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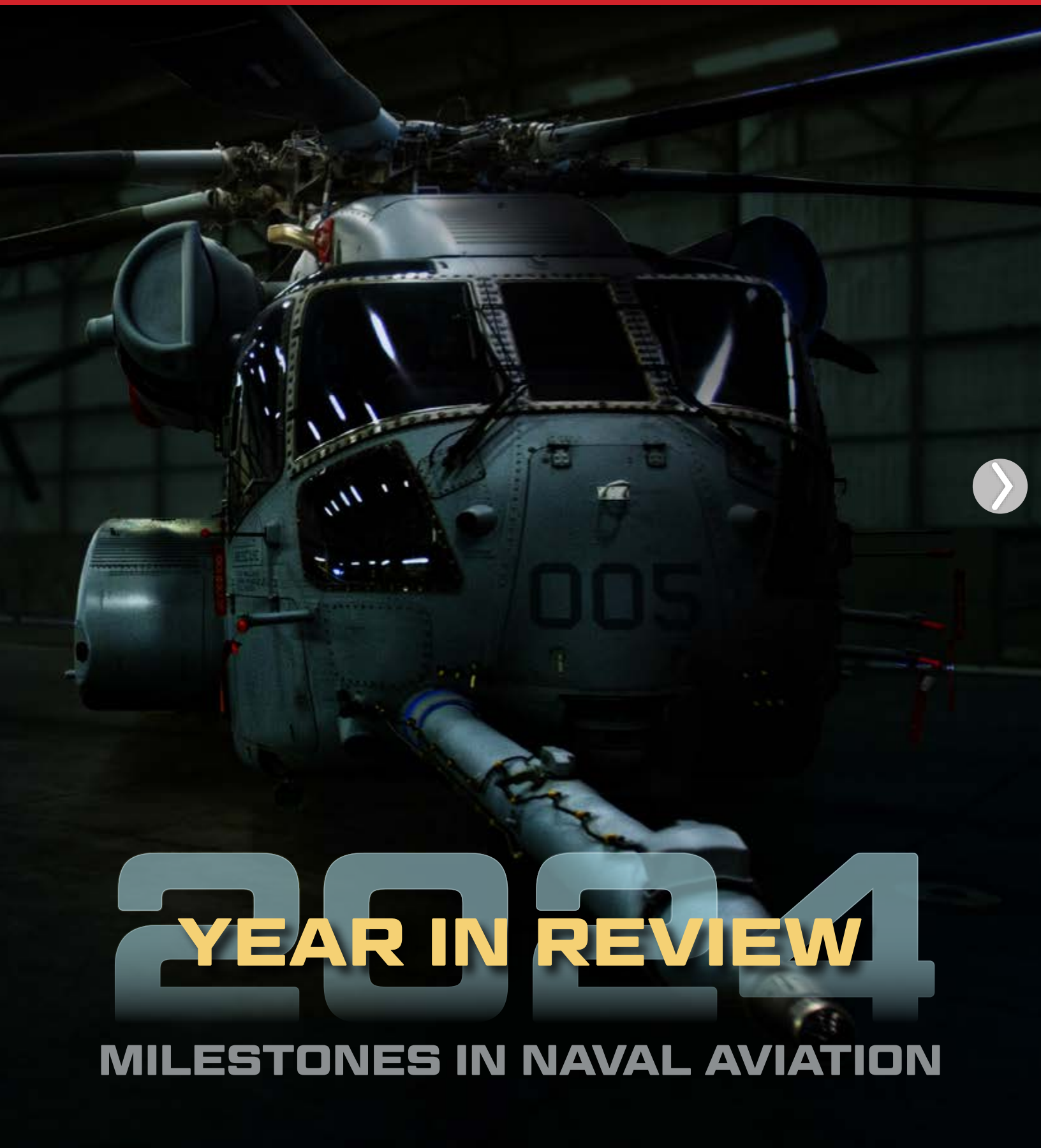
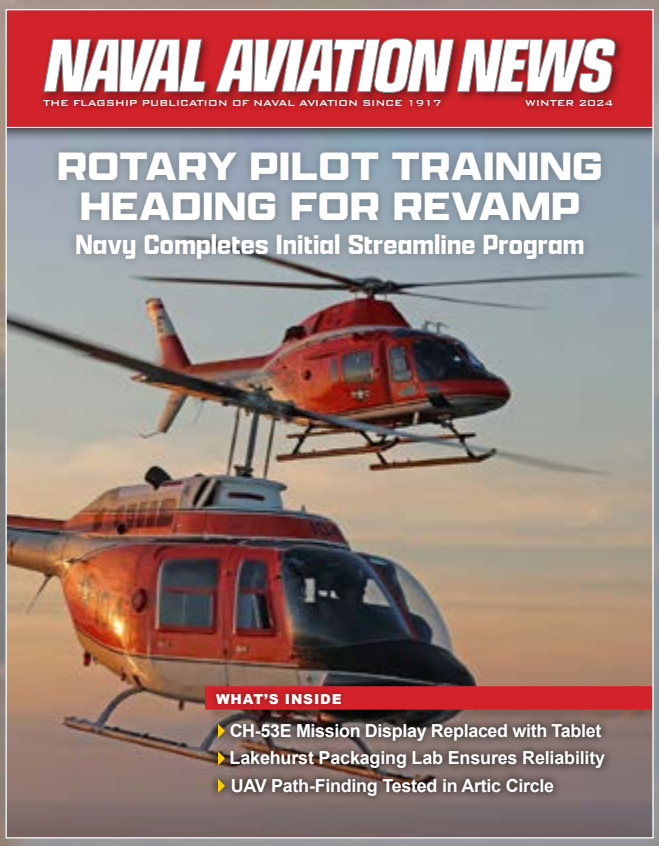


2024 YEAR IN REVIEW

MILESTONES IN NAVAL AVIATION



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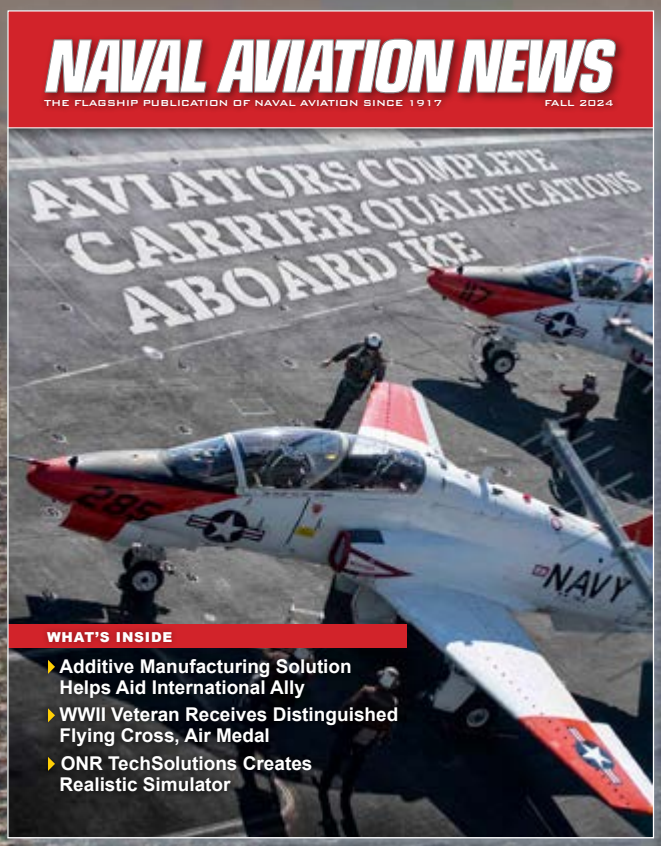

Fall 2024

NAVAL AVIATION NEWS

2024 Year in Review — Special Edition

EDITOR'S NOTE

Welcome to the second annual Year in Review edition of Naval Aviation News.

For 2024, we bring you an eclectic mix of stories, but with a few general themes.

Like last year, innovation in training was big news for the Navy throughout the period. Helicopter training was set to undergo fundamental change using a joint service, public-private partnership; the establishment of a Marine Corps F-35B landing signal officer (LSO) training school was designed to increase the quality and quantity of trained LSOs; and aviators from Training Air Wing 1 completed carrier qualifications aboard USS Dwight D. Eisenhower (CVN 69).

Meanwhile, another carrier, USS Gerald R. Ford (CVN 78), returned from an historic, eight-month deployment.

Innovative use of off-the-shelf technology, resourceful machinists and additive manufacturing—more commonly known as 3D printing—all played crucial roles keeping the fleet operational during the year. For the former, the CH-53 Super Stallion mission data team integrated a hard-mounted, commercially-available tablet to serve as the aircraft's primary mission display. Also in 2024, the machine shop aboard USS Ronald Reagan (CVN 76) created from scratch a valve seat wrench needed to repair the ship's arresting gear. Lastly, using a technique that seems to be becoming increasingly commonplace, the Naval Air Systems Command (NAVAIR) Additive Manufacturing Team used additive manufacturing to create a critical, torque-sensitive component replacement part for the Optical Landing System aboard USS Bataan (LHD 5).

In safety news, development of the HABIT app by the Chief of Naval Training aeromedical safety office reduced neck and spine pain and injury. And safety was the first consideration for the Landing Signalman Enlisted role aboard USS Boxer (LHD 4).

Naval laboratories also headlined 2024. The Packaging, Handling, Storage and Transportation and Supply Chain Risk Management laboratories, both at Lakehurst, New Jersey, kept materiel moving safely and securely. Out west, and decidedly further north, the Naval Postgraduate School, in conjunction with the Naval Research Laboratory, developed POTION software to increase UAV flight length during an Arctic test flight. Additionally, the Naval Air Warfare Center Training Systems Division BATTLE Lab conducted award-winning research into spatial disorientation.

Finally, a pair of history-related articles round out the Year in Review. Stories include a look at the final stop of a Marine One helicopter at the George H.W. Bush Presidential Library and Museum and the dedication of an E-6B Prowler at Point Mugu, California.

—Dave Byrd, Editor, Naval Aviation News

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On the cover: *A CH-53K King Stallion (front cover) and a CH-53E Super Stallion (back cover) are staged during a redesignation ceremony at Marine Corps Air Station New River, North Carolina, Jan. 24, 2022.*

U.S. Navy photo illustration by Fred Flerlage; imagery by Lance Cpl. Elias E. Pimentel III

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

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U.S. Navy photo

A U.S. Navy officer signals an F/A-18F Super Hornet, attached to Strike Fighter Squadron (VFA) 41, as it launches from the flight deck of aircraft carrier USS Abraham Lincoln (CVN 72).


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SHOOTER

TOMORROW LOOKS FOR NAVAL HELICOP

By Lt. Michelle Hernandez (U.S. Coast Guard) and Capt. Chris Hulser (U.S. Coast Guard)

The Navy took a first step to enhance rotary-wing aviation capabilities with an innovative approach that will benefit an age-old partnership. Eight Student Naval Aviators (SNA), including five Navy and three Coast Guard students, began training under a new joint-service, public-private partnership program that promises faster time-to-train, greater helicopter simulator availability and in-aircraft training hours, as well as better rotary-wing aviator for the joint-maritime services' talent supply lines.

These eight students are the first cohort of 48 volunteers (33 Navy and 15 Coast Guard) who have volunteered to participate in a rotary-only training pipeline that could replace traditional primary air training for aspiring helicopter pilots who opt into the program. If the pilot program is successful, the Navy hopes to permanently establish the rotary-only pipeline for helicopter students by fiscal year 2026. So far, Chief of Naval Air Training (CNATRA) reports that this new program can reduce time to train in the overall timeline for helicopter students by 13 weeks.

The Naval Air Training Command awarded a contract to Helicopter Institute, Inc. of Fort Worth, Texas, in the fall to evaluate contractor-based solutions to helicopter training.

"It is great to see our efforts to break out of the status quo —and the way we have done business—paying off," former Commander, Coast Guard Force Readiness Command Rear Admiral Joe Raymond said. Raymond sponsored Coast Guard participation in the effort and helped shape the program.

Primary training for helicopter pilots has not fundamentally changed in nearly half a century. Prior to this initiative, prospective rotary-wing Naval Aviators (Navy, Coast Guard and Marine Corps) reported to training in Pensacola, Florida, and flew fixed-wing followed by rotary-wing. This pipeline's time requirement could take upwards of three years to complete. This expanding time requirement was a primary driver for the CNATRA to study carefully the Air Force's and Army's rotary-wing-only training pipeline, which graduates a pilot in just over one year.

A Navy TH-57C Sea Ranger and a Navy TH-73A Thrasher, assigned to Training Air Wing Five (TAW-5) and flown by instructors from Helicopter Training Squadron 8 (HT-8), Helicopter Training Squadron 18 (HT-18) and Helicopter Training Squadron 28 (HT-28), fly over Pensacola, Florida, on Tuesday, Sept. 12, 2023.

U.S. Navy photo by Antonio More

DIFFERENT TER TRAINING

Aviation Training in the 1940s

In the 1940s, the path to becoming a naval aviator was characterized by rigorous classroom instruction in the areas of meteorology, aerodynamics, engineering, aviation safety, aviation physiology and more. In the following decades, the training system was adapted to include rotary-wing training, though it resembled a "bolt-on" addition at the end of fixed-wing training. The Army was the first to pioneer a rotary-wing only pipeline in the mid-1950s; the Air Force reinstituted its helicopter-only training in 2021 as part of its Helicopter Training Next initiative. Previously, the Air Force, like the Navy, required fixed-wing undergraduate pilot training before moving on to helicopters.

Regardless of the service branch or stage of training, previously most instruction occurred in the aircraft itself. As recently as the 1990s, a task as simple as learning to tune the radio was done in the aircraft, at altitude, at high expense and relatively high-risk. Training systems matured to incorporate simulators, some as basic as a tabletop trainer to manipulate navigation and radio systems, to improve quality and time-to-train. Just like the advent of sloped-deck aircraft carriers in the 1960s, technology made aviation operations and training safer. By today's standards, the majority of aviation training pipelines utilize simulators and advanced technology such as virtual and augmented reality.

Training after World War II took just under one year and was divided into three-phases of training: primary, basic and advanced. Aspiring aviators accumulated 65 flying hours during primary instruction and 140 hours between basic and advanced training. This equated to roughly 200 hours of in-aircraft training, first in fixed-wing aircraft, and then later in rotary-wing aircraft. Once helicopter training arrived on scene, the obvious solution was to simply add rotary-wing training onto the end of a proven flight training curriculum. Hence, all naval aviators were initially trained as fixed-wing pilots. This model changed little from 1940 to 2023.

The success of the Naval Aviation training system has endured for decades and was crucially tested in the crucibles of WWII, Korea, Vietnam and over the skies of the Middle East and Afghanistan, and reaffirms the principle that quality of training remains a linchpin of military readiness and success. Understanding the history of this training system, its challenges, successes and failures is paramount to upholding its legacy and ensuring its continued effectiveness. However, another linchpin of military success is to never rest on laurels—innovation and progress must be embraced. With the advent of modern technology, and the increased time-to-train, Naval Aviation rotary-wing training was thoroughly examined for innovative opportunities.

A New Approach to Training

Following a structure similar to the Air Force's model, the Navy and Coast Guard are participating in the most impactful change to rotary-wing aviation training in half a century. The Air Force beta-tested a new program labeled by CNATRA as Contract Operated Primary Training—Rotary (COPT-R) throughout 2022. This program questioned the need for a rotary-wing flight student to have any appreciable fixed-wing airplane training. It surmised the time spent in a single-engine airplane would be far better served with training focused solely in helicopters and associated rotary-wing training devices. Further, the system capitalized on a blend of contract and military training to provide an optimal mix of education and training for new pilots with tangible gains in time and cost-to-train.

Beginning in the 1990s, as the aviation landscape transformed, decision-makers noted the effectiveness of rotary-wing only training, utilized by the Army for decades with great success. This approach, which aimed to produce skilled helicopter pilots in approximately 12 months, garnered increasing attention as the need for more agile, cost-efficient training solutions became evident. The Naval Aviation helicopter training has now taken a leap into this modern paradigm and the results are promising.

To date, the Air Force's rotary-wing-only program has produced 24 winged aviators in the 12-month program. Initial feedback from squadrons receiving the new pilots is that quality was not sacrificed, and the new pilots are equally ready for transition to their fleet aircraft as the legacy students, which often took two to three times as long.

Collaboration to Explore a New Program

Unbeknownst to the Navy, a team from the Coast Guard's Aviation Training Center (ATC) and Coast Guard Liaison Office (CGLO) at Naval Air Station Pensacola conducted on-site evaluations of the new Air Force program in January 2023. Simultaneous studies were underway by the CNATRA team for Navy implementation. The findings were inspiring to both services: This hybrid model, which incorporated elements from the Air Force's training program, could provide the services they needed. This strategic adaptation served as a crucial step forward in ensuring our maritime aviation forces remain well-prepared and mission-ready in today's dynamic operational environment.

Under this newly developed program, students will complete several discrete phases of training, just like pilots have for decades, but at several locations and some under contract training agreements. While phased training is not new, content of these phases is starkly different. Student Naval Aviators first report to Naval Air Station (NAS) Pensacola for medical screening, indoctrination and introductory flight training, including academic lessons and approximately 10 hours of "introduction to flight" in a low-performance fixed-wing aircraft. Then, it is on to a contractor-owned/contractor-operated helicopter flight school called "The Helicopter Institute" in Fort Worth, Texas, to train in the Bell 206 (TH-57 Sea Ranger) helicopter. After completion of this "basic" flight training, in which students amass 50 hours of in-aircraft flight experience, they report to Advanced Helicopter Training at NAS Whiting Field, Florida. The TH-73 Thrasher will soon replace the aging TH-57 Sea Ranger as the advanced air training platform for helicopters at Whiting Field.

U.S. Navy photo by Lt. Michelle Tucker

The Navy's first TH-73A Thrasher, left, arrives at Naval Air Station Whiting Field, Milton, Florida, Aug. 6, 2021, escorted by a TH-57B Sea Ranger.

'I Have the Controls'…Early…Under this New Training Program

The program focuses on hands-on training right from the start. On day two of the 12-week program, students take the controls. This approach breaks training down into four digestible stages that pave the way to master helicopter flight in 81 ground training hours and 50 flight hours.

During Stage One, students delve into the foundational knowledge necessary for a private pilot helicopter license. Ground classes are a deep dive into aeronautical fundamentals, while flight sessions introduced the students to basic Visual Flight Rules (VFR) maneuvers and pre-solo training, laying the groundwork for future success. The syllabus was designed to have students in the cockpit every other day in order to transfer their knowledge to the controls. This is a stark difference from legacy training syllabi, in which students can be situated in long periods of classroom activities.

This first phase of training sets students up for success with small group learning in a 2.6-to-1 student-to-instructor ratio and hands-on flying right from the start. Even the location is ideal, utilizing three outlying fields nearby Fort Worth Meacham International Airport, Texas. This atmosphere exposes students to one of the busiest Class Bravo and Delta airspaces in the world and a multitude of airports in the Fort Worth/Dallas area that create a perfect environment for honing radio communication skills, navigation and the ability to make critical decisions in the face of ever-changing weather conditions.

Stage Two training marks a transition into navigation and aeronautical general knowledge. In the classroom, students toil over charts, become masters of aviation weather and gain a profound understanding of aeronautical regulations. In the air, students practice performance maneuvers, make a first foray into night flying and embark on thrilling cross-country journeys, broadening horizons and cultivating expertise, which will result in mastering the craft of aviation.

Stage Three training is a pivotal moment. Ground classes are devoted to special operations, handling emergencies, and preparation for the practical examinations to meet FAA and

eventually Navy "check rides" at NAS Whiting Field—south in Milton, Florida, during advanced flight. In the skies, students undertake VFR cross-country flights, coordinate special operations maneuvers in confined areas and prepare for the end-of-stage practical test, and finally, the "solo." This phase ensures students can navigate any situation with the poise and precision required of a military pilot. As students transition into the final stage, the intrigue of flying by instruments awaits.

Stage Four training reorients focus towards cockpit instrumentation, prioritizing a comprehensive understanding of instrument operations. Ground classes delve deep into the fundamentals of instrument flight, emphasizing instrument interpretation and cross-check procedures to enhance precision and elevate flight capabilities. This stage offers an in-depth education in basic instrument maneuvers, partial panel operations and precision approach techniques, cultivating proficient aviators with the requisite skills to navigate the skies safely and confidently.

"The Helicopter Institute's" student-friendly curriculum, digestible stages and diversified learning methodology embrace a hybrid approach to prepare students for advanced helicopter training at NAS Whiting Field and Part 141 Private Pilot Helicopter Course. The curriculum ensures students have the required aeronautical knowledge, skills and experience to conduct helicopter flight operations under day and night VFR safely and successfully, and to meet or exceed the requirements for a helicopter Private Pilot Certificate. In short, when pilots graduate from this phase of flight training, they are ready for military advanced training at NAS Whiting Field. These "new" students will start Advanced Helicopter Training alongside legacy advanced students. However, the students trained under this new system will have 50 hours of in-helicopter flight training and exposure to helicopter operations from the four stages provided by the COPT-R program.

"It is really reshaping the way we are training our rotor-wing pilots with the collateral benefit of reducing pilot training timelines," said Rear Adm. Jeffrey Randall, current Commander, Force Readiness Command (USCG).

CNATRA's mission is to train, mentor and deliver the highest quality naval aviators who prevail in competition, crisis and conflict. Headquartered at NAS Corpus Christi, CNATRA comprises five training air wings in Florida, Mississippi and Texas, which are home to 17 training squadrons. In addition, CNATRA oversees the Navy Flight Demonstration Squadron (the Blue Angels) and the training curriculum for all fleet replacement squadrons.

David Byrd, Editor in Chief of Naval Aviation News, contributed to this article.

Marine Major Innovates, Mission-Critical F-35B

From the 3rd Marine Aircraft Wing

On March 13, 2003, a flight of three AV-8B Harriers launched from the amphibious assault ship USS Bataan (LHD 5) on a night combat sortie. Sometime after launch, the Operation Southern Watch mission was scrubbed due to a sandstorm that swept across Kuwait and over the Northern Arabian Gulf headed toward the ship. The Harriers were dangerously low on fuel and had failed attempts to break out of the weather to find the ship.

Moments from fuel starvation, the landing signal officer (LSO) aboard ship directed a pilot, "turn your landing light on." The LSO picked up the Harriers half a mile from the ship and directed the pilots' eyes safely onto the deck one-by-one.

LSOs are pilots trained to guide fixed-wing, carrier-based aircraft to safe landings aboard ship. They work closely with the ship's captain and air boss to maintain launch and recovery timelines and address any delays or issues that may arise during operations. They are often referred to as "paddles" on the radio because early Navy LSOs used large colorful paddles to visually communicate with aircraft landing on carriers.

Today, paddles for short takeoff and vertical landing (STOVL) aircraft are more critical than ever. In the case of the F-35B Lightning II, STOVL LSOs are sourced from experienced pilots and have the same responsibilities as their Harrier predecessors, but LSO training is adapting to the Marine Corps' expanding role of the F-35B Lightning II for maritime operations. The F-35B is designed to operate from landing helicopter assault and landing helicopter dock amphibious assault ships, as well as expeditionary airstrips less than 2,000 feet long. STOVL LSOs enable the F-35B's expeditionary nature.

Maj. Brian Kimmins is an AV-8B and F-35B trained LSO leading the establishment of a Marine Corps F-35B STOVL LSO school at Marine Corps Air Station Beaufort, South Carolina, to increase the quality and quantity of trained LSOs.

Kimmins received his naval aviator wings in 2012 and was assigned to the AV-8B Harrier. He gained professional experience within the 3rd Marine Aircraft Wing. Most notably, Kimmins joined Marine Attack Squadron

Develops Course

Maj. Brian Kimmins with Marine Fighter Attack Squadron (VMFA) 211 observes pre-flight checks aboard Her Majesty's Ship (HMS) Queen Elizabeth at sea on Sept. 27, 2020.

U.S. Marine Corps photo

A Marine with Marine Fighter Attack Squadron (VMFA) 211 prepares to launch an F-35B Lightning II Joint Strike Fighter from the deck aboard Her Majesty's Ship (HMS) Queen Elizabeth at sea on Oct. 10, 2020.

U.S. Marine Corps photo

U.S. Marine Corps Maj. Brian Kimmins prepares to launch an F-35B from HMS Queen Elizabeth for a historic cross-deck operation with USS America in the Pacific Ocean on Aug. 20, 2021.

U.S. Marine Corps photo

(VMA) 211, Marine Aircraft Group 13, 3rd Marine Aircraft Wing, as a Harrier Pilot in 2013, transitioned to the F-35B in 2019 and returned to Marine Fighter Attack Squadron (VMFA) 211 in 2021 as an F-35B pilot. Kimmins deployed with multiple Marine Expeditionary Units, conducting flight operations at sea and earning Division Leader, Mission Commander and Training LSO qualifications. He has supervised more than 1,000 field carrier landing practice and shipboard vertical landings as an LSO and conducted 250 ship landings himself.

"The F-35B is the force's modern STOVL-capable fighter jet," Kimmins said. "The fifth-generation fighter incorporates advanced technology, including stealth capabilities, advanced weaponry and advanced sensors, providing a MEU with a more capable aircraft than its AV-8B predecessor."

Since 1985, the AV-8B Harrier served as the Marine Corps' vertical or short takeoff and landing (V/STOL) capable fighter jet that typically operated from large-deck amphibious ships. The Marine Corps is whittling its Harrier fleet and expects full retirement by fiscal year 2027, according to the Marine Aviation Plan.

Marine aviators have historically received LSO training for both the Harrier and F-35B platforms on the job. The Navy operates an LSO School at Naval Air Station Oceana, Virginia, that trains Navy and Marine Corps personnel embarking on nuclear-powered aircraft carriers. The Marine Corps used to send carrier-based F/A-18 squadron LSOs to train at NAS Oceana and now sends LSOs for the carrier capable F-35C Lightning II. Four pilots from Marine Fighter Attack Squadron (VMFA) 314 have trained as LSOs at NAS Oceana since the "Black Knights" stood up as the Marine Corps' first F-35C squadron in 2020. In 2022, VMFA-314 deployed aboard Nimitz-class aircraft carrier USS Abraham Lincoln (CVN 72) as part of Carrier Air Wing 9.

Until recently, there was not a formal school for F-35B LSOs deploying with MEUs.

"On-the-job training largely takes place with MEUs, where pilots conduct qualifications over the course of a six-to eight-month deployment," Kimmins said, referencing the Marine Corps deployments aboard Navy amphibious assault ships that F-35B squadrons support. "Because of the limited number of LSOs in the community right now, you have some LSOs doing back-to-back ship deployments."

The Marine Corps F-35B STOVL LSO school fills the training gap for future LSOs aboard amphibious assault ships. The school is hosted at Naval Air Station Patuxent River, Maryland, centering around the F-35 Integrated Test Force Manned Flight Simulator Facility.

"Modernizing LSO training with a dedicated simulator significantly reduces cost and increases throughput and quality of training," Kimmins said.

The simulator is a dome and projector setup where the environment replicates standing in primary flight control on an amphibious assault ship. It is capable of simulating launching and recovering an aircraft both day and night, in all weather conditions, and can simulate emergency procedures specific to the ship environment.

"The simulator provides the ability to monitor and control more shipboard launches and recoveries over the course of two days than you'll see in an entire week at the ship," Kimmins said. "The enormous effort of the leaders and engineers at the F-35 Integrated Test Force are the reason we've maintained momentum in formally establishing a schoolhouse."

A leap forward in capability, efficiency and realism, the simulator enhances readiness because it can produce LSOs at a much faster rate with a higher quality of training than before. Kimmins led the first course in June 2023 to prepare 3rd MAW pilots for a MEU deployment.

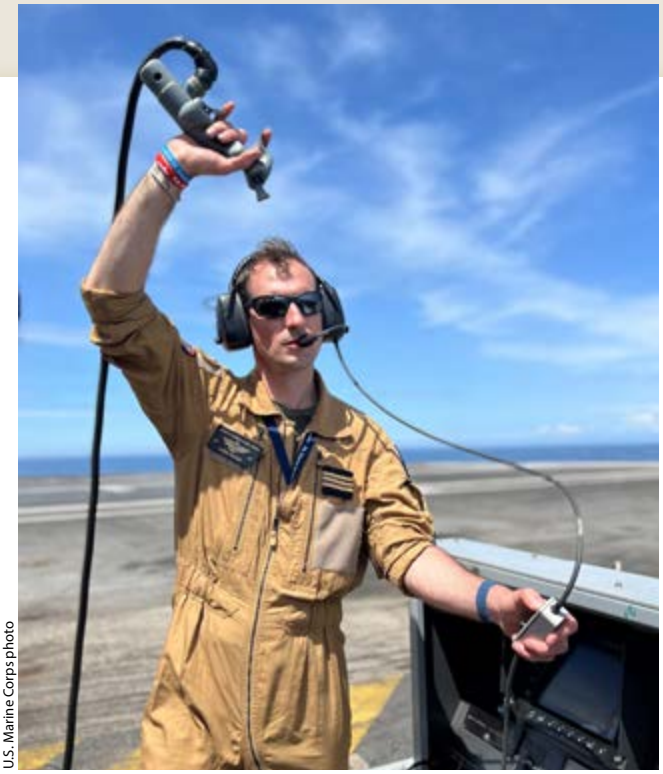
"Feedback has been that the simulator training before going to the ship was invaluable," Kimmins said. "Prospective LSOs felt more comfortable about going to the ship to control F-35B launches and recoveries, having already seen the environment in a simulator."

Marine Corps Force Design and modernization requires Marines who have critical thinking skills and mental dexterity. More than simple modern technologies and equipment, the Marine Corps values leaders like Kimmins who are adaptable and innovative problem solvers.

Looking forward, Kimmins envisions an LSO School with the capability to train partner nation F-35B LSOs, furthering interoperability and integration.

"My long-term vision is an LSO school where we teach F-35B LSOs to become subject matter experts in shipboard and expeditionary advanced base operations integration for their squadrons," Kimmins said. "The training will lay the foundation for team building with partner nation LSOs."

From the 3rd Marine Aircraft Wing.



U.S. Marine Corps photo

French navy Lt. Adrien Tosser

French LSO Instructor Expresses Benefits of U.S.-France Alliance

The Landing Signal Officer (LSO) School is the launching pad for all LSOs in the Navy. The school provides their initial training on providing safe and expeditious landings of aircraft on aircraft carriers.

The LSO School has been training U.S. Navy pilots for 79 years. Though they often welcome foreign pilots to train with them, French navy Lt. Adrien Tosser has inked his name into the history books as the school's second French instructor, continuing that legacy of opportunity.

Tosser was assigned to Naval Air Station (NAS) Oceana's LSO School in 2022 to extend his experience as an LSO, while simultaneously strengthening bonds between the United States and France.

Tosser's assignment represents the longstanding alliance between the United States and France. Both nations are proud members of NATO, which celebrates its 75th anniversary this April. One of the purposes of NATO is to build relationships that enhance security, and Tosser understands the importance of fostering those relationships.

"Sometimes you see U.S. pilots coming on the French carrier, and they see some of the friends they had in flight school that they hadn't talked to in years, and they're like, 'Hey! You're here?!' It's great," Tosser said.

Having been on almost all carriers on the East Coast, Tosser has gained invaluable experience. He credits advancements on the catapult systems on both French jets, and the French navy aircraft carrier, the Charles de Gaulle, with increasing interoperability between the navies. These changes enable pilots to land on both U.S. and French flight decks while at sea—further enhancing security worldwide. This additional training platform also enables French pilots to achieve their flight qualifications quicker, and provides U.S. pilots too with additional experience in landing methods.

"We still have barriers, but the goal is to erase those [barriers] and continue to move forward and build interoperability and relationships even more than in the previous generations," Tosser said.

Tosser is an example of the commitment NATO and its members have had to each other for the past 75 years. As he prepares his lessons for his students, Tosser provides this reminder.

"You can't think you know everything and just sit on your knowledge," Tosser said. "Every day there are new things to learn. Every day is different. Keep the will to learn."

Written by Information System Technician 2nd Class Megan Roberts, Naval Air Force Atlantic Public Affairs.

VT AVIATORS COMPLETE CARRIER

By Seaman Evan Antonisse

The Nimitz-class aircraft carrier USS Dwight D. Eisenhower (CVN 69) (IKE) hosted student naval aviators Sept. 24 from Training Air Wing (TW) 1, composed of Training Squadron (VT) 7 and VT-9 from Naval Air Station Meridian, Mississippi, and TW-2, composed of VT-21 and VT-22 from Naval Air Station Kingsville, Texas, as a part of carrier qualification (CQ) training off the coast of Florida.

For the VT students, CQs represent an important milestone in their training as it is the first time the students will land on an operational aircraft carrier.

During the evolution, students completed 256 recoveries aboard IKE in T-45C Goshawk training aircraft. This evolution is the culmination of the advanced phase of strike pilot training. The success of the students will earn them their wings of gold and designation as naval aviators, setting them up to fill operational commands across the fleet.

Throughout CQs, safety and emergency preparedness were paramount to both the student naval aviators and IKE personnel, especially those operating on the flight deck.

"In preparing for this CQ process, we have done numerous briefs and [simulations] of the T-45 models," said Lt. j.g. Terrance Wever, IKE's flight deck officer. "We planned for 20 aircraft but ended up with 14, so we knew how to manage the flight deck and the real estate available to us. Ultimately, it's on all of us to make sure we stop anything that is unsafe. We are preventative and not reactive."

In the air, the students' safety is carefully managed. From the tower to the ground, a network of IKE personnel and VT instructors kept a close eye on the performance of the students.

U.S. Navy photo by MCSA Theodore Morrison

Sailors refuel T-45C Goshawk training aircraft from Training Squadron (VT) 7 on the flight deck of the Nimitz-class aircraft carrier USS Dwight D. Eisenhower (CVN 69).

QUALIFICATIONS ABOARD IKE

Despite oversight at every level, the instructors have a high level of trust in their students and expect a high level of performance.

"If they're having difficulty, we'll talk to them in plain English," said Lt. Cory "Venus" Morgan, a VT-7 landing signal officer. "Otherwise, it's usually pretty silent; there's not much noise. We're letting them cook, so-to-speak; letting them get reps and sets, because they don't know what to expect until after the first couple [of recoveries]. Then, they start to loosen up a bit and think, 'I can do this.'"

Although the students are nearing the end of their advanced training pipeline, nerves are inevitable ahead of their first CQ. This is something even the most experienced pilots in the fleet can attest to.

"The first few passes from behind the ship, I barely remember," said Cmdr. Tyler "McGruber" McQuiggan, IKE's air department head, also known as "Air Boss." "My nerves were there and I realized after my first arrested landing, when my feet and hands were shaking from the gravity of what I had just accomplished. Your nerves start to cool over time, but I don't think you ever really get comfortable as a student out there."

In addition to technical support, instructors play a key role in helping the students manage their nerves during the evolution.

"I think everyone is nervous going to the boat, especially if they haven't done it in a while," Morgan said. "It's a healthy nervousness but we meter their nerves by emphasizing their training will set them up properly for landing on the boat."

While the students set their sights on earning their wings of gold, IKE's air department continues to practice its warrior tradecraft at a high level behind the scenes.

"Carrier aviation is always going to have risk and our job is to minimize the risk out here," McQuiggan said. "We have to keep our head on a swivel, be safe and look out for one another."

With CQs in the rearview mirror, IKE will return to Naval Station Norfolk, Virginia, and begin preparation for a scheduled maintenance period.

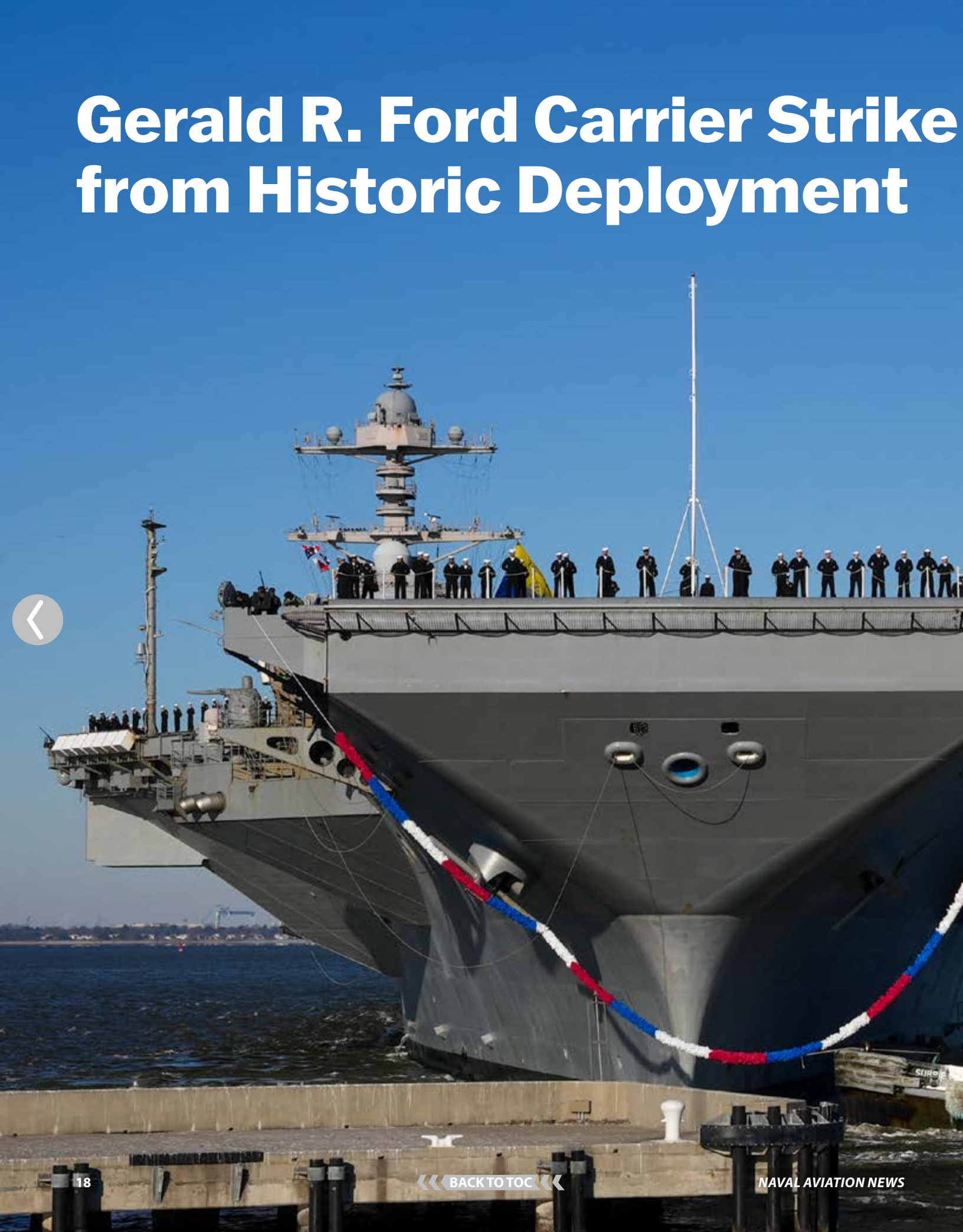
A T-45C Goshawk training aircraft assigned to Training Squadron (VT) 9 launches from the flight deck of aircraft carrier USS Dwight D. Eisenhower (CVN 69).

A T-45C Goshawk training aircraft from Training Squadron (VT) 9 on approach to perform a touch-and-go on the flight deck of aircraft carrier USS Dwight D. Eisenhower (CVN 69).

U.S. Navy photos by MCSA Theodore Morrison

A T-45C Goshawk training aircraft from Training Squadron (VT) 9 performs a touch-and-go on the flight deck of aircraft carrier USS Dwight D. Eisenhower (CVN 69).

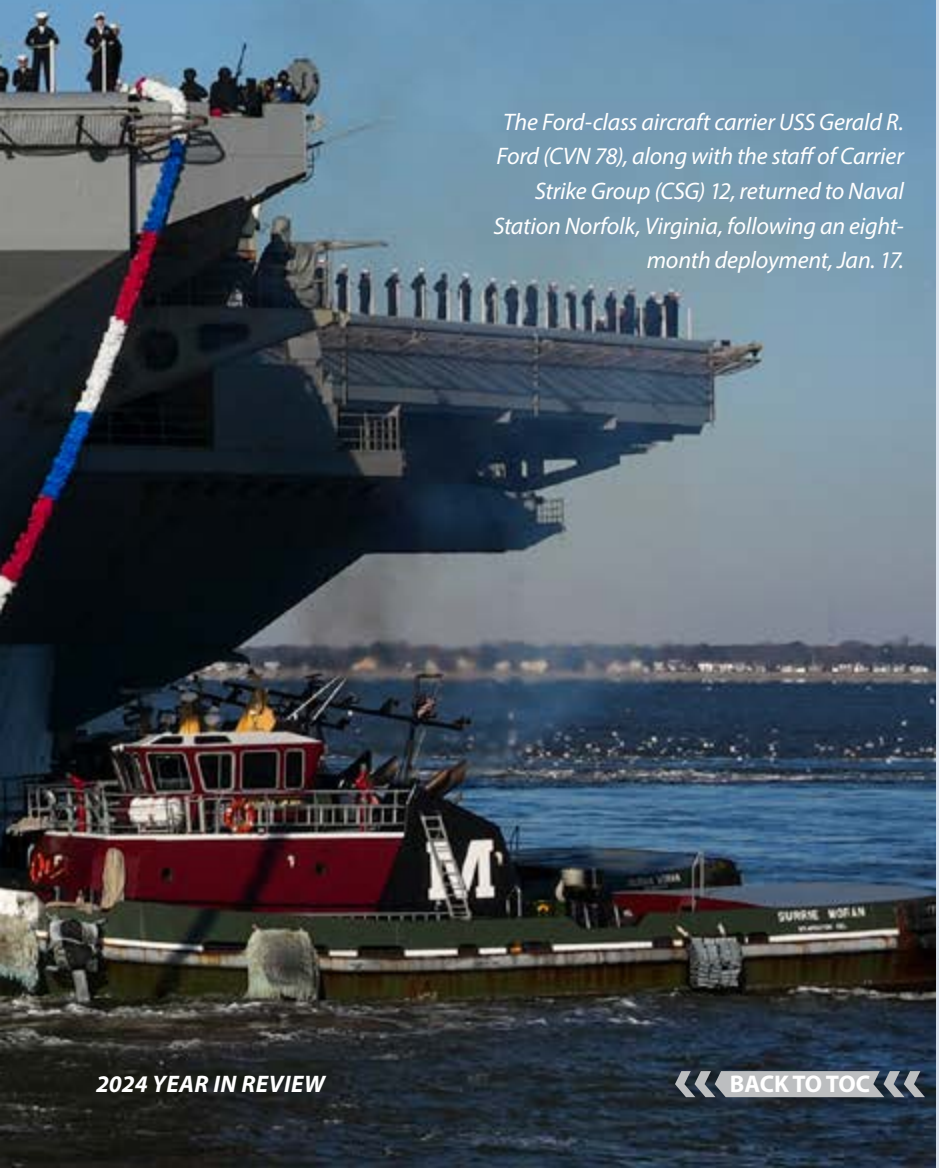
Gerald R. Ford Carrier Strike from Historic Deployment



Group Returns

By Petty Officer 1st Class Brian Glunt

USS Gerald R. Ford (CVN 78) returned Jan. 17, 2024, to its homeport of Naval Station Norfolk, Virginia, following an eight-month deployment.



The Ford-class aircraft carrier USS Gerald R. Ford (CVN 78), along with the staff of Carrier Strike Group (CSG) 12, returned to Naval Station Norfolk, Virginia, following an eight-month deployment, Jan. 17.

U.S. Navy photo by MC2 Manvir Gil

Gerald R. Ford is the flagship of Carrier Strike Group (CSG) 12 and deployed to the U.S. Naval Forces Europe area of operations.

"I am incredibly proud of every member of the strike group, especially the triads who led their teams of exceptionally talented Sailors with professionalism and perseverance," said Rear Adm. Erik Eslich, commander of CSG-12. "Due to our collective efforts, we excelled during a very challenging deployment, demonstrating the capabilities of a U.S. Navy carrier strike group, assuring our partners and allies, and deterring our adversaries with our operations in the U.S. Naval Forces Europe area of operations."

While in the Mediterranean, the carrier strike group participated in and supported numerous multinational exercises and vigilance activities to increase NATO capability and deter aggression in the region. The carrier visited ports in Croatia, Greece, Italy, Norway and Türkiye. Other ships in the strike group visited Belgium, Cyprus, Montenegro, Spain and Sweden.

The Gerald R. Ford Carrier Strike Group (GRFCSG) was extended 76 days following the outbreak of conflict in Israel and operated in the Mediterranean Sea to deter further escalation and support Israel in its right to self-defense. Two of the strike group's ships, the Arleigh Burke-class guided-missile destroyers USS McFaul (DDG 74) and USS Thomas Hudner (DDG 116), deployed to the U.S. 5th Fleet area of operations in support of maritime security objectives.

In total, the GRFCSG worked with 17 nations throughout its deployment during exercises Baltic Operations, Air Defender, Bomber Task Force Viking Trident, Neptune Strike and Sage Wolverine. The strike group operated with Standing NATO Maritime Groups 1 and 2, conducted dual-carrier operations with USS Dwight D. Eisenhower (CVN 69), and exercised with navies from France, Greece, Norway, Türkiye and the United Kingdom.

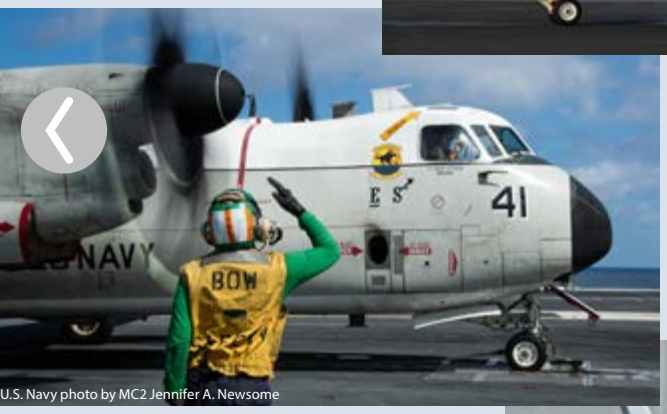
In 239 days underway, the ship's crew conducted 43 underway replenishments, logged more than 17,826 flight hours and 10,396 sorties, sailed more than 83,476 nautical miles, and safely transferred 20.7 million gallons of

U.S. Navy photo by MC2 Jackson Adkins

An MH-60S attached to Helicopter Sea Combat Squadron (HSC) 9 flies over the Mediterranean Sea, Aug. 16, 2023.

U.S. Navy photo by MCS Maxwell Orlosky

An E-2D Hawkeye, attached to the "Bear Aces" of Airborne Command and Control Squadron (VAW) 124, lands on the flight deck of USS Gerald R. Ford (CVN 78), Aug. 19, 2023.



U.S. Navy photo by MC2 Jennifer A. Newsome

A Sailor assigned to aircraft carrier USS Gerald R. Ford (CVN 78) air department signals to the pilot of a C-2A Greyhound from the "Rawhides" of Fleet Logistics Support Squadron (VRC) 40 on the flight deck, March 24, 2023.

U.S. Navy photo by MC2 Nolan Pennington

Aviation Boatswain's Mate (Equipment) 3rd Class Angel Rico, assigned to the "Ragin' Bulls" of Strike Fighter Squadron (VFA) 37, readies an F/A-18E Super Hornet from VFA-37 for launch.

U.S. Navy photo by MC2 Jackson Adkin

An F/A-18F Super Hornet attached to the "Black Lions" of Strike Fighter Squadron (VFA) 213 takes off from aircraft carrier USS Gerald R. Ford (CVN 78), May 31, 2023.

fuel with zero mishaps. The Ford crew conducted 33,444 flight deck moves, 3,124 hangar bay aircraft moves, 2,883 aircraft elevator moves, 16,351 aircraft fueling evolutions, and transferred 8,850 pallets of cargo and mail. The Gerald R. Ford culinary team prepared and served 3.1 million meals, which included approximately 48,000 dozen eggs, 24,000 gallons of milk, 131,000 hamburgers, 367,000 pounds of chicken, and Gerald R. Ford's favorite, 79,000 chocolate chip cookies.

"The Gerald R. Ford is everything our nation hoped it would be, and more. I am so proud of the crew, who breathed life into the world's most technologically advanced warship and stood the watch in defense of our national interests," said Capt. Rick Burgess, Gerald R. Ford's commanding officer. "Though extended, we were the right ship at the right time to answer the call, and our Sailors performed admirably. Ford Sailors honored our namesake's legacies of hard work, integrity and courage."

Sailors and resiliency were at the forefront of Gerald R. Ford's first combat deployment. The ship offered an array of services, including chaplain support, a deployed resiliency counselor and educator, a shipboard Wolverine TV program and daily Wolverine newspaper—an homage to President Ford's alma mater—and command associations and clubs. The Gerald R. Ford deployment also introduced the first military facility working dog to deploy with a U.S. Navy ship, pioneering a pilot program meant to address operational stress and promote morale and resiliency.

Notable visitors to the Gerald R. Ford included U.S. Secretary of Defense Lloyd J. Austin III; U.S. Secretary of the Navy Carlos Del Toro; commanders of Naval Forces Europe-Africa; U.S. 6th Fleet; Naval Striking and Support Forces NATO; the director of exercises and assessments and advisor on reserve component affairs for U.S. European Command; crown prince of the Kingdom of Norway; chief of the Norwegian fleet; and commander in chief of the Italian Navy.

In addition to the carrier, the GRF-CSG consists of CSG-12 staff, Carrier Air Wing (CVW) 8, Destroyer Squadron (DESRON) 2 staff and units, and the Ticonderoga-class guided-missile cruiser USS Normandy (CG 60). In total, the GRFCSG deploys with more than 5,000 Sailors across all platforms, ready to respond globally to the combatant commander's tasking.

The ships of DESRON 2 are the Arleigh Burke-class guided-missile destroyers USS Ramage (DDG 61), USS McFaul (DDG 74) and USS Thomas Hudner (DDG 116).

The squadrons of CVW-8 embarked aboard Gerald R. Ford are the "Tridents" of Helicopter Sea Combat Squadron (HSC) 9, the "Bear Aces" of Airborne Command and Control Squadron (VAW) 124 and the "Rawhides" of Fleet Logistics Support Squadron (VRC) 40 located in Norfolk, Virginia; the "Ragin' Bulls" of Strike Fighter Squadron (VFA) 37, the "Blacklions" of Strike Fighter Squadron (VFA) 213, the "Golden Warriors" of Strike Fighter Squadron (VFA) 87 and the "Tomcatters" of Strike Fighter Squadron (VFA) 31 located in Virginia Beach, Virginia; the "Gray Wolves" of Electronic Attack Squadron (VAQ) 142 based in Whidbey Island, Washington; and the "Spartans" of Helicopter Maritime Strike Squadron (HSM) 70 from Mayport, Florida.

Gerald R. Ford is the U.S. Navy's newest, largest, and most advanced aircraft carrier. As first in its class, the ship represents a generational leap in the U.S. Navy's capacity to project power on a global scale. Ford-class aircraft carriers introduce 23 new technologies, including Electromagnetic Aircraft Launch System (EMALS), Advanced Arresting Gear and Advanced Weapons Elevators. The new systems on Ford-class ships are designed to generate a higher sortie rate with a 20 percent smaller crew than a Nimitz-class carrier, paving the way for future Naval Aviation.

Petty Officer 1st Class Brian Glunt is a member of the USS Gerald R. Ford (CVN 78) public affairs office.

U.S. Navy photo by MC2 Jackson Adkins

Sailors assigned to aircraft carrier USS Gerald R. Ford (CVN 78) and Carrier Air Wing (CVW) 8 prepare to launch two F/A-18E Super Hornets from the "Golden Warriors" of Strike Fighter Squadron (VFA) 87 and the "Ragin' Bulls" of VFA-37, May 15, 2023.

An F/A-18E Super Hornet from the "Tomcatters" of Strike Fighter Squadron (VFA) 31 launches from the flight deck of aircraft carrier, USS Gerald R. Ford (CVN 78).

U.S. Navy photo by MC2 Nolan Pennington

U.S. Navy photo by MC2 Nolan Pennington

Lt. Evan Ladner signals to launch an E/A-18G Growler attached to the "Gray Wolves" of Electronic Attack Squadron (VAQ) 142.

U.S. Navy photo by MC2 Nolan Pennington

An MH-60R Seahawk helicopter attached to the "Spartans" of Helicopter Maritime Strike Squadron (HSM) 70 prepares to land on the flight deck, Oct. 9, 2023.

Marine's New CH-53K Helicopter Transports F-35 Airframe Between Test Sites in Maryland, N.J.

By Michael Land

Marines flying a CH-53K King Stallion heavy-lift helicopter transported April 24 an F-35C Lightning II airframe from the F-35 Integrated Test Force at Patuxent River (Pax ITF) to a Navy unit at Joint Base McGuire-Dix-Lakehurst, New Jersey.

A Marine aircrew from Marine Test and Evaluation Squadron (VMX) 1 flew the most powerful helicopter in the Department of Defense, carrying the inoperable airframe—which was without mission and propulsion systems, outer wings or additional equipment—to the Prototype, Manufacturing and Test (PMT) Department of the Naval Air Warfare Center Aircraft Division (NAWCAD) Lakehurst for use in future emergency recovery systems testing.

NAWCAD Lakehurst provides unique, full-service, test expertise, from test planning, setup and configuration to test execution and data analysis for all varieties of Aircraft Launch and Recovery Equipment (ALRE).

"I just think this is a great opportunity for the Marine Corps, the joint force and the world to see that the Marine Corps has a capability that no other force in the world has, in this case, the CH-53K," said Marine Lt. Col. Adam Horne, lead pilot and officer in charge of the CH-53 Detachment, VMX-1, at Marine Corps Air Station New River, North Carolina.

VMX-1, headquartered at Marine Corps Air Station Yuma, Arizona, is the Marine Corps' Operational Test & Evaluation squadron called upon to create and refine tactics, techniques and procedures for the service's aviation platforms and systems.

U.S. Navy photo by Kyra Helwick

Members of the HST from the Marine Corps Combat Logistics Battalion 26 sit poised atop CF-1, a non-flying F-35C airframe from the NAS Patuxent River F-35 Integrated Test Force, waiting to hook the airframe to sling hoists lowered from a CH-53K being flown by Marines from VMX-1. The airframe, lifted and transported via CH-53K, was flown from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey, April 24, to support future testing of emergency recovery systems.

Marines with the Helicopter Support Team (HST) from Combat Logistics Battalion 26 attach a non-flying F-35C Lightning II airframe from the Naval Air Station Patuxent River F-35 Integrated Test Force to a sling beneath a hovering CH-53K King Stallion, operated by Marine pilots from Marine Test and Evaluation Squadron (VMX) 1, at NAS Patuxent River, Maryland, April 24. After being secured to the sling, the airframe was transported via CH-53K to Joint Base McGuire-Dix-Lakehurst, New Jersey, for use in future testing operations.

Marine Corps members of the Helicopter Support Team from Combat Logistics Battalion 26 attach a non-flying F-35C airframe from the NAS Patuxent River F-35 Integrated Test Force to a sling beneath a hovering CH-53K, operated by Marine pilots from VMX-1, at NAS Patuxent River April 24.

A CH-53K piloted by Marines from VMX-1 hoists a non-flying F-35C from the NAS Patuxent River F-35 Integrated Test Force April 24 to transport the airframe from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey, where the airframe will be used in future emergency recovery systems testing. The successful operation was coordinated and carried out through extensive collaboration of multiple teams across NAS Patuxent River, JB McGuire-Dix-Lakehurst, the Marine Corps, the Navy, New Jersey State Police and Naval Air Warfare Center Aircraft Division.

"Marine Corps Aviation teams coordinated and planned extensively with the F-35 Pax ITF team to execute the evolution safely and successfully, and both teams worked with the Pax River Cargo Lab, whose gear the Marine Helicopter Support Team (HST) used to sling the airframe."

Minutes after 11 a.m., the almost 100-foot-long helicopter lifted the approximately 22,000-pound airframe from the airfield at NAS Patuxent River, briefly headed west, then turned southeast and headed out over the Chesapeake Bay to begin the 305-nautical-mile transport. The CH-53K is currently cleared to conduct lifts up to 36,000 pounds.

During the transport, the CH-53K aerial refueled with a KC-130T Hercules multi-mission medium-lift tactical tanker/transport aircraft.

"Air-to-air refueling is critical to the Expeditionary Advanced Base Operations (EABO) concept, and proving this capability on the CH53K King Stallion significantly increases the combat potential for the U.S Marine Corps' newest workhorse in its stable," Horne said.

He added that VMX-1; Air Test and Evaluation Squadron (HX) 21, the rotary-wing and tilt rotor aircraft test squadron; Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) and Marine Heavy Helicopter Squadron 461 (HMH-461) are expanding the capabilities of the King Stallion every day.

"The CH-53K provides capability not seen anywhere else across the Marine Corps, but also for the joint force and any potential foreign military sales (FMS) customers," Horne said.

"The CH-53K is not only able to lift more and for longer distances, but it can communicate across a large spectrum and will feed information from the battlespace back to the Marine Air-Ground Task Force (MAGTF) commander. Its increased maintenance efficiencies will allow it to be more available and operate longer with less logistical support."

Marine Corps Aviation teams coordinated and

A CH-53K, piloted by Marines from VMX-1, flies along the coast of Ocean City, New Jersey, with a non-flying F-35C test airframe from the NAS Patuxent River F-35 Integrated Test Force carried beneath it April 24 during an aerial transportation of the test aircraft from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey.

Marines from Marine Test and Evaluation Squadron (VMX) 1, piloting a CH-53K helicopter, conduct aerial refueling from a C-130T Hercules operated by the Navy's Air Test and Evaluation Squadron (VX) 20 while carrying a non-flying F-35C test airframe from the Naval Air Station Patuxent River F-35 Integrated Test Force on April 24. The flight was conducted to transport the non-flying airframe from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey, where it will be used in future emergency recovery systems testing.

U.S. Navy photo by Kyra Helwick

Marines from VMX-1 pilot a CH-53K helicopter over the Chesapeake Bay in Maryland, conducting aerial refueling from a C-130T operated by Navy's VX-20 while carrying a non-flying F-35C test airframe from the NAS Patuxent River F-35 Integrated Test Force on April 23. The flight was conducted in preparation for the aerial transport of the non-flying F-35C airframe from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey, the following day.

planned extensively with the F-35 Pax ITF team to execute the evolution safely and successfully, and both teams worked with the Pax River Cargo Lab, whose gear the Marine Helicopter Support Team (HST) used to sling the airframe.

In short, teamwork was the hallmark of the mission.

Key to success was "all the prior coordination and the goodwill of each team," Horne said. He identified the NAWCAD Cargo Lab at Pax River; HX-21; Air Test and Evaluation Squadron (VX) 23, the fixed-wing tactical aircraft test squadron; VX-20, the naval force aircraft test squadron, whom they tanked on the way up; the New Jersey State Police; and the NAWCAD Lakehurst team.

Additionally, he said the work of Marines on the helicopter support team "was a big help," ensuring "everything went smoothly for the 53K."

The HST, which was comprised of landing support specialists, or "Red Patchers," from the Combat Logistics Battalion 26 (CLB-26), traveled from Marine Corps Base Camp Lejeune, North Carolina.

"The real juice, meat and potatoes that we came here for…was this lift," said Marine Sgt. Joe Padilla, who had a safety role during the connection. Other Marines had roles of grounding the helicopter, the "static," and connecting the cargo, the "hook."

"Our team has been looking for something challenging, something big for us…and I think the best part was being able to accomplish our team's dreams," he said. "They came out here, and they did phenomenally."

The route included over-water and over-land portions. While flying over the Garden State, the New Jersey State Police Aviation Bureau provided crucial aerial support, as troopers from the Field Operations Section were on the ground orchestrating traffic slowdowns with precision. This synchronized effort ensures an additional layer of safety, seamlessly complementing each other to fulfill the mission.

The CH-53K is the U.S. Marine Corps' heavy lift replacement for the CH-53E Super Stallion.

The CH-53K is a new-build helicopter that will expand the fleet's ability to move more material faster throughout the area of responsibility using proven and mature technologies. The helicopter provides advanced technology and unmatched heavy lift capabilities and can lift nearly three times more than its predecessor.

Michael Land is a public affairs officer for the Naval Air Station Patuxent River, Maryland, F-35 Lightning II Integrated Test Force.

U.S. Navy photo by Kyra Helwick

Marine Corps pilots from VMX-1 flying a CH-53K helicopter lower a non-flying F-35C airframe from the NAS Patuxent River F-35 Integrated Test Force onto the runway at Joint Base McGuire-Dix-Lakehurst, New Jersey, April, 24, after transporting the F-35C airframe from NAS Patuxent River, Maryland. The transportation of the airframe will enable future testing at Lakehurst of emergency recovery systems.

A CH-53K from Marine Test and Evaluation Squadron (VMX) 1, carrying a non-flying F-35C airframe from the Naval Air Station Patuxent River F-35 Integrated Test Force, makes a turn over the Atlantic City coastline in New Jersey as beach-goers stop to watch the unique sight. The April 24 flight was conducted to transport the non-flying F-35C test airframe from NAS Patuxent River, Maryland, to Joint Base McGuire-Dix-Lakehurst, New Jersey, for future testing operations.

Manufactured by

Two USS Ronald Reagan Sailors Recreate a Tool for the First Time Aboard an Aircraft Carrier

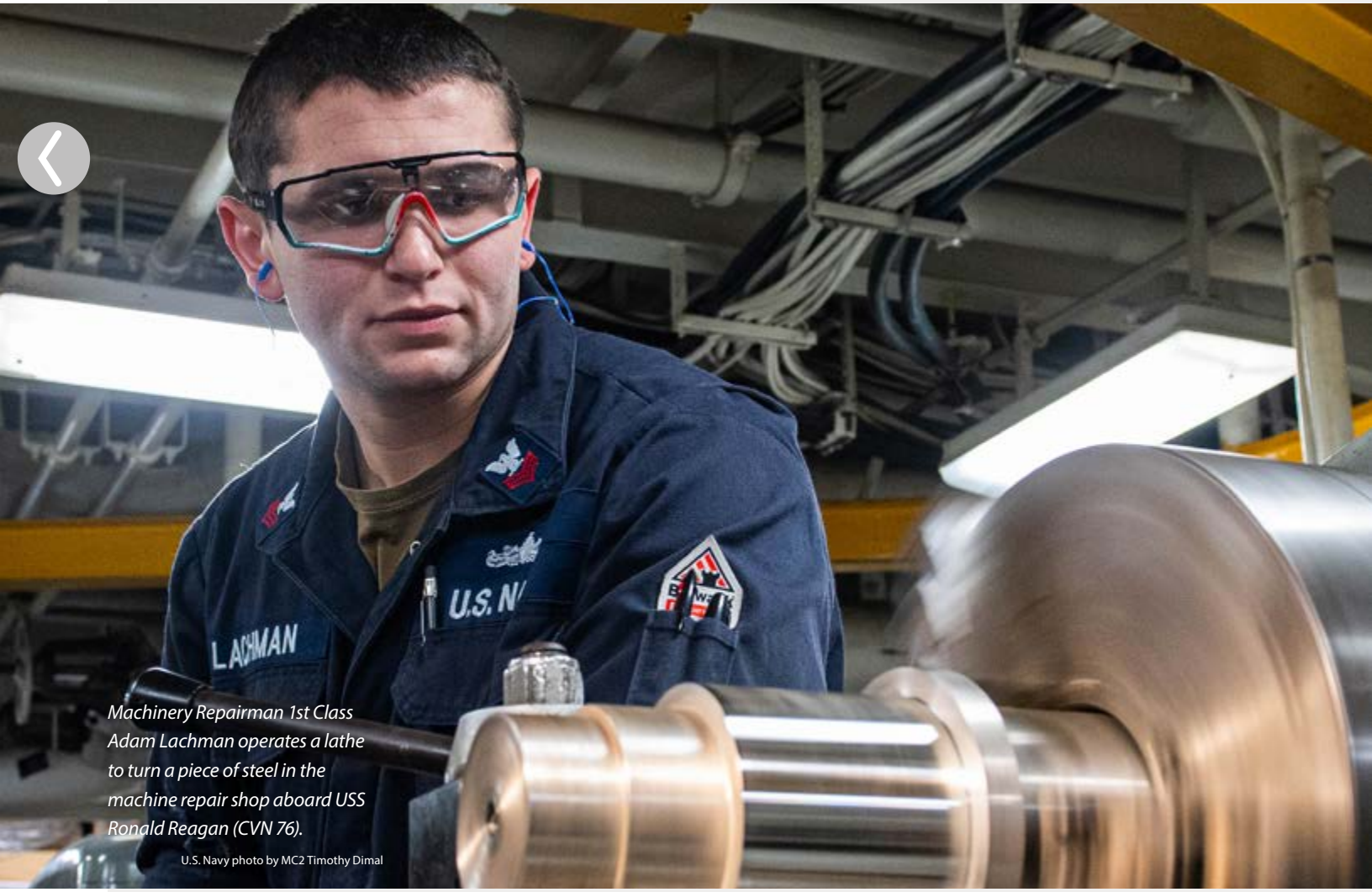
By Petty Officer 2nd Class Timothy Dimal

In the machine repair shop aboard USS Ronald Reagan (CVN 76), time ticks by at the speed of a spinning lathe shaving down a piece of steel. While spring-shaped metal chips fly into the air and pile onto the floor, the sound of jets landing on the flight deck booms overhead—each hit serving as a reminder that time is running out.

Machinery Repairman 1st Class Adam Lachman, repair division leading petty officer, from East Meadow, New York, and Machinery Repairman 2nd Class Kyle Martin, from Houston, led Ronald Reagan's machine repair team in redesigning and fabricating a tool that helped to repair parts of the ship's arresting gear wire system, May 30.

"I like to live by the statement: 'If we can't fix it, only God can,'" Lachman said. "There's never been a repair that Ronald Reagan's machine shop couldn't complete."

The tool, a valve seat wrench, was originally manufactured



Machinery Repairman 1st Class Adam Lachman operates a lathe to turn a piece of steel in the machine repair shop aboard USS Ronald Reagan (CVN 76).

U.S. Navy photo by MC2 Timothy Dimal

Lachman Martin:

by Lockheed Martin. Other carriers and shore facilities had not managed to recreate the tool. However, on May 27, a loose bolt was found within an arresting gear's hydraulic systems, causing critical damage.

Castro said without the number two wire, the number three wire would have "taken an extreme beating for several days," requiring more maintenance and severely disrupting the V-2 maintenance team's normal cycles.

The valve seat wrench Lachman and Martin were tasked to create was the only way to access the damaged part within the system. With the number two wire on the line, the repair team kept their machines running continuously for three days, working through nights and into the mornings.

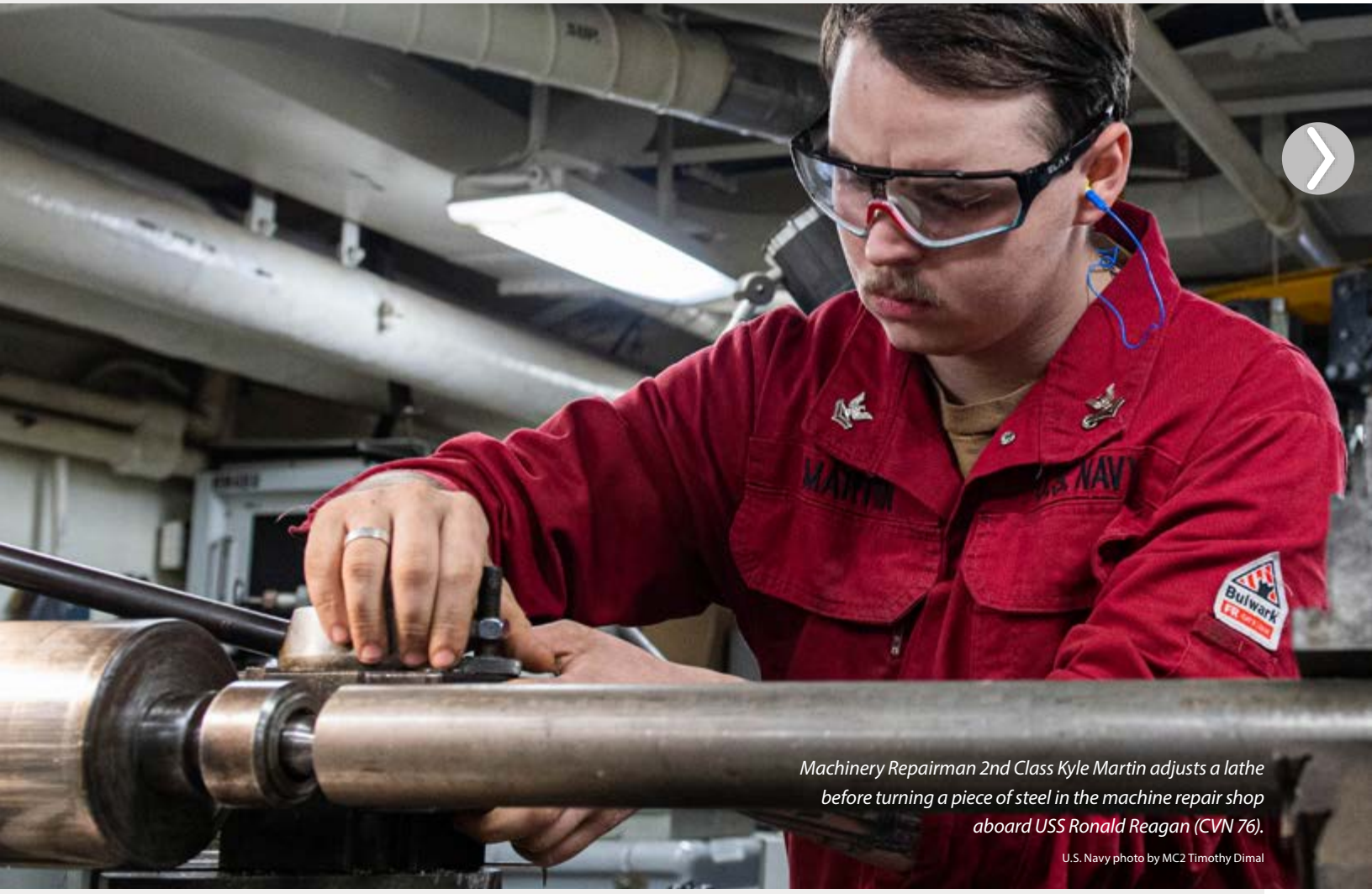
"What's amazing about what they did is a lot of aircraft carriers in the fleet have failed to extract that seat out of that [valve bowl assembly]," Castro said. "We were told basically, 'Good luck. If you get it, good on you guys. If you don't, we're not surprised.'"

The missing tool was their biggest challenge to completing the repair, Castro said. That's why he asked the machine repair team for help fabricating it.

"[Lachman and Martin] didn't hesitate at all," Castro said. "They came up and scoped it out, and they said, 'We've got this' from the get-go, with no hesitation whatsoever."

Not only did the team recreate the tool, it was also the first of its kind to complete the arresting gear maintenance. Additionally, their critical thinking skills led to them crafting a tool that was more efficient than the original design.

"As soon as we received the drawing, we realized how big of a part it was," Martin said. "We designed something about



Machinery Repairman 2nd Class Kyle Martin adjusts a lathe before turning a piece of steel in the machine repair shop aboard USS Ronald Reagan (CVN 76).

U.S. Navy photo by MC2 Timothy Dimal

U.S. Navy photo by MC2 Timothy Dimal

U.S. Navy photo by MC2 Timothy Dimal

Machinery Repairman 1st Class Adam Lachman uses a micrometer to measure a piece of steel before operating a lathe in the machine repair shop aboard USS Ronald Reagan (CVN 76).

35 percent smaller because we knew we had to carry it up to the 0-3 level. If we started with the original size, then it would've taken an extra three days to make—almost a week in total."

A few days after they completed the tool, Capt. Daryle Cardone, commanding officer of Ronald Reagan, expressed his gratitude towards the two Sailors on the 1MC, explaining their efforts to the crew and emphasizing the impact they had on flight operations.

"It feels good to receive some recognition for the work we did. I'll take some when I get some," Lachman said. "But I do believe [Martin] and [Hull Maintenance Technician 3rd Class] Austin Gilbert deserve most of it."

Both Lachman and Martin credit Gilbert for being on constant standby to weld between the periods they machined the tool. During the three days of work, it was a back-and-forth operation among the repair stations in the shop.

"Gilbert did a lot of welding for a good part of this," Martin said. "I remember taking it off the lathe while it was still hot and directly handing it over to him for welding."

Lachman and Martin take pride in their machining skills. Lachman expressed that as long as he is in the Navy, he will keep machining. Martin is proud of his work so far on Ronald Reagan, and while he plans to continue it elsewhere, he stressed the importance of learning one's craft.

Machinery Repairman 2nd Class Kyle Martin operates a lathe to turn a piece of steel in the machine repair shop aboard USS Ronald Reagan (CVN 76).

U.S. Navy photo by MC3 Natasha ChevalierLosada

Hull Maintenance Technician 3rd Class Austin Gilbert adjusts piping in the weld shop of USS Ronald Reagan (CVN 76).

"It makes me feel like 45 bucks an hour," Martin said with a smile. "I don't plan on making the military my life career, but I do plan on continuing to machine. Just knowing that our standards, knowledge and capability of power have been set even higher, based on other carriers and shore commands, makes me sit back and smile. It feels nice that when people need something, they reach out to us first."

While maintenance is an important skill for every Sailor on a forward-deployed aircraft carrier, some of the bigger jobs are saved for outside entities to manage. Lachman believes a well-trained repair team can tackle a lot of those bigger jobs with some trust and investment.

"I think we need to come back to relying on Sailors to conduct self-repair," Lachman said. "Our machines in our shop can make parts to fix themselves. This is pure ownership."

The new-and-improved valve seat wrench is now installed on the deck next to the arresting gear engine it was used to repair, in case it needs to be used again. While the original purpose of the tool remains, it now also stands as a symbol of the ingenuity and craftsmanship of the Ronald Reagan machine repair shop team, bearing an engraved name plate with the words: "Manufactured by Lachman Martin."

Petty Officer 2nd Class Timothy Dimal is with USS Ronald Reagan (CVN 76) public affairs.

Rapid Collaborative Additive Manufacturing Effort Helps U.S. Protect International Ally

By Rob Perry

The ability for Naval Aviation to deploy and intervene anywhere in the world is one of the many tenets that makes it a superior force. At any point in time, Sailors and Marines can receive orders to support an ally and need to be ready for whatever threat it engages. That requires shipboard and aircraft components to be fully operational. Last year, the failure of a single quarter-sized component aboard the landing system of a Wasp-class amphibious assault ship, the USS Bataan (LHD 5), nearly resulted in the vessel being unable to assist Israel in the escalating Red Sea crisis. However, quick thinking and action enabled the ship to make necessary repairs and intervene in a major battle, saving countless lives.

Small Part, Big Problem

In October 2023, Bataan was operating in the Indian Ocean. On Oct. 24, the ship's crew issued a casualty report (CASREP) back to the States, asking for help with the ship's broken Optical Landing System (OLS), which aids pilots in landing. The crew determined the culprit of the OLS system's failure was a broken polymer coupler inside the system's ball/screw jack assembly—a part roughly the size of a bottle cap. Without the OLS, aircraft would be unable to land aboard the ship, especially at night.

Without a spare coupler or assembly aboard, they needed a solution fast.

The OLS aboard Bataan is a Naval Air Systems Command (NAVAIR) system that is supported and maintained by Naval Air Center Aircraft Division (NAWCAD) in Lakehurst, New Jersey. The failed OLS coupler within the OLS's ball/screw assembly is considered a Critical Application Item (CAI) as it has a unique breakaway torque requirement where if it were to be over-torqued, it would break, thus saving the OLS's electric motor from binding and failing. In the unfortunate event the OLS's electric motor were to fail, it would require a fly-away team from NAWCAD Lakehurst to be dispatched to the ship to replace it, as well as perform an OLS final alignment to return it to normal operations. Since Bataan was in the Indian Ocean, the logistics of such an at-sea repair would take longer than operationally acceptable.

Early on Oct. 25 the Naval Sea Systems Command (NAVSEA) Additive Manufacturing Team received the Bataan's CASREP. Additive manufacturing is the ability to use 3D printers to "print" replacement parts on site using polymers, metal or other materials. The Bataan was equipped with a NAVSEA 3D printer, vice a NAVAIR 3D printer used to support aviation and related support equipment, so NAVSEA reached out to the NAVAIR Additive Manufacturing (AM) Team.

"Our alert came because the ship was equipped with a NAVSEA polymer printer and the Sailors aboard the ship did not know that the OLS was a NAVAIR-owned system, so they requested support from NAVSEA's additive team first," said Ling Xu, an engineer with NAVAIR's AM Team. "Once that support was requested, NAVSEA's additive team realized this was a NAVAIR part and required NAVAIR's AM team, so they forwarded it on to us."

U.S. Navy photo

The U.S. Navy Wasp-class amphibious assault ship USS Bataan (LHD 5) conducts a strait transit and Defense of the Amphibious Task Force (DATF) drill during an Amphibious Ready Group/ MEU Exercise (ARGMEUEX) while underway in the Atlantic Ocean, April 26, 2023.

U.S. Marine Corps photo by Cpl. Kyle Jia

U.S. Navy photo

The coupler located inside the Optical Landing System motor assembly.

An example of the Optical Landing System like the one aboard the USS Bataan (LHD 5).

U.S. Navy photos

The NAVAIR Additive Manufacturing Team tested more than 20 printed parts for torque strength before arriving at a part that passed the part's unique breakaway requirement.

The NAVAIR AM team learned the polymer printer aboard the Bataan used onyx to AM print parts, a material the NAVAIR AM team was not used to working with.

"Onyx is a chopped carbon fiber reinforced nylon which is significantly stronger than some of the materials that we work with," Xu said. "Knowing that there was a unique torque breakaway requirement— meaning that it needed to break at a certain torque level—we knew that we would have to come up with a design solution that would fail while still meeting other requirements. This component acts like a 'fuse.' It is an excellent design to prevent damage to obsolete or difficult-to-install components elsewhere into the Optical Landing System."

The NAVAIR AM Team quickly rallied to the challenge and, knowing the gravity of the operational impact Bataan was experiencing, quickly went to work. Fortunately, the NAVAIR AM Team had prior experience with the NAVSEA AM printer aboard the USS Bataan and had retained an older version of it in storage. As luck would have it, the NAVAIR AM Team even had the same raw, thermoplastic onyx feedstock used on Bataan.

Overnight and within 12 hours of notification of the CASREP, the NAVAIR AM Team's engineers redesigned and tested 22 prototypes of the AM coupler, being sure to design into it the unique breakaway requirement, before finding a working solution. In the meantime, the OLS's Cognizant Engineer and Technical Warrant Holder at NAWCAD Lakehurst already initiated the effort to pull the OEM coupler and ball/screw assembly jack from the Navy Supply System and send them to the ship. Lakehurst was kept apprised of the NAVAIR AM Team's effort to print a replacement coupler as a stopgap measure while the ship awaited delivery of the parts. After seeing the test results from the AM-created coupler, the NAWCAD Lakehurst team gave temporary approval to the ship to use the AM-created coupler in the OLS.

The approved design for the AM coupler and associated Technical Data Package (TDP) was electronically transmitted to the ship the next morning. A TDP is essentially a "blueprint" that is fed into the 3D printer to produce the part to exact technical specifications needed. The ship's company verified they received the TDP and printed the AM coupler using their resident AM printer. However, when the technician went to install the AM coupler in the OLS, the ship was issued immediate orders to redeploy to the Red Sea. The technician had to suspend the installation of the AM coupler.

Two days later, on Oct. 28, Bataan arrived on station in the Red Sea. The AM coupler was installed in the ship's OLS. After a few hours of testing, the ship sent back word that the coupler was holding fast and restored the OLS to its normal working condition. The ship immediately resumed normal flight operations—and just in time. Within hours, aircraft aboard Bataan launched and began intercepting and shooting down a salvo of drones and missiles being launched at Israel by the Yemen Houthis.

"Those aircraft were directly responsible for intercepting missiles fired by the Houthis towards Israel," Xu said. "That's something that would not have happened had there not been an AM printer aboard."

"Your efforts exemplify the mindset and behaviors that deliver winning outcomes for the fleet," said Vice Adm. Carl Chebi, Commander, NAVAIR, in a message delivered to the NAVAIR AM team, commending them for their can-do attitude and innovative approach.

"You immediately recognized the significance of the request, assessed the problem and reached outside your lanes to ensure all the right players were brought into the effort. You embraced an 'abundance vs. scarcity' mindset, engineering a solution using equipment and materials already available to the ship's maintainers. You demonstrated remarkable dedication, working through the night to design a coupler that met specifications. Incredibly, you designed and tested 22 iterations of the part, a testament to your high standards of excellence, attention to detail and tenacity.

"You were bold—obtaining verbal approval from the Tech Warrant Holder, OLS Division Head and cognizant engineer to expedite delivery of the tech data package to the ship. In a matter of days, normal flight operations resumed and the ship is back in the fight today because of you. Your actions demonstrate what we can accomplish by thinking differently,

A test coupler printed by the NAVAIR AM team from a similar OLS system the team had addressed a few months earlier than the USS Bataan OLS issue.

collaborating and focusing on outcomes that matter to the fleet."

Bataan continued using the AM coupler in the OLS until the replacement ball/screw jack assembly arrived March 29, 2024.

Xu said the part operating continuously without breaking for six months was a sure sign of success for the AM team.

"We could have very easily designed an extremely strong component, but then that would have just transferred the load into a different portion of the Optical Landing System, which could have broken and caused them a much longer delay," he said.

An engineer with the NAVAIR AM team uses a torque wrench to test the part's breakaway requirement.

Additive Manufacturing: Addressing Problems as They Arise

Bataan OLS provided but one example of how the NAVAIR AM team addresses problems just as quickly as they arise. Two other incidents that the team addressed were key parts for F/A-18 Hornets.

Xu said the armament plug back shell for the F/A-18—a part of the avionics kit that tells the aircraft how many hard points it has—failed. The lead time for a replacement component was "upwards of a year," he said, but, through AM, "we were able to bring that aircraft back up in about three days."

Another component was a heads-up display (HUD) mounting bracket, which had broken on another F/A-18 that was deployed on a carrier.

"In that case, we already had a technical data package ready to go, so they were able to just manufacture on the carrier and keep going," Xu said.

Xu said his team currently has more than 400 TDPs ready for printing AM parts at the point of need.

"We solicit parts from the fleet as they see problems. However, we are also pursuing components that we see as a potential issue in a contested logistics environment," Xu said. "One of the projects [I am working on is] the battery housing for the H-60 Seahawk night vision goggles. [The goggles are] required for nighttime operations on the H-60 and we are currently going through these at a rate of several hundred per month. [With the part] being a simple injection molded component, [the normal supply chain] is able to keep up with current demand. However, in a contested logistics scenario, we want to ensure the fleet has the ability to manufacture at the point of need.

"Ultimately, this is speed to the fleet. Instead of using traditional methods and traditional processes, we are using a new way to get parts out there or to get parts to where they are needed. And with this case, they are just being manufactured where they are needed."

Rob Perry is an editor/writer for Naval Aviation News.

Super Stallion Mission Data Team Breaks New Ground in Aviation

By Jason Babcock

By taking a simple solution and applying it to a needed upgrade, the CH-53E Super Stallion heavy lift helicopter is breaking new ground for Naval Aviation.

In December 2023, the H-53 Heavy Lift Helicopters Program Office started installation of a first-ever fully integrated, hard-mounted commercial off-the-shelf tablet functioning as a primary mission display on a naval aircraft. In doing so, the CH-53E Mission Data Extender team provided a replacement for a legacy capability while also enhancing current operational capabilities at a fraction of the development cost and schedule of a new mission display.

"This is a huge step toward open architecture, innovative solutions to mission-data presentation," said Lt. Cmdr. Neil Whitesell, former In-Service Avionics Systems project officer. "We did it at low cost, fast, and we provided a major capability improvement to the warfighter."

Currently, the CH-53E Super Stallion uses two instrument panel-mounted Smart Multi-Function Color Displays (SMFCDs) as primary mission displays. The SMFCD presents hover cueing, own ship position, threat reports, route/waypoint information, moving map and real-time Forward Looking Infrared (FLIR). The SMFCD suffers from reliability and reparability issues that reduce availability on the flight line and hinder readiness. Due to the high cost and lengthy timeline to perform a technical refresh on the existing SMFCDs, the program office required an innovative solution. The Avionics Integrated Project Team (IPT), in conjunction with the Tactical Mobility (TacMo) IPT at Naval Air Warfare Center Weapons Division (NAWCWD), fleet and industry partners developed a cyber-resilient system of systems collectively known as the Mission Data Extender (MDE) to replace the aging SMFCD.

MDE used a novel mix of developmental and non-developmental commercial/government off-the-shelf (C/GOTS) components to provide legacy SMFCD capability, while also enhancing operational capability. The system was comprised of a GOTS avionics bus reader (MOB HUB) developed by the China Lake TacMo IPT, and the COTS Miniature Encrypted Wireless Link (MEWL) and Marine Air-Ground Tablet (MAGTAB) provided

U.S. Marine Corps photo

The CH-53E Mission Data Extender team installed the first-ever fully-integrated, hard-mounted commercial off-the-shelf tablet functioning as a primary mission display on a naval aircraft.

A Marine Corps CH-53E Super Stallion crew chief assigned to Marine Medium Tiltrotor Squadron (VMM) 165 (Reinforced), 15th Marine Expeditionary Unit, prepares for flight operations.

U.S. Marine Corps photo by Sgt. Patrick Katz

by Kranze Technology Solutions (KTS). Additionally, MAGTAB required a cockpit instrument panel mount to allow for heads-up FLIR presentation in the cockpit. In close partnership with fleet users and an industry partner, Integrated Consultants Incorporated (ICI), the MDE team developed the first-ever permanent primary instrument panel mount for a COTS tablet in the Naval Aviation Enterprise. The resulting Informant Mount provides for continuous tablet charging, quick mount/dismount of the pilots' MAGTABs, and allows for swap-in/swap-out interchangeability with legacy SMFCDs. The Informant Mount provides flexibility for fleet operators to tailor their preferred mission display according to mission requirements and available hardware and to use their MAGTAB as both an instrument panel mission display and/or a kneeboard. The same physical MAGTAB can now be used for mission planning, assault package briefing, mission execution and section debrief without the need for removable media.

In addition to mounting provisions for the MAGTAB, the MDE system also provided much-needed permanent mounting provisions for carry-on data terminals widely used throughout the CH-53E fleet. As a result, the capability of the CH-53E mission display expanded to include a new Automatic Dependent Surveillance-Broadcast (ADS-B) capability, as well as Mobile User Objective System (MUOS) Data connectivity via carry-on ground radios. As an additional capability enhancement, the MDE was also designed to interface seamlessly with the newly fielded Link16 and ANW2 DI system being incorporated on the CH-53E during MDE development.

Finally, MDE development required the creation of a new software application to provide the legacy hover cueing displays available in the SMFCD. The program office was able to leverage their existing Software Support Activity (SSA), Noetic Inc., to code and deliver a new application to the MAGTAB within a single design sprint. By virtue of hosting this capability on an open system tablet, mission display capability insertion can now occur on the order of months, and at a fraction of the cost of developing new proprietary software code.

"The CH-53E now has an aircraft-powered, WiFi-based mission display capable of seamless interoperability with several carry-on data terminals, and capable of walk-on/walk-off expeditionary mission planning," Whitesell said. In addition, the integration allows for rapid capability insertion through Modular Open Systems Approach concepts, he said.

The MDE was an exemplary example of NAVAIR's capacity for organic innovation and rapid fielding. Altogether, the MDE system managed to bring all legacy SMFCD capability forward, concentrate all digital interoperability data onto a single aircrew interface, and place that interface on the pilot instrument panel as a tablet-based primary mission display. MDE represented a huge leap in capability and readiness, at less than one-third of the cost and schedule to upgrade the legacy SMFCD display.

Jason Babcock is a communications specialist with the H-53 Heavy Lift Helicopters Program Office.

UP IN THE AIR

Landing Signalman Enlisted Qualifications Keep the Deck Moving Safely

By Petty Officer 2nd Class James Finney

An Aviation Boatswain's Mate Handling (ABH) has many responsibilities aboard USS Boxer (LHD 4). The roles range from directing movement of aircraft and conducting maintenance on ground-handling equipment, to training for crash and salvage rescue operations.

The rate also includes the Landing Signalman Enlisted (LSE) qualification. During flight operations, the LSE has been described as being the quarterback on a football field—calling the shots and leading the pack.

Flight operations are loud, windy and a constant whirlwind of aircraft taking off, landing and maneuvering on the deck while personnel move quickly and efficiently to service them. For an LSE, this means operating safely and efficiently as they supervise operations on the flight deck.

"It's dangerous because anything can happen at any given time," said Aviation Boatswain's Mate 2nd Class Johnny Snowden. "The job can be repetitive, so if you don't maintain your focus and situational awareness, you could jeopardize the safety of the whole flight deck crew."

Pilots depend heavily on the LSE to perform safe launches and landings on the flight deck aboard a moving ship. He or she ensures that, on signal, aircraft are safely started, engaged, armed, launched, recovered, disarmed, shut down and all tie downs are removed prior to lift-off and secured after landing.

"As a pilot, what the LSE provides for me is peace of mind so I can perform my job safely," said Lt. Gerold Hausmchild, an MH-60S Seahawk pilot. "Observing flight operations is much different from being a part of them—that's why LSEs hold such an important role on the flight deck."

For a pilot, it is the last piece of assurance they need before landing or taking off. Haumschild said LSEs on an amphibious ship bear a lot of responsibilities compared to other ships. Whether they are signaling an MH-60S Seahawk, F-35 Lightning II or an AH-1Z Viper attack helicopter, it is a massive feat. The complexity behind every call and hand signal is vast. There are numerous safety precautions an LSE must follow to keep the flight deck crew and pilots safe. LSEs must go through rigorous training before becoming fully qualified. They first go to a week long LSE School where they learn the basics such as hand signals, safety precautions and situational awareness. After completing the school, they shadow a qualified LSE under instruction until they can master the craft. When they are ready, they complete a board with their chain of command covering everything they've learned to ensure they are qualified for the position.

"This job is so dynamically complex, you can't be the same person you were coming into the Navy. Self-growth and the ability to mold your mindset allows you to do this job," said Aviation Boatswain's Mate 3rd Class Breon Shields.

The LSE, under the supervision of the Air Office, is responsible for signaling the pilots flying the aircraft with sharp and precise hand movements. They assist the pilot in making a safe takeoff or approach on the flight deck. The LSE is responsible for directing the pilot to the desired parking spot and following

U.S. Navy photo by MC3 Michael T. Eckelbecker

safety precautions to protect the flight deck crew.

"We have to ensure the vicinity of the aircraft is clear and safe," said Aviation Boatswain's Mate 2nd Class Alfonso Gonzalez. "That is just a fraction of the precautions and safety checks we must perform before any takeoff or landing."

Just like the blades of an MH-60S Seahawk—always spinning and in a dynamic state—the same goes for the qualified LSEs aboard a ship. They are reliable, skilled and essential for flight operations.

Petty Officer 2nd Class James Finney is a member of USS Boxer public affairs.

Aviation Boatswain's Mate (Handling) Airman Fernando Portugal signals to the pilot of an MV-22 Osprey, assigned to Marine Medium Tiltrotor Squadron (VMM) 166 (Reinforced), as it prepares to land on the flight deck of amphibious assault ship USS Boxer (LHD 4).

Making

Lt. j .g. Milo Sawczyn, assigned to the El Centro strike training detachment, enters the cockpit of a T-45C Goshawk jet aircraft on the flight line onboard Naval Air Facility (NAF) El Centro, California.

U.S. Navy photo by MC3 Aleksandr Freutel

Injury Prevention a HABIT

First-Of-Its-Kind Virtual CNATRA App to Aid in Head, Back Injury Prevention

By Anne Owens

Chief of Naval Air Training (CNATRA) has renewed focus in researching, developing and implementing leading edge training technologies in the production of naval aviators. Throughout the history of naval air training, pilots used continuously evolving tools, hardware and wearable protective gear unique to the aviation profession.

Pilots are exposed routinely to physical stressors and demands when flying throughout the course of their careers. These demands can result in an elevated chance to develop physiological issues including neck and back pain, or more serious injuries years later. In an effort to reduce and mitigate these issues at the outset of each pilot's career, CNATRA partnered with some of the Navy's top aeromedical safety officers (AMSO) to implement a virtual injury prevention program that is the first of its kind in Naval Aviation.

The Head and Back Injury Training (HABIT) program seeks to increase mission performance by providing flight instructors and Student Naval Aviators (SNA) with the resources and training necessary to reduce the chance of injury by preparing their bodies for cockpit environment. This includes a collection of stretches, exercises and workouts developed specifically to enhance mobility and address the stressors frequently experienced by pilots and aircrew. The HABIT program is governed by CNATRA Instruction 6200, which requires these procedures be included as part of the pilots' briefing. By developing a virtual exercise program within the Navy App Locker to supplement this program, HABIT workouts can be incorporated into pre- and post-flight briefs with the goal of injury prevention and long-term health support for Naval Aviators.

Lt. Cmdr. Taylor Burton, CNATRA AMSO and deputy surgeon, saw many neck and back injuries during his time in the EA-18G Growler community. These aircraft, along with the F/A-18, use an Improved Joint Helmet-Mounted Cuing System (IJHMCS) helmet that weighs 22 pounds. This weight, in addition to G-force, creates a strain for neck muscles during high performance maneuvers. Over time, the exposure to repeated neck strain can result in a higher likelihood of chronic neck and back pain. Burton expanded his research to the strike fighter wing community and found similar issues.

"Aircrew didn't want to stop flying, so they would often ignore physical symptoms and not seek help," Burton said. "There wasn't a mechanism in place in Naval Aviation to prevent these symptoms from developing. While physical therapy was an option, the information wasn't adequately distributed so enough pilots would seek help through physical therapists."

Using volunteers as a study group, and utilizing the knowledge of Navy physiologists, an effort known as "prehabilitation" emerged to strengthen, stretch and improve physiology before and after flights with the goal to ultimately reduce the development of neck and back pain or injuries.

> **The HABIT program is divided into two options: the 'High G Series,' completed in 12 minutes, and the 'Relative Flight Series,' completed in eight minutes. Each set of stretches and movements can be incorporated into specific Naval Air Training and Operating Procedures Standardization (NATOPS) checklists.**

"With prehabilitation, we will use the Navy App Locker to ensure every Navy pilot has access to CNATRA HABIT," Burton said. "We all have mirror motor neurons, which are specialized nerve cells that enable someone to mimic a movement with 85 percent accuracy. If our pilots have access to a catalog of tested and approved exercises and movements that can help them reduce the chance of injury, we have that 85 percent chance that they will get the movements right and it improves with practice."

The HABIT program is divided into two options: the "High G Series," completed in 12 minutes, and the "Relative Flight Series," completed in eight minutes. Each set of stretches and movements can be incorporated into specific Naval Air Training and Operating Procedures Standardization (NATOPS) checklists. Instructors and students can perform these exercises whenever access to a tablet allows. Most stretches are simple movements performed while seated in a chair or in a space large enough to fit a yoga mat.

Lt. Tyler Grubic, an aerospace/operational physiologist with Marine Aircraft Group (MAG) 13, lent his extensive research and perspective with strength and conditioning to develop the exercises within the HABIT app.

"My background allowed me to treat athletes and learn how to make them bigger, faster and stronger," Grubic said. "When I started training professional athletes at the Olympic level, it was a matter of keeping them injury-free and healthy. With prehabilitation, we make sure injuries don't happen by warming up the body and strengthening smaller muscles around the big movers. Something I noticed from the beginning in aerospace physiology is that aircrew and pilots all deal with the prevalence of neck and back pain."

Grubic collaborated with other physical therapists and naval physiologists to review all published literature and research on neck and back pain associated with Naval Aviation. With those findings, they developed a succinct 10-minute routine.

"Pilots are sent into very dynamic flights under high G-force, or long flights where pilots sit with poor posture in a way that their vest or helmet is weighing them down," Grubic said. "We worked with the test pilot community in numerous aircraft to help pilots stationed there improve their health and get back into the cockpit. During my time at MAG-13, I have worked with F-35 pilots who have a large helmet, about 5 pounds, also flying dynamic flights anywhere up to 7 to 7.5 Gs. That is a lot of force on the body even without added weight of the helmet."

Several pilots who endured back and neck pain reduced their flying hours due to those stressors. As Grubic began to train them, strengthening the spine and overall body, they built their base strength, corrected posture and increased durability of the body, especially around the spine.

"We have already seen a big turnaround and success with

U.S. Navy photos by MC3 Aleksandr Freutel

Lt. Jacob Cummins, assigned to the El Centro strike training detachment, dons an oxygen mask in a T-45C Goshawk jet aircraft on the flight line onboard Naval Air Facility (NAF) El Centro, California.

A T-45C Goshawk jet aircraft taxis on the flight line onboard Naval Air Facility (NAF) El Centro, California.

those pilots who build their bodies up and incorporate these exercises into their flight plan," Grubic said. "AMSO's have vastly different backgrounds—some are biochemists, some are researchers, and a lot are athletic trainers. That diverse background lets us assist pilots as well. As a physiologist, we frequently fly with the aircrew. We have a unique opportunity to hear their concerns, build trust with them and then encourage them to begin strength training, taking care of their bodies. When we share their successes with other pilots and aircrew, they will want to participate as well."

Initial testing of the HABIT app by pilots, physiologists and physical therapists makes the HABIT app as user-friendly as possible. Allowing for personalization, HABIT app users can measure their pre- and post-workout pain scales and track their strength as it improves. Depending on what physical stressor a pilot experiences, they can select, from the app, the type of pain or location on the body and be shown a series of movements to alleviate that pain. Exercises are designed for all, but can be scaled for different ability levels by utilizing resistance tools and techniques to strengthen problematic muscle groups gradually without causing soreness. This creates a personalized strength-training program with supporting data for pilots and aircrew to share with their medical caregivers. Additionally, the app will be able to track use, provide analytics, and collect feedback to continually improve service and support.

"In the long term, we are hoping that our seasoned pilots and aircrew who have experience with neck and back pain will utilize HABIT, and upon seeing improvement, be able to attest to its effectiveness," Burton said. "We hope to meet in the middle with those who have existing pain and hard-to-reverse pain from injuries and new pilots who look to their mentors for guidance and example. We would like to see a culture change towards shifting tolerance for pain levels, utilizing the Navy PTs [physical therapists] early to address back and neck issues rather than waiting until the end of your career and filing a claim with the VA to try to reverse years of damage."

"I just want to see people get better," Grubic said. "Giving people the tools in their own hands so they can put in the work, strengthen themselves to be resistant to these injuries, this will be an invaluable resource. It's amazing that CNATRA is taking this research under their wing to give pilots an avenue to take care of themselves."

CNATRA's mission is to train, mentor and deliver the highest quality Naval Aviators who prevail in competition, crisis and conflict. Headquartered at NAS Corpus Christi, CNATRA comprises five training air wings in Florida, Mississippi and Texas, which are home to 17 training squadrons. In addition, CNATRA oversees the Navy Flight Demonstration Squadron (the Blue Angels) and the training curriculum for all fleet replacement squadrons.

Anne Owens is the Chief of Naval Training deputy public affairs officer.

LAKEHURST'S PHS&T LAB

KEEPS MILITARY CARGO MOVING SAFELY, STORED SECURELY

By Adam Hochron

Anyone who has purchased items online or from a store knows damaged or inadequate packaging often results in damaged contents. Proper packaging is often overlooked until there is a situation where the item(s) become damaged. For the Navy, improper packaging can result in loss of readiness as well as loss of capital. That's why the work done by the Packaging, Handling, Storage and Transportation (PHS&T) lab at Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey, is essential to supporting the warfighter.

The PHS&T lab tests barrier packaging materials and re-usable containers used for shipping Navy repairables worldwide, from items as small as a deck of cards to as large as a full-sized aircraft.

Along with ensuring the safety of items during storage and transportation, the lab tests barrier materials that protect items that are susceptible to damage from electromagnetic interference (EMI) as well as static electric release events. In addition, the lab tests barrier materials that provide water and vapor-proof protection to items that are at risk for corrosion. Mitigating corrosion is an integral step in ensuring the items issued to the fleet are ready for use.

The PHS&T lab has two locations at Lakehurst, building 333 for packaging materials testing and building 678 for container testing.

"Our standards are higher than commercial standards because our storage time and distribution environment is uncompromising," lab manager Karen McDonnell said. "Our storage is not temperature and humidity controlled with a short shelf storage. Therefore, our packaging must be theatre-robust in all weather, and ready-for-issue after five, 10 and even 15 years of storage. Oftentimes, some may view proper packaging as more expensive, but the environment can be harsh and the items they protect are critical to readiness. In the long run, the packaging is negligible compared to losing an asset."

Mechanical engineer Michael Ruff demonstrates a machine that can make bubble paper capable of withstanding the weight of an adult without popping.

U.S. Navy photos by Adam Hochron

Lab Manager Karen McDonnell demonstrates Quick RT, a packaging system that creates a barrier bag, which can protect items from shock and vibration impulses during shipping.

"It all comes down to preservation and packaging. It all depends on the need of the item," mechanical engineer Michael Ruff added.

The lab is currently testing Odor Barrier Bags that will hopefully provide the Navy with an additional manufacturer for food-contaminated plastic waste bags used on submarines. Waste management can be critical for the ship's success as the crew can spend long stretches underwater without having a place to offload the garbage. The plastic garbage bags not only contain liquids but also prevents odors from spreading throughout the ship.

"Most people say, 'Oh, it's just a trash bag.' But it is so essential that they can't go on deployment without it," Ruff said. "Most people look at it like it is regular plastic. But you can see how many different layers are in there."

The lab also helped address a storage issue with bubble wrap used on ships where space is at a premium. The solution they found is a machine that can take what looks like a roll of regular plastic and inflate it into a very protective bubble wrap that can withstand an adult's weight without popping.

"You go from this huge roll hanging from the ceiling to a roll that hooks onto this little machine, and it gives you as much as you need," McDonnell said.

One difference between the more common bubble-wrap and what they tested in the lab, according to McDonnell, is the commercially available version inflates the bubbles individually while the version they tested inflates whole rows to increase its strength and stability.

The lab also developed another space saving system with Naval Sea Systems Command, Naval Air Systems Command and the Air Force to develop a Joint Modular Intermodal Container (JMIC). Unlike other storage containers that stay in one configuration taking up extra space on a ship, the JMIC collapses on itself and can be stacked for easier storage. The partners in the program all fall under the umbrella of PHS&T, which serves all of the Department of Defense.

Working on a much larger scale, the lab helped preserve an AH-1Z, a UH-1Y and a V-22 Osprey using a combination of desiccant, water vapor-proof barrier material and shrink-wrap. Ruff described the size of the bag used to enclose the aircraft as "enormous," noting that the wrapping was more cost effective than transporting the aircraft to another location for storage.

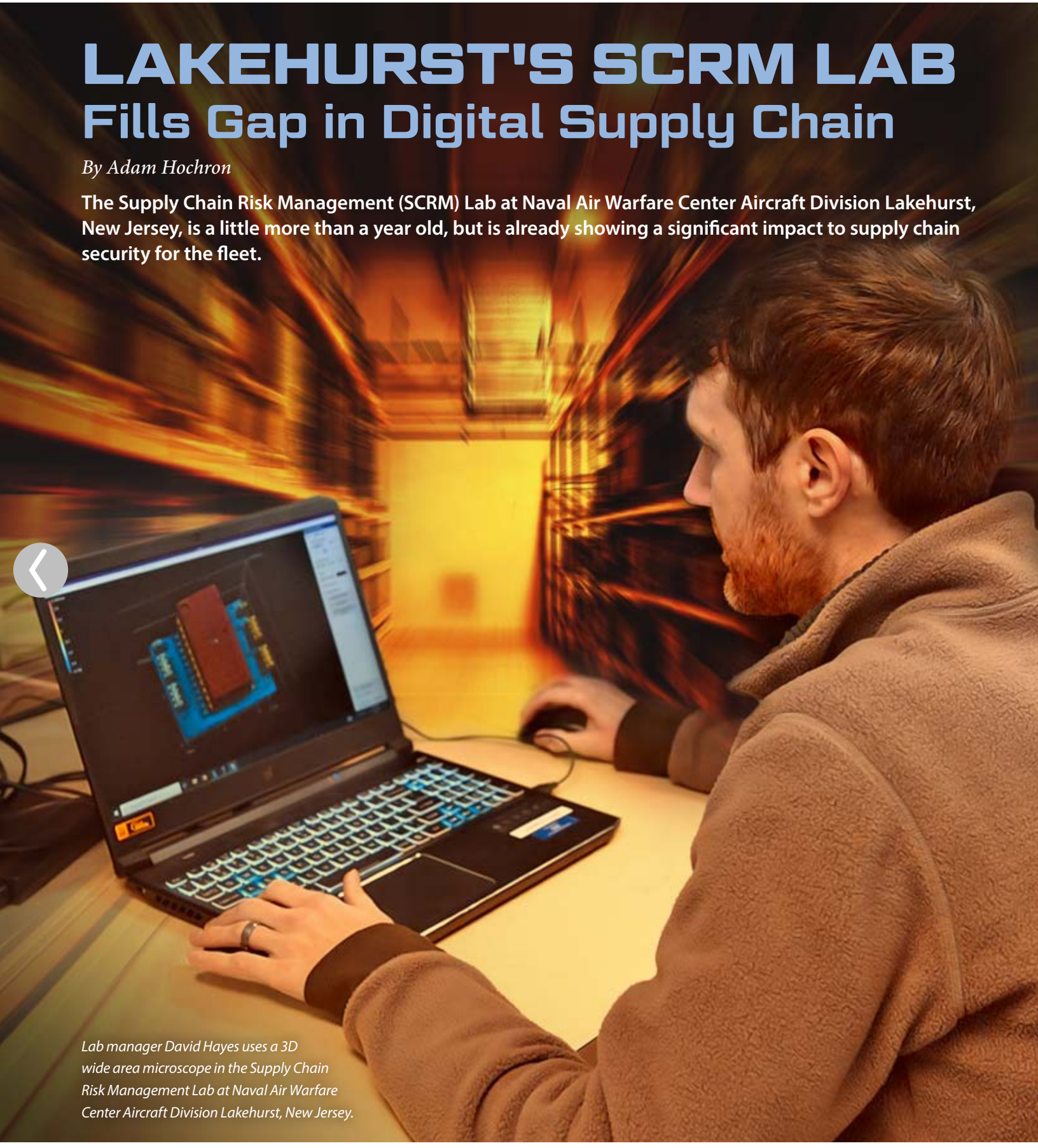
In addition to working with military partners, the lab also provides a unique capability for industry partners. When an original equipment manufacturer is developing a product that could be used for packaging, storing or transportation, the lab provides testing for the item and helps with development before making it available to the Department of Defense.

Adam Hochron is a communications specialist with Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey.

LAKEHURST'S SCRM LAB
Fills Gap in Digital Supply Chain

By Adam Hochron

The Supply Chain Risk Management (SCRM) Lab at Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey, is a little more than a year old, but is already showing a significant impact to supply chain security for the fleet.



Lab manager David Hayes uses a 3D wide area microscope in the Supply Chain Risk Management Lab at Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey.

U.S. Navy photo illustration by Fred Fierlage; imagery by U.S. Navy photo

One of the SCRM lab's critical assets is its members' flexibility to respond to evolving threats. For example, when a system is undergoing an Engineering Change Proposal, and engineers look at whether new equipment meets specifications, the SCRM lab evaluates where the equipment hardware and software is coming from and identifies potential vulnerabilities or threats in the supply chain.

Jack Menzies, the NAWCAD Lakehurst Cyber Team Lead for Data Analytics, said working in cyber security for more than a decade has seen significant changes, with the SCRM lab just the latest example of providing new tools to support the warfighter. The ability to test for counterfeit or manipulated components is invaluable when adversaries are constantly looking for advantages in the virtual realm.

"Essentially, our goal is to fill a gap with respect to providing supply chain risk cognizance to our systems," said lab manager David Hayes. "Before this lab was stood up, our systems didn't have a standardized way of performing due diligence on their equipment from a supply chain perspective, things like who's providing subcomponents, who's writing firmware, what software packages are being utilized, and things like that."

Hayes said the idea for the lab started to crystalize in 2019 as a Naval Innovative Science and Engineering (NISE) research project to look at what supply chain gaps existed within the Naval Air Systems Command (NAVAIR) enterprise and how that compared to others in the Department of Defense and the federal government as a whole.

"We started more with a focus on hardware and software. Now we're moving into the firmware environment," Hayes said. "We want to make sure that we're staying up to date with what everyone else is doing, making sure we're maintaining open lines of communication with other experts in the field, that we are up to date with the latest guidance and that we are providing an effective and efficient service to our systems."

The way the lab achieves all these goals simultaneously, according to Hayes, is by constantly adapting to and adopting new technologies and best practices to ensure customers get the best possible product.

Hayes said the SCRM team has built close relationships with other labs at Lakehurst, including labs from the Prototype, Manufacturing & Test (PMT), Support Equipment (SE) and Mission Operations & Integration (MO&I) departments. While the labs use much of the same equipment and machinery, Hayes said the application varies based on the team's needs.

The new lab has also allowed Lakehurst to bring on new personnel, including computer engineer Angelo Cardinale, who started as an intern before joining the lab in March 2023. Cardinale said his current main task is disassembling any hardware equipment they receive to check for questionable parts and pieces, and to develop hardware bills of material using microscopes, circuit card readers and other pieces of specialized equipment. While the lab and Cardinale are still relatively new to Lakehurst, he said he knows the work they do is essential.

"Other nations, other governments, everyone's trying to learn what we're doing, what the government is doing, what the military is doing. And if they have a listening device on some piece of equipment that might be going out onto a ship, then they're going to be able to see what we're doing on those ships and understand some of our plans or tactics or just know how the equipment works," Cardinale said. "And by knowing how it works, they can end up shutting it down and causing real damage to the forces out there."

Along with looking at the physical equipment, personnel like supply chain risk analyst Kristina Harrington do a deeper dive into the vendors of the Navy's systems. By doing a full review of the companies, Harrington said the lab has a better sense of whether the chain is safe and secure before sending the parts to the Sailors. As a newcomer to Lakehurst, Harrington said she enjoys being a small part of a much larger effort.

"It's definitely an honor to be able to do something that's helping the fleet and support them to make sure what they're doing can be safe and secure and not have to worry about that on top of other things," Harrington said.

Hayes said one of the lab's main focuses now is educating people involved in supply chain risk management on the importance of following protocols to check for risks during a system's lifecycle.

Having come to Lakehurst as a database developer, Hayes said he is excited to be part of a new endeavor with the SCRM lab.

"I enjoy having been able to get in on the ground floor of a new capability. And I think because there is still room for growth, I think there's opportunity for all of us to express our ideas and see those ideas meaningfully implemented," Hayes said.

Part of that effort includes onboarding new tools and adding automation, which can help to find threats faster. Menzies said it is also important for people to know about the lab's abilities and how it provides support.

"The future for all of these programs is to have this information, feed it into their cybersecurity profile, and give them a better idea of their risks to the system and how to best use their money to address those risks," Menzies said.

Adam Hochron is a communications specialist with Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey.

Naval Postgraduate School POTION Software Helps UAV Break Records During Arctic Test Flight

By Petty Officer 2nd Class Leonard Weston

Following years of dedicated work with unmanned aerial vehicles (UAVs), Naval Postgraduate School (NPS) and Naval Research Laboratory (NRL) partners have successfully concluded the ultimate test of a nine-year continuum of research and development in one of the world's most challenging environments: the Arctic Circle.

The collaborative team integrated NPS' own cutting-edge flight-path planning software, known as POTION (Path Optimization), with the Vanilla UAV, developed and operated by Platform Aerospace. This initiative pushed the boundaries of their research, subjecting the Vanilla-POTION combination to rigorous testing in the daunting North Slope of Alaska, making the best of a narrow weather window.

Remarkably, the outcomes of the Arctic flight in September surpassed all expectations, as well as numerous records set by Vanilla in previous missions. This achievement underscores the exceptional capabilities of the Vanilla-POTION combination and represents a milestone in advancing UAV technology for naval operations within the scope of the long-term partnership.

Leading NPS efforts on what he terms "energy-aware aerial flight" is NPS Associate Professor of Mechanical and Aerospace Engineering (MAE) Dr. Vladimir Dobrokhodov, who began at NPS as a postdoctoral fellow in 2001.

"A glider's efficiency is quantified by its judicious energy utilization, a stark contrast to the combat efficiency metrics applied to fighter aircraft. Similar to transport planes, gliders aim to traverse vast distances with minimal fuel consumption," Dobrokhodov said. "Over a meticulous nine-year collaboration between NPS and NRL, innovative approaches have been developed to optimize efficiency of long endurance aircraft."

Back in 2014, Dobrokhodov worked alongside NRL's Dr. Dan Edwards and Dr. Richard Stroman to explore energy-aware flight research with a novel hybrid UAV called Hybrid Tiger that integrated hydrogen fuel cell, solar and atmospheric wind energy-harvesting technologies.

The project spanned three years and received funding from the Operational Energy Capability Improvement Fund (OECIF), the Department of Defense's premier joint operational energy investment program, as well as support from DOD's Operational Energy Prototyping Fund (OEPF), which played a key role in development of energy-focused mission planning tools. Eventually, the initiative evolved into the energy-aware project called POTION.

Central to the project's achievements was the development of optimal trajectory planning software emulating the energy-conserving flight patterns of migrating birds navigating atmospheric wind rivers. In the realm of energy-efficient flight, characterized by low airspeeds and altitudes, susceptibility to the adverse effects of strong winds and icing is amplified, making flight-path planning extremely challenging for human operators. Mathematical optimization of routing becomes vital, necessitating a complex software solution that enables the aircraft to navigate skillfully through diverse and potentially hazardous weather conditions.

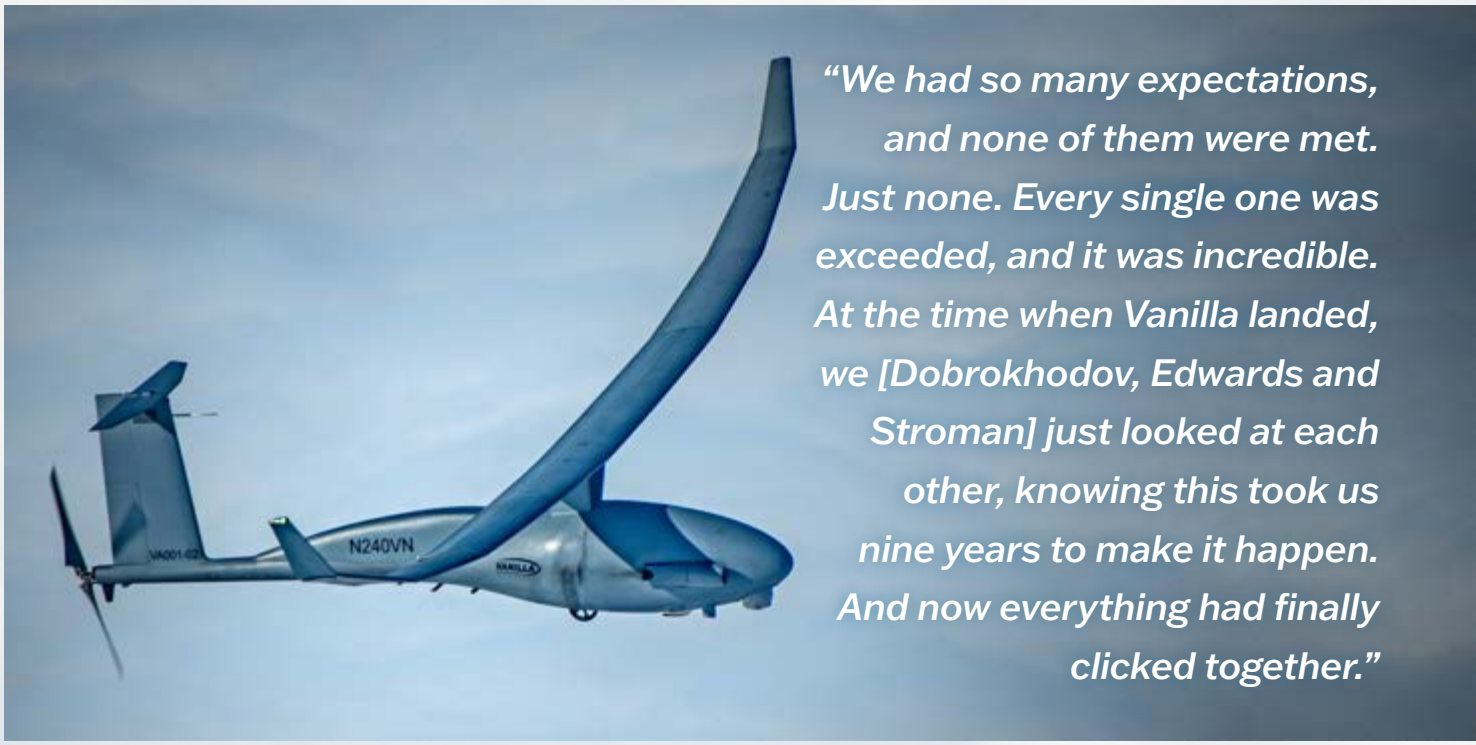
Close collaboration with MAE professors Mark Karpenko and Kevin Jones, researchers who have spent years in the area of flight efficiency and optimal control engineering, helped advance the energy optimal approach to what is now POTION. The team developed the propulsion efficiency model of an aircraft to model the Vanilla UAV's fuel consumption and used machine learning to integrate that model into the algorithm for route optimization.

"Using neural networks to represent and quickly execute an otherwise complicated energy model was a key enabler for optimizing Vanilla's flight path," Karpenko said.

Weather forecasts from Naval Meteorology and Oceanography Command (METOC) were used to inform multi-day missions of the weather conditions ahead. Just as with ships, an aircraft might waste precious energy flying directly into headwinds even if it is a more direct flight path. POTION designs a mission that finds the most energy-advantageous route through

A Vanilla ultra-endurance land-launched unmanned aerial vehicle (UAV) operates during U.S. Pacific Fleet's Unmanned Systems Integrated Battle Problem (UxS IBP) 21 at Naval Base Ventura County, Point Mugu, California.

U.S. Navy photo by Michael Schut



U.S. Navy photo by Michael Schutt

"We had so many expectations, and none of them were met. Just none. Every single one was exceeded, and it was incredible. At the time when Vanilla landed, we [Dobrokhodov, Edwards and Stroman] just looked at each other, knowing this took us nine years to make it happen. And now everything had finally clicked together."

A Vanilla ultra endurance land-launched unmanned aerial vehicle (UAV) operates during U.S. Pacific Fleet's Unmanned Systems Integrated Battle Problem (UxS IBP) 21 at Naval Base Ventura County, Point Mugu, California.

time-varying three-dimensional winds by referencing METOC weather forecasts that extend up to five to eight days.

To test the POTION software, researchers needed a unique aircraft to host the technology and found one in Vanilla, a Group III UAV. Vanilla UAVs have a maximum endurance of 10 days, a payload capacity of 150 pounds and a maximum range of 15,000 nautical miles. Vanilla's capability for long endurance flight makes it especially suitable for realistic testing of its flight performance in wind and icing conditions, and thus a prime candidate for testing the POTION software.

Originally, flight testing was to be conducted in California, but a last-minute change necessitated launching the Vanilla UAV from Alaska's North Slope—above the Arctic Circle—in rough weather. Typically, Vanilla is required to be "chased" by a manned aircraft in the terminal area of airports, but the weather was so intense the escort aircraft could not take off. Instead, Vanilla was given a chance to fly using Instrument Flight Rules (IFR) fully autonomously and following the POTION-generated routes.

"In the most severe arctic conditions, Vanilla demonstrated exceptional performance, achieving unprecedented milestones in its operational history. Notably, it set records for the longest duration flown by a Vanilla aircraft in Arctic environments, covered the greatest distance at these latitudes, and marked its inaugural operation utilizing Instrument Flight Rules," Dobrokhodov said. "We had so many expectations, and none of them were met. Just none. Every single one was exceeded, and it was incredible. At the time when Vanilla landed, we [Dobrokhodov, Edwards and Stroman] just looked at each other, knowing this took us nine years to make it happen. And now everything had finally clicked together."

In honor of the 101st flight by a Vanilla UAV and its unique location, the team named the flight Arctic 101. According to Karpenko, "Arctic 101 was also a fitting name for our first flight because we learned a lot, especially about deploying POTION software in the 'wild.'"

By adding NPS' POTION software to the Vanilla UAV, the team was able to significantly extend its endurance, and extending UAV endurance bears profound implications for military operations.

In this respect, the POTION software developed by NPS stands as a pivotal tool, facilitating the automation of mission optimization involving long-endurance aircraft deployment from a base, navigating to a designated location for extended loitering, and subsequently returning to base. This versatile software is compatible with diverse aircraft platforms and could be seamlessly integrated with nearly any ground control station.

The operational scenario in the Arctic also showcased the transformative potential of POTION. Notably, it effectively mitigated the operator's cognitive load associated with the intricate multi-day mission design and management

process, marking a substantial advancement in operational efficiency.

The POTION research initiative has proven instrumental in advancing the knowledge base of numerous NPS students. During the past three years, seven students in diverse NPS departments have chosen operational energy and its efficacy in aircraft applications as the focal point of their thesis topics.

While some students originated from the MAE department—including U.S. Navy Ensign Luke Lalumandier, a June 2023 graduate whose work focused on the energy-optimal guidance of UAS systems in varying wind environments—it is noteworthy that Operations Research students in particular have significantly contributed valuable insights into the realm of optimization at the mission level. One such OR student was Marine Corps Maj. Tyler Cotney, another June 2023 graduate whose thesis dealt with real-time solutions of robust, energy-aware UAV routing.

Dobrokhodov underscores his appreciation for the contributions from students across various disciplines.

"Active student engagement constitutes a cornerstone NPS endeavor. Many NPS students come in from the fleet. A lot of them already have operational experience flying UAVs, and they give us fruitful thought and advice on how UAVs should be operated. In part, the success of this project is also the success of our students. They come to NPS, learn from us, but, also, we learn from them. That's a significant part of what we all do here," Dobrokhodov said.

Although no NPS students were able to take part in the Arctic testing in September, NPS is already looking to incorporate results from the POTION research into a new project with opportunities for students and research partners alike. Another proposal for NPS, NRL and Platform Aerospace was recently awarded $7.5 million by OECIF for a project entitled GUIDER (Guidance of UxS: Intelligent, Energy-aware Routing) will be a natural extension of the work done with Vanilla, hopefully extending its applicability to a wider class of autonomous aircraft.

"We want to integrate the energy savings attained during transit to and from the operational zone with the aircraft's energy-aware performance during the mission execution phase," Dobrokhodov said of his goals for the GUIDER project. "The question is how we can extend the energy efficient flight into typical mission tasks, like searching a huge area of the south Pacific, for example. Using what we have learned in the Arctic experiment, we can now study how to perform a large-scale search, optimally with respect to fuel and energy, and apply that knowledge to other aircraft."

Use of the Vanilla UAV in research conducted by the Naval Postgraduate School does not constitute endorsement of Platform Aerospace or its products or services by NPS, the Department of the Navy or the DoD.

Petty Officer 2nd Class Leonard Weston is a communications specialist with the Naval Postgraduate School.

U.S. Navy photo

A team of researchers from Platform Aerospace, the Naval Postgraduate School (NPS) and the Naval Research Laboratory (NRL) recently used a Platform "Vanilla" unmanned aerial vehicle (UAV) to conduct testing of flight-path planning software developed at NPS.

Get Real, Get Better:
NAWCTSD's Theoretical Research, Engineering

U.S. Navy photos by LCDR Jeremy Miller

Left, Shaun Andrew with Naval Air Warfare Center Training Systems Division (NAWCTSD) taps into the building power supply and hardwires the motor control unit to the fuse box. Right, Chris Pyles with NAWCTSD secures a spare motor to the frame to anchor it to the floor for safety.

By Angelika B. Robertson

The Basic & Applied Training & Technologies for Learning & Evaluation (BATTLE) Lab is an in-house capability dedicated to improving training and human performance. Since its establishment in 2014, the lab has produced capabilities by applying cognitive science, behavioral research and emerging technology solutions in a variety of learning environments.

The BATTLE Lab's immense effort has received several awards, including the Dr. Dolores M. Etter Top Scientist and Engineers Award of the Year and Naval Air Warfare Center Aircraft Division (NAWCAD) Acquisition Support Award for collaborative work with the Naval Aviation Survival Training Program (NASTP). In August 2023, the lab's research into "Galvanic Vestibular Stimulation (GVS) as a Training Device for Spatial Disorientation in Naval Aviation" received the U.S. Naval Aeromedical Conference (USNAC) 2023 Theoretical Research Award. The lab's focus on spatial disorientation solutions led to the Rapid Design, Development and Fabrication (RD2F) Lab, another Naval Air Warfare Center Training Systems Division (NAWCTSD) team, to update the current training device, the Multi-Station Disorientation Demonstrator (MSDD), with the NASTP. Senior Research Psychologists Beth Atkinson and Dr. Mitch Tindall explained how the NAWCTSD labs aim to improve aviation survival training.

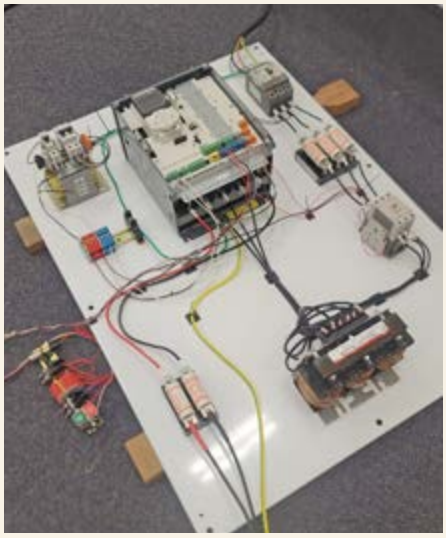
Imagine rolling out of bed and feeling the room spinning despite barely moving. That sensation of orientation mismatching what is happening in the environment is similar to spatial disorientation. Tindall defined spatial disorientation, in regard to Naval Aviation, as a mismatch between visual and/or vestibular systems and other senses that result in disorientation during flight.

"If your perception of reality is different than reality, then you'll modify your behavior based on what you think is happening," which most commonly occurs during low visibility situations. "Sometimes that might be descending when you should be ascending, or staying steady when you should be turning, or turning when you should be staying steady," Tindall said.

These reactions that are not grounded in the reality of the situation can be fatal and are the most cited factors associated with Class A mishaps within the Navy.

Due to the physiological nature of spatial disorientation, it affects pilots of all kinds. For example, famed basketball player Kobe Bryant died in 2020 from a helicopter crash. According to Business Insider, the helicopter was cleared to fly Bryant, Bryant's 13-year-old daughter and seven other passengers through dense fog because of the pilot's experience. The pilot missed clearing a hill by less than 30 feet and the helicopter crashed, killing all of the passengers. The findings released by the National Transportation Safety Board (NTSB) cited the probable cause of the crash was spatial disorientation due to poor visual

Improves Spatial Disorientation Training


Anil Thomas, a mechanical engineer with NAWCTSD who designed the motor control unit, pictured center, works on the prototype motor control unit for the Multi-Station Disorientation Demonstrator, or the "spin and puke" trainer. Pictured at right is a spare motor from the unit.

conditions, which resulted in the loss of control of the aircraft.

Although spatial disorientation has been a known issue for decades, the training devices available to support awareness training have limitations. According to Atkinson, the MSDD in Pensacola, Florida, affectionately called the "Spin and Puke," has been around for over 40 years. Students climb inside the MSDD, which looks like a big canister, and experience the sensations associated with a mismatch between vestibular systems and visual systems. The motion of the device and visual displays provided by a projector stimulate the sensation.

While the MSDD can provide basic familiarity training, "it can't replicate changes in altitude" or more dynamic motion associated with flying. This lack of a realistic experience and the lack of an aviation-specific environment "could be a training gap," Atkinson said. The MSDD provides invaluable training, so the RD2F Lab is updating the MSDD with the NASTP.

The legacy's computer system was outdated, and the motor controller failed. The RD2F team is modernizing the system's computer and control functionality to regain control of the carousel, capsules and projector. The team pressurized the training device and attached the motor control unit at a recent site visit at Naval Air Station Pensacola. This success "blew the cobwebs out of the system and got the motors on the device operational and moving freely," NASTP IPT Lead Lt. Cmdr. Jeremy Miller said.

Thanks to the efforts of BATTLE lab, RD2F, NASTP, connections within the aeromedical community and research from the National Aeronautics and Space Administration (NASA), additional potential solutions are being posed to update the GVS device.

"The idea is to leverage some existing capabilities and try to integrate them and see if we can technically align the systems in a way that allows us to replicate exactly the sensations we want and not some random assortment of experiences," Tindall said.

The GVS device would stimulate the vestibular system and make the trainee feel like they are in motion. The GVS system works by placing small probes on the neck or forehead of an individual to deliver electric signals to stimulate the vestibular system, resulting in a feeling of sway or movement. If successful, this method would reduce training cost and increase accessibility of training.

BATTLE Lab, RD2F and NASTP collaboratively leveraged their research and engineering skills to address a serious capability gap in aviation survival training. Instead of rendering the MSDD legacy training device as obsolete, the labs strategically saved time and cost by getting real about necessary changes to device. Two prototype control units will be developed to run each motor, which are stacked on top of each other under the carousel. Then control units will replace the legacy computer system to minimize footprint. The labs' research and technological updates are examples of how improving training devices with technological advances will improve human performance and help warfighters get better.

Angelika B. Robertson is a communications specialist with Naval Air Warfare Center Training Systems Division.

Marine One, BUNO 358, on display at the new George H. W. Bush Presidential Museum and Library Marine One/4141 Locomotive Pavilion in College Station, Texas. The new pavilion showcasing the retired Marine One helicopter hosted a Day of Gratitude and an invitation-only Centennial Celebration Dinner in the new 29,000-square-foot pavilion as part of the 41@100 event on what would have been President George H.W. Bush's 100th birthday.

U. S. Navy photo by Megan Wasel

Retired Marine One Makes a Memorable Final Stop

By Megan Wasel

A retired, de-militarized and restored VH-3D Marine One was inducted into the George H.W. Bush Presidential Library and Museum, College Station, Texas in June. The library and museum, located within the Texas A&M University campus, welcomed Presidential Helicopters Program Office members, Bush family members, donors and supporters to the grand opening of a new pavilion that now houses the retired Marine One.

Bureau number 159358 (BUNO 358) served United States presidents beginning with the Ford administration. The VH-3D was sent to Marine Helicopter Squadron One (HMX-1) in 1976, flew roughly 12,100 hours and was returned to the program office's Presidential Helicopter Support Facility (PHSF) at Naval Air Station Patuxent River, Maryland, in 2023 for its end-of-service life.

Retiring a Flying Legacy

As BUNO 358 neared its end-of-service flight hours, the program office began reaching out to Department of the Navy and National Museum of the Marine Corps stakeholders regarding disposition options for a retired Marine One helicopter.

The George & Barbara Bush Foundation and the George H.W. Bush Presidential Library and Museum were in the process of expanding its current facility footprint by adding an extension to draw more visibility and increase attendance to the museum. The plan was to house the retired and donated 4141 Union Pacific presidential locomotive, add in a café, and use the space for functions. As luck would have it, the foundation's new facility also had room for the retired BUNO 358. The locomotive and helicopter both transported President Geroge H.W. Bush in his many years of service as the 43rd vice president and as the 41st president.

The Presidential Helicopters Program Office team worked a detailed schedule in preparation for the helicopter's de-militarization and transport. The helicopter went through a process like many other retiring aircraft, including top shelf inspection, maintenance, testing and white-glove care. A retired aircraft must be able to sustain all

types of weather, elements, temperatures, conditions, and even being transported to and from locations inside other aircraft or on a flatbed.

Preparing a helicopter for retired life takes a team of experienced government and contract professionals. The de-militarization process for BUNO 358 began March 2023. This grand effort consisting of employees from the program office, VTG and Clayton International—the small business tasked to preserve and transport the retired helicopter—had hundreds of combined man-years of experience in aviation maintenance and extensive VH-3D hands-on experience.

"This was no easy effort; the joint team worked hard to coordinate and prepare the retired and restored helicopter for its final resting place at the George H.W. Bush Presidential Library and Museum."

Months of strategic planning and coordination between all the entities culminated in early February when BUNO 358 was ready to make its cross-country trip to its final resting place.

Presidential Helicopter Program Office sustainment lead Todd Humiston said, "This was an incredibly rewarding effort that was executed by professionalism up

Photo courtesy of the George & Barbara Bush Foundation

Presidential Helicopter Executive Lift Mission and History

The use of the presidential helicopter can be traced back to 1957 when then-President Dwight D. Eisenhower first found this mode of transportation essential to get quickly from his current location to the White House. Since then, the importance, speed and practicality of using a helicopter became a routine mode of transportation for all future United States presidents.

Photo courtesy of George H.W. Bush Presidential Library and Museum

President George H.W. Bush and First Lady Barbara Bush arrive on the White House South Lawn from Camp David on Nov. 8, 1992.

The presidential helicopter has evolved since the late 1950s, with the first variant being the UH-13J Sioux, then the UH-34 Seahorse. The H-34 replaced the H-13, and by the early 1960s, the VH-3 was introduced. In 1978, the VH-3D entered presidential transport service and in 1987, the VH-60N joined the fleet serving alongside VH-3D to fill out the fleet of presidential and executive lift transport.

HMX-1, while established in 1947 as an experimental test and evaluation unit during the initial years of rotary wing flight, became the squadron to fly the president in 1957. That was because then-President Dwight D. Eisenhower—away on vacation—was urgently needed back at the White House. What would have been a two-hour motorcade trip was reduced to a seven-minute helicopter ride. On that day, HMX-1 earned its most prestigious of missions—direct support of the president. Now, when the president is aboard the HMX-1-piloted ever-reliable Sikorsky VH-3D helicopter, it takes on the name Marine One.

When Bush began using the executive transport, a VH-3D already in the presidential lift mission since President Gerald R. Ford's administration was called upon. BUNO 358 carried presidents and heads of state until the helicopter was decommissioned in early 2023.

Marine One, BUNO 358, wrapped for transport by Clayton International, arrives in College Station, Texas, in February with police escort. A skilled team relocated the aircraft, which is on permanent loan from the National Museum of the Marine Corps.

and down the chain of command, from the scheduling of all the tasks, demilitarization, transportation, disassembly, reassembly, transportation across the country, the offloading of the aircraft and finally the placing of the aircraft within the museum."

VTG provided their expert team to ensure the utmost care and consideration went into every detail of the de-militarized aircraft. The integrity of the executive interiors was expertly maintained, and all the helicopter's parts removed in such a manner as to be replaced with non-serviceable components, displays or covered to give the appearance of a functional cockpit, cabin and exterior.

After the demilitarization process was complete and the aircraft was found to be suitable after inspection, it was then transported to Clayton International, which was responsible for loading the aircraft on a trailer and then transporting it to its Maintenance Repair and Overhaul facility in Georgia.

Clayton International is an expert in aircraft relocation. Once in Clayton's possession, they completed the intensive restoration and reassembly process, along with museum preparations and safety/compliance. This effort included sourcing, cleaning and reinstalling of executive interior panels, seating, carpeting, even repopulating the cockpit instruments, gauges and controls as they were during the 41st president's use of the helicopter. Clayton also installed essential dynamic components and did a complete exterior paint before its final transport and relocation to College Station, Texas. On Feb. 27, the retired Marine One, BUNO 358, arrived in College Station with a police escort motorcade.

Once on site, Clayton completed the offload, reassembly, positioning and final clean for museum display and lighting.

As for long-term sustainment of the helicopter, as it is no longer in flying condition, the National Museum of the Marine Corps will upkeep as necessary.

"This was no easy effort," said Col. Alex Ramthun, program manager. "The joint team worked hard to coordinate and prepare the retired and restored helicopter for its final resting place at the George H.W. Bush Presidential Library and Museum."

Photo courtesy of the George & Barbara Bush Foundation

Marine One, BUNO 358, arrives in College Station, Texas, in February. The 72-foot-long helicopter was transported by flatbed over two days and is estimated to weigh 4.65 tons.

Photo courtesy of the George & Barbara Bush Foundation

Marine One BUNO 358 arrives in College Station, Texas, in February. A skilled team relocated the aircraft, which is on permanent loan from the National Museum of the Marine Corps.

Photo courtesy of the George & Barbara Bush Foundation

In February, the retired, demilitarized and restored Maine One, BUNO 358, was placed inside the pavilion. At that time, the new Marine One/4141 Locomotive Pavilion was still being finalized as it waited for the arrival of the presidential helicopter.

Final Resting Place

On the evening of June 12, on what would have been President George H.W. Bush's 100th birthday, in the presence of the Bush family, George and Barbara Bush Foundation CEO Andrew H. Card Jr., and hundreds of donors, the preserved Marine One was unveiled in the new pavilion. The VH-3D Marine One was the backdrop for the evening's remarks, singing and recognition to the many who made this historic moment possible.

On June 13, the campus of Texas A&M and the George and Barbara Bush Foundation, and George H.W. Bush Presidential Library and Museum opened the building to the public for the first time.

Thousands of excited patrons, donors, college alum and more passed through the doors to view the VH-3D, read its displays and learn more about the aircraft's important part of the 41st president's history.

"We are proud of be part of this legacy and I am proud to work alongside these talented individuals who constantly impress me with their dedication to this no-fail mission," Ramthun said.

The Future of Presidential Lift

The venerable VH-3D and VH-60N Marine One helicopters have not stopped their rigorous mission to transport the president and heads of state to places near and far. These rugged yet very reliable and secure aircraft have a meticulous maintenance protocol. Aircraft come in for white glove maintenance and testing, then put back into service without missing a scheduled mission.

But all aircraft have a service life, and the VH-3D and VH-60N are closing in on their end of mission. Additionally, over time, requirements change, capabilities advance and develop, and customer needs change. In May 2014, the program office—the acquisition arm of the helicopter's mission—with approval from the Navy, awarded Sikorsky Aircraft a contract to build the next presidential helicopter, the VH-92A, a derivative of the commercial S-92. The VH-92A Patriot, with 23 aircraft in its program of record, is nearing the end of production. The VH-92A is in the midst of a phased plan to ensure a smooth, safe and timely transition from the legacy VH-3D and VH-60N aircraft.

Megan Wasel is a public affairs officer with the Presidential Helicopters Program Office.

U.S. Navy photo by Megan Wasel

Retired, demilitarized and restored Marine One, BUNO 358, on display inside the new Marine One/4141 Locomotive Pavilion in College Station, Texas.

U.S. Navy photo by Megan Wasel

This Union Pacific Railroad 4141 locomotive was used by the 41st president throughout his career. The 4141 locomotive is most known for transporting President Bush to his final resting place in College Station, Texas. 4141 is on display at the new George H. W. Bush Presidential Museum and Library Marine One/4141 Locomotive Pavilion.

U.S. Navy photo by Megan Wasel

Marine One, BUNO 358, on display at the new George H.W. Bush Presidential Museum and Library Marine One/4141 Locomotive Pavilion in College Station, Texas. The new pavilion, showcasing the retired Marine One helicopter, hosted a Day of Gratitude and an invitation-only Centennial Celebration Dinner in the new 29,000-square-foot pavilion as part of the 41@100 event on what would have been President George H.W. Bush's 100th birthday.

U.S. Navy photo by Megan Wasel

Retired Marine One, BUNO 358, was the backdrop for President George W. Bush, the 43rd president of the United States, who spoke at the invite-only June 12 Centennial Celebration Dinner inside the new Marine One/4141 Locomotive Pavilion on what would have been his father's 100th birthday.

U.S. Navy photo by Megan Wasel

This Union Pacific Railroad 4141 locomotive was one of the centerpieces at the invitation-only June 12 Centennial Celebration Dinner inside the new George H.W. Bush Presidential Museum and Library Marine One/4141 Locomotive Pavilion.

EA-6B PROWLER HONORED

By Tim Gantner

Naval Air Warfare Center Weapons Division (NAWCWD) held a dedication ceremony April 17 at Point Mugu, California, to commemorate the EA-6B Prowler's nearly five decades of service as the premier electronic attack platform for the Navy and Marine Corps.

Nearly 100 people gathered to honor the iconic Prowler at Missile Park. Veteran and current aviators in their flight jackets shared stories with civilians whose expertise forged the aircraft's legacy. The ceremony featured the unveiling of a bronze plaque—a lasting tribute to the aircraft and the Point Mugu personnel who ensured its long and storied service from 1971 to 2019.

For some, this dedication was a long-awaited dream, finally coming to fruition.

Dr. Ron Smiley, who retired in 2020 after years heading up electronic warfare efforts for NAWCWD and Naval Air Systems Command, began working at

Rear Adm. Keith Hash, commander of NAWCWD, speaks during the EA-6B Prowler dedication ceremony at Missile Park at Point Mugu, California, April 17.

U.S. Navy photo by Rob Grabendike

AT POINT MUGU

Point Mugu in the early 1970s, coinciding with the Prowler's initial operational deployment. Over the years, he witnessed the aircraft's evolution and the tireless efforts of the Point Mugu team to keep the Prowler at the forefront of electronic attack.

"I have waited many years for this dedication," Smiley said. "As I stand here before you today with this beautiful aircraft behind me, four words come to my mind: venerable, iconic, symbolic and a legacy."

Between 1966 and 1991, a total of 170 EA-6B Prowlers rolled off the assembly line at Grumman's Calverton, New York, facility on Long Island. These versatile aircraft transitioned quickly to active duty, with the first arriving at Electronic Attack Squadron (VAQ) 129 at Naval Air Station Whidbey Island, Washington, in December 1971. The Prowler's baptism by fire came quickly in Vietnam. They flew combat missions as part of Operations End Sweep and Linebacker II in 1972. The Prowler's legacy continued throughout the decades, proving its worth in conflicts like the Persian Gulf War and the War on Terror.

No EA-6B Prowler was ever shot down in combat. The Prowler's ability to suppress enemy defenses

U.S. Navy photo by Drew Verbis

Dr. Ron Smiley, who retired in 2020 after years leading the electronic warfare efforts for NAWCWD and NAVAIR, speaks during the EA-6B Prowler dedication ceremony at Missile Park at Point Mugu, California, April 17.

made it a linchpin for ensuring the safety of U.S. and coalition forces. When it came to strike missions, pilots never wanted to leave the carrier, or "mom," as the aviators dubbed it, without an EA-6B or two to protect them.

"There are several types of combat strike missions against enemies with effective air defenses, particularly early in combat like the first few days or weeks, that EA-6B support was required or the mission would not happen," said Michael Szczerbinski, a former EA-6B pilot. "Some missions actually required multiple EA-6Bs, or the mission was a 'no-go.'"

The Prowler's electronic warfare capabilities were so crucial that strike operations often would only launch with its support. The Navy and Marine Corps relied heavily on the EA-6B, affectionately nicknamed the "flying drumstick" or "family truckster," to shield their aircraft from enemy fire.

"Fighter pilots always wanted EA-6Bs there to protect them. We were like their good luck charm of electronic attack Armageddon," Szczerbinski said. "We joke now that the cool kids needed the 'flying drumstick.'"

This dedication celebrates the deep connection between Point Mugu and the legendary Prowler. The base played a pivotal role in the aircraft's development, upgrades, and enduring success throughout its decades of service.

After countless missions flown from iconic carriers like the USS Abraham Lincoln (CVN 72), USS Nimitz (CVN 68), USS Carl Vinson (CVN 70) and USS George H.W. Bush (CVN 77), this particular Prowler made its final journey in June 2015, landing at Point Mugu, which sustained its extraordinary career. Now, in Missile Park, it represents the remarkable partnership between the aircraft and the skilled personnel of Point Mugu.

"The EA-6B depended on the experts here, whose work was enabled and supported by Point Mugu's resources and infrastructure," said Rear Adm. Keith Hash, NAWCWD commander.

The relationship between Point Mugu and the Prowler dates back to 1973, when the base became the designated EA-6B Aircraft Computer Systems Software Support Activity.

Protection, deception, disruption: These were the tools in the Prowler's bag of electronic tricks. By blinding enemy radar with electronic interference, the Prowler suppressed air defenses. Its actions also allowed for gathering critical intelligence, ensuring the survivability of U.S. and coalition forces in combat.

"Point Mugu was critical to the Prowler's effectiveness over the years, actually improving capability as the plane aged,"Szczerbinski said. "Professionals at Point Mugu pioneered several series of electronic upgrades that improved sensor systems and their integration with jamming capabilities and pilot interface."

This expertise was vital, especially after the Air Force retired the EF-111A Raven in 1998. The Prowler was the only dedicated electronic warfare

Point Mugu's Prowler Legacy

- Established the Jammer Technique Optimization team in 1984
- Released the first EA-6B software version in 1987
- Developed successive ICAP II upgrades through the late 1980s and 1990s
- Opened the Electronic Combat Simulation and Evaluation Lab in 1991
- Established ICAP III Software Support Activity in 1999
- Continued ICAP III upgrades and support through the Prowler's 2019 retirement

aircraft until the Navy introduced the EA-18G Growler in 2008.

"In Iraq and Afghanistan, the Prowler was one of the most effective platforms against modern telecommunications and cell phones," Szczerbinski said.

The Prowler's adaptability was especially evident in Iraq and Afghanistan, where it evolved to meet new threats. One example of this was the aircraft's ability to disrupt improvised explosive devices by jamming the communication signals used to detonate them remotely. This crucial capability, developed in response to the growing IED threat, made the Prowler one of the most effective platforms for protecting ground troops in these conflicts.

"The 'flying drumstick' with a 'ground-seeking nose' holds a special place in my heart, especially as it has gotten me home safely many times, hundreds of miles from anything resembling 'safe,' over Afghanistan getting shot at," Szczerbinski said.

During the ceremony, one EA-6B alum, retired Navy Capt. Jeff Chism, shared his own journey with the Prowler, from a young kid inspired by the aircraft at an air show to a seasoned pilot who flew the EA-6B in combat. His heartfelt thanks highlighted the deep bond between the Prowler and those who flew it. For Chism and many others, the Prowler was more than just an aircraft—it was a trusted partner that protected them and their fellow service members in the face of danger.

"Thank you for the countless lives you saved through your black magic of electronic warfare, dominating the electromagnetic spectrum, and the number of Sailors that allowed you to grace, caress and maintain you," he said.

The EA-6B Prowler displayed at Missile Park also represents Pont Mugu's continuing excellence in electronic warfare support. Innovations pioneered for the Prowler laid the foundation for the Growler, ensuring a seamless transition and continued excellence in electronic warfare.

"The EA-18G Growler was effective on day one because of the legacy that was carried over from the Prowler," said Harlan Kooima, NAWCWD's director of Research and Development.

A bronze plaque, unveiled during the dedication ceremony, pays a fitting tribute to an extraordinary aircraft and the dedicated professionals who kept it at the forefront of electronic warfare for nearly half a century. Its place in history is now cemented at Point Mugu for generations to come, a reminder of its vital role in protecting U.S. forces and ensuring mission success.

U.S. Navy photo by Rob Grabendike

A bronze plaque commemorating the EA-6B Prowler was unveiled during a dedication ceremony at Missile Park at Point Mugu, California, April 17. The plaque honors the Prowler's service from 1971 to 2019 as the U.S. Navy and Marine Corps' premier electronic attack aircraft.

Dedication on Plaque

From 1971 to 2019, the EA-6B Prowler, managed by PMA-234 and manufactured by Northrop-Grumman, served as a premier electronic attack aircraft for the U.S. Armed Forces.

This specific USN ICAP II Prowler, bearing Bureau Number (BUNO) 163890 and affiliated with VAQ-134, played a pivotal role in military operations across the Middle East. Its illustrious career culminated in participating in the official Navy Prowler retirement ceremony at NAS Whidbey Island before making its final transit to Point Mugu on 27 June 2015, and is now part of the esteemed collection of the National Naval Aviation Museum.

This venerable EA-6B Prowler is dedicated to all the military and civilian personnel at NAWCWD Point Mugu, whose unwavering dedication and expertise contributed significantly to the development and delivery of unparalleled electromagnetic warfare capabilities and services for the Prowler for almost 50 years. Their commitment ensured that Fleet Warfighters received the very best support and technology.

May this display stand as a tribute to the legacy and remarkable contributions of the EA-6B Prowler and the individuals who shaped its storied history.

"I say to you who are here and have been part of the EA-6B e-warfare workforce, thank you for all you have done. Thank you for helping the Prowler become the machine that changed the world of e-warfare," Smiley said.

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