NAVAL AVIATION NEWS

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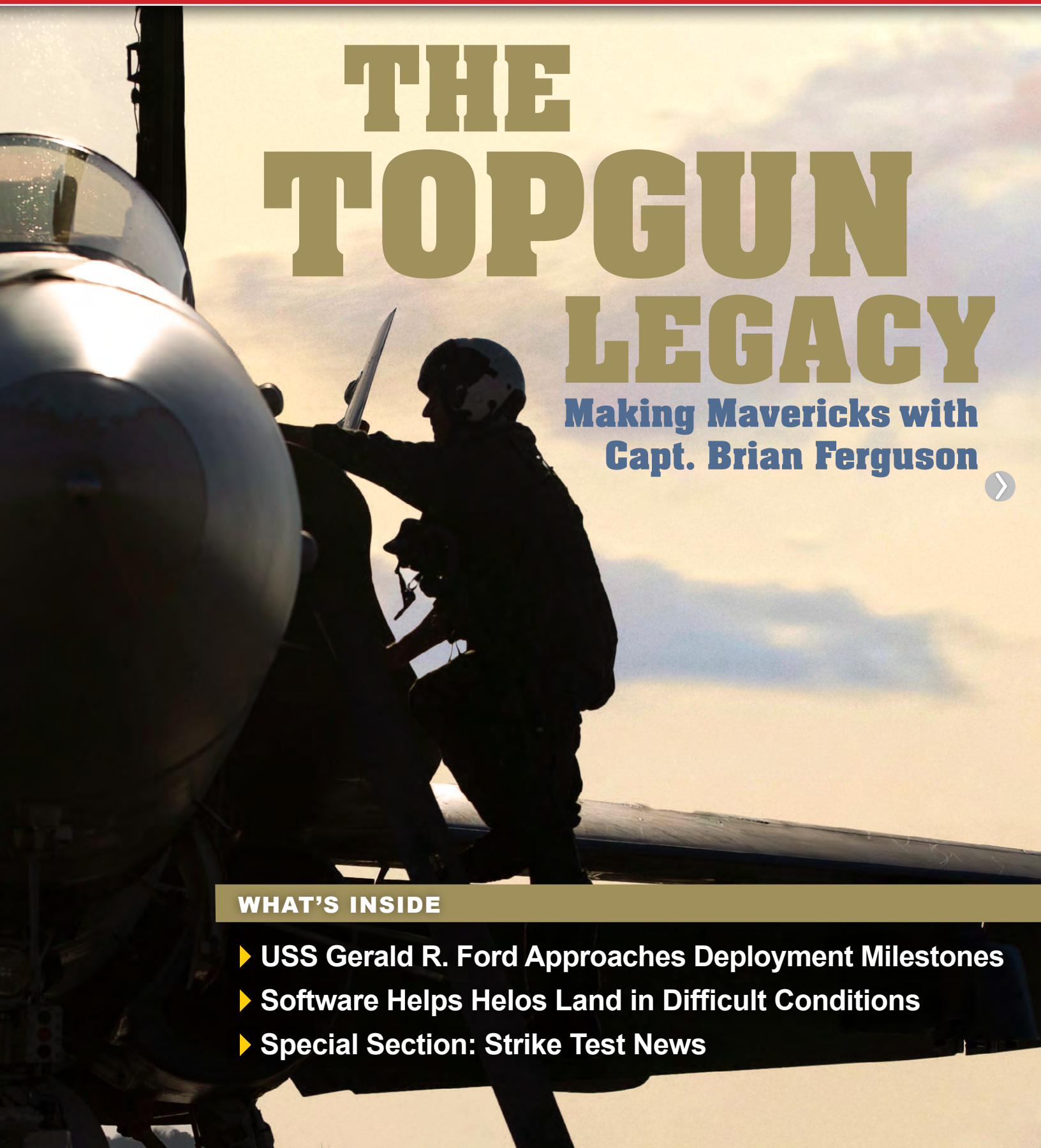

THE TOPGUN LEGACY

Making Mavericks with Capt. Brian Ferguson

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U.S. Marine Corps F/A-18 Hornet, aircraft assigned to Marine Fighter Attack Squadron 112, are parked at Hyakuri Air Base, Japan, 2021.

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SPECIAL SECTION

ON THE COVER

On the cover: *Chief of Navy Reserve, Vice Adm. John Mustin, boards a Fighter Squadron Composite (VFC) 12 F/A-18 Hornet during a visit to discuss various topics, including warfighting readiness, COVID-19 vaccinations and the status of the Navy Reserve. Reserve Sailors assigned to VFC-12 provide strategic depth and operational support to the U.S. Navy by training and qualifying F/A-18 A-D aviators while maintaining warfighting readiness. (U.S. Navy photo illustration by Fred Flerlage; photographic image by MC3 Zachary D. Van Nuy)*

In our first fully digital edition of Naval Aviation News, we highlight the Navy's involvement in the biggest movie of the summer—and one of the highest grossing films of all time—"TOP GUN: Maverick." Capt. Brian "Ferg" Ferguson shares his experience as the Navy's technical advisor for the film on page 32, ensuring that the flying sequences were thrilling, technically accurate and safe for all involved. In what has become an annual feature in the summer edition of Naval Aviation News, the team at Air Test and Evaluation Squadron (VX) 23 shares their latest advances in our special Strike Test News section beginning on page 55. On page 22, engineers at the Naval Surface Warfare Center Aircraft Division (NAWCAD) explain the steps they have taken to make landing a helicopter in low visibility conditions safer using new software technology. A new flight control system for the CH-53K is showing results in helping the heavy-lift helo operate in degraded visual environments and increase its handling with even higher payloads, as discussed on page 24.

On the back cover: *Aviation Machinist's Mate 1st Class Eli Dias, assigned to the "Tridents" of Helicopter Sea Combat Squadron (HSC) 9, conducts maintenance on an MH-60S Nighthawk, attached to HSC-9, in USS Gerald R. Ford's (CVN 78) hangar bay, March 23. (U.S. Navy photo by MCSA Sasha Ambrose)*

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

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Airscoop

Compiled by Rob Perry

Navy Demonstrates New, Improved Breathing Device for Air Crew Training

PATUXENT RIVER, Md.—The Naval Aviation Training Systems and Ranges program office recently installed and demonstrated the new Mask on Breathing Device (MOBD) trainer July 7 at Naval Air Station Patuxent River, Maryland.

The MOBD trainer allows tactical jet aviators to experience unique breathing-related distress symptoms that may occur during flight, which could lead to potential Physiological Episodes (PE), one of the Navy's top safety concerns.

Flight Physiologist Lt. Tyler Grubic demonstrated the effect of the different breathing distress profiles on subject Electronic Warfare Systems Specialist 1 Shawn Bell. On hand for the demonstration were Naval Air Systems Command (NAVAIR) Commander Vice Adm. Carl Chebi, Deputy Program Executive Officer for Aviation Common Systems and Commercial Services Marci Spiotta and members of the Naval Aviation Survival Training Program (NASTP) team.

"When I speak of the importance of why we do what we do at NAVAIR this is exactly it; ensuring we prepare our naval aviators before they get to the fleet and bring our sons and daughters safely home," Chebi said.

Aircrew Receive New Training Devices to Improve Capability, Readiness

PATUXENT RIVER, Md.—The Naval Aviation Training Systems and Ranges program office recently delivered the first fully capable Naval Aircrewman Training Systems (NATS) and Marine Common Aircrew Trainers (MCAT) to the fleet.


U.S. Navy photo

The Naval Aviation Training Systems and Ranges program office recently delivered the first fully capable Naval Aircrewman Training Systems (NATS) and Marine Common Aircrew Trainers (MCAT) to the fleet. The graphic depicted here displays U.S. Navy aircrew conducting training in an aircrew virtual environment trainer.

U.S. Navy photo

NAVAIR Commander Vice Adm. Carl Chebi (left) gets a firsthand look at the Mask on Breathing Device (MOBD) trainer July 7 at the Patuxent River Aviation Survival Training Center (ASTC). Flight Physiologist Lt. Tyler Grubic (right) demonstrated the effect of the different breathing distress profiles on subject Electronic Warfare Systems Specialist 1 Shawn Bell (center). The MOBD trainer will be available at all eight ASTC locations later this year.

The NASTP team developed the MOBD trainer, which replaces and improves upon the legacy Reduced Oxygen Breathing Device by using an on-demand airflow trainer consistent with the On-Board Oxygen Generating System found in tactical aircraft.

"This groundbreaking training device enables naval aviators to recognize how they personally respond to breathing distress and allows them time to execute emergency procedures prior to becoming incapacitated" said Program Manager Capt. Kevin McGee.

The program office has delivered 10 MOBD devices to date. A total of 35 trainers will be installed in all eight Aviation Survival Training Centers across the country by November 2022.

From the Naval Aviation Training Systems and Ranges Program Office.

The NATS was delivered to Naval Air Station Mayport, Florida, and two MCATs were delivered to Marine Corps Air Station New River, North Carolina. Both the NATS and the MCAT devices are being used to conduct initial, integrated crew training and proficiency flights, ultimately reducing flight hours in operational aircraft, reducing and in some cases eliminating ordnance expenditures, and reducing high-risk evolutions that could lead to mishaps.

"This is long overdue" said Capt. Lisa Sullivan, program manager, who oversees the two programs. "In the past, H-60, H-53, H-1 and V-22 aircrew did not have an opportunity to start their training in a controlled simulator environment before entering into a dynamic aircraft environment. For our Marine Corps aircrew, it provides the ability to gain initial weapon engagement proficiency in a simulator before live fire training on operational flights."

The NATS device is the first of nine deliveries under the Aircrewman Training Optimization program, an effort enhancing their hardware and software capability baseline. It provides a blend of virtual and physical environments for training MH-60R Seahawk aircrew in crew coordination; aerial gunnery; hoist operations; search and rescue; and vertical replenishment. The Navy is incorporating these enhanced environments into Navy helicopter Wing Training Manuals.

"These devices are changing the way we train and prepare for missions around the world. It is exciting to be one of the first to experience them," said Naval Aircrewman Tactical Helicopter Chief Matthew Owens, H-60 Training Systems deputy integrated product team lead. "This is a remarkable time to be in the realm of training. There seems to be a shift happening, and the realization that training truly does equal combat lethality is occurring. We must train like we fight to be effective."

The fleet officially began training in the MCAT this spring, and during recent MCAT mission scenario testing Marine Corps enlisted aircrew subject matter experts (SME) remarked that the MCAT will be a training and readiness game-changer. All SMEs involved in the mission scenario testing voiced a desire to start training in the MCAT as soon as possible. Prior to the delivery of the new device, Marine Corps CH-53E Super Stallion, MV-22B Osprey, and UH-1Y Venom enlisted aircrew trained on operational aircraft.

The new system enables non-pilot aircrew to maintain and enhance individual and unit mission readiness and will allow the Marine Corps to optimize aircraft flight hour utilization by offering a new, state-of-the-art, simulation-based alternative.

From the Naval Aviation Training Systems and Ranges Program Office.

F-5 Modernization Program Completes Engineering Phase, Moves to Production and Deployment

U.S. Navy photo

The Navy's Specialized and Proven Aircraft Program Office Avionics Reconfiguration and Tactical Enhancement/Modernization for Inventory Standardization (ARTEMIS) program successfully reached Milestone C decision June 28. The ARTEMIS program will blend commercial-off-the-shelf solutions and industry partner investments to reduce potential safety risks by adding necessary upgrades to instrumentation increasing safety and capability.

PATUXENT RIVER, Md.—The Navy's Specialized and Proven Aircraft program office F-5N+/F+ Avionics Reconfiguration and Tactical Enhancement/Modernization for Inventory Standardization (ARTEMIS) program successfully reached Milestone C decision June 28, effectively moving into production and deployment.

To meet the Navy and Marine Corps requirement to increase fleet adversary training capacity with high-altitude tactical fighters, the program office's Adversary Team is inducting 22 repatriated, former Swiss Air Force F-5E/F aircraft into the ARTEMIS modification program. This program will reconfigure the airframe and incorporate a block upgrade consisting of emerging and existing commercial technology while capitalizing on industry's private investment and lessons learned to upgrade necessary safety and capability features on the aircraft.

The program office will reconfigure the airframes and convert the F-5E/F engines to the Navy and Marine Corps standard F-5N/F. Once that is complete, the program will integrate the block upgrade, which consists of a new glass cockpit and avionics suite that uses technology found in more modern aircraft to improve safety and capability. Subsequent to this upgrade, the 22 aircraft will be in the F-5N+/F+ baseline configuration.

The Adversary Team and industry partner Tactical Air Support Inc. will execute the F-5N+/F+ ARTEMIS program. Tactical Air Support owns and operates F-5AT aircraft currently supporting the program office's tactical fighter training and has performed similar modernization and safety upgrades on its own fleet of aircraft. Tactical Air Support assisted in the validation of the block upgrade F-5N+/F+ configuration on two of the prototype Navy F-5Ns completed earlier this year.

"This program will provide a fleet of upgraded, safe and modernized adversary aircraft, providing the realistic and relevant tactical training that our aviators need to win in the fight," said Capt. Gregory Sutton, program manager,

To improve and enhance aircraft safety and mission effectiveness and to meet existing and emerging requirements and obsolescence issues, the ARTEMIS program integrates fully digitized avionics instrumentation and provides increased safety and capability upgrades. These upgrades will also add tactical capabilities designed to improve air-to-air training.

"The program office's Adversary Team drove to a successful milestone decision by challenging norms to tailor the program requirements using a blend of commercial solutions and the lessons learned by our industry partners with a focus on desired outcomes and risk mitigation," said Boyd Forsythe, F-5 Adversary Team lead.

Given the significant use of commercial-off-the-shelf components with well-defined maintenance and support equipment requirements that are used for the F-5N+/F+ configured aircraft, the product support strategy will be to execute Navy and Marine Corps maintenance procedures at the original equipment manufacturer (OEM) maintenance facility, with fleet support teams within close proximity to the OEM facility to assist. The program's preventive maintenance will consist of inspections, cleaning and scheduled maintenance tasks.

From the Specialized and Proven Aircraft Program Office.

Navy Delivers Final Normobaric Hypoxia Training Device

PATUXENT RIVER, Md.—The Naval Aviation Training Systems and Ranges program office's Naval Aviation Survival Training Program (NASTP) installed the eighth and final hypoxia trainer at the Aviation Survival Training Center (ASTC) located at Whidbey Island, Washington, in April.

The NASTP installed the Normobaric Hypoxia Trainer (NHT) in eight locations across the Naval Aviation Enterprise, providing fixed-wing, non-ejection seat aircrew the opportunity to experience hypoxia in a safe and technologically relevant environment.

"The staff of ASTC, Whidbey Island, are excited to deliver dynamic hypoxia training to our aviators and aircrew using the NHT. Being able to incorporate specificity of training to our students and accommodating their aircraft platform equipment will increase the fleet relevance and quality of training we're able to provide," said Lt. Cmdr. Miles A. Erwin, ASTC director at Whidbey Island. "The fleet personnel aware of the NHT but who haven't yet experienced the trainer are eager to experience the updated training and appreciate the advancements to their survival training."

The Navy previously used low pressure chambers for hypoxia awareness, but those chambers were considered high risk to aircrew long-term health.

"The chambers put extreme stress on the body and caused some aviators to experience ruptured sinuses, forcing them to be grounded for months," said Cmdr. Andrew Hayes, NASTP team lead. "Barotrauma, decompression sickness and ruptured eardrums along with structural integrity issues became the catalyst to decommission our chambers."

The NHT allows students to experience the symptoms of hypoxia, but not through the use of low pressure. The pressure they experience is equal to that at sea level. The trainer uses a nitrogen generation system that removes a portion of the oxygen from ambient air and then filters the nitrogen-enriched air that is delivered to the training enclosure, causing the aircrew to experience hypoxia without subjecting them to dangerous low pressure.

"The NASTP team pulled together and fielded this groundbreaking training device in just two years," said Capt. Lisa Sullivan, program manager. "With the installation of the last NHT at Whidbey Island, there are now eight NHT devices installed at ASTCs across the United States. The NHT is government designed, built, and installed and is revolutionizing how we safely train aircrew."

Written by Lindsey Frisco, Communication Specialist with PEO(CS) Public Affairs.

U.S. Navy photo

The Naval Aviation Training Systems and Ranges Program Office's Naval Aviation Survival Training Program (NASTP) installed the eighth and final hypoxia trainer at the Aviation Survival Training Center (ASTC) located at Whidbey Island, Wash., in April. Whidbey Island ASTC staff conduct initial training on the final NHT installed by the team.

The Broad Area Maritime Surveillance Demonstrator (BAMS-D) returned from Fifth Fleet to Naval Air Station Patuxent River, Md., June 17 after accruing more than 42,500 flight hours and over 2,000 oversea missions during a 13-year deployment.

Photo courtesy of Northrop Grumman Corporation

BAMS-D Unmanned Aircraft Returns After Long Deployment

PATUXENT RIVER, Md.—The Navy's Broad Area Maritime Surveillance Demonstrator (BAMS-D) returned June 17 from Fifth Fleet to its home base at Naval Air Station Patuxent River, Maryland, marking the end of a 13-year deployment that was originally intended to be just six months.

The unmanned aircraft landed at Pax River shortly after 2 p.m. where the dedicated BAMS-D team of military, civilian and contractor personnel welcomed its arrival.

In 2009, the Navy deployed BAMS-D—a maritime variant of the Air Force Global Hawk—for a six-month concept demonstration in Fifth Fleet, but as demand overseas increased its mission was extended year after year. BAMS-D provided more than 50 percent of maritime intelligence, surveillance and reconnaissance (ISR) in theater, accruing over 42,500 flight hours in 2,069 overseas missions.

"BAMS-D has been a singular force multiplier for Fifth Fleet and U.S. Central Command and has provided invaluable insights into the use of unmanned air systems as part of an overall concept of operations for naval ISR," said Dave Seagle, BAMS-D deputy program manager.

Seagle, who has led the program since its inception, and his team at Pax River supported fleet operational requirements in theater while concurrently providing training and testing capabilities at Pax River.

By 2013, BAMS-D had ramped up its capabilities to 15, 24-hour missions every month, supplementing its first deployed aircraft with a second aircraft. Through the next nine years, BAMS-D provided uninterrupted operations and collected almost 1.4 million ISR scenes, highlighted over 11,500 targets of interest and provided the fleet with over 15,000 tactical reports, becoming an indispensable asset for the warfighter. One of many notable achievements occurred as recently as August 2021 when BAMS-D provided ISR coverage to non-combatant evacuation operations during the U.S. drawdown in Afghanistan, Seagle said.

"Despite the aging of the system and limited spares available, BAMS-D's incredible operations and maintenance team achieved an overall mission availability rate of 96 percent, with more than 94 percent of scheduled missions completed," said Seagle.

MQ-4C Triton is the Navy's newest UAS platform that provides the fleet with a high-altitude, long-endurance system in the maritime domain. It is currently being upgraded with a multi-intelligence capability that is expected to be fielded next year.

From the Persistent Maritime Unmanned Aircraft Systems program office public affairs.

Navy Holds UAS Wide-Area Mission Demonstration

PATUXENT RIVER, Md.—The Navy recently completed an Unmanned Aircraft System (UAS) wide-area mission demonstration to assess capabilities that could benefit the fleet in the future.

The Navy and Marine Corps Small Tactical UAS program office, Naval Air Warfare Center Aircraft Division (NAWCAD) AIRWorks and Navy Warfare Development Command (NWDC) led the sea-based demonstration July 11-15 aboard USS Paul Hamilton (DDG-60) in San Diego, California.

Two vendors, Insitu Inc. and L3 Harris, showcased multiple technologies designed to operate as a portable system in challenging conditions while providing the same wide-area coverage as a shore-based system.

"This event was a great opportunity to evaluate unmanned capability in a relevant environment, learn how it can support and enhance operations, and get direct feedback from the fleet," said Col. Victor Argobright, program manager. "A lot of work was done in a short time across the enterprise to make this happen."

Earlier this year, the program office and AIRWorks teamed up in collaboration with Innovation and Modernization Patuxent River (IMPAX), the NAWCAD partner for experimentation, technology demonstrations, and prototyping, and with NWDC's Fleet Experimentation (FLEX) team to identify and examine a UAS capable of performing wide-area missions from a Navy surface vessel at long ranges for extended periods while relaying accurate, relevant information back to the host vessel.

The team selected the vendors to participate in the demonstration based on their ability to provide a system able to operate without additional support systems, deploy without dedicated launch or recovery equipment, and have maximum portability, self-sufficiency, and modularity across UAS hardware and payloads.

"The USS Paul Hamilton team was pleased to be a part of this demonstration," said Cmdr. Jake Ferrari, the ship's commanding officer. "To see the energy put behind providing capabilities associated with UAS aboard surface vessels is exciting. I look forward to future efforts that will provide an enduring fleet capability that is integrated into sustained operations."

The systems demonstrated wide-area surveillance capability across multiple mission sets. The government will review data gathered during the demonstration to further evaluate each system's performance.

"Both vendors stepped up to the challenge and the crew of the USS Paul Hamilton provided outstanding support and feedback," Argobright said. "It's teamwork like this that's needed to get capability in the hand of sailors as quickly as possible. We will be leveraging this effort and working with Navy leadership on the next steps to make this happen."

As part of a multi-phased merit-based selection process, the demonstration may lead to Insitu or L3 Harris being awarded an Other Transaction Authority (OTA) prototype project later this year. OTAs are used by the DoD to carry out prototype, research and production projects.

From the Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office.

U.S. Navy photos

The Navy conducts a demonstration aboard USS Paul Hamilton (DDG-60) July 12 to identify and examine Unmanned Air Systems (UAS) capable of wide-area missions from a Navy vessel at long ranges for extended periods while sending information back to the vessel.

New Mine Countermeasure Prototype Successfully Tested on MQ-8C Fire Scout

U.S. Navy photos

MQ-8C Fire Scout demonstrates a new mine countermeasure (MCM) prototype technology in May at Eglin Air Force Base, Florida, proving a capability that could allow the warfighter to rapidly detect and respond to threats.

PATUXENT RIVER, Md.—The Navy recently demonstrated a mine countermeasure (MCM) prototype technology aboard the MQ-8C Fire Scout Unmanned Air System (UAS) at Eglin Air Force Base, Florida, proving a capability that could allow the warfighter to rapidly detect and respond to threats.

The objective of the demonstration was to gather performance data for both the MQ-8C Fire Scout and Single-system Multi-mission Airborne Mine Detection (SMAMD) System to inform future MCM integration efforts.

"The team successfully demonstrated that the prototype SMAMD System effectively operates as designed aboard the MQ-8C Fire Scout unmanned helicopter in relevant real world environments," said Capt. Thomas Lansley, Fire Scout program director. "This cutting-edge technology could really enhance Fire Scout's capability going forward."

The team conducted operations from the Naval Surface Warfare Center utilizing drifting, tethered and moored mines throughout beach zone to deep waters. They gathered data day and night, across all water depths and in mild to difficult weather conditions.

The demonstration also proved the reliable and repeatable high performance of the MQ-8C Fire Scout. The air vehicle handled the dual podded system with ease, being the first MCM capability flown on the MQ-8C as well as the heaviest payload carried to date. Fire Scout successfully operated in restricted and unrestricted air space alongside other aircraft platforms.

The SMAMD System, developed by BAE Systems under a Future Naval Capability Program sponsored by the Office of Naval Research (ONR), is an airborne optical sensor suite that, in a single pass, detects and localizes mines and obstacles on land and at sea. With a low false-alarm rate, SMAMD provides real-time detection sent via data link enabling warfighters to respond much quicker to threats than the current MCM technologies allow as post-mission analysis is required.

This effort, led by ONR, included support from multiple organizations across the Navy and industry including the MQ-8 Fire Scout program office, the Program Executive Office Unmanned and Small Combatants (PEO USC), Naval Air Warfare Center Aircraft Division (NAWCAD), Aircraft Prototype Systems Division, Webster

MQ-8C Fire Scout gathers performance data during a mine countermeasure (MCM) prototype technology demonstration in May at Eglin Air Force Base, Florida.

Outlying Field, St. Inigoes, Maryland, the Digital Analytics Infrastructure and Technology Advancement Group Prototyping, Instrumentation and Experimentation Department, and Air Test and Evaluation Squadron (UX) 24.

ONR and program office engaged NAWCAD AIRWorks to manage the demonstration taking advantage of AIRWorks' project execution expertise and ability to connect warfare center resources.

airworthiness and cyber certifications, design, fabrication and hardware integration along with flying qualities testing prior to the final demonstration at Eglin, she said. They assured close coordination between the U.S. Air Force, ONR, Naval Air Systems Command, Naval Sea Systems Command and other stakeholder organizations to successfully achieve their objectives in less than 24 months and at a reduced cost.

AIRWorks is NAWCAD's office focused on rapidly and effectively delivering fast, affordable, quality solutions to meet immediate and emergent warfighter needs working with government and industry partners to deliver services including aircraft modification, prototyping, additive manufacturing, system integration, sustainment, intelligence, surveillance, reconnaissance and rapid contracting.

"Throughout the project, the team facilitated execution of a complex demonstration including airworthiness and cyber certifications, design, fabrication and hardware integration along with flying qualities testing prior to the final demonstration at Eglin."

"The AIRWorks SMAMD Team was proud to be a part of demonstrating a future naval capability which provides real-time threat detection to the warfighter," said AIRWorks' project lead Kristina Hewitt-Thompson. "Through this effort, we were able to assist in risk reduction and provide critical data for future integration."

Throughout the project, the team facilitated execution of a complex demonstration including

From the Multi-Mission Tactical Unmanned Aerial Systems (UAS) Program Office.

First Small Unmanned Aircraft Systems Training Facility Opens

PATUXENT RIVER, Md.—The Navy opened a new facility July 27 at Joint Expeditionary Base (JEB) Little Creek-Fort Story in Virginia Beach, Virginia, that's dedicated to training Sailors who will operate the service's Family of Small Unmanned Aircraft Systems (FoSUAS).

The facility, known as Training and Logistics Support Activity (TALSA) East, is the first dedicated Navy facility for unmanned aircraft operators to complete SUAS training.

Previously, Naval SUAS operators received training directly from the original equipment manufacturer, through contractor-lead training, or at one of the four Marine Corps TALSAs when seats were available.

"Navy UAS training takes a leap forward today with the opening of this first-of-its-kind facility," said Marine Corps Col. Victor Argobright, program manager for the Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office, whose team will manage training at TALSA East. "Our FoSUAS team has been working diligently for nearly two years to provide high-quality training and certifications to our Navy personnel."

The TALSA is a central location for scheduling and formal entry-level SUAS courses that provide Initial Qualification Training for systems currently in use by the operating forces. It also supports centralized storage of unit systems, supply, and maintenance services.

Scheduling at Navy TALSA East is flexible and tailored to student requirements. The first official course in the new facility began Aug. 8 for SkyRaider R80D.

"Being the first-of-its-kind, SUAS facility dedicated to training and logistics is a force multiplier for our Navy and Marine Corps," said Navy Capt. Michael Witherspoon, JEB Little Creek-Fort Story commanding officer. "This could not have been possible without the close coordination and collaboration of the program office, JEB Little Creek-Fort Story Public Works, the renovation team and the trainers here onboard the installation."

Navy TALSA East currently supports training for the vertical take-off and landing SkyRaider R80D, Skydio X2D and PD-100 Black Hornet 3. The Naval Expeditionary Combat Command will join the Naval Special Warfare community in fiscal year 2023 to also utilize the training and logistics support that the TALSA provides.

From the Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office.

U.S. Navy photo

Col. Victor Argobright, Navy and Marine Corps Small Tactical Unmanned Aircraft Systems program manager, officially opens the Navy Training and Logistics Support Activity East July 27 at Joint Expeditionary Base Little Creek-Fort Story in Virginia Beach Va. From right to left, he is joined by Frank Ball, director of operations, Air/Ground Systems Engineering Amentum; JEBLCFS Commanding Officer Capt. Michael Witherspoon, and Lee Hess Jr., Navy TALSA East project manager.

U.S. Marine Corps photo by Lance Cpl. Gavin T. Umboh

U.S. Marines with Marine Air Control Squadron 2 monitor simulated aircraft communications during exercise MISTEX-20 at Marine Corps Air Station Cherry Point, North Carolina, July 2020. During the exercise, Marines practiced setting up communication between squadrons in Marine Air Control Group 28 while also exercising aircraft control skills necessary for successful combat flights in an expeditionary setting.

Marine Wing Support Squadrons Realign Under MACG-28 in Support of Force Design 2030

CHERRY POINT, N.C.—Marine Air Control Group (MACG) 28 assumed command June 1 of all three Marine Wing Support Squadrons assigned to 2nd Marine Aircraft Wing (2nd MAW) to modernize and enhance capabilities in support of the commandant of the Marine Corps' Force Design 2030.

The realignment unites aviation command and control and ground support functions under a single group headquarters within 2nd MAW.

The innovative realignment is an independent 2nd MAW action, occurring in parallel with similar efforts within 2nd MAW, and aligned with Force Design 2030 aviation-ground support initiatives. MACG-28 is the first operational command to merge AC2GS mission units under a single commander.

"We have significantly diversified the composition of the group in terms of the [military occupational specialties] that are now resident here, and the missions that we are going to be expected to execute," said Col. Michael McCarthy, MACG-28 commanding officer. "Frankly, this is the biggest change this group has seen in its command relationships and command organization in its 79-year history, so this is a really big deal for us."

The consolidation will increase AC2GS capabilities across 2nd MAW and II Marine Expeditionary Force, enhance unity of command, and sustain relationships between Marine Aircraft Groups and the geographically co-located MWSS units. The MWSSs and geographically co-located Marine air command and control system units will also implement mutual-support relationships that will allow both unit types to capitalize on the unique command-and-control and enabler capabilities of the other.

The realignment will also enhance operational design in the Indo-Pacific region, will inform institutional change, and will advance Force Design 2030.

"It's an exciting time for all the aviation expeditionary enablers internal to MACG-28, and we're excited to get after this on behalf of the [commanding general] and continue to provide world-class air command-and-control support and world-class aviation-ground support to 'America's Air Wing,'" McCarthy said.

MACG-28 now consists of three MWSS, three aviation command-and-control squadrons, a low-altitude air-defense battalion, and a communication squadron.

Written by 1st Lt. Gabriela Mogollan, 2nd Marine Aircraft Wing.

4th MAW Marine Becomes Marine Corps' First C-40A Clipper Crew Chief

U.S Marine Corps photo by Sgt. Justin Bell

U.S. Marine Corps Staff Sgt. Lauren Song, a C-40A Clipper crew chief with Marine Transport Squadron 1, Marine Aircraft Group 41, Marine Forces Reserve, reviews training publications while conducting preventative maintenance on a C-40A Clipper at Naval Air Station Joint Reserve Base Fort Worth, Texas.

NAVAL AIR STATION JOINT RESERVE BASE FORT WORTH, Texas—Staff Sgt. Lauren Song joined the Marine Corps do something more with her life and has surpassed that goal by now serving as the first crew chief for the C-40A Clipper.

Song is currently stationed with Marine Transport Squadron (VMR) 1, Marine Aircraft Group (MAG) 41, Marine Forces Reserve, in Fort Worth, Texas.

"A C-40 is a [Boeing] 737 that's been converted to have a cargo door on the side of it so we can load and unload pallets of cargo in addition to passengers," Song said.

The Marine Corps placed an order for two C-40A aircraft in 2018 and assigned its personnel with VMR-1 to work with Navy C-40s with Fleet Logistics Support Squadron (VR) 59, resulting in Song being one of the first Marines to be a fully certified loadmaster on the airframe. The C-40 is envisioned to provide strategic lift capabilities organic to the Marine Corps, capable of transporting personnel and cargo farther and faster than any other aircraft currently with the service.

Song joined the Marine Corps in October 2015, eventually being assigned to Marine Aerial Refueler Squadron (VMGR) 234 after completion of her military occupational specialty (MOS) training. While with VMGR-234, she served as a KC-130J Super Hercules loadmaster. During her time as a KC-130J loadmaster, she was awarded the humanitarian service medal and the sea service deployment ribbon with a bronze star in lieu of second award.

"I got started as a C-40 crew chief when I was stationed with VMGR-234 and the previous commanding officer of VMR-1 was a C-130 pilot, so he would train with us while VMR-1 didn't have any aircraft," Song said. "He told me, 'Hey, we're looking for some good Marines to get started on the C-40 program,' and I said, 'Sign me up!'"

Song was sent back into the training pipeline with two other Marines from her unit, but training flights ended up working in her favor, granting her the privilege of being the first ever C-40A crew chief in the Marine Corps.

Song's command opted to submit her name for the Marine Corps Aviation Association's Danny L. Radish award, established in honor of Master Gunnery Sgt. Danny L. Radish, who served as a Marine Aviator for more than 23 years. The award seeks to recognize outstanding contributions to Marine Aviation by enlisted aircrew members.

Song was instrumental in developing the doctrinal products, processes and programs for VMR-1, writing multiple chapters of the Marine Corps' first C-40A training and readiness manual, according to her submission for the Danny L. Radish award.

"It's really a pretty cool experience being able to be the first in anything in the Marine Corps. But specifically like the C-40s, we've never done this," she said. "The last time we had a similar aircraft was the C-9 that shut down in 2017. So just us getting our feet under ourselves and learning how to work with the Navy and learning a completely new aircraft was a challenge that I really enjoyed."

As a female Marine, Song is no stranger to challenge.

"I figured the Marine Corps would be the biggest challenge out of all the branches and it has not disappointed in that aspect," Song said. "But I've enjoyed it so far."

Female Marines make up 8.9 percent of the active duty Marine Corps and just 4.3 percent of the Select Marine Corps Reserve, branding them the title, "The Fewer, The Prouder."

Gender diversity has been a long-standing issue in the Marine Corps but the service has taken strides to close the gap between genders. Female Marines were permitted to serve in combat MOSs starting in 2016, including the admission of women into the infantry community, a once male-only occupational field.

"We are Marines. We all earned that title out of boot camp," Song said. "I don't feel any different than my male counterparts. We are all pushing to get to the same angle and end state. We're all Marines at the end of the day."

Written by Cpl. Brendan Mullin, Marine Forces Reserve.

An AV-8B Harrier and an F-35B Lightning II are staged during the change of command and redesignation ceremony for Marine Fighter Attack Squadron (VMFA) 214 onboard Marine Corps Air Station Yuma, Arizona, March 2022.

U.S. Marine Corps photo by Sgt. Samuel Ruiz

Marine Attack Squadron 214 Transitions to the F-35B

MARINE CORPS AIR STATION YUMA, Ariz.—Marine Attack Squadron (VMA) 214, Marine Aircraft Group (MAG) 13, 3rd Marine Aircraft Wing (MAW), conducted a re-designation ceremony March 25 at Marine Corps Air Station (MCAS) Yuma, Arizona.

As part of the transition from the AV-8B Harrier to the F-35B Lightning II, VMA-214 was re-designated as Marine Fighter Attack Squadron (VMFA) 214. The F-35B Lightning II is replacing the AV-8B Harrier to introduce unmatched capabilities to the Marine Corps. The F-35B Lightning II represents a leap forward in air dominance by providing the operational agility and tactical supremacy Marines need to provide expeditious and lethal support.

"Having previously served in VMA-214 and flown the AV-8B for many years, the 'Black Sheep' and the Harrier hold a special place in my heart," said U.S. Marine Corps Maj. Gen. Bradford J. Gering, the commanding general of 3rd MAW. "As 3rd MAW says a bittersweet farewell to the Harrier, we are excited to increase our number of F-35B squadrons with the re-designation of VMFA-214."

VMA-214 was initially commissioned as Marine Fighter Squadron (VMF) 214 on July 1, 1942, on Oahu, Hawaii, flying the F4F Wildcat before transitioning to the F4U-1 Corsair. The squadron completed two combat tours under the previous call sign "Swashbucklers" before reforming as the "Black Sheep" under the leadership of U.S. Marine Corps Major Gregory "Pappy" Boyington in August 1943.

The Marines of VMF-214 selected the new squadron namesake to highlight the pilots' varied experience levels. From seasoned veterans with multiple combat tours under their wings to pilots fresh from flight school, the Black Sheep built their legacy from years of arduous fighting in World War II. As a result of their accomplishments, VMF-214 became the first Marine fighter squadron awarded the Presidential Unit Citation for extraordinary heroism in action.

On July 9, 1957, the squadron was re-designated VMA-214 as the Black Sheep transitioned to flying fixed-wing attack aircraft. In Vietnam, the Marines of VMA-214 distinguished themselves as an attack squadron, flying the trustworthy A-4 Skyhawk from expeditionary airfields in Chu Lai. The Black Sheep continued to fly the A-4 until 1989, when they transitioned to the AV-8B Harrier. Over the next 30 years, the Black Sheep participated in combat operations throughout the globe, including Operation Restore Hope, Operation Iraqi Freedom and Operation Enduring Freedom. Most recently, VMA-214 completed its final AV-8B deployment with the 11th Marine Expeditionary Unit, during which they participated in Operation Inherent Resolve.

"The re-designation of VMA-214 to VMFA-214 is the end of a legacy for the Black Sheep and Marine Aircraft Group-13," said U.S. Marine Corps Lt. Col. Keith Bucklew, the outgoing commander of VMA-214. "This symbolic event finalizes the sundown for Harriers on the West Coast and closes the chapter on 58 years of attack aircraft operations for the Black Sheep.

"Finishing this mission with a successful 11th Marine Expeditionary Unit deployment is a testament to the viability and performance of the Harrier over the last 33 years and, more importantly, the talent of the Marines who managed them," Bucklew said. "The AV-8B will be missed in the skies of Yuma, but it is time to transition to the next generation of fighter attack aircraft."

"The F-35's fifth-generation strike fighter capability brings more lethality and flexibility to combatant commanders than any other fighter platform," said U.S. Marine Corps Lt. Col. Christopher Kelly, the commanding officer of VMFA-214. "The STOVL capability inherent in the F-35B variant allows the Marine Corps to operate expeditiously and from remote locations, making the model uniquely qualified at supporting expeditionary advanced base operations."

3rd MAW continues to "Fix, Fly and Fight" as the Marine Corps' largest aircraft wing and remains combat-ready, deployable on short notice, and lethal when called into action.

Written by 1st Lt. Zachary Bodner and Lance Cpl. Courtney Robertson, 3rd Marine Aircraft Wing Public Affairs.

Marine Corps Declares IOC for CH-53K King Stallion

WASHINGTON, D.C.—Deputy Commandant for Aviation Lt. Gen. Mark Wise announced the Marine Corps has achieved initial operational capability in the CH-53K King Stallion on April 22. This plan supports Gen. David H. Berger's Force Design 2030 by improving capabilities and restructuring Marine Corps aviation for the future fight.

In addition to meeting IOC criteria, the CH-53K successfully completed a thorough initial operational test and evaluation period that resulted in more than 3,000 mishap free hours flown in various challenging environments and terrain.

"My full confidence in the CH-53K's ability to execute the heavy lift mission is the result of successful developmental and operational testing conducted by Air Test and Evaluation Squadron (HX) 21 and Marine Operational Test and Evaluation Squadron (VMX) 1" Wise said.

The CH-53K is an optimized vertical, heavy lift, sea-based, long-range solution for the naval force and will immediately provide nearly three times the lift capability of the CH-53E Sea Stallion, with the ability to transport 100 percent of the vertical Marine Air-Ground Task Force (MAGTF). Per the Commandant's Force Design 2030 Annual Update, the CH-53K will complement connectors that will enable littoral maneuver and provide logistical support to a widely disaggregated naval force.

"The success to date of the CH-53K is a reflection of the hard work and effort by the Marines, sailors, and civilians at VMX-1, H-53 Program Office and Marine Heavy Helicopter Squadron (HMH) 461, and the support we have received over many years from across the Department of the Navy and our industry partners," Wise said.

The King Stallion boasts an engine that produces 57 percent more horsepower with 63 percent fewer parts relative to its predecessor, which translates to an expanded capability to deliver internal and external cargo loads, providing the commander a mobility and sustainment capability the MAGTF has never had before.

The most notable attribute of the King Stallion is its ability to maintain increased performance margins in a degraded aeronautical environment—for example at higher altitudes, hotter climates and carrying up to 27,000 lbs. out to 110 nautical miles—whereas, the CH-53E would be limited to a 9,628-pound external load in the same environment.

The Marine Corps plans to deploy the first CH-53K Marine Expeditionary Unit (MEU) detachment in fiscal year 2024, setting the initial conditions for sustained CH-53K deployments in support of MEUs.

Written by Maj. Jorge Hernandez, Communication Directorate, U.S. Marine Corps.

U.S. Navy photo

U.S. Marines with Marine Heavy Helicopter Squadron (HMH) 461 taxi in a CH-53K King Stallion after its first operational flight at Marine Corps Air Station New River, North Carolina, April 2022.

First Flight Test of Mission Computer Alternative on T-45 Successful

PATUXENT RIVER, Md.—The Navy's Air Combat Electronics program office recently completed the first test flight of the T-45 Goshawk trainer aircraft's Mission Computer Alternative (MCA), which is intended to improve readiness for the legacy system.

The program office collaborated with the Naval Undergraduate Flight Training Systems program office, which manages the T-45 aircraft, and Air Test Evaluation Squadron (VX) 23 to execute the March 30 flight at Naval Air Station Patuxent River, Maryland, and test out the design replacement for the existing Mission Display Processor.

"The flight was flown successfully, proving MCA is on the right track," said Lt. Alex Mensing, VX-23 test pilot. "We know what needs to be improved and will continue to work together to bring an accurate and reliable system to the fleet."

Naval Undergraduate Flight Training Systems program office sought out MCA as a mission computing solution primarily to address the potential obsolescence issues the Navy may face on an aging platform. They plan to leverage the MCA to support additional capabilities such as required navigation performance/area navigation (RNP/RNAV).

The MCA is a Hardware Open Systems Technologies (HOST) conforming mission computer that drastically reduces schedule for regular hardware and software updates associated with mission computing. It can be economically and rapidly adapted to support platform requirements and processing needs. The system is on track to provide RNP/RNAV in the near future.

"The Navy developed this mission computer technology using [Open Architectures] standards, bringing the government one step closer to getting much needed capabilities and functionality to the fleet cheaper and faster," said Capt. Margaret Wilson, Air Combat Electronics program manager.

The Navy will leverage investments made during the MCA's development to support and minimize development cost of future MCA iterations, and lower the hardware and software logistics lifecycle funding footprint by using common, commercial-off-the-shelf hardware and software development designed to OA standards.

"We are very excited to be leading the way in bringing OA standards to the warfighter with the MCA," said Jeff Williamson, the program office's common mission computers team lead. "This technology will enable accelerating new capabilities to the fleet, at reduced cost, while paving the way for it to be employed in the Naval Aviation systems that our warfighters already have."

From the Air Combat Electronics Program Office.

U.S. Navy photo

The Navy's Air Combat Electronics Program Office successfully completed first flight test of the Mission Computer Alternative (MCA) in a T-45 at Naval Air Station Patuxent River, Md., on March 30. Pictured are team members, from left: Bill Brown, Michael Kay, Jason Bean, Jeff Boyce, Kelly Pruitt, Jeff Williamson, Brandon Patz, Richard Boecher and Tom Adams.

U.S. Navy photo by MC2 Zane Ecklund

A CH-53 Super Stallion helicopter from Marine Medium Tiltrotor Squadron (VMM) 261 (REIN) takes off from the flight deck of the amphibious transport dock ship USS New York (LPD 21).

Engine Air Starter Reaches Wholesale Material Availability for First Time in Four Years

PHILADELPHIA, Pa.—Naval Supply Systems Command Weapon Systems Support's (NAVSUP WSS) H-53 Integrated Weapon Support Team (IWST) achieved a significant milestone by placing 39 "A" condition engine air starters in wholesale for the first time since 2018. As a result, the H-53 community is currently seeing record readiness rates, averaging 68 mission-capable aircraft.

The IWST reduced a backlog of 169 backorders, including 80 Inventory Priority Group 1 backorders, to zero and was further able to stock 39 'A' condition assets in wholesale in March. 'A' condition means the material is new or repaired and ready for use by the fleet.

NAVSUP WSS worked with Eaton, the original equipment manufacturer, Naval Air Systems Command (NAVAIR) and Fleet Readiness Center East (FRCE) in order to support this effort.

The IWST began engaging Eaton in February 2019 regarding the re-establishment of manufacturing capabilities for this asset.

"Through the partnership, Eaton was able to facilitate a cold production line restart of spares to support the flight line as repairs were carcass constrained," said Marc Diaz, NAVSUP WSS H-53 IWST deputy director.

This allowed for the generation of new spares, repairs and upgrades of other configurations.

This engine air starters received a high-level of attention and involved a monthly sync with leadership to discuss the initiative.

"At the high point of backorders, the commander of NAVSUP WSS was heavily involved. It is a true testament to the success of the team to have 'A' condition assets on the wholesale shelf today," said Maj. Emilie Monaghan, NAVSUP WSS H-53 IWST director.

There were multiple challenges associated with the engine air starters which compounded repair efforts for a long time. There were multiple piece part inhibitors for repairs, configuration challenges, and test bench bottlenecks.

"The different configurations of the engine air starter are interchangeable, but the piece parts for the two styles are completely different," Monaghan said.

This led to difficulties in fixing the different configurations at FRCE, leading NAVSUP WSS to seek out Eaton to stand up as not only a second repair source but also the source for difficult to procure piece parts.

"We are currently engaged with both Eaton and FRCE to align goals under a public private partnership, which Eaton would directly contract with FRCE for future support, thus eliminating competition on piece part support," Diaz said.

Additionally, Eaton has been able to work with NAVAIR engineers on their new repair manuals. Thus, aligning both Eaton and FRCE's repair procedures.

"The goal of this partnership is to improve piece part availability and continue to keep our naval forces mission ready," said Ashley Steffney, NAVSUP WSS propulsion lead.

Written by Tristan Pavlik, NAVSUP Weapon Systems Support Public Affairs.

From Flight Line to Museum Display

PATUXENT RIVER, Md.—The Tactical Airlift Program Office coordinated the donation and delivery of a full-sized C-130 training cockpit to the Patuxent River Naval Air Museum.

The cockpit, a Navy C-130 Communications/Navigation /Instrumentation (CNI) candidate training device was initially part of the Navy's C-130T Avionics Obsolescence Upgrade program. Transferred to Naval Air Station Patuxent River, Maryland, from Fort Worth, Texas, in 2012, it had served a number of demonstration and engineering purposes until it was stripped of all internal equipment, wrapped in white shrink-wrap and preserved awaiting modernization. In October 2021, the Navy restructured its C-130T upgrade program and the trainer cockpit was no longer required. Tactical Airlift Program Office team members obtained permission to donate the massive piece of equipment to the Patuxent River Air Museum and the item was towed to the museum on April 10 to begin its next adventure.

"It was quite a sight to see the cockpit roll down the taxiway and then out Gate 1," said Zac Bongianino, C/KC-130T avionics integrated program team lead. "I hope that in the near future, aviation fans will get a chance to experience what it is like to sit in a C-130 cockpit when they visit the museum. Thank you to everyone who helped to make this happen."

U.S. Navy photo

A massive, Navy C-130 Communications/Navigation /Instrumentation (CNI) candidate training device is towed to the Patuxent River Naval Air Museum, Md., April 10.

Photo courtesy of Northrop Grumman Corporation

The first E-6B lands in Lake Charles. The aircraft will undergo a Block II upgrade consisting of six modifications to improve the aircraft's command, control and communications functions connecting the National Command Authority with U.S. strategic and non-strategic forces.

First E-6B Inducted Under New Maintenance Contract

PATUXENT RIVER, Md.—The first E-6B Mercury arrived in May at Northrop Grumman Corporation's Aircraft Maintenance and Fabrication Center in Lake Charles, Louisiana, for Block II modification.

The work is part of an Integrated Modification and Maintenance Contract (IMMC) awarded in February, which focuses on fielding improved airborne strategic communications sooner.

"This is an important event because it's the first time a single company will be responsible for executing the entire installation," said Bob Stailey, Airborne Strategic Command, Control, and Communications Program Office E-6B deputy program manager. "NGC Lake Charles built an integrated modification schedule that implements efficiencies and lessons learned from previous efforts."

The Block II upgrade consists of six modifications to improve the aircraft's command, control and communications functions connecting the National Command Authority with U.S. strategic and non-strategic forces.

The previous modification contract was executed by two separate commercial activities and one organic activity with a 19-month average turnaround time. With this new IMMC, the team anticipates ultimately achieving a six-month modification turnaround timeline.

"This contract streamlines how we are fielding our capability upgrades," Stailey said. "We are fully engaged with the fleet and our partners as we reduce the time required for aircraft modifications."

Driving toward the timeline reduction goal has been a team effort with partnership between the program, Naval Air Warfare Center Aircraft Division, Fleet Readiness Center Southeast, Defense Contract Management Agency, Strategic Communications Wing One (SCW-1), Fleet Air Reconnaissance Squadron 4, Navy liaison officers and program representative's onsite in Lake Charles.

"I'm very proud of the entire team and all the work they've done to get to this point," said Capt. Adam Scott, program manager. "It's taken a big effort and they are constantly looking for ways to identify and overcome any challenges."

Faster turnaround times with the upgrades will lead to more aircraft being available with increased capabilities for the warfighter.

"Our No. 1 priority is ensuring SCW-1 accomplishes its mission providing assured airborne strategic communications and that the President is always connected to his nuclear forces," Scott said.

The Airborne Strategic Command, Control, and Communications Program Office's mission is to deliver and support survivable, reliable, and endurable airborne command, control and communications for the President, Secretary of Defense and U.S. Strategic Command.

From the Airborne Strategic Command, Control, and Communications Program Office public affairs.

Grampaw Pettibone

Gramps from Yesteryear: May-June 2002

Illustration by Ted Wilbur

Breakdown in the Break

A student Naval Aviator launched in a T-45 Goshawk for his initial carrier qualification flight. He was number two in a flight of three. The weather at the carrier required a Case II recovery, so when the flight was cleared into the pattern the leader detached number three and descended with the student in number two on his wing.

The flight approached the break at 300 knots and 800 feet altitude. The leader detached the wingman and broke to the left for the upwind leg. Following a 17-second interval the student commenced his break and turned sharply to the left, reducing power. Approximately eight seconds later the student noticed a warning/caution tone with an associated master alert light. He checked the warning/caution panel and saw the fuel pressure caution light on. He turned off the master alert light and continued with his turn. He did not yet realize he had inadvertently shut down the T-45's engine.

A few seconds later there was another warning/caution tone with an associated master alert light. The student rolled wings level, checked the throttle position and engine switch on. He advanced the throttle and retracted the speed brake (which was extended when executing the break turn). Realizing he had flamed out, he tried an immediate air start approximately 45 seconds after the break. This failed. He tried a second relight but this also failed. At 125 feet, abeam the ship, with engine rpm approaching zero, he successfully ejected from the Goshawk. He was safely recovered but the T-45 was lost.

Grampaw Pettibone says...

Gotta be careful when making major throttle changes when you're down close to the wave tops—or the treetops, for that matter. All the sky above you is no help at all when the motor quits and you've only got a few hundred feet to play with. This student Naval Aviator simply closed the throttle too far during the break and didn't have the time or altitude to relight the engine. Also, seconds really count under such circumstances, so think ahead and execute relight procedures as quick as you can once you realize the engine has quit. Gramps is pleased that the student survived this close call.

Navy Engineers Make Helicopter

By Brittany Dickerson

Landing a helicopter in low visibility environments is one of the most difficult tasks in aviation for a rotary-wing pilot; add weather like fog, wind or worse and aircraft recovery can be dangerous.

The very team who brought naval tactical aviation Precision Landing Mode (PLM) has now set sights on advancing capability and operational readiness for pilots flying legacy rotorcraft across the DOD.

"Rotary-wing pilots flying newer rotorcraft like CH-53K have the benefit of augmented landing tech built in," said Naval Air Warfare Center Aircraft Division (NAWCAD) engineer Matthew Rhinehart. "But there are thousands of legacy helos across the DOD that don't—it's a safety challenge for which we've engineered a proven-successful solution."

Between 2000 and 2013, 26 Class A mishaps were attributed to degraded visuals in DOD aviation.

The engineering team is working on two prototype systems that will be integrated into aircraft to help pilots with landings. The first is the Adaptive Shipboard Guidance and Recovery Display (ASGaRD), a software system designed for pilots landing on ships at sea. The system integrates into cockpit displays to provide visual cues that allow pilots to make safer landings on pitching decks. Different from PLM, ASGaRD provides visual assistance only and does not interfere with a pilot's flight handling. Deploying the system is as simple as a software update making it an immediate solution for rotary pilots flying legacy aircraft.

The second prototype is the Low Speed Precision Control (LSPC), a software and hardware system that helps pilots make land-based landings in low-visibility environments with dust, sand or snow. The modular system also integrates into cockpits bolted to existing controls providing pilots with landing assistance through flight control and stability modification, similar to PLM. As LSPC includes a hardware component—essentially a metal box with a lever—the system requires additional logistics for installation.

Recently, the team demoed the systems in NAWCAD's Manned Flight Simulator, where Navy and Marine Corps test pilots suc-

Pilots' Most Dangerous Job Safer

cessfully approached and landed rotary aircraft like an MH-60S and CH-53E in zero-visibility conditions, an extremely dangerous task for rotary pilots today.

During the demonstrations, more than 10 developmental test pilots flew mission representative tasks in simulators—in this case with degraded visuals—both with and without the augmentation tech. The results were starkly different: the test team found the systems significantly reduced pilot workload and increased safety when landing in zero-visibility environments on virtual pitching decks at sea in fog, and amidst a dust cloud in a virtual desert.

"In the lab we monitored how hard the pilots worked and how much drift they experienced, which generally precedes a mishap or crash," Rhinehart said. "Pilots using the tech landed safely every single time—we're confidently reducing the workload and most importantly, improving their safety."

Both technologies target legacy aircraft including the H-60, CH-53, H-1 and V-22 aircraft. Pilots operating these aircraft would fly with both systems installed, with ASGaRD serving as an immediate solution as a simple software update.

"If NAWCAD's visual landing aids were fielded in aircraft like MH-60R/S or legacy aircraft like CH-53E today, fleet aviators would see a safe and successful recovery every single time," said NAWCAD engineer Jacques Hoffler.

ASGaRD is under development by Systems Technology Inc. in sponsorship by the Office of Naval Research and with support from NAVAIR. LSPC is a developmental initiative in partnership with AMERICAN SYSTEMS. Its initial design was funded by the H-53 Heavy Lift Helicopters Program Office. Both technologies require funding and adoption by a rotary-wing program to mature the capabilities to fleet deployment.

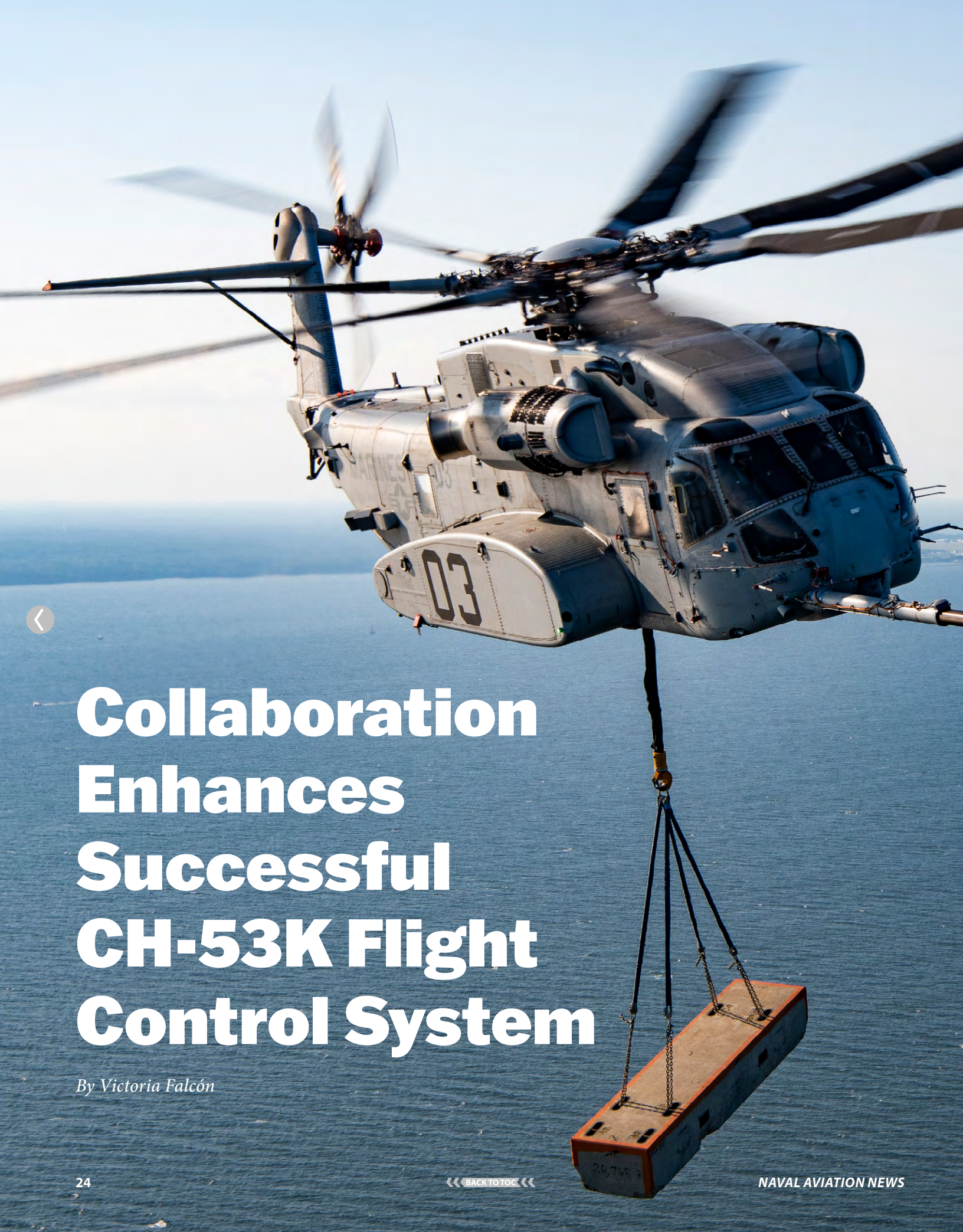
Brittany Dickerson is a public affairs specialist with Naval Air Warfare Center Aircraft Division.

A rotary pilot performs a shipboard-landing maneuver through fog in a simulated scenario at the Naval Air Warfare Center Aircraft Division's Manned Flight Simulator in Patuxent River, Md.

U.S. Navy photo by Theresa Thomas

Pilots, assigned to the "Blackjacks" of Helicopter Sea Combat Squadron (HSC) 21, prepare to hot seat a MH-60S Seahawk helicopter on the flight deck aboard Independence-variant littoral combat ship USS Charleston (LCS 18), during routine flight operations.

U.S. Navy photo by MC2 Ryan M. Breeden



Collaboration Enhances Successful CH-53K Flight Control System

By Victoria Falcón

A CH-53K prepares to receive fuel from a KC-130J while carrying a 27,000-pound external load during aerial refueling tests in late 2020.

U.S. Navy photo by Dane Wiedmann

A full authority digital fly-by-wire Flight Control System (FCS) is one of many impressive capabilities setting the CH-53K King Stallion heavy lift helicopter apart from any other heavy lift aircraft. "Full authority" means the FCS provides all of the aircraft motion—not just supplementing the pilot for stability.

A digital fly-by-wire FCS is an electronic flight control system teamed with a digital computer that replaces mechanical control systems in an aircraft. It makes the aircraft easier to handle in degraded visual environments at gross weights up to 88,000 pounds. The CH-53K is currently cleared to 27,000 pounds external lift but will eventually be cleared to 36,000 pounds.

"The CH-53E/D were much harder to fly," said retired Lt. Col. Lucas Frank, formerly of Marine Operational Test and Evaluation Squadron (VMX) 1. "And the ease of flying this, the flight control system is probably the biggest game changer for the 53 community. We're not used to anything like this."

The high performance of the FCS is a direct result of the ongoing collaboration and cooperation between subject matter experts within the Naval Air Systems Command (NAVAIR) Heavy Lift Helicopters Program Office, the Integrated Test Team (ITT), and the Flight Controls System design engineers from Sikorsky, a Lockheed Martin Company.

For pilots, the FCS provides more predictable and stable control responses to improve safety and mission effectiveness.

For maintainers, the FCS reduces complexity by eliminating conventional helicopter hardware like mixers, push-rods and tail rotor cables, while improving diagnostic capability and maintenance time.

For members of the CH-53K ITT, the most impressive FCS benefit is how it can be used to achieve future capabilities and quickly correct identified deficiencies.

The flight test program for the CH-53K uses four Engineering Development Model CH-53K aircraft. In these four test aircraft, the fly-by-wire FCS permits the use of adjustable parameters called Flight Test Variables (FTVs), giving the test team opportunities to improve the aircraft control characteristics.

"FTVs are an extremely powerful tool," said Craig Merriman, CH-53K assistant program manager for test. "It allows us to test design fixes on aircraft in between major software releases."

According to Merriman, this means the team can continually improve the FCS software. If an issue is identified in flight test, the FTVs can be adjusted within a preapproved range, providing the pilots an opportunity to evaluate the correction in the aircraft in the intended environment. These FTVs are then incorporated into the next major FCS software release.

A CH-53K King Stallion aircraft plugs a refueling drogue behind a KC-130J aerial refueling tanker during a test event over the Chesapeake Bay in 2021.

U.S. Navy photo by Dane Wiedmann

"With each major FCS software drop, the aircraft baseline performance markedly increases due to the incorporation of these verified FTVs," Merriman said.

The CH-53K FCS is a work in progress and a team effort. When issues were identified through flight test, which required a quick resolution, the whole team collaborated from sites in Florida, Maryland and Connecticut.

One example of the team's success was the correction of air data faults during aerial refueling. During initial aerial refueling testing on the CH-53K in 2018, the FCS showed faults due to the turbulent air data created by the tanker aircraft. The FCS air data computers were reading large pressure fluctuations causing the FCS to think the air data computers had failed.

"The use of FTVs has been key in resolving FCS deficiencies discovered during flight test and will be used to enhance the already successful fly-by-wire system as the CH-53K takes on additional capabilities in the future."

With the deficiency identified by the flight test team, the design engineers began developing FTVs and performing analysis. The FTVs were evaluated in the Flight Controls System Integration Lab (FCSIL), a Sikorsky-owned lab in Stratford, Connecticut, used by the ITT. The FCSIL is a CH-53K aircraft representative laboratory and simulator with triple redundancy—a flight representative control system. The facility is used to simulate aircraft behavior and evaluate the aircraft performance relative to new FTVs. The facility is also used to verify the safe load and unload of FTVs to the software.

Following the FCSIL testing, the NAVAIR Airworthiness group reviewed the analysis and granted approval to fly the FTVs. With this approval, the test team loaded the FTV on the aircraft. The fix was tested with no degradation, permitting the fleet aerial refueling operations which are in use today.

"It's a very intuitive flight control system," Frank said, "and it blends very well with the pilot and the computers. It allows you to override the computer. And then the second that you stop overriding it, the computer takes back over without any further pilot input. That's probably the biggest game changer for our community."

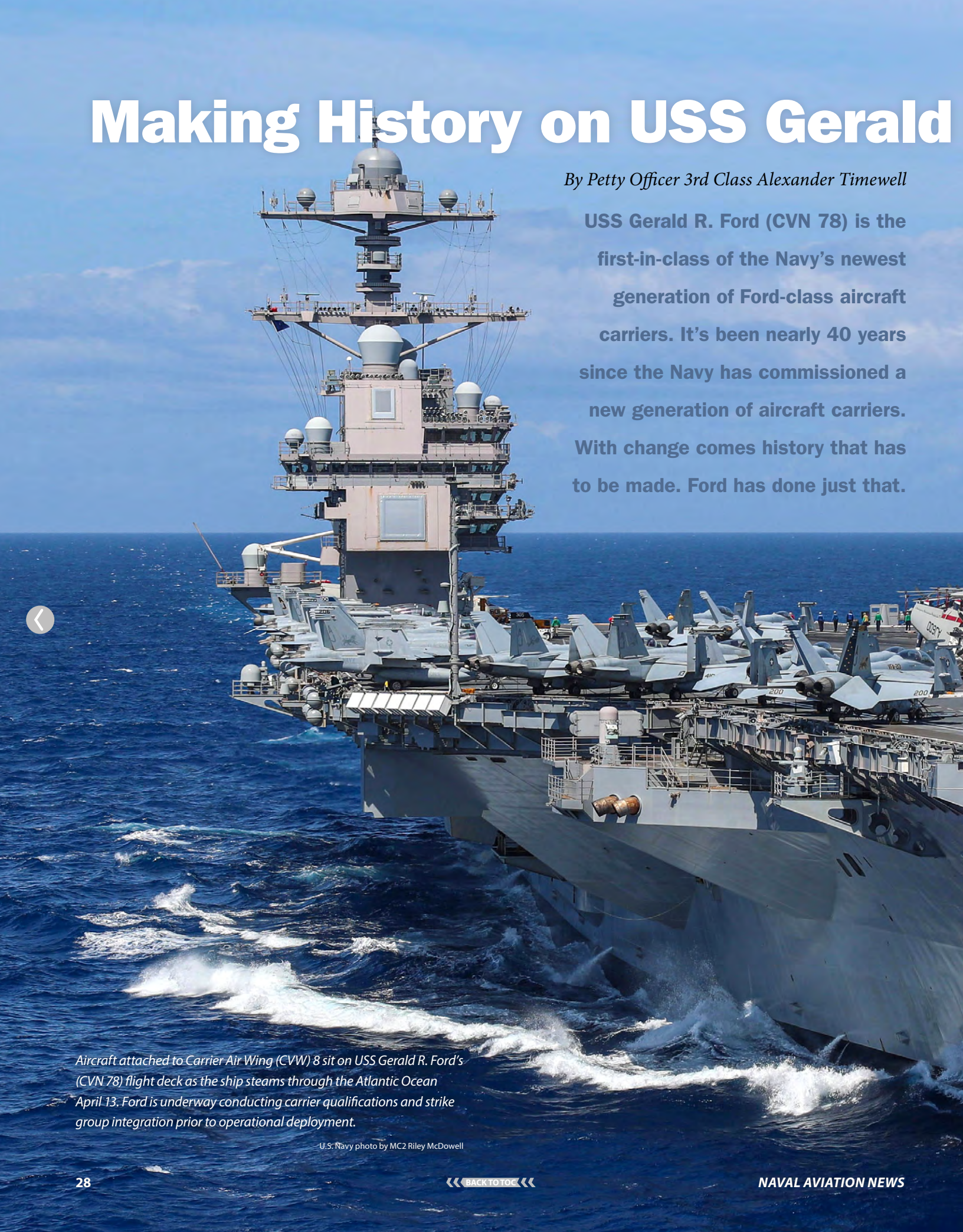
The use of FTVs has been key in resolving FCS deficiencies discovered during flight test and will be used to enhance the already successful fly-by-wire system as the CH-53K takes on additional capabilities in the future.

Victoria Falcón is a Strategic Communications Specialist with the H-53 Heavy Lift Helicopters Program Office.

Making History on USS Gerald

By Petty Officer 3rd Class Alexander Timewell

USS Gerald R. Ford (CVN 78) is the first-in-class of the Navy's newest generation of Ford-class aircraft carriers. It's been nearly 40 years since the Navy has commissioned a new generation of aircraft carriers. With change comes history that has to be made. Ford has done just that.



Aircraft attached to Carrier Air Wing (CVW) 8 sit on USS Gerald R. Ford's (CVN 78) flight deck as the ship steams through the Atlantic Ocean April 13. Ford is underway conducting carrier qualifications and strike group integration prior to operational deployment.

U.S. Navy photo by MC2 Riley McDowell

R. Ford as Deployment Nears

With new technologies and advancements in multiple different systems compared to legacy class carriers, Ford is ahead of its time leaving the history in the past and paving its own future.

The keel of the Ford was laid on Nov. 14, 2009. Laying the keel is the formal recognition of the start of a ship's construction. The ceremony was attended by Huntington Ingalls Industries Newport News Shipbuilders and members of the United States Navy. In earlier times, keel laying was when the first placement of the central timber took place, but as steel ships replaced wooden ones, the central timber gave way to a steel beam.

Christening is a ceremonial ship launching where the vessel is transferred to the water. On Nov. 9, 2013, the Ford was christened by Susan Ford-Bales, the daughter of Gerald R. Ford.

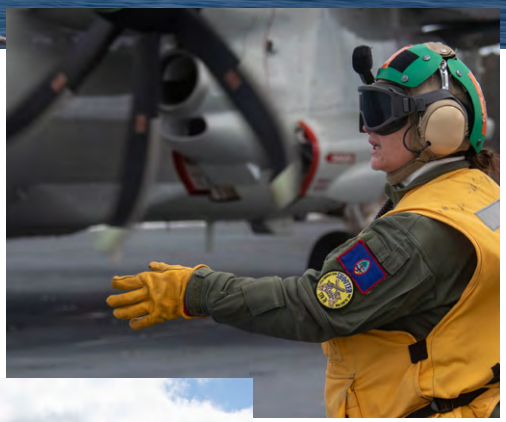
"For the United States of America, I christen thee Gerald R. Ford," Ford-Bales said, ending the ship's final moments ashore. A traditional shattering of a champagne bottle across the ship's bow christened the ship.

USS Gerald R. Ford was commissioned July 22, 2017, by President Donald J. Trump. The commissioning ceremony marks the entry of a ship into active naval service. This was the day Ford took her place in the fleet alongside the other ships.

The first trap or fixed wing aircraft landing was July 28, 2017, when an F/A-18F Super Hornet assigned to Air Test and Evaluation Squadron (VX) 23, piloted by Lt. Cmdr. Jamie "Coach" Struck, performed an arrested landing aboard Ford.

U.S. Navy photos by MC2 Zachary Melvin

An F/A-18E Super Hornet, attached to the "Tomcatters" of Strike Fighter Squadron (VFA) 31, launches from USS Gerald R. Ford's (CVN 78) flight deck March 28.



U.S. Navy photo by MC2 Zachary Melvin

Lt. Jess O'Brien, assigned to Ford's air department, signals to a C-2A Greyhound on the flight deck March 29.

U.S. Navy photo by MC2 Zachary Melvin

Sailors assigned to Ford's air department direct an F/A-18E Super Hornet, attached to the "Ragin' Bulls" of Strike Fighter Squadron (VFA) 37, to takeoff from the flight deck March 29.

Ford entered an 18-month Post-Delivery Test and Trials period in late October 2019. The test and trials period are designed to stress critical combat systems and to exercise the flight deck, with the goal of ensuring the ship's overall deployment readiness.

During this time the Ford performed exceptionally well, and conducted a series of 11 Independent Steaming Events that were interlaced with shore-based Maintenance Windows of Opportunity. Over the 18-month testing time, the Ford exercised installed systems, conducted crew training, and completed construction and activation of select shipboard systems.

Over the course of four months in 2021, Ford withstood the impact of three 40,000-pound underwater blasts, also known as Full Ship Shock Trials. Shock trials are a testing period that proves the validation of the ship's ability to sustain operations in a simulated combat environment using live ordinance. The tests demonstrated that the ship will be able to withstand formidable shocks and continue to operate under extreme conditions.

EMALS and AAG Reach 10,000 Aircraft

U.S. Navy photo

Sailors and their families and friends observe USS Gerald R. Ford's (CVN 78) 10,000th launch from the flight deck, June 25, 2022. Friends and family members were invited aboard Ford to experience a day in the life of a Sailor at sea first-hand.

Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG) achieved 10,000 aircraft launches and recoveries June 25 aboard USS Gerald R. Ford (CVN 78).

The landmark launch and arrestments were made on Ford's "Friends and Family Day," where guests were present to watch flight deck demonstrations and experience a day out at sea.

Capt. Kenneth Sterbenz, program manager for Aircraft Launch and Recovery Equipment (ALRE), said ALRE teams are accomplishing some of their life's best work as they continue to ensure the Ford-class systems are ready to deploy, but everyone took a moment to enjoy and appreciate the major milestone.

"10,000 cats and traps onboard Ford marks a significant milestone for the EMALS and AAG programs as well as the future of Naval Aviation," Sterbenz said. "A tremendous amount of teamwork and collaboration across multiple organizations has prepared Ford for this accomplishment. For every launch and recovery on the

Ford finished its Flight Deck Certification and Carrier Air Traffic Control Center Certification on March 29, 2022. Once out at sea, F/A-18E/F Super Hornets, E-2 Hawkeyes, MH-60R Seahawks, E/A-18G Growlers and MH-60S Knighthawks assigned to Carrier Air Wing (CVW) 8 conducted operations to prove the ship's and crew's capabilities. Ford's flight deck certification and carrier qualifications are part of the basic tailored training phase prior to the ship's first deployment.

The Ford is currently doing workups, which are a series of underway periods conducting training, running drills, conducting flight operations, and completing certifications in preparation for its first deployment and the U.S. Navy's first Ford-class full deployment. The Ford and its crew has gained a huge amount of experience and training since it was built and are going to be thriving during the upcoming deployments.

Written by Petty Officer 3rd Class Alexander Timewell, USS Gerald R. Ford Public Affairs.

U.S. Navy photo by MCSA Sasha Ambrose

Interior Communications Electrician 3rd Class Jordan Lutz, assigned to USS Gerald R. Ford's (CVN 78) air department, communicates with the flight deck during flight operations in Ford's primary flight control March 28.

U.S. Navy photo by MC2 Zachary Melvin

An F/A-18F Super Hornet, attached to the "Blacklions" of Strike Fighter Squadron (VFA) 213, takes off from Ford's flight deck March 29.

U.S. Navy photo by MC2 Zachary Melvin

Sailors assigned to Ford's air department direct an E2-D Hawkeye, attached to the "Bear Aces" of Airborne Command and Control Squadron (VAW) 124, on the flight deck March 29.

Launches and Recoveries

books, we've had an equal number of opportunities to learn, train Ford's crew, improve the systems, and ensure we're delivering the very best tools and capabilities to the warfighter."

CVN-78 completed its planned incremental availability in March and is now working through its final training requirements and stores onload in preparation for deployment later this year.

The Navy's newest aircraft launch and recovery technology, EMALS and AAG, are managed by the Aircraft Launch and Recovery Equipment Program Office. The systems were designed for use aboard Ford-class aircraft carriers, beginning with USS Gerald R. Ford. Land-based test sites, located at Joint Base McGuire-Dix-Lakehurst, New Jersey, enable test, troubleshooting and Sailor training. EMALS and AAG provide significant advancements to the Navy's Ford-class aircraft carriers. EMALS and AAG require a smaller footprint in the ship, less maintenance, and less manpower than comparable steam catapults and arresting gear aboard Nimitz-class carriers.

U.S. Navy photo

Electromagnetic Aircraft Launch System and Advanced Arresting Gear reached 10,000 aircraft launches and recoveries aboard USS Gerald R. Ford (CVN 78) on June 25.

THE TOPGUN LEGACY:

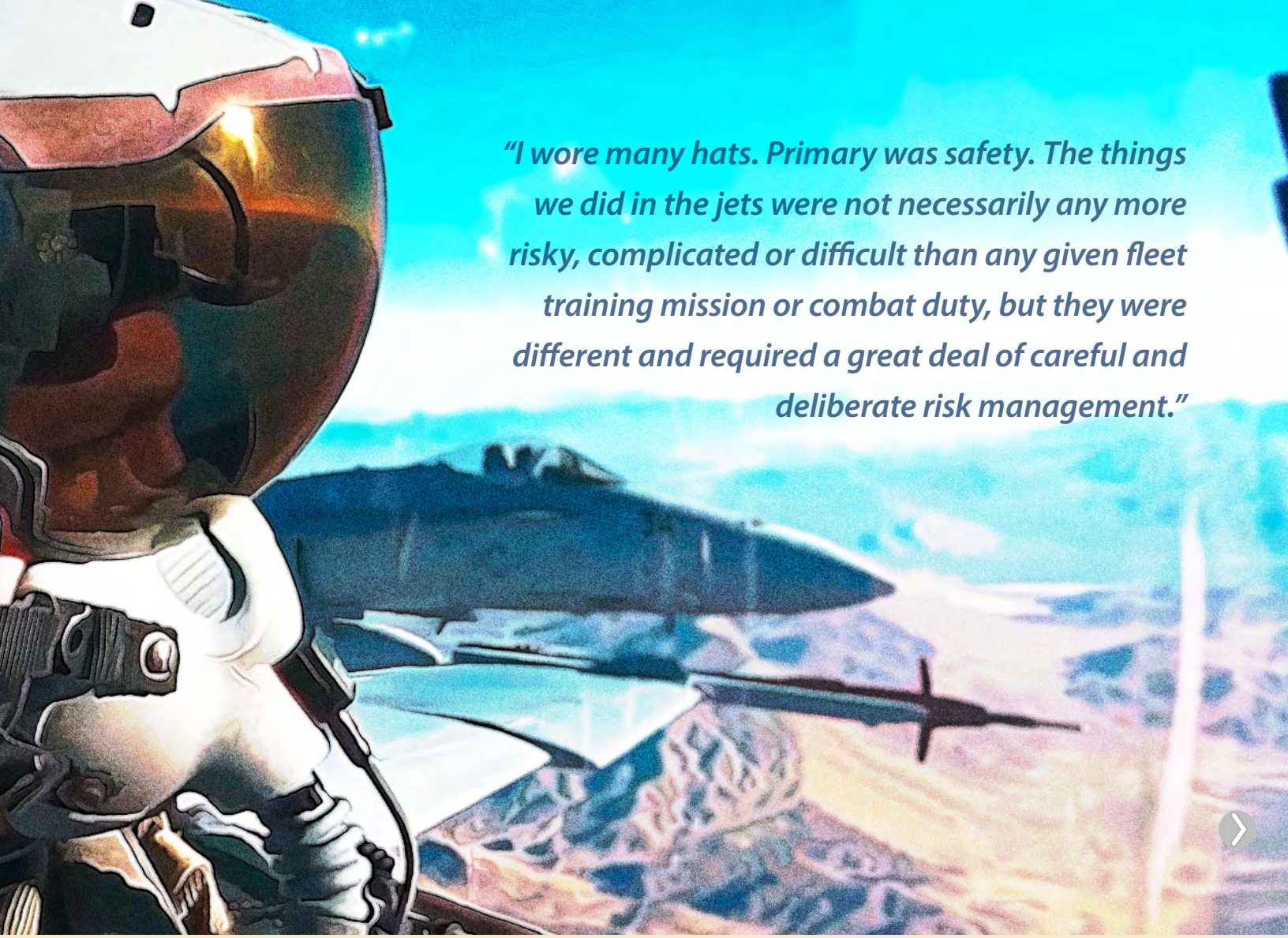
Making Mavericks with Capt. Brian Ferguson

By Lt. Bryce Baswell, U.S. Navy

The sun rises over Nevada. A rumble rolls across the desert, but it's not the sound of a rare rainstorm. It's two U.S. Navy F/A-18 Hornets engaged in a close-range combat training exercise. One is the haze-grey color of fleet squadrons. The other sports desert camo with a red star on its tail, one of the paint schemes used by the Navy Reserve's adversary aircraft squadrons to mimic those used by America's adversaries.

From a long way off, the jets seem serene, like birds of prey gliding the updrafts. But up close, it's a hell storm. The jets pump out swirling vortices of scorched gases. The sound can literally be felt, and the acrid smell of jet fuel permeates the air. The two aircraft maneuver furiously, both attempting to establish positional advantage against the other. Finally, one gets the upper hand. "Copy Kill"—a successful engagement.

Capt. Brian "Ferg" Ferguson has spent a significant portion of his career involved with air-to-air combat training exercises. Ferguson attended the Adversary Instructor Course at the Navy Fighter



"I wore many hats. Primary was safety. The things we did in the jets were not necessarily any more risky, complicated or difficult than any given fleet training mission or combat duty, but they were different and required a great deal of careful and deliberate risk management."

U.S. Navy photo illustration by Fred Flerlage; Imagery of Lt. Stu Whipkey from U.S. Navy video by Matthew Hilborn, " Patch Wearers: The Real TOPGUN"

Weapons School, also known as TOPGUN. He also commanded the "Fighting Saints" of Fighter Squadron Composite (VFC) 13, based at Naval Air Station Fallon, Nevada, the same installation as TOPGUN. VFC-13 is one of the Navy Reserve's adversary aircraft squadrons dedicated specifically to providing the highest quality adversary training for Navy fleet squadrons and other units, a Navy role provided only by the Navy Reserve. These and numerous other career experiences helped make Ferguson an ideal candidate to serve as the Navy's technical advisor for "TOP GUN: Maverick," Paramount Pictures' new sequel to its 1986 blockbuster-hit feature film, "TOP GUN." Ferguson described how he came by the job.

"Toward the end of my tour of duty as the Deputy Commander, Naval Air Force Reserve, the Chief of Staff for Commander, Naval Air Forces, contacted me," Ferguson said. "He said he thought I might be the right person for the role of advisor for 'TOP GUN: Maverick.' At first, I declined because I had been focused on so many other things professionally, and I knew there would be many other people well-qualified for the job. However, the Chief of Staff kept pinging me, and eventually my wife, Susan, was the one who changed my mind. She told me, 'If they get it wrong and you had a chance to make it better that you didn't take, you'll be complaining about it for the rest of your life, and if they get it right, you'll regret that you weren't a part of it.'"

Ferguson served on active-duty orders for just over a year while filling the role of the Navy's technical advisor for "TOP GUN: Maverick," during which he also performed the critical role of aerial coordinator for the Naval Aviators and aircraft involved in the film.

"I wore many hats," Ferguson said. "Primary was safety. The things we did in the jets were not necessarily any more risky, complicated or difficult than any given fleet training mission or combat duty, but they were different and required a great deal of careful and deliberate risk management. It was clear to me that any benefits the Navy hoped to gain from the film showcasing our profession to the nation and the world would be more than erased by a mishap. I also coordinated the aerial sequences, knowing the capabilities and limitations of the F/A-18 and aircrew. Tom Cruise, Jerry Bruckheimer or Joseph Kosinski would want something, and perhaps it was not attainable safely within our comfort margins. I would work with them and the

Navy Aerial Advisor Capt. Brian Ferguson and Tom Cruise on the set of 'TOP GUN: Maverick.'

Photos courtesy of Paramount Pictur

Navy Aerial Advisor Capt. Brian Ferguson and Tom Cruise on the set of 'TOP GUN: Maverick.'

Navy Aerial Advisor Capt. Brian Ferguson and Aerial Coordinator/Lead Camera Jet Pilot Kevin LaRosa II on the set of 'TOP GUN: Maverick.'

civilian aerial cinematographer, to find a way to make it work safely and still be spectacular. I was also responsible for assisting with realism in the script, storyline and uniform accuracy, minus a few scenes that were filmed prior to my arrival."

Although Ferguson stipulates that not every part of the film is 100-percent accurate to the realities of Naval Aviation, he said that, overall, it provides an extremely realistic vision of what being a Naval Aviator is like.

"The film makes very limited use of CGI—it's almost all real-life Navy pilots in real Navy jets doing real maneuvers," Ferguson said. "We're taking the audience into the jets with us, onto the ship and into combat. Various people who saw the film with me all said the exact same thing: 'I felt like I was in the jet!'"

Working on "TOP GUN: Maverick" was coming full circle for Ferguson. Like many others, he was inspired in a major way when he saw the original "TOP GUN" in theaters when it was first released in 1986, his senior year of high school. He attributes watching the film, as well as seeing the Navy's Blue Angels and other Navy aircraft at airshows, to his decision to enter Naval Aviation. Now, 36 years later, he's working on film projects that will help to inspire a new generation of Naval Aviators, including another Hollywood film named "Devotion," the renowned story of Naval Aviators and brothers-in-arms Jesse Brown and Tom Hudner during the Korean War, scheduled to be released in the fall of 2022. Ferguson explained the lasting legacy that films about the Navy can have.

"I think that films can have a dramatic impact." Ferguson said. "For example, the original 'TOP GUN' film did three things. First, it helped boost Navy recruiting a tremendous amount. It allowed the Navy to enjoy a massive influx of applications from some of the best and brightest young men and women in America. Second, it helped remind the Naval

Capt. Brian Ferguson and movie producer Jerry Bruckheimer.

Capt. Brian Ferguson and Glen Powell on the set of 'TOP GUN: Maverick.'

Aviation community that we literally have the coolest job on the planet. Like every job, there are parts of it that are mundane, but the film celebrated the most thrilling parts of it and reminded people that when they look back on their time in the service, those are the parts they are going to remember, not the long hours or paperwork. Third, it helped connect much of the American public to the Navy in a way in which they hadn't been before—in a contemporary way that gives them some familiarity with what the Navy does today. I am confident that 'TOP GUN: Maverick' will have the same effect, which is why the Navy and the Department of Defense supported the project at the highest levels."

Ferguson described more about the impact he thinks the new film will have.

"I am confident this film is going to help re-energize pride in the Naval Aviation community and the military at large. It can really pull people in and connect them to a Navy that they may not realize has been continuously involved in combat operations around the world for most of the last 30 years. This film will bring Naval Aviation to screens in front of hundreds of millions of people and allow them to experience how it looks from the cockpit, and more importantly, what it feels like to be an aviator in the U.S. Navy."

Ferguson also discussed the critical role the Navy Reserve plays in supporting Naval Aviation and the Navy at large.

"The Navy Reserve provides a strategic depth for warfighting readiness during these times when we are challenged by near-peer adversaries. We stand ready to surge combat-capable end strength…whether the demand signal is tactical airpower, strategic lift, unmanned systems, watch-floor manning, seapower, medical support, Seabees, logistics, Naval Special Warfare, or any number of other specialties, the Navy Reserve maintains a readiness to mobilize, to fight and win anywhere in the world."

Ferguson offered the following advice to Navy Reserve Sailors in the early parts of their careers:

"Be proud of what you do. The Navy cannot do its job without the Navy Reserve. Take care of the person on either side of you and the person in the middle, and lean on each other. Also, listen to your Chiefs, whether you are junior enlisted or an officer."

Photo courtesy of Paramount Pictures for release by the U.S Navy

Capt. Brian "Ferg" Ferguson earned a bachelor's degree in Aeronautical Science from Embry-Riddle Aeronautical University and commissioned in the Navy through the Aviation Officer Candidate School in 1993. After completing flight school, he was assigned to fly F/A-18s. Among numerous other tours, Ferguson served as Assistant Air Operations Officer aboard USS Constellation (CV-64), in which he flew with the " Vigilantes" of Strike Fighter Squadron (VFA) 151 and led numerous night combat missions into Iraq in F/A-18s in support of Operation Iraqi Freedom. He also attended the Navy Fighter Weapons School (TOPGUN) Adversary Instructor Course. During his tour as Commanding Officer of the Fighting Saints of VFC-13, Ferguson transitioned from active duty to the Navy Reserve, in which he has continued to serve the Navy in many roles. Ferguson currently serves as Commanding Officer of U.S. 6th Fleet's N5/N7 unit in Naples, Italy, and is also director of the Aviation Mentoring Network for Commander, Naval Air Force Reserve. In his civilian life, Ferguson has worked as a federal agent with the Department of Homeland Security (DHS) where he served as a pilot, tactical team member, weapons and tactics instructor and airborne sniper cover officer, and is now a captain for a major U.S. airline.

FRCSW Goes to the Movies

Supporting 'TOP GUN: Maverick'

By Fleet Readiness Center Southwest

It takes a lot to make a movie. In the case of Tom Cruise's latest film, "TOP GUN: Maverick," it took the artisans, engineers and staff of Fleet Readiness Center Southwest (FRCSW) to not only provide an authentic presentation of the aircraft used in the film, but also support for the filming itself.

U.S. Navy photos

"TOP GUN: Maverick" F/A-18 Super Hornet.

FRCSW painted one of the film's two F/A-18 Super Hornet fighter aircraft and led the installation design of the audio/visual (A/V) equipment fixed in the cockpit of an F-model Super Hornet used in the movie's production.

"When it came time to start installing the A/V cockpit equipment and the production team was in place at our first location at Naval Air Station (NAS) Lemoore, California, we had meetings with the director and some of the producers, including Tom Cruise. He was very passionate about making this the greatest aviation film of all-time," said F/A-18 MRO Engineering Department Head Jonathan Ramba who oversaw the installation.

"The production crew used new Sony Venice 6K cameras that weighed about 8 pounds with a lens. The cinematographer wanted four of these to be installed on the aft seat's glare shield, but settled for three full camera bodies mounted and a sensor block, which acted as a fourth camera. All said, the total weight of the equipment on the aft glare shield was about 40 pounds."

Ramba's involvement with the filming began in July 2018 with a call from the F/A-18 & EA-18G Program Office asking FRCSW's F/A-18 Fleet Support Team to accommodate a visit from the "TOP GUN" production crew.

"I was the E/F/G FST Structures Engineering Lead at the time, so I was tasked to lead this project," Ramba said.

About two weeks later, he traveled to NAS Lemoore to discuss the installation and locations of the cameras on the interior and exterior of the aircraft.

He developed a proposal afterward and worked with Naval Air Systems Command (NAVAIR) to establish the required action for approval.

Filming was slated to start by the end of September 2018, and a fit check had to be completed approximately two weeks prior to that.

Knowing the effort demanded a top-notch team to meet the timelines, Ramba enlisted aerospace engineer Tony Pacheco for his expertise in design and MRO-E F/A-18A-F and EA-18G Structural Analysis Division Head Manny Hernandez to handle stress analysis considerations.

To assess the feasibility of the production crew's camera mounting requirements, Pacheco traveled to FRC West to adapt the Super Hornet provided by Strike Fighter Squadron (VFA) 122.

"After all mounts were designed and approved for use by the F/A-18 & EA-18G Program Office Airworthiness Certification Engineer (ACE), I coordinated with third-party machine shops designated by Paramount Studios to have all parts machined to specifications and delivered to the production crew," he said.

"Ultimately, all designed mounts fit perfectly, and all filming equipment was successfully installed. After a shake-out flight, Tom Cruise went on a quick test flight and it was determined that the entire assembly worked perfectly."

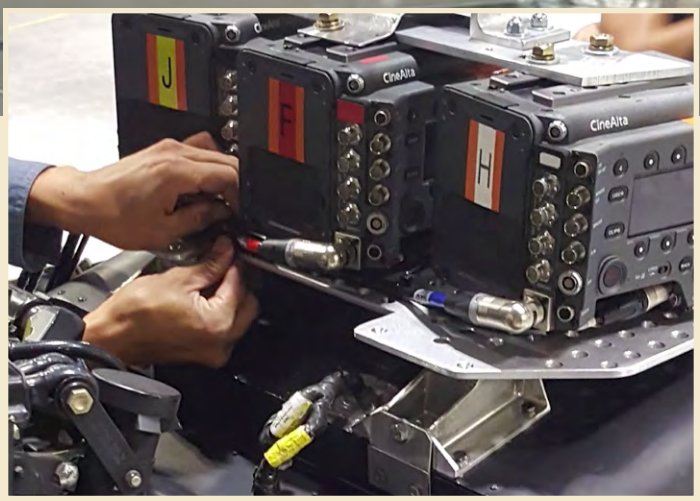
Next, to gain an Interim Flight Clearance (IFC), Pacheco developed drawings to reflect the aircraft configuration change that included the installation processes of the mounts and cameras, and the temporary removal of any components.

"After all flight limits were established within the IFC by the program office, I quickly familiarized myself with them and ensured the production personnel and flight crew were aware of the limits to avoid any issues," he said.

Approximately one month before filming, Hernandez completed a crucial strength analysis for the design of the cockpit camera mounts in less than three weeks.

He also analyzed the glare shield, a 0.063-inch thick aluminum component that held the 40-pound camera rig, and subjected it up to a 7.5 g acceleration rate along multiple directions.

"I used MSC Patran and Nastran (software) to simulate the added equipment



Sony Venice 6K cameras, that weigh about 8 pounds with a lens, were installed on the aft seat's glare shield of an F/A-18.

with the existing affected structure being subjected to the considered loads," he said.

Meanwhile, in the FRCSW paint shop, six artisans began duplicating the F-model paint job on a single-seat E model Super Hornet from the command's long-term storage area.

"We replicated the paint job on that aircraft for non-flying scenes and close ups of the actors near the aircraft on the ground," said Tommy Sapien, Aircraft Services Paint Production Line Manager.

After applying several polyurethane top coats and stencils, the project was complete in five days.

"Getting the details correct were a challenge because we did not work off of any blueprints," Sapien said. "We did the paint job based on pictures we had of the two-seater Super Hornet from the flying scenes in the movie."

In February 2020, the E-model Super Hornet was delivered to FRC Southeast where it underwent modification. It is currently a Blue Angel.

"TOP GUN: Maverick" took approximately eight months to film at a variety of locations including NAS Lemoore, Whidbey Island, Fallon and Naval Weapons Station China Lake, California. In-flight filming concluded in the winter of 2019.

Collectively, FRCSW and Fleet Readiness Center West (FRCW) teammates devoted more than 1,000 hours to the production of the film while simultaneously completing their real jobs: Providing mission-ready Super Hornets to the fleet.

"TOP GUN: Maverick" was released in theaters May 24, and no, Tom Cruise did not actually fly an F/A-18 Super Hornet. A real "TOP GUN" piloted the aircraft.

Editor's Note: *FRCSW would like to acknowledge the following teammates for their support in the production of "TOP GUN: Maverick:" FST Project Engineer Nicholas Candrella, FST Senior Aerospace Engineer Daniel Collins, FRCW Engineering Site Lead Mariana Magana, FRCW Aerospace Engineer Calvin Gong and MRO-E Senior Aerospace Engineer Jake Schomaker.*

FRCE Declares Capabilities on Next Round of F-35 Components

Fleet Readiness Center East (FRCE) has expanded its support of next-generation Naval Aviation by declaring capabilities on a new round of F-35 components. These capabilities build upon the 17 F-35 components the depot previously declared capabilities on in 2020.

"This expansion of our F-35 component workload is extremely important because the F-35 is a not just a unique platform, it's the future of Naval Aviation," said FRCE Commanding Officer Capt. James Belmont. "The F-35 component work will be a vital part of the depot's workload as we move forward into the future. It will bring continued growth and I believe it will have a positive economic impact on the local community."

FRCE is the lead site for depot-level maintenance on the F-35B Lightning II and has conducted modifications and repair on the Marine Corps' short takeoff-vertical landing (STOVL) variant of the aircraft since 2013. The facility has also worked with the F-35A (conventional takeoff and landing) and F-35C (carrier) variants.

FRCE declared capability on its first F-35 component in 2020. By the close of 2020, the depot had declared capability on 17 components for the fifth-generation fighter. Mike Mishoe, FRCE F-35 Lightning II depot activation lead, said that was just the start of an initiative aimed at declaring capabilities on a range of F-35 components, all geared toward supporting the warfighter.

"Since then, we have declared capability on parachutes and the ground maintenance motor pumps," Mishoe said. "Although all of these components are important, of note are the parachutes. The aircraft can't be flown without them. We are working with the original equipment manufacturer (OEM) to produce as many as we can and as quickly as we can. Providing these parachutes, as well as all the other components, allows the pilots to keep training, supporting operations and conducting real-world missions."

In addition to supporting fleet requirements and mission readiness, the new F-35 component work provides FRCE with a scheduled workload going forward, Mishoe said.

"We continue to stand up capability on a quarterly basis," he said. "We currently have F-35 component workload scheduled through at least 2026, and we continue to pursue bringing in additional workload."

Mike Sermarini, FRCE's former F-35 Lightning II depot activation lead, has championed most of these initial efforts along with his team. Sermarini, who recently transferred to another assignment within Naval Air Systems Command, said the depot is already working toward declaring capabilities on an ever-expanding range of F-35 components.

"FRCE is working on 84 different end items," Sermarini said. "They've stood up initial repair capability for 19 components and they've developed and managed successful partnerships in support of the workload. They recently declared capability on parachutes and the ground maintenance motor pump. The capability team and depot were working hard and anticipating declaration for engine-driven pump and filter modules within the coming weeks."

U.S. Navy photo

Kristopher Kirksey, a quality assurance specialist at Fleet Readiness Center East (FRCE), and Jeff Ellman, FRCE ordinance and survival shop work leader, inspect an ejection seat parachute for the F-35B Lightning II.

While the term "declaring capability" sounds simple, the actual process is complex. According to Mishoe, it involves intensive collaboration both within the depot as well as outside it.

"When FRCE declares capability on a component, that means that we have all the required materiel, support equipment, and staffing in order to test and repair components so they may be sent back to the fleet to be installed on F-35s around the world," Mishoe said. "In order for this to happen, we must collaborate not only within our own workforce at the depot but also with entities outside of FRCE such as Commander, Fleet Readiness Centers along with the F-35 Joint Program Office, OEMs and others."

The process of declaring capability on a component begins years before the component ever arrives at the depot and involves a team of experts. This team must consider a variety of factors such as current and future workloads, manpower requirements, facility and tooling needs, and supply support. Engineers must analyze vast amounts of technical data. Mishoe said it takes critical thinking, expertise and commitment to make it all happen.

"To declare capability on a component, we have a team of people from across our workforce all working hand-in-hand," he said. "We really strive to make sure we have the right people in place and ensure that they are properly trained and equipped. Everyone here understands the process and just how important these components and capabilities are to the workforce and the fleet. Their motivation astounds me. Without them, none of this would be possible."

In addition to having the right people working together, standing up new component capabilities also means ensuring those people have the facilities, gear and training necessary for the project. Sermarini said that each component brings with it a unique set of requirements.

"Our efforts are not limited to simply training the artisans on the required maintenance tasks," Sermarini said. "Our team must ensure a logistically supportable and validated repair solution. This means the facilities, infrastructure, technical data, technical expertise, supporting hardware and software must all be in place to meet the forecasted demand."

Sermarini said the COVID-19 pandemic has also presented a unique set of challenges as the depot worked to stand up capabilities.

"Due to travel restrictions and personnel requirements, all of our major milestones are basically overlapping—which is certainly not something you want in the project management world—but here we are today, and we're pushing through to get all these systems activated."

Sermarini cites the men and women who work at FRCE as the key factor in overcoming COVID-related obstacles and tight timelines.

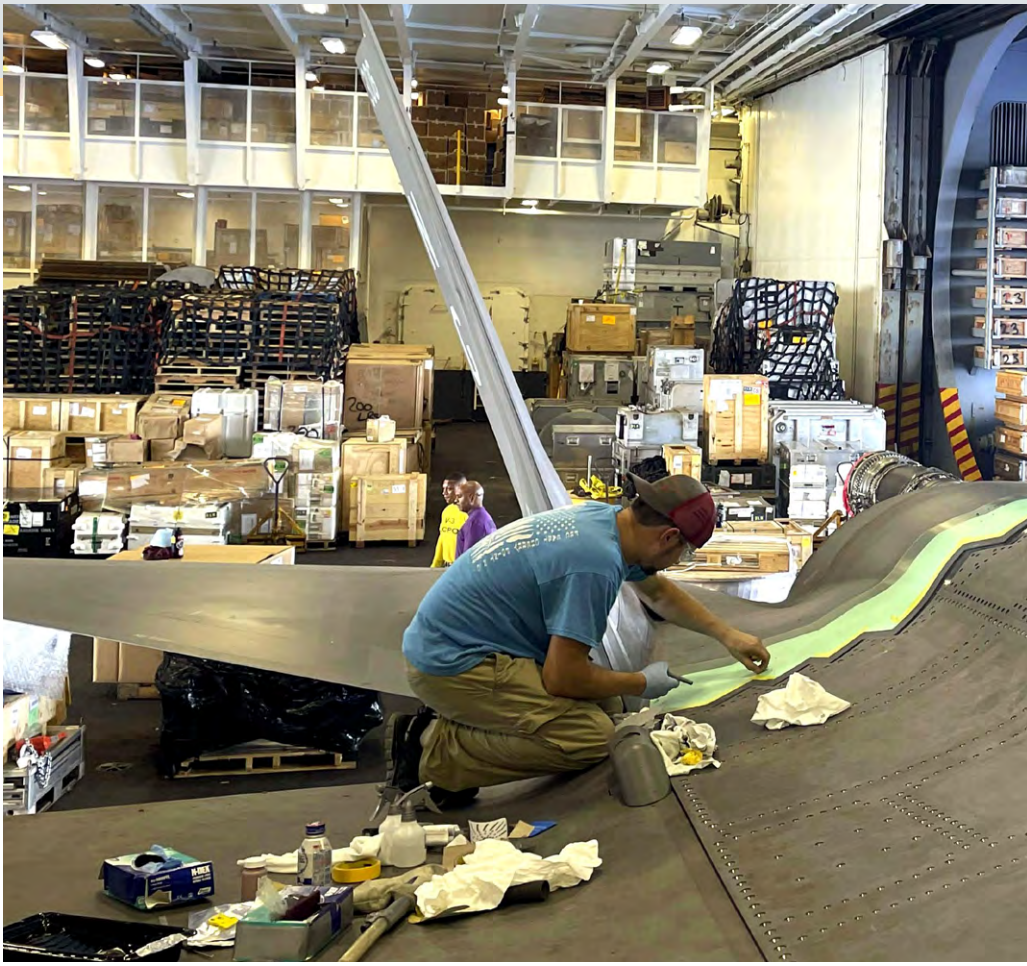
"We recognize growing our F-35 repair capability requires an all-hands-on-deck approach," Sermarini said. "With the support of our command, we've been extremely successful in generating the excitement and buy-in amongst the staff that's crucial to achieving our objectives. We're asking a lot of our workforce and—as always—they've come through."

The F-35 component workload, while important to the future of FRCE, also yields positive impacts that go far beyond the boundaries of the depot. According to Sermarini, these component capabilities benefit warfighters and contribute to mission readiness throughout the Department of Defense.

"FRC East is not solely standing up repair capability for the Marine Corps variant," Sermarini said. "We are establishing component repair capabilities for all F-35 variants in support of both our local warfighters as well as the global enterprise."

FRCE's F-35 Rapid Response Team Makes Global Impact on Flight Line Readiness

As the number of operational F-35 Lightning II aircraft in the Navy and Marine Corps continues to rise, the number of missions flown increases—and with them, the requirements for maintenance and repair.



The requirement for in-service repair and the need to mend battle damage don't always come at a convenient time, or in a convenient location, and that's where the F-35 Rapid Response Team (RRT) comes in. This team of highly skilled, cross-trained aircraft maintenance professionals stands ready to answer the call for support anywhere in the world at any time.

Based at Fleet Readiness Center East (FRCE), RRT members can deploy at a moment's notice to any location, from a Marine Corps Air Station halfway around the globe to a Navy aircraft carrier afloat in the Indo-Pacific region. As more operational squadrons convert from legacy aircraft to the fifth-generation F-35 Lightning II, the team's workload has increased.

"Over the past few years, the Rapid Response Team has ramped up the number of service requests it responds to," said Ike Rettenmair, F-35 Branch Head at FRCE. "More aircraft in the fleet leads to a higher operational tempo, which leads to more depot-level support required for the aircraft."

In fact, in fiscal year 2022, which started Oct. 1, 2021, and runs through Sept. 30, the F-35 RRT has already deployed 12 times to various locations—outpacing its entire fiscal year 2021 calendar by almost 50 percent, with four months still to go, said Jeanie Holder, F-35 Joint Program Office induction manager at FRCE. In comparison, the team deployed just seven times from 2017-2019.

The requirement for depot-level support of specific repairs has led to a higher demand for RRT support, Holder said, which allowed the squadrons flying the aircraft to reduce the downtime when compared to sending the aircraft to a Fleet Readiness Center for traditional depot-level service. Having the RRT team available to travel to the aircraft in need has made FRCE the go-to provider for these repairs, rather than sending the aircraft to a depot facility for modification.

"FRC East was able to quickly provide this support to return these aircraft back to service quickly, and has become the provider for this type of support within the continental United States, as required," she said. "The RRT will remain highly engaged for these types of repairs."

Recent deployments to Marine Corps Air Station (MCAS) Iwakuni, Japan, USS Carl Vinson (CVN 70) and USS Abraham Lincoln (CVN 72) have allowed the F-35 RRT to shine in its support of Naval Aviation and flight line readiness.

At MCAS Iwakuni, the team repaired two F-35B aircraft for Marine Fighter Attack Squadron (VMFA) 121, the first forward-deployed permanent F-35 squadron in the Marine Corps. One fix involved the aircraft's structure; the other involved both the aircraft's structure and skin, the outer surface that covers most of the wings and fuselage.

"Both aircraft were damaged outside the organizational-level maintenance and repair capabilities, and the Fleet Readiness Center Western Pacific Detachment is not equipped or qualified to perform maintenance on the F-35," said Chief Warrant Officer 2 Anson Conner, VMFA-121 maintenance material control officer. "The work performed by the RRT artisans returned one aircraft to the fight and put another one back in our control to repair,

U.S. Marine Corps photo courtesy of Marine Fighter Attack Squadron 314

Steven Cope, left, and Joe Shanda, both members of the Fleet Readiness Center East (FRCE) F-35 Rapid Response Team (RRT), perform maintenance on an F-35C for Marine Fighter Attack Squadron (VFMA) 314 aboard the USS Abraham Lincoln, underway in the Indo-Pacific region.

keeping VMFA-121 prepared to defend our country and its allies.

"I would rate their skill at a 10 out of 10," Conner said. "I have not come across any other maintainers with that much F-35 knowledge, and we were very satisfied with the work they performed on our aircraft."

For Strike Fighter Squadron (VFA) 147, the Navy's first non-training F-35 squadron, the RRT deployed to the USS Carl Vinson, afloat in the Indo-Pacific region, to assist with repairs to an F-35C. The RRT's expertise helped facilitate a repair aboard the ship that wouldn't have been possible otherwise.

"VFA-147 personnel performed a majority of the repair work. The RRT removed a permanent skin panel, prepared it for reinstallation and installed it back on the jet," said Lt. j.g. Oliver Williamson, VFA-147 maintenance material control officer. "Some work on aircraft require depot artisans and their knowledge of in-depth aircraft repair in reference to work not normally performed by organizational technicians. This type of work is critical when a situation arises where this type of expertise is required."

The RRT has worked aboard the USS Abraham Lincoln twice in 2022, assisting VFMA-314 in the repair of several F-35C aircraft, which had a huge impact on the squadron's readiness.

"The work performed by the FRC team enables the squadron to have enough aircraft to conduct our missions on a daily basis," said Maj. Derek Heinz, VMFA-314 aircraft maintenance officer. "Without assistance from this team, we would have 30 percent of our jets out of the fight."

Heinz said VMFA-314 has built a relationship with FRCE and the F-35 RRT, and that has grown during the squadron's deployment due to its increased requests for support.

"The relationship is unique in that FRC East, while located in Cherry Point, supports our squadron even when we are halfway around the world on an aircraft carrier. It presents many logistical challenges for both parties to gain and provide support to enable mission accomplishment," he said. "The artisans did an excellent job and have returned the aircraft to the squadron with all of its capabilities fully restored. This enables our squadron to continue to provide fifth-generation fighter capabilities to Carrier Air Wing 9."

Williamson echoed praise for the work the F-35 RRT artisans performed aboard the USS Carl Vinson.

"The two artisans who came to assist VFA-147 were very skilled in their profession. Once all of the parts and tools required for the repair arrived on the ship, they wasted no time doing their job," he said. "During the process, they had VFA-147 technicians alongside them and both teams were learning from each other. The repair process went much smoother than anticipated and is directly due to their skill at their profession."

The F-35 RRT artisans' depth of skill—demonstrated in deployments like these, across the globe—and flexibility makes the team a valuable addition to the F-35 program, Holder said. The proven benefits of the team's performance is inspiring similar initiatives.

"Because of FRCE's F-35 depot artisan experience across all variants of the aircraft, as well as the agility to quickly deploy, the RRT is the sought-after asset for fleet support," she said. "In fact, the U.S. Air Force is in the process of standing up a similar team, modeled after FRCE's team."

With its ability to put aircraft back on the flight line—or flight deck—that would otherwise be grounded for longer periods while awaiting depot-level maintenance, the F-35 RRT is a valuable asset to both FRCE and the F-35 enterprise, Rettenmair said.

"Having an RRT that can deploy within 72 hours to fix any variant of F-35 anywhere in the world is not only value added to the F-35 enterprise, it also shows FRCE's dedication to support," he said. "Our FRCE RRT artisans are truly the most dedicated, highly-skilled depot F-35 artisans there are. The majority are veterans so they understand what it is like having an aircraft down awaiting maintenance and the value of expeditious repair capability to get that asset back up and in the fight.

"As a former Marine and aircraft mechanic myself, I also understand that level of need, and the value we bring to the fleet," Rettenmair said. "Service to the fleet is what we do and what we will continue to do, supporting F-35 in any time and place."

U.S. Navy photo

Fleet Readiness Center East (FRCE) artisans ready an MV-22 Osprey for "ground turn" which is an essential operational test of all of the aircraft's systems and components. This is one of the last major steps that must be accomplished before this aircraft can be determined to be "Safe for Flight."

FRCE Marks Maintenance Firsts with V-22 Repairs

Fleet Readiness Center East (FRCE) is gearing up to return an MV-22 Osprey to the fleet after conducting a wing-off stow ring replacement on the aircraft, the first completion of this procedure by a Naval Aviation depot. In another inaugural depot-level repair, FRCE artisans tackled corrosion on the aircraft's K-fittings with the wing off, rather than the standard wing-on method; this required a novel approach to the process.

"There were a number of firsts associated with this aircraft," said Matt Sinsel, FRCE's V-22 branch head. "We found ourselves performing work on this airplane that was not part of our normal routine. We were not the first people to take a wing off an MV-22 by any means, but FRCE was the first depot to do it."

One unique feature of the MV-22 is the wing/rotor fold system that allows the rotor blades to fold inward, the nacelles to be rotated down, and the entire wing to turn 90 degrees clockwise, stacking it above the body of the aircraft. This folded configuration considerably reduces the footprint of the MV-22, allowing it to operate off all Navy L-class amphibious ships, including LHA/LHD amphibious assault ships. It can also be stowed on full-size CV/CVN carriers.

According to Don McLean, V-22 overhaul and repair supervisor at FRCE, the stow ring is a key element of the wing/rotor fold system.

"It's a crucial component. The stow ring is what allows the plane to stow the wing 180 degrees," McLean said. "It also holds the airplane and the wing together. Take the stow ring off the wing and the fuselage will not stay together."

The V-22 team discovered the corrosion on the aircraft's stow ring when the MV-22 was inducted for planned maintenance. Corrosion is a problem common to military aircraft like the MV-22, which are flown in some of the most demanding operating environments on the planet. According to Sinsel, the stow ring had to be replaced and this would require removing the wing.

"After working extensively with engineering, we made a decision to remove the wing; we felt like this was something we're going to be doing in the future, so we might as well tackle it now," he said. "Removing the wing is not a process that has been commonly executed. We had data to go by, but it was coming mainly from stricken and salvaged aircraft rather than airplanes that were going to go back into a flight status."

The removal of the wings also impacted the work to be done on the aircraft's K-fittings. As with the stow ring, FRCE's V-22 team had done work on K-fittings before, but this had always been performed on the aircraft. With this MV-22's wing removed, McLean said, artisans had to either wait until the wing was back on the aircraft or explore the possibility of tackling the K-fittings off the aircraft.

"This team is full of out-of-the-box thinkers who will attack any challenge. When we thought we would have to stop work because the wing was on the deck, they immediately began to explore possible solutions," McLean said.

K-fittings are a critical component that house the flaps that control the aircraft's up and down movements. When conducting a replacement, artisans must place the new fitting within 30 one-thousandths of an inch of the original fitting's location.

According to Jonathon Risner, FRCE's V-22 production manager, the work involving the K-fittings required intensive collaboration and an almost obsessive level of attention to detail.

"When you talk about K-fittings, you cannot understate the importance of accuracy," Risner said. "Those parts are laser measured, checked and rechecked countless times. They have to be precise. Engineering worked closely with us through the entire process because this had never been done on a maintenance stand before. We had previously replaced them on the aircraft. The engineers had to identify all the points off the aircraft that need to be verified once the fitting went back on the aircraft."

Austin Dixon, V-22 overhaul and repair supervisor at FRCE, said the V-22 team had no hesitation about venturing outside their comfort zone in order to gain new expertise.

"This was the third airplane we did K-fittings on, but on the previous two, we performed the work on the aircraft," Dixon said. "We decided as a team that we needed to be able to do this off the aircraft if it was possible. We worked very closely with engineering to make sure this could be done, and we did it successfully. As far as I know of, this has never been done anywhere else."

Sinsel also cited collaboration as crucial to the success of the project. Despite the challenges the team faced, he said the learning process equipped the depot with new skill sets moving forward.

"This was a challenging project," he said. "We were dealing with a lot of unknowns so it required a total team effort here at the depot. We worked closely with the quality department, our engineers, logistics and parts, and many others. Everyone faced challenges throughout this process that we had to overcome, but those challenges are what sharpens the spear going forward. We've done two other wing lifts since then, and we were able to apply the lessons learned from this first one and ensure the next two were completed successfully and with a shorter turnaround time."

According to McLean, the project showcases what a team of highly skilled and dedicated professionals can accomplish. He also said it underscores the motivation that drives the FRCE team.

"We'll always be able to look back at this project when we are stumped with the next project," McLean said. "We can look back and realize that we can accomplish anything. We just need to put the right people together—the right team. It's important because, at the end of the day, what we do affects national defense. We're here for the warfighter. It's serious business and I think at FRCE we do it better than anybody else."

FRCSW Sets Sights on Growler Mishap Repair

Less than 35 days after inducting a CMV-22 Osprey aircraft to repair a crack to an inner skin panel, Fleet Readiness Center Southwest's (FRCSW) unique refurbishing capabilities and resources were tapped by the Navy once again—this time to repair an EA-18G Growler involved in a flight deck mishap.

Because of the command's investments in the latest maintenance and restoration technologies and systems, the estimated repair time will be approximately 50 percent sooner than purchasing the Growler's components from the aircraft's original manufacturer, Boeing.

A version of the F/A-18F Super Hornet, the Growler is an airborne electronic attack (AEA) platform and is one of a variety of aircraft typically assigned to naval aircraft carriers.

U.S. Navy photo by Chief MC Paul Seeber

Two EA-18G Growlers from squadron VAQ-136 taxi toward the runway at Ault Field as they prepare to take off.

On Jan. 14, while performing operations in the South China Sea aboard the aircraft carrier USS Carl Vinson (CVN 70), an F-35C Joint Strike Fighter aircraft struck the flight deck, slid and caught fire. Debris from the mishap damaged the Growler's aft fuselage under the vertical tail.

Specifically, the S9 skin in between the Y631 and Y645 formers (fuselage structure) was punctured, according to Ehren Terbeek, F/A-18 Legacy and E/F program manager.

The Growler, assigned to Electronic Attack Squadron (VAQ) 136, was inducted by FRCSW on Feb. 15 as an in-service repair (ISR), or a repair that is handled outside of scheduled maintenance.

"The repair plan is to remove the vertical tail in order to remove the S9 and S10 skins. We will replace the S9 skin and are hoping to save the S10 skin after evaluating it with a non-destructive inspection (NDI)," Terbeek said.

"We will need to NDI the Y631 former to verify that there is no crack, put the skins back on and place the vertical tail back on. If we do not have to replace the Y631 former or the S10 skin it should be around 4,500 manhours or about nine months."

Terbeek said that the command will manufacture the Y645 former using its Flexible Manufacturing Cell (FMC). It will be the first Growler part to be made on the FMC.

The manufacturing cell is the first of its kind in the Defense Department and is comprised of six computer numerically controlled (CNC) five-axis machines and a pallet system which

Fleet Readiness Center Southeast Launches Ground Check Huts

Fleet Readiness Center Southeast (FRCSE) recently received five new environmental protection shelters or ground check huts. The shelters aren't just new to FRCSE, but they are the first of their kind aboard Naval Air Station Jacksonville, Florida.

"Without the teamwork between FRCSE and Naval Facilities Engineering Systems Command, the huts would not exist," said Cmdr. David Drake, FRCSE's Flight Test Director. "The funds that paid for construction were acquired internally, which shows a commitment from our leadership to constantly find better, safer and more efficient ways to operate."

The primary purpose of the huts is to help extend the life of aircraft by protecting them and their components from UV exposure and heat. Also, the shelters were built keeping in mind the need for powered operations to take place beneath them, taking into account future aircraft such as the F-35 Joint Strike Fighter.

"While similar huts are used extensively on military bases throughout the southern half of the United States and in hot, sunny environments, the shelters are primarily used throughout the Fleet to keep avionics and machinery cooler resulting in increased on-time departure rates," Drake said. "There is also the added benefit of the shelters providing cooler aircraft interiors for pilots and shaded environments for maintainers."

U.S. Navy photos by Toiete Jackson

Fleet Readiness Center Southeast's ground check crew recovers a Navy T-6A aircraft, the first aircraft operated beneath the new Ground Check Huts, after a successful post-ACI Functional Checkflight.

are made by DMG-Mori and Fastems, respectively. The FMC's fixturing and preprogrammed parts were initially designed to support F/A-18 Hornet fighter and the E-2/C-2 airframe landing gear.

The CNC machines are capable of milling, turning and grinding within one machine and can be used on parts and components made of aluminum, steel and titanium.

The Growler's former is made of aluminum, and once the material is received, manufacturing of the component should take about three weeks, Terbeek said. Manufacturing costs total approximately $208,000.

"Of that amount about $107,000 would be for non-recurring charges for modeling, programming and prove-out due to the fact this is the first time it is being manufactured; plus material is $23,906," Terbeek said.

In addition to a crew leader and three sheet metal mechanics, teammates from the command's engineering and manufacturing departments will contribute to the repair.

Assignment of the aircraft after repairs are complete is currently undetermined.

"It would depend on Commander Electronic Attack Wing Pacific (CVWP) at Whidbey Island and the aviation Type Commander (TYCOM) to determine if it is still needed at VAQ-136 or a different squadron," Terbeek said.

The VAQ-136 aircraft is the third Growler FRCSW has inducted under a mishap or damaged scenario.

Most depot maintenance activities will still be performed indoors within hangars, but the huts allow the flexibility for certain maintenance evolutions to occur right on the flight line.

"These huts have been in-work for a long time, and it's truly amazing to see them up and running for not only my artisans but for all FRCSE personnel who are required to work on the flight line," said Ryan Davis, FRCSE's Trainers Ground Check Supervisor.

Conceived nearly six years ago, construction on the huts broke ground in December 2021 and was completed by the end of February. The shelters totaled approximately $1.4 million in cost, but the benefit to the depot and the crews that work beneath them is invaluable.

Those familiar with Florida's scorching temperatures understand the risks of working in direct sunshine during almost any season, particularly for FRCSE's ground and aircrews. Since the teams have taken possession, the boost in morale is significant.

"Morale of the artisans has risen because they know they now have a dry and shaded place to work during those long days on the flight line," Davis said. "As of yet, we have not truly seen the significance of the huts, but we will once our hot, rainy season arrives."

Before the shelters, the hazards for ground maintenance crews ranged from sunburn and heat exhaustion or stroke to melanoma and other types of skin cancers.

"It's a three-fold benefit. Cooler equipment extends equipment life and prevents failures, cooler aircraft interiors prevent overheating aviators during preflight, and working in the shade creates a better quality of work-life for ground crews," Drake said. "In the summer, we've had to delay preflights and functional flight check requirements, and we've even aborted missions based on aircrew dehydration. We also have had ground crew personnel with basal cell carcinomas or melanomas. We are hopeful that the shelters will decrease direct sun exposure and help avoid issues like this in the future."

Fleet Readiness Center Southeast (FRCSE) pilots Lt. Cmdr. Joseph 'Boom'r' Breeden (front) and Lt. Cmdr. Andrew 'Riddler' Konowicz (rear) successfully completes a post-ACI Functional Checkflight on a Navy T-6A aircraft that is the first aircraft operated beneath the new Ground Check Huts.

FRCSE Steps Up to Support Rolls-Royce in Meeting Fleet Requirements

More than 40 artisans with Fleet Readiness Center Southeast (FRCSE) were deployed to Naval Air Station (NAS) Kingsville, Texas, during a year-long effort to assist Rolls-Royce in meeting the fleet demand of 145 ready-for-issue (RFI) F405 engines powering the T-45 Goshawk.

U.S. Navy photos by Toiete Jackson

Members of Fleet Readiness Center Southeast who supported Rolls-Royce in the F405 engine recovery effort pose for a photograph at Naval Air Station Jacksonville, Fla.

"A shortfall, due to a 2019 engineering issue, created shorter intervals between turbine removals, which resulted in a backlog of engines," said James Bock, FRCSE MRO Business Office Engines Lead. "Because of an urgent need to meet the RFI goal, we were able to execute the initial Commercial Service Agreement in less than one week and get personnel onsite in record time."

The T-45 is a vital training aircraft for Navy and Marine Corps pilots, and the shorter turbine blade removal intervals impacted the fleet's ability to maintain them, ultimately leading to a push from then-Commander, Naval Air Systems Command (NAVAIR) Vice Adm. Dean Peters to reach 145 RFI engines by January 2022.

Rolls-Royce needed help getting from 128 RFI to the new goal, and the personnel from FRCSE were eager to step up at the request of the Naval Aviation Enterprise, the Naval Undergraduate Flight Training Systems Program Office and Commander, Fleet Readiness Centers.

"FRC Southeast is rich with personnel who are dedicated and ready to go the extra mile when called upon," said FRCSE Commanding Officer Capt. Grady Duffey. "When the engineering issue created a shortfall that threatened engine throughput, many of our members were quick to volunteer.

Some artisans spent months at [Naval Air Station] Kingsville away from their families, helping to get things back on track. We couldn't be more proud of our augmentation team and the herculean effort it took to reach the RFI target."

Seventeen engines might not seem daunting, but the turbine blade removals reduced the on-wing time from 2,000 to 1,050 hours, decreasing the amount of time the F405 could be operational and ultimately doubling the workload.

"This particular partnership was different than any we've done in the past because we sent people to a commercial site for support instead of conducting labor at our facility," Bock said. "We had 43 people deployed and 15 personnel locally supporting the effort. The main FRCSE work was conducted at NAS Kingsville, but the overall effort included both NAS Kingsville and NAS Meridian, Mississippi."

While recruiting FRCSE personnel to step up and assist wasn't difficult, getting caught up and organized was a tall order. The complexity of the scope of work had to be executed in phases and also required assistance from Fleet Readiness Center East, which primarily supported the efforts in Meridian, Mississippi.

Phase one of this effort took less than two months and was all about taking stock of materials, paper-pushing and creating an organized plan of attack.

Once completed, it was time to kick off phase two, all about manpower, skillsets and labor, which required two augmented efforts to support F405 production, as well as other efforts like Non-Destructive Inspection (NDI) and assembly and disassembly.

Finally, phase three utilized an exit strategy. Because the company had suffered significant workforce losses, FRCSE wanted to ensure it gave Rolls-Royce plenty of time to hire, train and get through probationary periods. Command personnel began departing in late March when they were certain Rolls-Royce had enough skilled staffing to maintain production.

"FRC personnel brought in new concepts that Rolls-Royce has been able to learn from and incorporate," Bock said. "This includes efficient cell set up, faster and more effective ways of cleaning and inspecting parts and even standardizing logs and records processes. This effort is a great example of how quickly FRCSE can react and work collectively to exemplify our mission as an unparalleled aviation maintenance solutions provider that epitomizes flight line readiness."

"FRC personnel brought in new concepts that Rolls-Royce has been able to learn from and incorporate, this includes efficient cell set up, faster and more effective ways of cleaning and inspecting parts and even standardizing logs and records processes."

With plenty of workload back home, FRCSE operates engine production lines supporting five other engine programs. While the Goshawk's F405 isn't a completely unfamiliar engine, it has never been supported by command personnel—that meant tapping into the original equipment manufacturer's expertise to get FRCSE's artisans up to speed.

"While our personnel didn't have any F405 experience, they routinely work on these types of power plants, so it didn't take long for the team to have the F405 mastered," said FRCSE Supervisory Planner and Estimator Barron Clark. "The mechanics of jet engines are typically very similar for the most part, so the majority of the learning curve was Rolls-Royce nomenclature, process, tooling and other company-specific procedures."

As of May 5, not long after all FRCSE personnel finalized the last steps of phase three and hopped on planes to head home, Roll-Royce reported that they had successfully reached their 145 RFI target.

While the achievement was celebrated at both Rolls-Royce and FRCSE, the most significant accomplishment wasn't hitting the target, but instead was developing a productive partnership that subsequently resulted in more available trainer aircraft to support fleet demand.

FRCE Moves Into Future With New Helicopter Blade Balancing System

Rotor blades for the CH-53K King Stallion helicopter that arrive for rework at Fleet Readiness Center East (FRCE) will be balanced on a new system that will save about $18 million by eliminating the need for building a new testing facility.

Helicopter rotor blades must be balanced to reduce vibration that can place stress on the helicopter's airframe. At FRCE, this balancing process has traditionally been performed using the facility's Helicopter Blade Balance Facility, commonly known as a whirl tower, to simulate the blade's performance in flight.

U.S.Navy photos by Kimberly Koonce

Robert Call, left, work leader for the Fleet Readiness Center East (FRCE) dynamic components shop, and Zackary Barnard, rotor blade shop lead engineer, position an H-53E helicopter blade on the universal static balance fixture (USBF) to begin the balancing procedure. The H-53K program will use the USBF system to balance its blades because the fixture can accommodate the increased length and weight of the new aircraft's blades.

"Normally, when you balance a blade, you're using a physical master blade," said Joshua Peedin, senior rotor systems engineer for the H-53 Fleet Support Team (FST). "You check it against a static balancer, then you run it on the tower to take into account the dynamic loads. The goal is to make the blade weigh and fly similar to the master blade."

However, the whirl tower at FRCE doesn't have the size or the horsepower to accommodate the length and weight of a CH-53K blade; that's where the universal static balance fixture, or USBF, comes in.

"The USBF fixture creates a virtual master where the known parameters, dimensions and characteristics of the master blade are entered into the software," Peedin said. "When you weigh a main rotor blade, it compares the data against the virtual parameters to tell you how to adjust the blade and what weights to add or subtract."

The artisan then adds weights to the tip end of the blade, in positions that affect the lengthwise weight of a blade or how it will pitch forward and back. This process must be precise—the weight difference caused by sanding or applying a repair can spell the difference between balancing a blade or sending it back to the manufacturer for stripping and rebuilding.

The USBF is currently used to balance H-53E main rotor and tail blades, as well as blades for the V-22 Osprey and H-1 Viper and Venom aircraft. The system has performed so well that the maintenance plan for the new CH-53K model calls for its rotor blades to be tested on the USBF, according to FRCE engineers.

The decision whether to adopt the USBF system required extensive testing in order to gather and analyze data, Peedin said.

"We used the data we procured while testing H-53E blades to validate the process," he said. "As we stepped through and finally tested it on aircraft, everyone became comfortable enough with the results to remove the whirl tower requirement from the CH-53K maintenance plan in favor of the USBF."

The USBF system's reliability and comparatively low purchase and maintenance costs are expected to help FRCE meet the fleet's needs for economical maintenance strategies for the H-53K program, according to Daniel Ventry, CH-53K lead system engineer at the H-53 FST.

"The addition of this system is one of the initiatives that the program is investigating to reduce the total life cycle cost of the new acquisition program," Ventry said. "As we develop the strategy for the life cycle, one of our tenets of the program strategy is to ensure that the long term sustainment of the program is as cost effective as possible."

FRCE engineers and artisans say the static fixture is more reliable than the whirl tower, which can be affected by wind, rain or bright sunlight. In addition, crane maintenance can also be a factor in whether the whirl tower can be used on a

given day. Conversely, the USBF is housed in a climate-controlled building with four overhead crane systems available for use.

"Just the other day, I had blades up and I got a call from the [air traffic control] tower saying there was a gust of wind coming at 30 knots," said Robert Call, work leader for the dynamic components shop. "I had to run out there and take them down, or the wind could snap a blade. I can run blades on the new fixture no matter what the weather."

Unlike the whirl tower, FRCE has a backup USBF fixture available for use in case the primary system requires maintenance or repair. The H-53 Program Office procured two USBF fixtures to mitigate any potential downtime that could result from an inoperable system, said Zackary Barnard, rotor blade shop lead engineer at FRCE. In addition, with a price tag of $170,000 per unit, engineers say the USBF system is more economical than the whirl tower in the long run.

"The cost to run the tower, as far as power draw and maintenance, is around $500,000 a year," Barnard said. "The USBF doesn't have those costs."

The systems are also portable, which makes them accessible to deployed units. Engineers said this ability to balance blades will allow fleet maintainers to perform more blade repairs on site.

"There are some repairs the fleet couldn't perform because the blade had to be balanced afterward," Peedin said. "Now they'll have the capability to balance the blade rather than sending it back to FRCE for balancing, which means they can do more repairs themselves."

FRCE engineers are hoping the new system will give them forecasting ability to determine the outcome of repairs before the work is done. The plan is to use the data collected from the USBF to create a "cheat sheet" to determine how much a repair can be expected to add to the weight of the blade.

"That way, when I evaluate a blade, I can see that blade has XYZ weights on it, and when the aircraft examiner recommends a repair, we have a playbook that says this repair weighs this much," Peedin said. "You can see how the blade is currently weighted and get an educated guess as to whether we can still balance the blade when this is done."

Engineers say this preplanning will help eliminate the time and money spent on unsuccessful repairs.

"There's always a concern with blades that need a lot of repairs that we will put in the effort for a repair only to find we can't balance the blade due to the additional repair weight," Barnard said. "This will allow us to know whether a blade can ultimately be balanced before we perform the repairs."

Peedin said adopting the static balance fixture system for the CH-53K blades has taken some time to validate, because the whirl towers have such a long history of balancing blades. However, he said the feedback the USBF system is getting makes his efforts in advocating for the system worthwhile.

"My biggest satisfaction was when we got the first two units here, and we started putting blades on them and getting consistent data," Peedin said. "A great deal of effort has gone into procuring this system, and it's gratifying to see evidence that we're going in the right direction."

Joshua Peedin, left, senior rotor systems engineer for the H-53 Fleet Support Team, and Robert Call, work leader for the dynamic components shop, inspect the weights used to balance an H-53E rotor blade. Fleet Readiness Center East uses the universal static balance fixture to balance rotor and tail blades for the H-53E, V-22 and H-1 helicopters, and the H-53K program plans to use the fixture to balance its blades as well.

The Helicopter Blade Balance Facility's whirl tower has traditionally been used to balance helicopter rotor blades at Fleet Readiness Center East. However, the H-53K program is opting to use the universal static balance fixture (USBF) instead of the whirl tower to balance its blades, because the USBF can accommodate the increased length and weight of the blades for the new helicopter.

FRCSW First Depot to Tackle Super Hornet Service Life Modification

When the artisans, engineers and support staff of Fleet Readiness Center Southwest (FRCSW) inducted their final F/A-18 legacy (A-D model) Hornet fighter to undergo the Center Barrel Replacement (CBR) procedure last March, they probably thought they could take a break.

Not so.

Once again the command is at the maintenance forefront of the F/A-18 airframe, this time taking the lead as the only FRC currently assigned to perform the Service Life Modification (SLM) to the Super Hornet E and F variants.

Like the legacy CBR procedure created by FRCSW in 1991, the Super Hornet SLM will be conducted when an aircraft reaches 6,000 flight-hours, extending the service life of the airplane to 7,500 and eventually 10,000 flight-hours.

Super Hornet variants have been active in naval service since 1999.

"The SLM will involve over 20 direct artisans as well as a team of maintenance, repair and operations (MRO) and Fleet Support Team (FST) engineers and other support groups."

The SLM aircraft FRCSW inducted on June 29 has approximately 6,200 flight-hours logged, and is assigned to Strike Fighter Squadron (VFA) 106 from Naval Air Station Oceana, Virginia.

FRCSW F/A-18 Legacy & E/F Program Manager Ehren Terbeek said that the Super Hornet SLM will require less time to complete than the legacy CBR/high-flight-hour modifications because the Super Hornet procedure will not involve the replacing of major structural components.

So, the SLM should be complete in several hundred hours vice several thousand as needed for the legacy Hornets.

"The SLM will involve over 20 direct artisans as well as a team of maintenance, repair and operations (MRO) and Fleet Support Team (FST) engineers and other support groups. They have been tasked with a 17-month turn-around time (TAT) but will work in earnest to complete the project earlier than that," Terbeek said.

"The SLM will be comprised of a series of inspections that can drive repairs, as well as incorporate technical directives and standard dispositions that have been created for the event."

U.S. Navy photo

The first F/A-18 Super Hornet fighter aircraft to undergo the Service Life Modification (SLM) procedure at a Naval Aviation depot is pictured at the FRCSW testline June 29. The aircraft, assigned to Strike Fighter Squadron (VFA) 106, will undergo induction for the SLM that will extend the airframe's flight hours from 6,000 to 7,500. The procedure is estimated to take about 17 months.

"The most difficult aspect in performing the modification is the unknown of opening up a 6,000 flight-hour aircraft, the known requirements are understood by the team but it is the unpredictability of items outside of the scope of work that are always the most worrisome," Terbeek said.

The F/A-18 & EA-18G Program Office and Boeing established the initial procedures for the SLM, and two years ago, Boeing delivered the first Super Hornet to complete the modification to the Navy.

Otherwise, the Super Hornet and EA-18G Growler airframe typically undergoes one Planned Maintenance Interval (PMI) every six years.

"The SLM does offer the opportunity to credit an E/F aircraft with a new fixed induction date (FID) for PMI if certain requirements are met during the modification," Terbeek said.

Terbeek added that eventually Block III upgrades, or avionic type modifications, will be added to the existing SLM workload. The upgrades include an advanced cockpit system with a touch-screen display, enhanced networking and a reduced radar signature.

The SLM budgeted cost per aircraft is currently $5.5 million.

FRCSW will induct its second SLM Super Hornet during the second quarter of Fiscal Year 2023.

"The entire team has worked in earnest in preparation for the induction of this aircraft with just a 30 day notice. FST, MRO-E, PSLs and production have worked long hours to ensure that the work scope and packages were prepared so that FRCSW is successful in returning the asset back to the warfighter and in hopes that we can continue to contribute to SLM in the future," Terbeek said.

Professional Reading

By Cmdr. Peter Mersky, USNR (Ret.)

When the Shooting Stopped, August 1945

By Barrett Tillman, Osprey Publishing, Oxford, UK. 2022. 304 pages. Ill.

So many books and articles and occasional papers have been written about World War II's different theaters, it might be good to stop and consider if anything at all has been written about when the fighting stopped, when the war was finished and people were allowed to return home from whence they came to fight, or what were they doing when word of the ceasefire finally reached them. Leave it to one of military aviation's premier authors and historians to step up to take a crack at this unusual bit of reporting.

My father was a Navy Yeoman 1st class stationed at Pearl Harbor in mid-1945, working on highly classified maps for the planned invasion of the Japanese Home Islands. His younger brother Frank had just returned home after being badly wounded chasing the Germans out of Italy while he was a member of the Army's 10th Mountain Division's ski troops. Frank and his men had taken shelter in a mountain tunnel near Venice when a German shell hit the tunnel and he was almost killed. If my father ever knew about it, much less my grandparents, I never knew.

Though I asked my father about the details of his unit, I never asked him where he was when word came of the Japanese surrender on Aug. 15, 1945. I still don't know. Was he at work, or was he on liberty amid the daily throngs in Honolulu? Just one example of a remaining hole in the tapestry of history in that momentous time.

But Tillman fills other holes. Missions from carriers still launched, and still ran into opposing Japanese Army and Navy fighters. Hellcats still wheeled in high-altitude dogfights against the still dangerous Zero as Japanese pilots flew as ordered to destroy the daily attacks on the homeland. Young men still died although the word was slowly coming to cease hostilities. New B-32 Dominator bombers flew photo-reconnaissance missions. The B-32, which looked more like a single-tailed derivative of the famous B-24 Liberator, but was once considered a second-string replacement for Boeing's seminal B-29 Superfortress that had been laying waste to Japanese cities and industrial targets since late 1944, and had even ushered in the nuclear age by bombing Hiroshima and Nagasaki a week before the surrender.

Both sides were spent, tired, national economies were in ruins all over the world. Yet, the Soviet Union, under the draconian rule of Joseph Stalin, one of the most ruthless dictators world history has ever seen, was bound and determined not to be left out of whatever post-conflict pickings might be gained by attacking Japanese targets on Aug. 8, a week before the surrender in the far east of the Eurasian continent. Indeed, who could forget that Stalin had signed a non-aggression pact with Adolf Hitler, who had then attacked the USSR in June 1941, something the German dictator had always had in mind.

This book is a heavily detailed, thoughtful account of what brought the Japanese surrender and all the events that affected so many people in and out of the military, not just those actually in combat. Tillman has many vignettes to tie together like the fateful atomic bombing approach and afterward when word is passed by various sometimes secretive avenues, but without a definite word of capitulation from Japanese leaders. Preliminaries also include military and political personalities, fighting for their continued piece of the action as plans are laid for the final push toward the Home Islands in late 1945 or early 1946.

There was also confusion in Japanese inner circles, especially what to do with Emperor Hirohito and his guarded speech on Aug. 14 to his people about accepting the Potsdam and Allied surrender terms. The Soviet attacks are told in particular detail

Just before a flight to Luzon in the Philippines on Aug. 25, 1945, this B-32 taxis at Yontan Air Strip (sic) on Okinawa.

Photo courtesy of National Archives and Records Administration (NARA)

Convair B-32 Dominator

Showing its huge single vertical tail, but originally designed with twin vertical tails, and something of a contestant against Boeing's advanced B-29, only 115 Convair B-32 Dominators were built, with only 15 of the big bombers seeing very limited action in the final months of the Western Pacific. On Aug. 17, 1945, two days after word came of the Japanese surrender, two B-32s of the USAAF's 386th Bomb Squadron, 312th Bomb Group were sent out on a photo-recce mission to monitor the state of operations of selected Japanese air bases. Japanese Navy fighters intercepted them and attacked the Dominators. Among the attackers was newly promoted (Aug. 1, 1945) high-scoring Navy ace Lt. jg. Saburo Sakai flying an N1K1 Shiden (code-named "George"). He had lost his right eye on Aug. 7, 1942, flying a Zero and attacking SBD Dauntlesses over Guadalcanal. His tortured flight back to his base on Rabaul became one of the epochal survival stories of the Pacific air war. Although Sakai's accepted total is 64 kills in China and the Pacific, many historians now believe his total was much less, perhaps no less than 28. Actually, Sakai, himself never made the claim his total was 64.

The massive 800-plus flyover (460 B-29s—after a 6 ½-hour flight from the Marianas—and 349 carrier aircraft flying at perhaps 1,500 feet to 3,000 feet, because of weather conditions, including some 2,200 engines) of the surrender-signing ceremony aboard the USS Missouri (BB-63) on Sept. 2, 1945, and other assembled ships bears witness to how strong the Allies had become since Pearl Harbor (Dec. 7, 1941) and frankly, how weak the Japanese had deteriorated.

Photos courtesy of NARA

Viewing space was crowded aboard the Missouri on Sept. 2. Framed by two of the barrels of three-16-inch guns of one of battleship's two forward turrets, servicemen of the Navy and Marine Corps, as well as members of other nations' services strain to see and hear the historical event ending World War II.

and given today's headlines about Russian aggression in Ukraine, bear marked similarities some 77 years later. As previously noted, aerial action was surprisingly brisk with Navy Hellcats tangling with Zeros, Franks and Jacks (army and navy fighters) as well as last-ditch kamikaze raids.

The most poignant chapter is No. 4. Tillman takes time to write a collection of often emotional vignettes around the world describing how news of the surrender first affected the many people from the U.S. in ships still deployed and men still fighting every day in in Asia—from the iconic kissing sailor and nurse in New York City's Times Square, to the cockpits thousands of feet in the air over the targets, to even dazed Japanese soldiers hiding in forsaken jungles waiting to hear of the war's end.

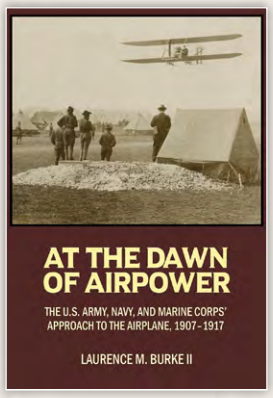
At one point, the author discusses the contemporary histories of India and China and their leaders, a brief digression from the book's main story line. There is the story of Mao tse-Tung's Communist party that would soon split the huge country's political and national social identity.

The predictably complicated, dangerous and definitely emotional surrender ceremonies aboard the battleship USS Missouri (BB 63) on Sept. 2, 1945, are described in great detail as victor and vanquished (that is, if the Japanese ever truly considered themselves conquered) make for interesting and colorful reading.

Barrett Tillman's latest book is a valuable anthology of how the war that truly engulfed the world finally came to an agonizing end—and yet, did it? Korea, five years later, Vietnam two decades later perhaps proved it hadn't. The antagonists had just changed somehow. Today's conflicts from Europe to the Middle East still can point to a number of unsettled religious and nationalistic scores that began in the early to mid-20th Century.

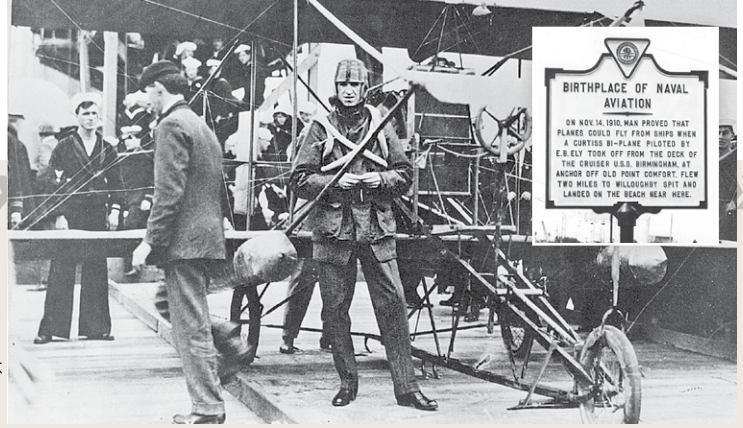
At the Dawn of Airpower, the U.S. Army, Navy and Marine Corps' Approach to the Airplane, 1907-1917

By Laurence M. Burke II
Naval Institute Press, Annapolis, MD. 2022. 338 pages. Ill.



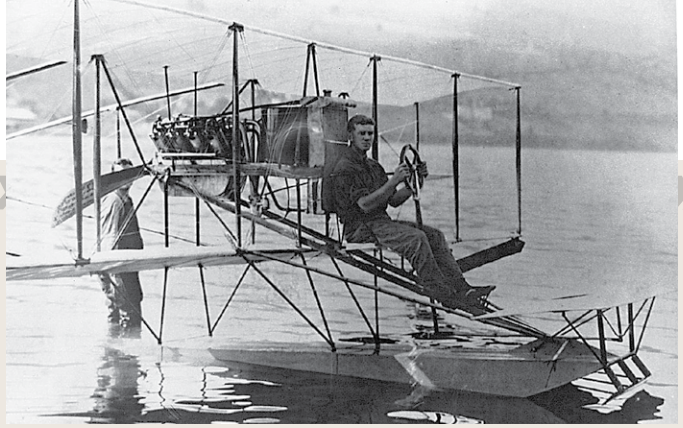
Books about the first decade of aircraft development and use by the U.S. military are few and far between, and several have come from the Naval Institute Press, the publication arm of the venerable U.S. Naval Institute, based in Annapolis, Maryland, which the United States Naval Academy also calls home. This latest book on the subject of early military aviation is a lengthy discussion of how the three main American services first discovered aviation then took their time in indoctrinating their first aviation crews and their aircraft into halting use and understanding. It wasn't easy. Few major technological advances are. It might be said that even today, a century later, we are still learning how to best design and build and finally use the descendants of these flimsy doped canvas-and-wood flying machines.

The author has served as an experienced curator of several aviation museums and departments, including the imposing National Museum of the U.S. Marine Corps at Quantico, Virginia, certainly not to be missed by tourists of the Washington, D.C., area and especially Marine Corps veterans of any years' duration. To an extent, his writing emulates that of an academician, typical of a Ph.D.'s (which he is)



U.S. Navy photos

Eugene B. Ely by his Curtiss Model D between landing and takeoff on the armored cruiser USS Pennsylvania (ACR-4/CA-4), Jan. 18, 1911. Note his padded football helmet and improvised personal flotation inner tubes. Note also, the inset photo of a road sign on eastbound Virginia State Highway 60 just outside NAS Norfolk, which I took in 1984. It commemorates Ely's flight on Nov. 14, 1910, from the cruiser USS Birmingham (CS-2), the first aircraft launch from a ship and his subsequent landing on a nearby beach near Willoughby Spit.



Lt. Theodore G. Ellyson (1885-1928) reported for flight training in early 1912 to the Curtiss pilot training camp at Hammondsport, New York. He is probably seated in the Curtiss A-1 at Hammondsport, which he flight tested as the first Navy aircraft, shortly afterward becoming the first designated Naval Aviator in the process. He rose to commander but was killed in the crash of his Loening XOL-7 on the night of Feb. 27, 1928, while flying to Norfolk. It was his 43rd birthday.

doctoral thesis, and it starts out with a lengthy heavy-worded introductory first chapter describing how each service began its particular air department.

I have to say the single folio of photos leaves much to be desired. Many of them are just poorly reproduced. The last photo especially is poorly presented. Its caption takes pains to point out a most important figure in such black shadow as to be hard to find and its detail is non-existent.

The author discusses the difficulties each service encountered in establishing its early operations, exacerbated by the unreliability of aircraft engines and performance of the day, which definitely highlights the courage and dedication of the first military aviators. He often describes the ever-present bickering between the Army and the Navy as to who knew more, had more experience about aviation and used their few aircraft and growing force to the better advantage.

There are details of the long and varied career of Capt. Washington Irving Chambers who held several positions during the first two decades of the development of American Naval Aviation, often overlooked except in brief mention. These details may be new to many general readers but show his dedication to the new department of the Navy, a dedication that was poorly rewarded in the long term.

Chapter 6 is an excellent thought-provoking analysis of the developing friendships and positive inter-service attitudes of the U.S. services as they struggled to develop their individual air arms while establishing human understanding of the new endeavors they and their youthful representatives tried to work out. All this hard work would be needed 30 years later in the second world-wide conflict that was seething just below the surface even while the *first* world war was still in progress. Even Capt. Chambers had a second chance to be included. It is the first time I have seen such items of historical personal and professional interest in the world of military aviation described in such detail and shows a typical American take on working together for the common good and makes reading this book worthwhile.

The full-force expedition, led by then-Brig. Gen. John "Black Jack" Pershing, in March 1916 into Mexico in pursuit of the bandit chieftain Pancho Villa, complete with Curtiss JN-3 two-seaters, provided important though at times frustrating lessons for Army aviators and their support teams.

The so-called "European War," which became World War I, was still far away in 1915, but America watched the proceedings with growing interest, especially the use of aircraft by the warring powers. The Allies allowed occasional visits by American officers to observe the new weapon and its development, and by the time the U.S. entered the war in April 1917, American aviators had already seen combat with French and British squadrons. The U.S. Army, Navy and Marine Corps had spent the period of "neutrality" devising their own units, augmented by these experienced pilots and crews.

This is one of the more unusual books on early aviation, a scholarly treatise that gets into such areas as the initial use of pusher-engine arrangements (with the engine mounted behind the cockpit) versus the soon-to-be more popular tractor placement of engines in the front end of the aircraft. The Army discarded pushers fairly quickly whereas the Navy used the arrangement a bit longer. Another example is the constant rewriting and reorganizing of administrative programs, though not advanced (at least in modern terms), even those of two or three decades after the initial period. Military aviators struggled to find stability in these areas in the first decade of military and uniformed aviation. Perhaps one could say, at least from the Navy's viewpoint that such constancy did not come about until the arrival of its Naval Air Training and Operating Procedures Standardization program (more familiarly known as NATOPS) in 1961.

Even with a brief list of its negative points, "At the Dawn of Airpower" is still an important addition to the history of early military aviation and definitely deserves a place in the gap of such historical writing.

STRIKE TEST NEWS

SPECIAL SECTION: AIR TEST & EVALUATION SQUADRON (VX) 23

U.S. Navy photo by Erik Hildebrandt

Greetings from the world of developmental test at Air Test and Evaluation Squadron (VX) 23, based at Naval Air Station Patuxent River, Maryland. Our mission is to execute research, development, and test and evaluation of fixed-wing tactical manned and unmanned aircraft and it is an exciting time to be a Salty Dog. We're working hard to increase capability and lethality for the Fleet testing new software for the F/A-18 Super Hornet and the EA-18 Growler, and the F-35 is poised to begin the Block 4 aircraft test program. We completed the MQ-25 Unmanned Aircraft System demonstration program with deck operations onboard a carrier, and now await delivery of the first flight test articles.

One of Naval Aviation's greatest strengths is its network of warfighters. The ability to bring together a diversity of experience and perspective delivers the best solutions to our warfighting challenges. As you read this issue of Naval Aviation News, if you have questions about what we are working on in the developmental test world please reach out to the contacts in this issue. If you are interested in joining us at VX-23, we welcome you to visit. Collaboration is key for our organization to continue its excellence in flight test.

–Cmdr. Daniel "Tonto" Kitts
Commanding Officer, VX-23

BACK TO TOC

U.S. Navy photo

Integrating the Live and Virtual Environments for Development and Training

A TCTS II pod loaded on an Air Test and Evaluation Squadron (VX) 23 F/A-18F Hornet at Naval Air Station Patuxent River, Maryland.

By Lt. Cmdr. Colin "Honey Bear" Locke

"Train like you fight:" This mantra is becoming a reality as advanced technology ushers in training environments that merge live, virtual and constructive (LVC) capabilities to expand the scale and complexity of training conditions. LVC training environments connect live, in-person elements with manned virtual simulators and constructive computer-generated forces.

Recently, VX-23 conducted flights of the Tactical Combat Training System Increment II (TCTS II) in support of Advanced Naval Technology Experiment (ANTX) 2021, Large Force Exercise (LFE) 2021, and ANTX 2022; and the Secure LVC Advanced Training Environment (SLATE) system.

TCTS II is the Navy and Air Force's next generation secure, LVC-enabling, air combat maneuvering instrumentation system that connects live aircraft LVC entities on the Navy Continuous Training Environment (NCTE). ANTX21 and LFE21 marked TCTS II's first carriage on board a fleet aircraft and demonstrated the TCTS II's connection of live aircraft to the NCTE, allowing those aircraft to receive constructive radar warning receiver threats generated from the NCTE. Participants included four live aircraft, the Naval Air Warfare Center Aircraft Division's Manned Flight Simulator emulating a virtual F/A-18F, and the USS Bainbridge (DDG 96). During the event, the live and virtual aircraft performed simulated air-to-surface and air-to-air weapons employments while receiving synthetic radar warning indications and real-time kill notifications from successful weapons engagements. In June 2022, ANTX22 built upon the ANTX21 event with link inject-to-live, fleet simulators at the Strike Fighter Wing Atlantic and Airborne Command & Control and Logistics Wing, constructive threats from the Naval Aviation Distributed Training Center, and two live aircraft.

Earlier this year, VX-23 also conducted flight testing of SLATE. The Navy has used the system to identify and demonstrate technical specifications and standards needed to meet LVC requirements. SLATE connects airborne pods with other aircraft, virtual simulator and constructive entities, and injects them and their simulated weapon

employments onto cockpit displays. The SLATE pod's onboard LVC processor enables synthetic air and ground threats to appear as dynamic, realistic tracks to virtual and live aircraft sensors. Constructive entities can engage all scenario participants with representative weapon fly-outs modeled by the SLATE weapons server, and successful engagements result in a real-time kill notification for the targeted aircraft. VX-23 conducted eight flight events demonstrating SLATE's technical maturation and refining core-enabling technologies to accelerate advanced LVC training capability to the fleet.

LVC capabilities have shown their effectiveness in expanding the scale and complexity of training options, the importance of which increases as the threat of potential near-peer conflict grows. Leveraging the work and lessons learned from the SLATE advanced technology demonstration accelerates TCTS II's continued development and fielding of these critical LVC capabilities to the fleet.

Increased Aerial Refueling Compatibility Facilitates True Joint Environment

By Marine Corps Major Paul "RABBIT" Gucwa

Aerial refueling capabilities can increase the range, lethality and survivability of modern aircraft. Maximum compatibility between tanker and receiver aircraft enable warfighters to get to the fight and return home safely.

U.S. Navy photo

An F-35B Lightning II strike fighter and a KC-46A Pegasus tanker execute aerial refueling compatibility testing near Naval Air Station Patuxent River, Maryland.

An F-35B Lightning II fifth generation strike fighter conducted compatibility and envelope expansion testing with the U.S. Air Force's newest tanker aircraft, the KC-46A Pegasus, in October 2021. The test not only proved that the systems worked together, but that they worked at the limits of each aircraft's flight envelopes.

The F-35 Integrated Test Force (ITF) team used data from previous tests on similar tankers to streamline their approach. This allowed them to start testing further into the envelope limits of both the F-35 and the KC-46A. Typically, testing is done incrementally starting with a clean aircraft, one that has no extra weight in its configuration, and then moving step-by-step to the maximum load the aircraft will carry. Since data was available for many of those configurations, the ITF immediately went to the highest weight and furthest edge of the respective aircraft's aerial refueling envelope to begin testing. Leveraging the near identical flying qualities in the aerial refueling envelopes of the F-35B short takeoff vertical landing (STOVL) and F-35C carrier variants allowed the team to clear both for KC-46 operations without requiring a repeat of every single point. This approach drastically cut the time and money required to complete the evaluation and push clearance to both the F-35B and F-35C fleets. In total, only five flights were required, with the last occurring in early November 2021. The team released the full flight clearance in January 2022.

This type of streamlined approach to flight test is one of the many benefits of joint programs like the F-35. Although demonstrated on what is typically considered a simple mission set in modern aerial warfare, the attitude and professionalism exhibited by both the KC-46 and F-35 test teams demonstrated that despite the challenges and often long timelines inherent to the acquisition process, a properly motivated team can clear those hurdles and deliver a solid product and capability to the warfighter in a timely manner.

Deck operators test a new Deck Control Device for the MQ-25 Stingray aboard USS George H.W. Bush (CVN 77) as part of flight deck integration testing.

Collaborate to Innovate: Grassroots Effort Fosters Integrated Test Ops

By Lt. Zach "FAb" Fisher

A grassroots movement–started at Naval Air Station (NAS) Patuxent River, Maryland–is fostering integrated test operations across the Navy's test enterprise.

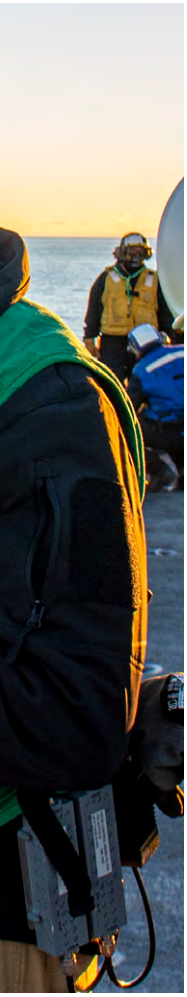
Formed as a prototype for the Warfighter Integration Network (WIN), the "INTEROP" (a shorthand phrase for interoperability and co-op) cuts across organizational, disciplinary and administrative boundaries to facilitate routine integrated tactics and test events. It furthers WIN's vision to be a human network that connects military operators across the Navy by linking groups, like the INTEROP, that are focused on collaboration, integrated evaluation and mission alignment. Project officers and engineers from Air Test and Evaluation Squadrons (VX) 23, 20 and 1, and (HX) 21 are championing this effort with the support of personnel from the Naval Air Warfare Center Aircraft Division (NAWCAD), Naval Air Warfare Center Weapons Division and Naval Surface Warfare Center Dahlgren.

The INTEROP breaks down communication barriers associated with typical organizational structures to eliminate information silos, limit redundant

Unmanned Carrier Aviation Demonstration Gives Glimpse of the Air Wing of the Future

By Lt. Nick "ALF" Waugh

The Air Wing of the Future is here. The Unmanned Carrier Aviation Demonstration (UCAD) conducted by the MQ-25 Stingray Integrated Test Team recently evaluated the deck handling system, propulsion testing and lighting evaluation of the aircraft.



U.S. Navy photo by MC3 Brandon Roberson

The MQ-25 will be the first unmanned platform to operate from the flight decks of U.S. aircraft carriers, as well as take on the responsibility of refueling other platforms within their designated air wing.

This refueling capability alone will free the F/A-18 Hornet to focus solely on its strike fighter mission set, and pave the way for future unmanned platforms' integration into the carrier air wing.

UGAD brought the Boeing-owned prototype, known as T1, aboard USS George H.W. Bush (CVN 77). Traditionally, aircraft platforms navigate the flight deck with the help of flight deck directors, affectionately referred to as "Yellow Shirts" for the yellow jerseys and float coats they wear on the flight deck. Yellow Shirts communicate with pilots via hand signals to help them taxi out of tightly packed spots on the flight deck, around obstacles such as other aircraft and people, and into the catapult system used to launch aircraft. As an unmanned asset, MQ-25 will not have the luxury of a pilot in a cockpit to view hand signals, so a deck handling system was developed to accomplish the task of taxiing and negotiating obstacles between the aircraft and its ultimate destination of the catapult track or parking spot.

During the demo, T1 employed Deck Operators (DO) who use Deck Control Devices (DCD)—a control stick held in the right hand with a small display strapped to the right forearm—and radios around a belt. The DOs stood behind the Yellow Shirt and input commands to the aircraft via the DCD, communicated by the

efforts and reduce interdisciplinary knowledge gaps. Since its inception in December 2021, the INTEROP has conducted nine events totaling 45 sorties across nine type-model-series aircraft from both operational test and developmental test squadrons. With a coalition nearing 200 people, the INTEROP facilitates sharing of best practices and has highlighted the importance of digital tools. Under NAWCAD's Rapid Prototyping Experimentation and Demonstration's (RPED) management, the group is using lessons and findings to develop a secure online collaboration system with Georgia Technical Research Institute through funding from NAWCAD Naval Innovative Science & Engineering. This tool will enable users from across the fleet and acquisition community to share lessons learned and fresh ideas, provide real-time updates and feedback, and send large files.

The benefits of this effort have been immediate and evident. The group has overcome human networking obstacles, fixed tactical data link issues (e.g. Link 16 crypto modernization and creating a persistent Link 16 network at NAS Patuxent River) and developed integration flight products. It has also found developmental system deficiencies and investigated new mission threads to complete kill chains with the newest developmental and operational systems. A standing group of liaisons from different capabilities and agencies regularly plan for the next event, set objectives, and integrate live, virtual and constructive environments. They focus on mission-relevant scenarios to add value to multiple program offices simultaneously, and will become a venue for RPED to introduce new technologies.

The INTEROP will continue to grow as it incorporates additional warfare centers, program office partners and test commands in multiple services to drive collaboration while creating a feedback loop from fleet operators to the acquisition community.

U.S. Navy photo by MC3 Brandon Roberson

A Boeing unmanned MQ-25 aircraft rests aboard the flight deck aboard the aircraft carrier USS George H.W. Bush (CVN 77).

same hand signals given to manned platforms. Multiple DOs were used so the aircraft could seamlessly taxi across the entire span of the flight deck. When the aircraft taxied beyond a DO's range, control of the aircraft was passed to the next DO in position on the flight deck via an input on the forearm display. This technique was used to evaluate deck handling for taxiing out of the landing area, simulating post recovery spotting, as well as taxiing into the catapult, taxiing out of the catapult and taxiing into tight parking spots.

"UCAD was a success and provided the necessary data to reduce risk moving forward in the program, and demonstrated the capability to safely and efficiently integrate and operate with the air wing on the flight decks of aircraft carriers."

The other two components of flight deck integration are propulsion tests and lighting evaluations. Propulsion tests are used to evaluate an aircraft's engine performance during start-up on the flight deck with tail and crosswinds, its performance while waiting in line for launch behind a jet blast deflector with an EA-18G Growler, at varying power capacities, in the catapult, and with T1 in the catapult at varying power capacities. The lighting evaluations are conducted at night with a variety of flight deck light settings to determine proper illumination of the aircraft for night deck operations.

The Joint Precision Approach and Landing System (JPALS) testing using a surrogate aircraft was conducted concurrently during the detachment and collected much needed data for MQ-25, as it will be the first aircraft to use JPALS for fully automated landings aboard aircraft carriers. The MQ-25 test team flew 13 approaches and collected data using the same hardware and software that will be used by both the ship and MQ-25 for recoveries. Once the recovery is complete, the DOs pick up control of the aircraft and use the same deck handling system to park MQ-25 on the flight deck.

UCAD was a success and provided the necessary data to reduce risk moving forward in the program, and demonstrated the capability to safely and efficiently integrate and operate with the air wing on the flight decks of aircraft carriers.

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- **Results Posted:** January/February 2023

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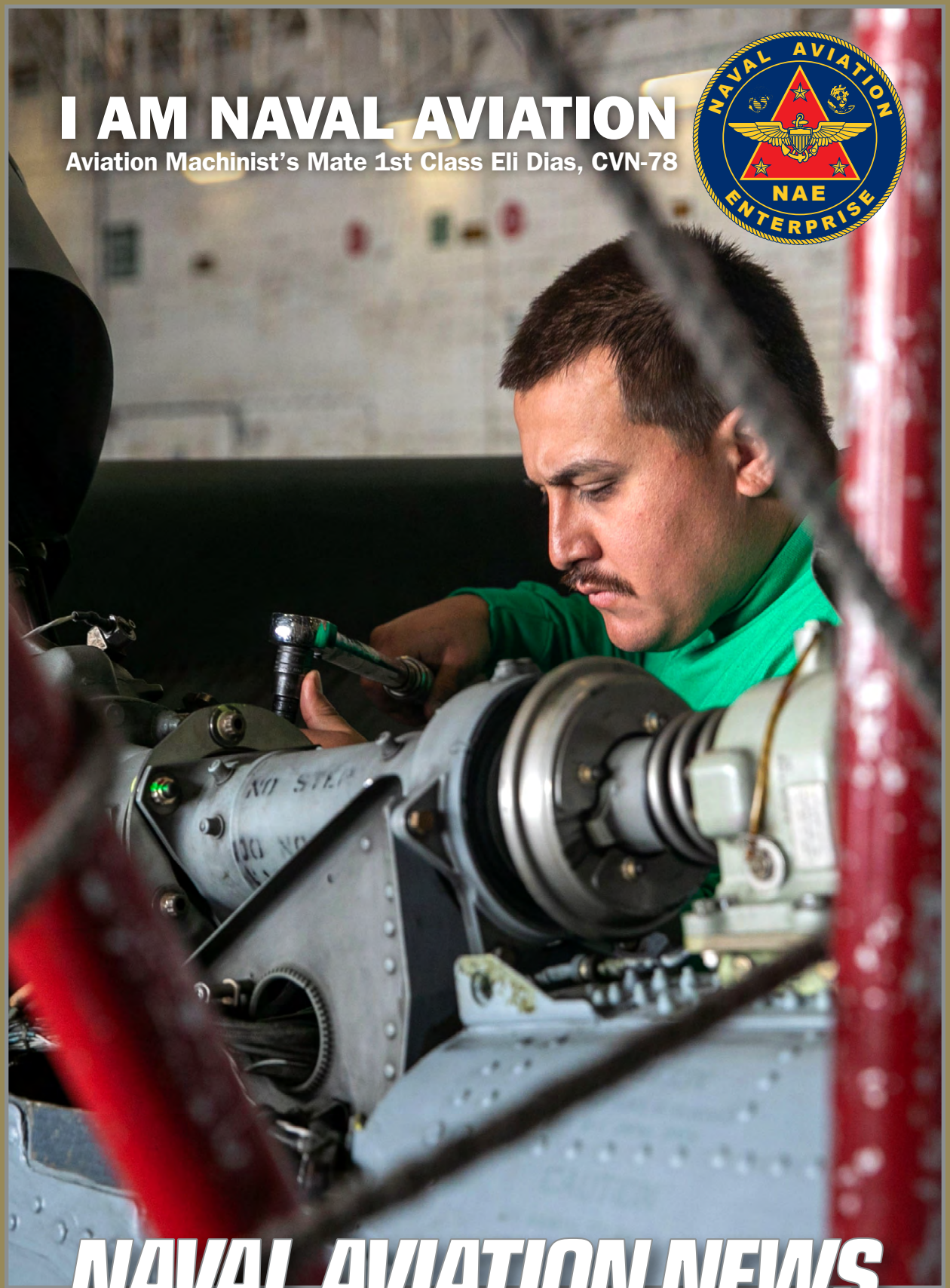

I AM NAVAL AVIATION

Aviation Machinist's Mate 1st Class Eli Dias, CVN-78

NAVAL AVIATION NEWS

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