiences shaped his later career and life.

For readers unfamiliar with the Blue Angels, four aircraft fly in the diamond formation while two solo pilots perform separate maneuvers that show off individual aircraft capabilities. Anyone who has watched the diamond formation, only to be startled by the sneak "surprise" pass of two Hornets soaring by at 50 to 500 feet and 600 knots, usually with an exit to the right of the crowd, knows exactly what those solos can do.

Weisser includes an entertaining anecdote about watching "Top Gun: Maverick" on an airliner (he flew most of the incredible in-flight maneuvering sequences), while the woman beside him thoroughly enjoyed the movie, unaware of who was sitting next to her. He resisted the urge to tell her.

U.S. Navy photo by Glen Watson

Cmdr. Frank Weisser brings his F/A-18 Super Hornet in close during a 2017 flight, offering a dramatic view.

The author goes to considerable lengths explaining the team's various maneuvers in detail, and his style is much different from other Blue Angels memoirs. The writing here is often hard to get through, as short as the book is, but perseverance pays off. This is not just another Blue Angels book, but a deep look inside how a team of specially selected, highly experienced and dedicated naval aviators train and

Photo courtesy of Capt. Scott Janik

Crew chief Aviation Ordnanceman 2nd Class Aldriick Kittles helps Cmdr. Frank Weisser strap into his specially painted F/A-18E Super Hornet during filming for the second "Top Gun" movie.

Photo courtesy of United States Naval Institute

In an end-of-cruise scene familiar to anyone who has returned from a long deployment, Cmdr. Frank Weisser holds his newborn daughter for the first time on April 28, 2013.

Photo courtesy of United States Naval Institute

In May 2019, the "Top Gun" film crew prepares for an extremely low-level, high-risk flyby sequence.

operate while showing the public what it means to fly and maintain the highly sophisticated jets at the heart of today's carrier Navy.

Chapter 4, "Communication," is perhaps the most revealing in the book, detailing the short but important calls made during air show maneuvers, including the complex "Fleur de Lis," the most complicated maneuver in the team's repertoire. Chapter 6, "Adversity," discusses in-flight emergencies, such as night carrier landings with system failures, including pulling the green ring that supplies emergency oxygen, something every aviator, pilot and backseater must know. This section warrants a second read—it's that important.

The lengthy discussion of exciting, demanding and dangerous carrier landings may lose some civilian readers, but it powerfully illustrates what sets naval aviators apart from their counterparts in other services.

Weisser originally aspired to be a Navy SEAL, but after falling short of meeting that goal, he was ordered to flight training, a "disappointment" that led to him earning his naval aviator wings, flying the F/A-18 Hornet and ultimately becoming a Blue Angel.

An index and glossary would have been helpful additions, especially for readers unfamiliar with Blue Angels terminology. Even so, "Lead Solo" is one of the more unusual books I have had the opportunity to review, and I highly recommend it.

The Vought F4U Corsair in the War Against Japan

A Photographic Record of the 15th Naval Fighter Wing at War 1944-45

By Tim Hillier-Graves, Pen & Sword Books Limited/Casemate, Havertown, Pa., 2025.

As familiar as Vought's iconic gull-winged World War II fighter is, comparatively little has been published about service with Great Britain's Royal Navy (RN) carrier fleet during the two final years of the Pacific war, years in which Japan's carrier fleet remained potent.

This new volume offers a rich photographic collection, in both black-and-white and color, depicting the RN's 15th Naval Fighter Wing and its highly dangerous day-and-night operations against what remained of Japan's army and navy—a once large and effective force of fighters and bombers.

Hillier-Graves introduces American readers to the young, highly capable and motivated naval aviators of the British fleet who flew these unusually configured, powerful long-nosed fighters. The F4U had already earned a formidable reputation in the United States in the hands of such luminaries as Marine ace Maj. Gregory "Pappy" Boyington and his "Black Sheep" of Marine Fighter Squadron (VMF) 214, and Navy Corsair ace Lt. j.g. Ira C. Kepford of Bouganainville-based Fighter Squadron (VF) 17.

A particularly valuable aspect of this book is its attention to RN squadrons and wing organization, an area often over-

Photo courtesy of Tim Hillier-Graves

Sub Lt. (ensign in U.S. Navy terms) Gerry Salmon poses, "forced," as he later called it, in his 1830 Squadron Corsair. He scored 1 ½ (i.e., shared) kills and was "mentioned in dispatches," a uniquely British commendation marked by a certificate and special device rather than a dedicated medal.

Photo courtesy of Tim Hillier-Graves

Lt. Cmdr. Alan M. Tritton assumed command of 15th Naval Fighter Wing after the death of Lt. Cmdr. "Dickie" Cork, a difficult late-war assignment. Tritton had previously flown Blackburn Skuas, a dive-bomber occasionally pressed into fighter duty.

Photo courtesy of Tim Hillier-Graves

Corsairs aboard the carrier HMS Illustrious prepare to launch on May 17, 1944, to attack targets on Java.

Photo courtesy of Peter B. Mersky Collection

Lt. Cmdr. "Dickie" Cork (9 kills, including German, Italian and French aircraft) grins from the cockpit of his Sea Hurricane aboard his carrier HMS Indomitable as it makes its way back to England following the conclusion of Operation Pedestal (Aug. 2-15, 1942) to relieve embattled Malta.

Photo courtesy of Tim Hillier-Graves

This Corsair is thought to be flown (perhaps in early 1944) by Royal Navy Lt. Cmdr. Richard John Cork, the wing leader of the Royal Navy's 15th Naval Fighter Wing aboard the carrier HMS Illustrious. He was an accomplished naval aviator in World War II, as well as fighter ace, having flown the Hawker Hurricane. The Corsair's long nose could pose problems in lining up for an approach for deck landings, but Cork was up to the job.

looked. American readers familiar with U.S. Navy and Marine Corps unit designations will enjoy the detailed look at an important ally's structure, while recognizing the skill and courage of these aviators matched their American counterparts as they encountered Japanese Navy A6M Zeros (Zeke), G4M bombers (Betty) and Japanese Army fighters such as the Nakajima Ki-43 (Oscar) and Ki-44 (Tojo). These enemy types are often left out of U.S.-centric narratives, making their inclusion here unique.

We should note that Maj. Gen. John P. Condon, USMC (Ret.) (1911-1996), wrote a similar American-side account in "Corsairs and Flattops: Marine Carrier Air Warfare, 1944-1945," making Hillier-Graves' book a timely and complementary addition to Corsair history.

Japanese Submarine Aircraft, Japan's Underwater Aircraft Carriers

By Ishiguro Ryusuke and Tadeusz Januszewski, Stratus, MMP Books, Poland and Casemate, Havertown, PA.

Perhaps the most unusual aircraft to emerge in World War II were the submarine-based, submarine-launched floatplanes, an idea that had few adherents, with the inventive Imperial Japanese Navy (IJN) fielding the most examples. Until recently, the only substantial treatment of these warplanes was iconic British writer William Green's "War Planes of the Second World War, Volume 6, Floatplanes" (Doubleday, 1963). Green set a standard for research and writing that shaped modern aviation enthusiasts, myself included. His books paired finely researched and written text with rare photographs and airbrushed three- and four-view "drawings" of aircraft never before seen in aviation literature.

This new book begins with an introductory history of one- and two-seat aircraft designed to be broken down, carried aboard submarines and launched for reconnaissance and scouting missions from World War I through the interwar years. Japan showed the greatest interest in and commitment to the concept, investing heavily in designs that could be carried, assembled and launched from its submarine fleet. The late-war Aichi M6A1 Seiran ("Mountain Haze") marked the high point of this effort. Introduced in June 1942, the Seiran was built as an attack bomber with detachable floats and folding wings to fit within the limited spaces of a submarine. The book's cover features a fine Tomasz Kaca illustration of a Seiran fleet overflying its submarine.

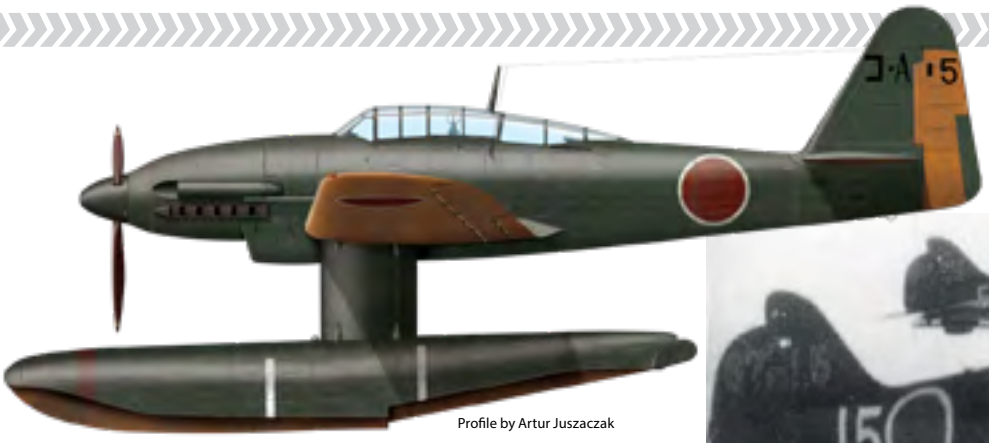
Originally, the Seiran was intended for an attack on the Panama Canal, with each aircraft carrying a large bomb. Twenty production Serians were built, and crews trained intensively for a July 1945 mission that never came. Japan's surrender in August 1945 rendered the entire program null and void. Still, the streamlined design and advanced look of the Seiran and the extensive modifications made to existing submarines suggest that, had it been deployed earlier, this new aviation weapon could have posed a real threat to the growing Allied fleets and land-based sites.

The most well-known operational use of a Japanese Navy submarine-launched aircraft is the E14Y1 ("Glen") mission from submarine I-25. On Sept. 9, 1942, the Glen's two-man crew dropped two small incendiary bombs over a forest of trees in southern Oregon. After the war, the pilot, Chief Warrant Officer Nobuo Fujita, visited the United States and presented his family's 400-year-old Samurai sword to the city of Brookings as a gesture of reconciliation. I-25 had earlier shelled Fort Stevens, Oregon, on June 21.

The watertight cylindrical hangar of the I-400 submarine, designed to house three folded Aichi M6A1 Seiran seaplanes.

Four land-based reconnaissance aircraft, Nakajima C6N1 Tenzan ("Heavenly Mountain"), codenamed Jill, prepare to depart for Truk, where their crews would observe operations on Ulithi before and after attacks by submarine-launched floatplanes. Originally a carrier attack bomber, the C6N1 also flew reconnaissance and later Kamikaze missions in the Pacific War.

Photos courtesy of MMP Books

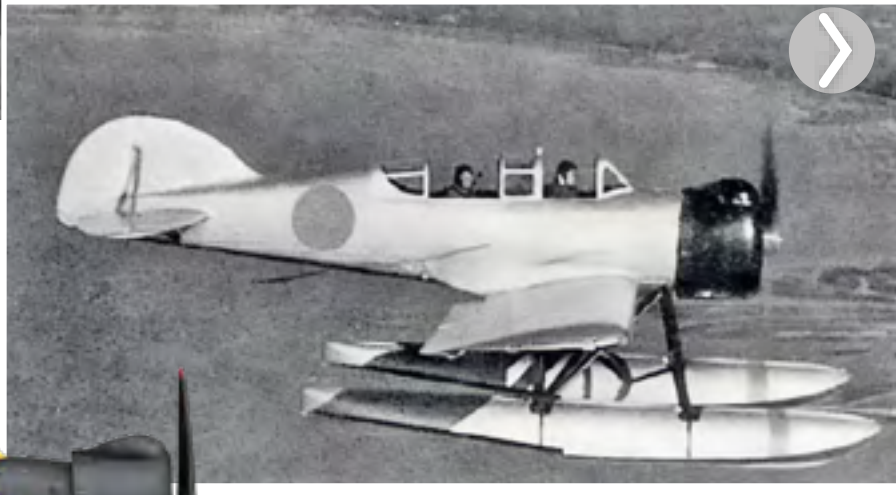


Profile by Artur Juszaczak

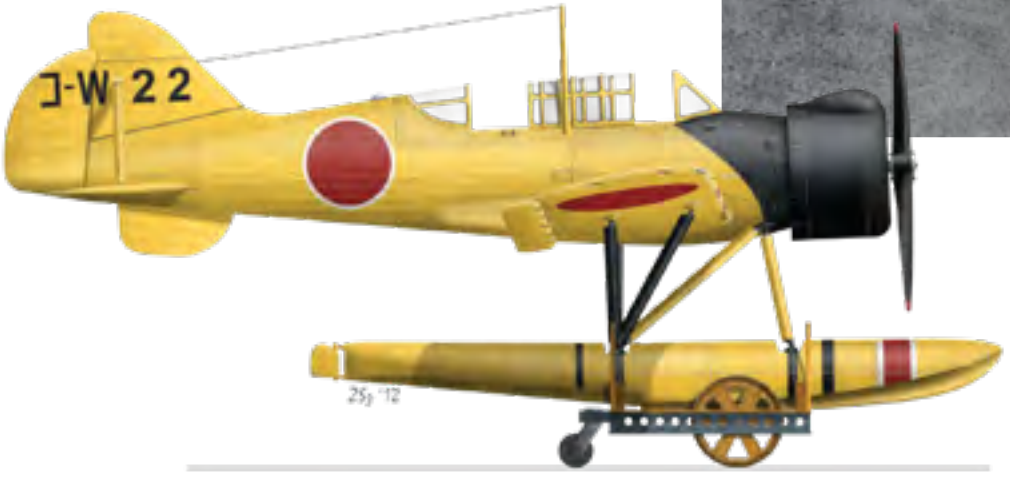
The No. 5 prototype of the M6A1 Seiran in one of its color schemes.

Two E14Y1 Model 11 floatplanes fly in formation over the Kure Naval Base.

A production Watanabe E9W1 reconnaissance floatplane assigned to submarine I-6 undergoes a technical inspection at Kure Naval Base in 1937. Note the Japanese character and Roman numeral on the vertical tail.



The first prototype of the Kugisho E14Y1 reconnaissance floatplane conducts a test flight over Tokyo Bay. This may be the aircraft used in the Sept. 9, 1942, mission from submarine I-25, when its crew dropped two small incendiary bombs over a forest in southern Oregon. After the war, pilot Chief Warrant Officer Nobuo Fujita returned to present his family's 400-year-old Samurai sword to the nearby city of Brookings. The I-25 had also shelled Fort Stevens in Oregon on June 21, 1942.



The second E14Y1 production prototype, marked Ko-W22.

Thanks to Jack Russell, USNI and Tony Holmes, Osprey Publishing, UK, for their help with this issue.

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