NAVAL AVIATION NEWS

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SUMMER 2021

THE FUTURE IS NOW

Carrier Air Wing 2

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An MV-22B Osprey, attached to Task Force 51/5, prepares to land aboard expeditionary sea base USS Lewis B. Puller (ESB 3), during flight operations in the Arabian Gulf, July 16.

U.S. Navy photo by MCS2 Dawson Roth

NAVAL AVIATION NEWS

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ON THE COVER

On the cover: *Carrier Air Wing (CVW) 2 "Broadsword" participates in Air Wing Fallon in preparation for its upcoming deployment later this year. (U.S. Navy photo by Lt. Cmdr. Lydia E. Bock)*

In this edition we celebrate recent Naval Aviation milestones, starting on page 22 with the conducting of Full Ship Shock Trials of first-in-class USS Gerald R. Ford (CVN 78), putting the aircraft carrier one step closer to operational deployment. On page 32, we highlight how the Hornet Health Assessment and Readiness Tool (HhART) has directly contributed to the decline in physiological episodes (PEs) in pilots. In the Marine Corps, aviators are taking cues from online gaming concepts to train for flight, page 36. As we have featured in summers past, we host a special section from Air Test and Evaluation Squadron (VX) 23 on page 47, where members of the squadron share the latest updates on emerging technology being tested prior to fleet delivery; we also introduce the squadron's new commander, Capt. Elizabeth Somerville, the first woman to take command of VX-23 on page 44.

On the back cover: *Petty Officer 2nd Class Ty Nichols, a crew chief with Helicopter Sea Combat Squadron (HSC) 25, is lowered from an MV-22B Osprey during integrative advanced hoist training aboard amphibious assault ship USS America (LHA 6) in the Coral Sea, July 16. (U.S. Marine Corps photo by Cpl. Karis Mattingly)*

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Flightline

NSS-A Focuses on Fleet Readiness Center Reform

By Rear Adm. Joseph Hornbuckle, Commander, Fleet Readiness Centers

The Naval Sustainment System for Aviation (NSS-A) seeks to recover readiness to increase combat capability and create a model of sustainment that will allow the Navy to more effectively project combat air power.

As one part of the Navy's strategy to deliver the Navy the Nation Needs, NSS-A focuses on optimizing all elements of aviation maintenance to ensure Naval Aviation is ready to compete, deter and win. NSS-A delivers an integrated approach to providing support functions with the goal of creating more mission-capable aircraft.

One of the key pillars of NSS-A is Fleet Readiness Center (FRC) Reform. As we continue to work toward scaling NSS-A across all type/model/series (TMS) aircraft, we must focus on transforming our facilities to accommodate requirements from a modernized fleet.

Commander, Fleet Readiness Centers (COMFRC) is improving its workforce, facilities and processes to provide Naval Aviation with elite-level organic repair centers. Along with the investments in our facilities, our workforces have adopted proven commercial practices to maximize quality and cost efficiency while minimizing repair cycle timelines.

To build more effective repair depots, Naval Aviation has instituted the Fleet Infrastructure Optimization Plan (FIOP), designed to reset aviation maintenance's most critical facilities and equipment.

NSS-A efforts revealed sustainment challenges including the capacity at FRCs to sustain and modernize aircraft, engines, components and support equipment. Constructed and procured decades before the conceptualization of new fourth- and fifth-generation aircraft, depot repair facilities and equipment do not have the capacity to sustain and modernize aircraft.

New aircraft are driving specialized and ever-increasing requirements, ranging from larger facilities to handle increased size and configurations of rotary-wing aircraft (V-22 Osprey and H-53K King Stallion), to increased environmental controls supporting exacting tolerances of avionics systems. Some facilities require enhanced security measures and increased size and configuration. Changes to paint interval requirements are driving the need for additional facilities to meet fleet aircraft demand while maintaining critical surge capacity. Aircraft across all platforms are using more advanced composite materials than ever before on both airframes and components. Propulsion systems in new aircraft come with new requirements for dynamic component repair and testing.

The intended outcome of the FIOP is a 10-year effort to revitalize aviation infrastructure to include, multi-use sustainment facilities, sufficient power, security, technology and optimized maintenance production configuration to support the sustainment of legacy platforms through their

U.S. Navy photo

Onboard USS Abraham Lincoln (CVN 72), Fleet Readiness Center Southwest Voyage Repair Team artisans remove the catapult launch valve as part of the maintenance program to the ship's catapult system.

U.S. Navy photo

Mike DeLuzio, an aircraft engine mechanic in the T64 engine shop at Fleet Readiness Center East, installs the electrical harness to the overspeed switch on a T64 engine.

life cycle. FIOP will also provide capability to support the next generation of weapon systems. These investments will help COMFRC meet its obligations under the new NSS-A system to deliver an elite, organic network of repair centers.

In 2019, our Phase 1 FIOP report was submitted to Congress. Phase 1 provided an initial baseline assessment of our most critical production and manufacturing facilities and equipment. We provided an interim update in 2020. FIOP Phase 2 is currently underway providing a comprehensive assessment of our aging facility and equipment infrastructure and will result in an enterprise investment strategy and master plan. These phases are critical to charting the right course to the infrastructure COMFRC needs to meet its obligations under NSS-A.

Along with infrastructure improvements, NSS-A has also spurred our Maintenance Program Optimization (MPO). The concept, implemented in 2019, was designed to recover readiness, while increasing combat capability and creating a model of sustainment. This continues to further establish a rigorous governance to a more dynamic, living maintenance program while correcting fragmented, static, duplicative and unnecessary work growth. The initiative drives a more robust and on-going process to continually groom the scheduled maintenance

U.S. Navy Photo by Tolete Jackson

Fleet Readiness Center Southeast's sheet metal apprentice Jayda Hall installs forward latches for a P-3 Orion door in the Small Surface Shop.

U.S. Navy photo by MCSA Rafael Avelar

Aviation Support Equipment Technician Chief Petty Officer Palmer Carreon, with Fleet Readiness Center Western Pacific, performs a visual inspection on the engine of a shore tow tractor being serviced aboard Naval Air Facility Atsugi, Japan.

program, leveraging data, tools and lessons learned. It targets re-alignments of task moves needed for reduction of downtime while aligning processes across TMS. Today, the FA-18E/F Super Hornet and EA-18G Growler are implementing MPO. The E-2D Advanced Hawkeye and V-22 are beginning the process as well.

Our FRCs have adopted best practices that were introduced during NSS-A implementation and scaled them across all production lines to improve performance. Successes include reduced turnaround times (TAT) in E-2D and V-22 planned maintenance interval (PMI) events. Moving forward we will execute with a critical eye on the areas of supply forecasting and with increased responsiveness in our engineering and maintenance programs targeting a 15- to 20-percent improvement year-over-year.

Our goal for fiscal 2021 is building on FRC improvements achieved through the implementation of NSS-A, continuing the application of industry best practices across all TMS aircraft with cost in mind, and ensuring our mission-capable aircraft and weapon systems are at a level of readiness needed in today's near-peer power competition.

A native of Rock Hill, South Carolina, **Rear Adm. Joseph Hornbuckle** is a 1992 graduate of the U.S. Naval Academy with a bachelor of science in ocean engineering and earned a master of science in systems engineering management from Naval Postgraduate School.

He was designated a naval aviator in 1995 and assigned to Sea Control Squadron (VS) 32 where he flew the S-3B Viking. He completed two Persian Gulf deployments aboard USS George Washington (CVN 73) and USS John F. Kennedy (CV 67), flying more than 30 combat missions in support of Operation Southern Watch.

In 2000, he reported to the U.S. Embassy in London, England, as an exchange officer with the Royal Air Force. He qualified in both the Tornado GR-1 and GR-4 aircraft, and joined No. 617 Squadron, the "Dambusters," based at RAF Lossiemouth, Scotland. With the Dambusters, he participated in combat operations in support of Operation Resinate South, the U.K. component of Operation Southern Watch, and Operation Telic, the U.K. component of Operation Iraqi Freedom. He flew more than 25 combat missions, including numerous strike and urban close-air-support sorties.

As an Aerospace Engineering Duty Officer, his acquisition assignments encompassed multiple program management and systems engineering roles culminating as commanding officer and program manager of Naval Air Traffic Management Systems Program Office. Additional acquisition assignments included deputy director for Test Design at Commander, Operational Test and Evaluation Force; senior military assistant, Undersecretary of Defense (Acquisition and Sustainment); and vice commander, Naval Air Warfare Center Aircraft Division. As an individual augmentee, Hornbuckle supported combat operations in both Iraq and Afghanistan.

Hornbuckle has accumulated more than 2,000 flight hours in eight aircraft types and approximately 400 carrier arrested landings. He is also certified as an FAA Airline Transport Pilot.

Hornbuckle assumed duties as Commander, Fleet Readiness Centers in May 2021.

U.S. Navy photo

Grampaw Pettibone

Gramps from Yesteryear: May-June 2001

Illustration by Ted Wilbur

Danger Zone

A CH-53D Sea Stallion was conducting practice landings at confined-area landing sites. As a demonstration, the helicopter aircraft commander (HAC) would make the first landing at a succession of different sites, after which the co-pilot would take over and make two landings at each site.

One of the locations had an upward sloping landing zone when approached on a southerly heading and was 150 feet in diameter with trees around the perimeter. The HAC made his demonstration approach and landing to the upper portion of the site on a southerly heading. The aircraft experienced an unexplained loss of lift on short final. The HAC initiated a moderate flare and power application to arrest the sudden rate of descent, and landed uneventfully. On deck, the HAC transferred the controls to the co-pilot who took off and established a downwind pattern 400 feet above the ground at 80 knots.

The co-pilot then began a descending, decelerating turn onto the final approach to the site at 60 knots. All was normal until the final portion of the approach when the helo seemed to lose lift just prior to commencing a hover on short final. The aircraft settled and the rotor blades struck the trees, damaging the CH-53D. The tail rotor drive system was severed between the No. 4 and No. 5 drive shafts, producing uncontrolled right yaw as the helo landed. Although the Sea Stallion had been on a southerly heading, when it struck the ground it had come around to 300 degrees. There were no injuries.

Grampaw Pettibone says …

Methinks the copilot was placed in a situation beyond his experience and abilities. Me also thinks the HAC failed to keep pace with what was goin' on. The HAC may have looked danger in the face on his approach to the landing zone and survived, but he failed to recognize a repeat occurrence. Remember the old, simple and enduring axiom: stay ahead of the aircraft, not the other way around.

Compiled by Andrea Watters and Rob Perry

U.S., Indian Navies Commemorate India's First MH-60R

U.S. Navy photo by MC2 Sara Eshleman

Vice Adm. Kenneth Whitesell, Commander, U.S. Naval Air Forces, left, presents the Material Inspection and Receiving Report for first aircraft to Vice Adm. Ravneet Singh, Indian Navy Deputy Chief of Naval Staff, during an acceptance ceremony at Naval Air Station North Island July 16.

SAN DIEGO, Calif.—The U.S. and Indian navies celebrated a historic milestone when two MH-60R Seahawk helicopters were inducted into the Indian naval fleet during a ceremony July 16 at Naval Air Station North Island, California.

The ceremony is part of an ongoing initiative that also includes comprehensive training for Indian aircrew and maintainers on operating and sustaining the MH-60R. This bilateral initiative serves to strengthen the U.S. and India's enduring friendship and enhance our combined anti-submarine and undersea domain capability.

Indian Ambassador to the United States Taranjit Singh Sandhu spoke at the ceremony.

"The induction of these all-weather multi-role helicopters is an important milestone in our bilateral defense ties," he said.

During the ceremony, Vice Adm. Ravneet Singh, Indian navy Deputy Chief of Naval Staff, and Vice Adm. Kenneth Whitesell, Commander, Naval Air Forces, signed the U.S.-India MH-60R commemorative plaque, which all Indian navy personnel will also sign upon completion of the MH-60R training program.

"For the Indian navy, it's really a proud moment," Singh said. "The induction of the MH-60 helicopter into the Indian navy is a symbol of the ever-growing global strategic partnership of our two countries and reinforces the common ideologies of our great nations."

The primary mission of the MH-60R is surface and subsurface warfare. The helicopter is also capable of search and rescue operations, vertical replenishments, personnel transport and medical evacuation operations.

"The MH-60R is a cutting-edge multi-mission aircraft that will significantly enhance our navy-to-navy cooperation and strengthen our combined anti-submarine and undersea domain capabilities on the open seas," Whitesell said. "As was true for the U.S. Navy, these aircraft and their operators will immediately strengthen their armed forces to deter, counter and defend against any threat to the international rules-based order that we mutually recognize as critically important to global security."

Over the coming years, the U.S. Navy will help prepare Indian naval aviators, sensor operators and maintainers to operate and maintain the MH-60R. Members of the Indian navy arrived in the United States last month to begin training on the MH-60R; maintenance personnel are currently studying maintenance requirements and procedures at NAS North Island, while the first Indian navy MH-60R pilots and sensor operators have completed the Naval Aviation Survival Training Program at NAS Pensacola, Florida, and begun aircrew training with the "Seahawks" of Helicopter Maritime Strike Squadron (HSM) 41.

Written by Mass Communication Specialist 2nd Class Sara Eshleman with Commander, Naval Air Forces Public Affairs.

U.S. Navy Photo by MCS Joshua D. Sheppard

Sailors man the rails as aircraft carrier USS Dwight D. Eisenhower (CVN 69) returns to Naval Station Norfolk, Virginia, July 18..

CVW-3, Eisenhower CSG Return from Deployment

NORFOLK, Va.—The nine aircraft squadrons and more than 1,800 men and women of Carrier Air Wing (CVW) 3 returned to their home ports July 13 after their five-month deployment aboard nuclear-powered aircraft carrier USS Dwight D. Eisenhower (CVN 69) (IKE).

The Eisenhower Carrier Strike Group (IKE CSG) departed Naval Station Norfolk, Virginia, for deployment on Feb. 18 to U.S. 5th and 6th Fleet areas of operation. The Eisenhower returned home to Norfolk July 18 followed by the rest of the strike group. Arleigh Burke-class guided-missile destroyer USS Laboon (DDG 58) returned to Norfolk July 16 and USS Thomas Hudner (DDG 116) returned to its homeport July 17 in Naval Station Mayport, Florida.

Embarked aboard Eisenhower, CVW-3 supported Operation Inherent Resolve (OIR) from the Eastern Mediterranean Sea and Operation Freedom's Sentinel (OFS) in the Arabian Sea as a continuation of the U.S. commitment to promote maritime stability, ensure safe passage and de-escalate tensions in international waters throughout 5th Fleet.

For their part in OFS, the IKE CSG provided armed over-watch, security, electronic attack, intelligence, surveillance and reconnaissance in support of the drawdown of U.S. and coalition forces from Afghanistan from April 28 to June 23. The IKE CSG was relieved of OFS duties June 23 by the Ronald Reagan Carrier Strike Group.

CVW-3 conducted a total of 6,100 sorties and 12,401 flight hours for the IKE CSG's deployment.

"The courage and effort put forth by the Sailors of CVW-3 over these many months speaks great volumes to their unwavering commitment to success, no matter what kind of adversity emerges over the horizon," said Capt. Marcos Jasso, Commander, CVW-3. "Our Sailors gave it their all each and every single day during this deployment. I am honored to have served with our great air wing and flight deck crew. I wish them all a relaxed and enjoyable time off after deployment. The whole strike group deserves it. They've all earned it."

Some of CVW-3's highlights from the five-month deployment included the air wing's participation in Exercise Lightning Handshake 21, a U.S.-led, bi-lateral maritime exercise with the Royal Moroccan navy and Royal Moroccan Air Force, and dual-carrier flight operations April 13 with the French navy (Marine Nationale) Charles de Gaulle Carrier Strike Group in the Arabian Sea, which demonstrated the combined military capabilities fostered through many years of operations between the U.S. and French navies.

CVW-3 conducted protected entry operations as USS Thomas Hudner (DDG 116) and USS Monterey (CG 61) transited into the Black Sea. CVW-3 aircraft conducted aerial refueling operations with a Turkish KC-135 to extend time on-station and demonstrate our high-end interoperability with NATO partners.

"I am honored to have been part of this great team. It took a great deal of strength, focus and effort from every member to overcome the many personal, professional and tactical challenges we faced during this deployment," said Cmdr. Michael Luebkert, Commanding Officer, Airborne Command & Control Squadron (VAW) 123. "I'm in awe of all the Sailors that make the difficult look easy and am proud to stand with my brothers and sisters from Carrier Air Wing 3 who are looking forward to having families reunite and the end of deployment."

Luebkert added that the "Screwtops" have been answering the call of duty for over 50 years and have proven to be a dynamic pillar of Naval Aviation.

"Having checked into my squadron only a couple months prior to deployment, I truly could not have predicted what the following months would have in store," said Lt. Kaylyn Young, a naval aviator attached to Helicopter Maritime Strike Squadron (HSM) 74. "Whether I was walking to a spinning helicopter with

jets landing only a few feet away, seeing the Strait of Gibraltar from the air, coordinating a game night with VAQ-130, or applying our training against real-world threats, it is difficult to identify the sole highlight from my first deployment."

The IKE CSG worked alongside the Hellenic, Italian, Albanian and Turkish navies, as a reassurance to NATO allies, European and African partners and friends of the United States' continued commitment to operate in 6th Fleet. While in 5th Fleet, the strike group conducted exercises with the Canadian navy and later with the Egyptian navy. The IKE CSG also participated in joint operations with the United Arab Emirates, U.S. Coast Guard, Joint Aviation Command, Royal Saudi Naval Forces and U.S. Air Forces Central.

Squadrons returning to Naval Air Station (NAS) Oceana, Virginia, included Strike Fighter Squadron (VFA) 32, the "Swordsmen" flying 12 F/A-18F Super Hornets; VFA-131 "Wildcats," flying 10 F/A-18E Super Hornets; the "Gunslingers" of VFA-105, flying 12 F/A-18E Super Hornets; and VFA-83 "Rampagers," flying 10 F/A-18E Super Hornets.

Squadrons returning to Norfolk include the "Screwtops" of VAW-123, flying four E-2C Hawkeyes; Helicopter Sea Combat Squadron (HSC) 7 "Dusty Dogs," flying eight MH-60S Knighthawks; and Fleet Logistics Support Squadron (VRC) 40 "Rawhides," flying two C-2A Greyhounds.

The "Zappers" of Electronic Attack Squadron (VAQ) 130, flying five EA-18G Growlers returned to NAS Whidbey Island, Washington, and the "Swamp Foxes" of HSM-74 flying 11 MH-60R Seahawks returned to NAS Jacksonville, Florida.

From U.S. 2nd Fleet Public Affairs.

Next-Generation Jammer Mid-Band Receives Milestone C approval

PATUXENT RIVER, Md.—The Navy's Next-Generation Jammer Mid-Band (NGJ-MB) program received Milestone C approval June 28 from Frederick J. Stefany, acting Assistant Secretary of the Navy for Research, Development and Acquisition.

This decision gives NGJ-MB the green light to enter the Production and Deployment phase and proceed with Low-Rate Initial Production (LRIP).

"This capability is a game changer for our warfighters and the airborne electronic attack (AEA) community," said Rear Adm. Shane Gahagan, Program Executive Officer, Tactical Aircraft Programs. "Milestone C is the critical next step in ensuring that our team will be able to deliver a high-performing, state-of-the-art capability to the fleet."

U.S. Navy photo by Katie Archibald

An EA-18G Growler, attached to Air Test and Evaluation Squadron (VX) 31, conducts a Next-Generation Jammer Mid-Band flight test over China Lake, Calif.

The NGJ-MB system is an external jamming pod that will address advanced and emerging threats using the latest digital, software-based and active electronically scanned array technologies. It will also provide enhanced AEA capabilities to disrupt, deny and degrade enemy air defense and ground communication systems.

"Reaching Milestone C and entering the production phase validates the thousands of test hours and planning that our combined U.S. Navy and Royal Australian Air Force team has contributed to this evolutionary capability, and I couldn't be prouder," said Capt. Michael Orr, AEA Systems program manager, who manages the NGJ-MB program.

Part of a larger NGJ system that will augment and ultimately replace the legacy ALQ-99 Tactical Jamming System currently used on the EA-18G Growler, NGJ-MB has successfully completed more than 145 hours of developmental flight testing on the Growler and has more than 3,100 hours of chamber and lab testing.

The U.S. and Australia share a cooperative relationship for the development, production and sustainment of NGJ-MB.

Written by Kristine Wilcox, Airborne Electronic Attack Systems Program Office Communications.

U.S. Navy photo by Liz Mildenstein

An MV-22B Osprey flies for the first time June 15 with the latest Intrepid Tiger II (V)4 (IT II) electronic warfare payload, marking the start of developmental flight testing for IT II (V)4 and the first time the payload is mounted internally on an aircraft.

Intrepid Tiger II Takes First Flight on MV-22B Osprey

PATUXENT RIVER, Md.—The Marine Corps' newest Intrepid Tiger II (IT II) electronic warfare (EW) capability flew for the first time June 15 on an MV-22B Osprey.

"The significance of this developmental test flight was two-fold," said Navy Capt. Michael Orr, Airborne Electronic Attack (AEA) Systems Program Office manager. "Not only was this the first time we've integrated the Intrepid Tiger II capability onto an Osprey but also the first time the capability has been incorporated internal to a platform."

Marine Air-Ground Task Force EW Team Lead Bill Mellen said the typical, externally mounted pod was not an option because the MV-22 tilt rotor aircraft does not have traditional wing stations from which to mount podded payloads. The AN/ALQ-231(V)4 IT II system's upgraded design consists of a roll-on/roll-off rack-mounted payload, controlled from a laptop in the aircraft cabin.

The IT II is a precision, on-demand, EW weapon system designed to provide Marine Corps fixed- and rotary-wing aircraft with an organic, distributed and networked EW payload that can be controlled from the cockpit or by a ground operator.

The V4 system design will include state-of-the art upgrades, utilizing government and commercial-off-the-shelf technologies and jammer techniques that will allow the Marine Corps to keep pace with the ever-evolving threats on the battlefield and provide the needed adaptability to allow for future iterations of expanded frequency coverage and advanced capabilities, Mellen said.

"As the 21st century battlespace becomes more complex and more contested, military assets must support themselves across the entire spectrum of threats," said Marine Corps Col. Brian Taylor, V-22 Joint Program Office Program manager. "The fielding of this upgrade provides a significant and incremental improvement in the V-22's organic electronic warfare capability, providing commanders more options to support our Marine Corps ground forces. This improves both operational safety to our aircrews and operational success to the commander, our ultimate goals in everything we do."

Following successful integration on the MV-22B, the IT II team will further expand the V4 design to include a counter-radar capability on the KC-130J aircraft, hoping to leverage much of the MV-22B technology, including the in-cabin rack-mounted payload design, Mellen said.

The IT II V4 is scheduled to begin fleet deliveries for the MV-22B in fiscal 2023 to achieve Initial Operating Capability by the end of fiscal 2024 with an inventory objective of 42 total systems.

Written by Kristine Wilcox, Airborne Electronic Attack Systems Program Office Communications.

AMRAAM Completes Two Free-Flight Test Shots

U.S. Navy photo

The Advanced Medium-Range Air-to-Air Missile safely launched from an F/A-18F Super Hornet over the Point Mugu Sea Test Range in California.

EGLIN AIR FORCE BASE, Fla.—The Advanced Medium-Range Air-to-Air Missile (AMRAAM) Joint Program Office completed the second live-fire test May 12 of the new AIM 120D-3 missile variant, incorporating upgraded hardware into the guidance section.

The weapon safely launched from an F/A-18F Super Hornet and flew the expected flight path over the Point Mugu Sea Test Range in California. Preliminary analysis provided by the prime contractor, Raytheon Missiles & Defense, indicates all primary and secondary objectives of the shot were met.

"Completing the first two free-flight shots of upgraded hardware and software is a significant milestone in the integration and test phase of the new AIM-120D-3 missile," said Col. Sean Bradley, AMRAAM Senior Materiel Leader at the U.S. Air Force's Armament Directorate. "These successes are important to the overall execution of the Form, Fit, Function Refresh (F3R) program—a program implemented to address an increasing number of production challenges due to obsolescence of various electronic components within the AIM-120."

Combined with software upgrades, AIM-120D-3 will deliver advanced capabilities to improve missile effectiveness against advanced threats for Air Force, Navy and Allied Partners. This missile shot tested the missile's safe separation autopilot and free-flight navigation capabilities.

Together, with the first shot on Dec. 9, 2020, these shots represent a critical first in a series of developmental flight tests that provide crucial data to assess the missile's ability to acquire, track and guide to targets.

AMRAAM is the world's most sophisticated, combat-proven air dominance weapon. With AIM-120D-3 production deliveries beginning in 2023, the AIM-120 missile will continue to meet warfighter requirements in all weather and beyond-visual range engagements. Its capabilities have been fully demonstrated in more than 4,900 test shots and more than 13 air-to-air combat victories.

Written by Ross Novack, Form, Fit, Function Refresh program manager.

Mine Countermeasures Squadrons Celebrate 50 Years

PATUXENT RIVER, Md.—Helicopter Mine Countermeasures Squadrons (HMs) and the HM community recently celebrated their 50-year anniversary with a fly-by of the aircraft at Naval Air Station Norfolk, Virginia, April 1.

The MH-53E Sea Dragon has two main missions: airborne mine countermeasure (AMCM) and Navy vertical onboard delivery (VOD). The aircraft is part of the trio of heavy-lift helicopters managed by the Naval Air System Command (NAVAIR) Heavy Lift Helicopter Program Office which manages the cradle to grave procurement, development, support, fielding and disposal of the entire family of H-53 helicopters, including the CH-53E Super Stallion and the CH-53K King Stallion.

Today, there are three HM squadrons—HM-12, HM-14 and HM-15—based out of Norfolk, with detachments all over the world as the need arises. The squadrons fly an inventory of 29 MH-53E aircraft.

The Sea Dragon is an aging airframe from the mid-1980s and is anticipated to remain in service until 2027. With the Navy's shift of focus from conducting mine countermeasures to a mine avoidance approach, the role of AMCM will move to a family of manned and unmanned systems.

Heavy Lift Helicopter Program Welcomes "Godfather"

Capt. Patrick Murphy is the Heavy Lift Helicopter Program Office's incoming in-service integrated product team lead. He is the current Commanding Officer of HM-12, and senior member of the HM community.

His call sign "Godfather" is a tribute to more than 20 years of service. He will bring his knowledge and experience with AMCM and heavy lift to the program in August.

Murphy believes he is leaving the HM community in excellent shape, having surpassed every production and flight hour record since 1995.

"I've practiced mine warfare for more than 20 years," he said. "But moving heavy stuff is our specialty."

Murphy swept for mines off the Suez Canal in the Mediterranean Sea, and moved mail and packages for VOD in the Persian Gulf. He supported relief efforts following Hurricane Sandy in 2012, as well as in Puerto Rico following Hurricanes Irma and Maria in 2017. After last year's fire onboard USS Bonhomme Richard (LHD-6), Murphy built up an East Coast aerial fire capability for the MH-53E aircraft, rigging it for Bambi Buckets, the water storage bladder carried under helicopters for firefighting. He trained the pilots, certified the buckets and tested the process. As a result, the Navy has aerial firefighting capabilities on both coasts.

"My goal is to increase readiness for the fleet, but I'm very passionate about safety," he said. "The key is to safely and quickly increase readiness, then we'll be successful."

Victoria Falcon provides strategic communications for the Heavy Lift Helicopter Program.

U.S. Navy photo

An MH-53E Sea Dragon, assigned to Helicopter Mine Countermeasure Squadron (HM) 12, conducts aerial firefighting capability testing with a Bambi Bucket.

U.S. Marine Corps photo

MH-53 Sea Dragons perform a fly-by at Naval Air Station Norfolk, Virginia, April 1, honoring 50 years of helicopter mine countermeasures service.

U.S. Navy photo

An F-35B Lightning II prepares to land aboard the Royal Navy's HMS Queen Elizabeth (R08).

PALS Certified on U.K.'s New Aircraft Carrier

PATUXENT RIVER, Md.—The Naval Air Traffic Management Systems Program Office completed Precision Approach and Landing System (PALS) certification on the United Kingdom's newest aircraft carrier, HMS Queen Elizabeth (R08), in March, completing a critical step in readying the ship for its first operational deployment.

The PALS system includes the AN/SPN-41B Instrument Carrier Landing System (ICLS), previously installed by the program office as a foreign military sales (FMS) effort, and the AN/USN-3 Joint Precision and Approach Landing System (JPALS) system, installed as a U.S. asset to support the future embarkation of Marine Fighter Attack Squadron (VMFA) 211's F-35B Lightning IIs aboard Queen Elizabeth during its inaugural operational deployment.

The early phases of the installation were supported remotely by the Naval Air Warfare Center Webster Outlying Field (NAWCAD WOLF) Air Traffic Control and Landing Systems (ATC&LS) Division. Once the initial installation activities were completed, the team, led by Shawn Magoon, travelled to the U.K. in early February to finalize the installation and support the certification, after overcoming a few challenges.

The team faced heightened U.K. coronavirus travel restrictions, unique policy questions concerning the installation of the JPALS system on HMS Queen Elizabeth, and even a case of lost luggage. Magoon's resourcefulness, onsite leadership and interface with U.K. counterparts was instrumental in overcoming these challenges and in completing the installation and pierside portion of the certification in an incredibly compressed timeline, said Capt. Kevin Watkins, program manager.

"It truly is a testament to the individual determination, communication and leadership that all of our teammates embody, because each of these ship installs and certs was incredibly difficult, with barriers from COVID travel restrictions to first-time technical installation issues on a new ship class," Watkins said.

"Our USN-3 and SPN-41B teams, both onboard and supporting from home, exemplified our core values of teamwork and customer focus in overcoming many challenges to successfully accomplish our mission delivering on time system certification onboard HMS Queen Elizabeth."

The NAWCAD WOLF team was joined by members of Naval Test Wing Atlantic ATC&LS Test Branch and Air Test and Evaluation Squadron (VX) 23 to complete the at-sea portion of the certification. The ATC&LS Test Branch is the certification authority for all U.S. ships, and in this case

for the U.S.-owned JPALS installed aboard the British aircraft carrier, while also supporting certification recommendations for FMS installed systems.

Coincidentally, the final certification flights for HMS Queen Elizabeth were completed on the same day another team from the program office was carrying out PALS certification for the Italian aircraft carrier, ITS Cavour (CVH 550) off the U.S. East Coast.

The teamwork and constant communications between the U.S. and U.K. partners fully aligns with the March 2021 Interim National Security Strategic Guidance to "reinvigorate and modernize our alliances and partnerships around the world" and in "forging a strong, common agenda with the European Union and the United Kingdom."

From Program Executive Office (Tactical) Public Affairs.

Navy Maternity Flight Suits Increase Safety

U.S. Navy photo by Chief Stephen Hickok

Lt. Cmdr. Jacqueline Nordan, Commander, Naval Air Force Reserve mobilization program manager, poses in the first Maternity Flight Suit Uniform prototype on May 8.

PATUXENT RIVER, Md.—In response to an urgent fleet need, the Aircrew Systems Program Office, with the assistance of an in-house tailor, recently began modifying and testing standard flight suits to create a prototype Maternity Flight Suit Uniform (MFSU) and has begun rolling them out to the fleet in less than four months from requirement to fielding.

The program office began alterations to standard flight suits by sewing in expandable panels that provide extra room in the abdomen area where pregnant aircrew need it the most.

Prior to the MFSU, pregnant aircrew had the choice of wearing maternity khaki uniforms or larger-sized flight suits throughout their pregnancies. Wearing larger flight suits resulted in longer hems and sleeves, and, if not tailored for length, these longer lengths presented safety hazards. Additionally, wearing increasingly larger flight suits without tailoring has the potential to present a less professional appearance.

The ultimate goal is to have each flight suit custom-tailored upon request. The program office is building up a "pool" of sizes that could be sent out and drafted the ordering procedures and Aircrew Systems Advisory (ASA) naval message. If the program office receives a request for a size that is not in stock, the tailor can shift to work on that specific size in real time.

"We are proud to say the prototype MFSUs are available now," said Scott Adley, Fleet Support Team lead. "Even though they are custom orders, we are capable of filling orders in approximately three days. We released the ASA procedures for ordering to the fleet, and once initial measurements are made at the command, the request chit is reviewed and then a custom flight suit is made and sent to the command."

The new MFSUs are fitted to aircrew height, preventing rolled up sleeves or cuffed/stuffed flight suit leg lengths. Each MFSU has adjustable side panels made of the same material as the rest of the flight suit with hook adjusters, to provide not only more comfort but also improve safety and allow a customizable fit. A single adjustable flight suit can expand across multiple trimesters depending on each pregnancy, saving pregnant aircrew the added expense associated with purchasing multiple flight suits as well as tailoring larger-sized flight suits historically purchased to accommodate the changing form.

"The team supporting the MFSU development and distribution deserves all the credit for being able to work the drafting and coordination of procedures for ordering and distribution in parallel with the design of the uniform. They continue to provide superior support to the warfighter every day," said Capt. Tom Heck, Aircrew Systems Program manager.

From Program Executive Office, Aviation Common Systems and Commercial Services Public Affairs.

H-1 Mixed Fleet Soars Past 400K Flight Hours

PATUXENT RIVER, Md.—The Marine Corps AH-1Z Viper and UH-1Y Venom surpassed the 400,000 joint flight-hour milestone in April.

The H-1 mixed fleet of attack and utility helicopters have been deployed around the globe since 2010.

"Reaching this milestone is a culmination of thousands of hours of work by pilots, maintainers, engineers, test teams and industry partners. It is a true team effort," said Col. Vasilios Pappas, program manager for H-1 Light/Attack Helicopters Office. "The H-1s have defended warfighters for six decades, and with the integration of new capabilities, H-1s will continue to support warfighters for decades to come."

Full Rate Production for the UH-1Y started in 2009, and the last of 160 aircraft was delivered in April 2018. Production of the 189 AH-1Zs will complete with the final delivery in 2022.

The Marine Corps will operate H-1s through the 2040s and plans to maintain critical capability and combat relevance through digital interoperability, survivability and lethality on an ever-evolving battlefield.

"Currently, a new digital interoperability (DI) effort that includes the Link 16 system is in test," Pappas said. "This capability is vital to the Marine Corps and allows information to be shared between platforms."

The DI effort is just one enhancement to ensure the H-1 platform maintains its technological edge and combat capability throughout its service life.

From the H-1 Light/Attack Helicopters Program Office.

U.S. Navy photo by MC3 Jessica Kibena

A UH-1Y Venom, left, and AH-1Z Viper fly alongside Wasp-class amphibious assault ship USS Iwo Jima (LHD 7) May 17.

U.S. Navy photo by Joy Shrum

An AH-1Z Viper, assigned to Air Test and Evaluation Squadron (HX) 21, takes off from Naval Air Station Patuxent River, Md., for its first flight with the new Digital Interoperability Suite.

AH-1Z Conducts First Flight with New Digital Interoperability Suite

PATUXENT RIVER, Md.—For the first time in flight, the AH-1Z Viper established a two-way connection between a ground station and the aircraft's Link 16 and Advanced Networking Wideband Waveform (ANW2) systems earlier this spring.

A new capability for the H-1 platform, the digital interoperability (DI) suite includes Link 16 and ANW2 data links, a gateway to share information across various networks. Additionally, the suite includes a new digital moving map, enabling the H-1 platform to display information from these data links on a common display.

The DI suite also modernizes how data is loaded to and from the H-1 platform.

"The H-1 has decades of battlefield experience and has evolved to fight in numerous environments," said Col. Vasilios Pappas, Marine Corps H-1 Light/Attack Helicopters Program Office program manager. "The integration of these data links aligns with this platform's ability to adapt to the ever-changing threat and meet the needs of current and future warfighters."

Link 16 and ANW2 enable the AH-1Z to rapidly share information with other weapon systems, provide greater situational awareness, accelerate the kill chain, and enhance survivability to outmaneuver and defeat the threat across a range of military operations.

During the one-hour flight, conducted by Air Test and Evaluation Squadron (HX) 21, pilots successfully communicated with a multiband networking manpack radio, the PRC-117G and the Mobile Systems Integration Lab, a ground station designed by Naval Air Warfare Center Aircraft Division (NAWCAD) to validate the suite's connection with the aircraft.

"The flight was a success and went exactly as expected," said Capt. Jason Grimes, first-flight pilot and H-1 project officer with HX-21. "There is still work to be done before fleet integration, but it was a step in the right direction in getting a much needed capability to the HMLA [Marine Light Attack Helicopter] squadrons."

The DI suite includes a new radio, processor and mission computer software to integrate the information from this new data link onto a new digital map interface. This capability enables the AH-1Z to directly exchange critical data with other Marine Corps and Naval Aviation and shipboard systems.

"The flight is the culmination of hours of hard work and innovation. I am very proud of the government and industry team's dedication to making this critical capability for the Marine Corps a reality," Pappas said.

Led by the program office, the effort was a collaboration of the Avionics Integrated Product Team, numerous government and industry partners, NAWCAD and the Naval Air Warfare Center Weapons Division.

Flight test on the AH-1Z will continue through the summer, with initial fleet integration expected in 2022. In addition, the program is working with industry and HX-21 to flight test the same DI suite on the UH-1Y Venom next.

From the H-1 Light/Attack Helicopters Program Office.

U.S. Navy photo

A TH-73 helicopter flies above the Leonardo manufacturing facility in Philadelphia, Pa., where 129 others will be built.

Navy Receives First TH-73A Helicopter

PATUXENT RIVER, Md.—The first operational TH-73A helicopter was presented to the Navy June 10 during a ceremony at the AgustaWestland Philadelphia Corporation (Leonardo) plant in Philadelphia, Pennsylvania.

"The TH-73A will be instrumental in providing higher fidelity training to our future rotary-wing and tiltrotor aviators for the Navy, Marine Corps and Coast Guard," said Vice Adm. Kenneth Whitesell, Commander, Naval Air Forces. "The cutting-edge technology and advanced avionics within the Advanced Helicopter Training System (AHTS) will enable a more seamless transition from the training aircraft to fleet aircraft, which in turn allows more focus on high-end warfighting development and training."

Eventually, the Navy will have 130 TH-73A helicopters total, with deliveries continuing through 2024. The new helicopters will meet the capability and capacity gaps of the aging TH-57 Sea Ranger training platform.

The TH-73As are fully Federal Aviation Administration-certified prior to delivery, thus bringing a ready-made solution that will transition the TH-57 platforms out of service by 2025. The TH-57 is scheduled to begin sundown in fiscal 2022.

"This delivery signifies a new era for Naval Aviation training," said Rear Adm. Robert Westendorff, Chief of Naval Aviation Training (CNATRA). "By using current cockpit technologies and a new training curriculum, the TH-73A will improve pilot training and skills and ensure rotary-wing aviators are produced more efficiently at a higher quality and are ready to meet the fleet's challenges."

In addition to new helicopters, the full AHTS includes aircrew training services that provide availability on new simulators, a modernized curriculum and a new contractor logistics support contract for the maintenance and flight line support requirements of the new helicopter.

Using the first TH-73A, the team will train the cadre of instructor pilots and validate the modernized curriculum efforts, which is a requirement prior to training student naval aviators with the new curriculum in the new system. The helicopters will ensure the Navy has capacity to train several hundred aviation students per year for CNATRA at Naval Air Station (NAS) Whiting Field in Milton, Florida.

The AHTS accounts for the training needs of all the fleet replacement squadrons, thus students will be highly trained and fully capable of succeeding, regardless of which platform they select.

"The combined government and contractor team set new standards to meet much needed requirements in the fleet," said Capt. Holly Shoger, Undergraduate Flight Training Systems Program manager. "We are proud to develop and provide these new capabilities that will improve pilot training for many years to come."

The aircraft is scheduled to arrive at Whiting Field following final DoD inspections. A total of 32 TH-73As are scheduled for delivery to the Navy this calendar year and 130 total over the contract period. The new TH-73As will be housed in a temporary hangar at NAS Whiting Field, with construction to begin in 2023 on a new helicopter maintenance hangar.

From the Flight Training Systems Program Office.

Navy Declares Initial Operational Capability for JPALS

PATUXENT RIVER, Md.—The Navy declared Initial Operational Capability (IOC) for the Joint Precision Approach and Landing System (JPALS) on May 4, signaling the system is ready to provide precision approach and landing capabilities to tactical carrier aircraft at sea in support of Naval Aviation operations worldwide.

"JPALS has reached a historic milestone, which supports our requirement to deliver, operate and maintain a Navy with a focus on our core roles of sea control and power projection," said Cmdr. Jeff "Doogie" Dugard, Director, Naval Airspace and Air Traffic Control Standards and Evaluation Agency. Dugard worked closely with the Naval Air Traffic Management Systems Program Office to ensure all requirements were met to demonstrate that JPALS will safely and effectively support U.S. Navy and Marine Corps aviation at sea.

IOC was declared by Rear Adm. Gregory Harris, Director Air Warfare Division, N98, Office of the Chief of Naval Operations, following the successful installation, integration and flight certification of the first JPALS production unit aboard USS Carl Vinson (CVN 70) in December 2020. After the flight certification, the JPALS team continued working with the Navy's operational test community to demonstrate that the F-35C Lightning II could effectively conduct at-sea precision approaches to the flight deck, and that adequate manning, training and sustainment infrastructure were in place to support and sustain JPALS operations while globally deployed.

The JPALS IOC declaration is the culmination of many years of system development and testing activities that began in 2008. The JPALS team has successfully provided a critical combat capability to the U.S. naval fleet, delivering the IOC capability nearly a year ahead of the planned threshold while overcoming many challenges including delivering, installing, testing and certifying systems during a persistent global pandemic.

"The achievement of JPALS IOC is a positive reflection on the hard work, innovation and resilience from a dedicated team of government and industry professionals who have developed and fielded this critical capability to the warfighters," said Capt. Kevin Watkins, program manager.

JPALS has been supporting F-35B deployments on LH-class amphibious assault ships with an early operational capability since 2016, and will now provide the all-weather, precision navigation, approach and landing capability for all F-35C deployments on aircraft carriers as well. JPALS will also support future operations with the Navy's unmanned MQ-25A Stingray aboard carriers.

From Program Executive Office (Tactical Aircraft Programs) Public Affairs.

U.S. Navy photo by MC3 Aaron T. Smith

The Joint Precision Approach and Landing System is a GPS-based system that integrates with shipboard air traffic control and landing system architectures to guide fixed-wing tactical carrier aircraft with pinpoint approach and landings on nuclear aircraft carriers and amphibious assault ships in all-weather and sea-surface conditions.

MQ-4C Triton Program Moves Operations, Adds Fleet Flexibility

U.S. Navy photos

A member of the U.S. Air Force C-17 aircrew supports the transport of the MQ-4C Triton Unmanned Air System's forward operating base from NAS Patuxent River, Md., to Japan.

PATUXENT RIVER, Md.—The Triton program team coordinated a C-17 Globemaster III airlift April 13 to move the unmanned air system's expeditionary forward operating base (FOB) at Naval Air Station Patuxent River, Maryland, to an air base in Japan in an effort to increase Triton's operational flexibility in the future.

The fleet requested this expeditionary capability to provide the Maritime Patrol and Reconnaissance Fleet (MPRF) additional geographic flexibility to support operations beginning in summer 2021.

"Our team was able to identify truly innovative low-cost solutions to meet a fleet problem," said Cmdr. Josh Calloway, deputy program team lead. "They pulled a FOB out of the fleet, worked with Dayton T Brown Inc., and in about six months, at minimal cost, reconstituted the FOB into a mobile trailer and are now shipping it half way across the world."

Unmanned Patrol Squadron (VUP) 19 is currently operating two MQ-4C Triton out of Andersen Air Force Base in Guam and recently marked its one-year deployment. Now, with this new capability VUP-19 can support operations from nearly any U.S. facility in the world, he said.

The MQ-4C Triton Unmanned Air System's expeditionary forward operating base is loaded onto the U.S. Air Force's C-17 at NAS Patuxent River, Md.

"Triton is fully integrated into the 7th Fleet mission gathering intelligence, interacting with joint partners, carrier strike groups, and other MPRF assets and exercises, and remaining agile to pave the way for future unmanned platforms," said Cmdr. Michael Minervini, VUP-19 commander.

VUP-19 will continue to operate Triton to further develop the concept of operations and fleet learning associated with operating a high-altitude, long-endurance system in the maritime domain.

The MQ-4C Triton delivers unprecedented situational awareness of the battle space to shorten the sensor-to-shooter decision loop in the maritime and littoral battlespace. Its persistence and sensor mix are integral to the Navy's Maritime Strategy to deliver a more lethal, efficient and effective global joint force.

From Program Executive Office (Unmanned Aviation & Strike Weapons) Public Affairs.

U.S. Navy photo

An MQ-4C Triton flew its first test flight in its new hardware and software configuration July 29 at Naval Air Station Patuxent River, Md.

First MQ-4C Triton Test Flight with Multi-Intelligence Upgrade Conducted

PATUXENT RIVER, Md.—The Navy conducted its first test flight of the MQ-4C Triton in its upgraded hardware and software configuration July 29 at Naval Air Station Patuxent River, Maryland, beginning the next phase of the unmanned aircraft's development.

The MQ-4C Triton flew in its new configuration, known as Integrated Functional Capability (IFC) 4, which will bring an enhanced multi-mission sensor capability as part of the Navy's Maritime Intelligence, Surveillance, Reconnaissance and Targeting (MISR&T) transition plan.

Triton's Integrated Test Team (ITT) comprised of the U.S. Navy, Australian cooperative partners and government/industry teams completed a functional check flight and initial aeromechanical test points, demonstrating stability and control of the MQ-4C after a 30-month modification period.

"Today's flight is a significant milestone for the program and a testament to the resolve of the entire ITT, their hard work and passion for test execution and program success," said Capt. Dan Mackin, Persistent Maritime Unmanned Aircraft Systems Program manager. "This flight proves that the program is making significant progress toward Triton's advanced multi-intelligence upgrade, and it brings us closer to achieving the Initial Operational Capability (IOC) milestone."

Multiple Triton assets have been modified into the IFC-4 configuration in support of IOC in 2023. A single test asset is in the current IFC-3 configuration to support sustainment of deployed systems as well as risk reduction for IFC-4.

Currently, two MQ-4C Triton aircraft in the baseline configuration known as IFC-3 are forward deployed to 7th Fleet in support of Early Operational Capability (EOC) and Commander Task Force (CTF) 72 tasking. Unmanned Patrol Squadron (VUP) 19 will operate Triton to further develop the concept of operations and fleet learning associated with operating a high-altitude, long-endurance system in the maritime domain.

"The MQ-4C Triton has already had a tremendous positive impact on operations in [7th Fleet] and will continue to provide unprecedented maritime intelligence, surveillance and reconnaissance capabilities which are especially critical to national interests with the increased focus in the Pacific," Mackin said.

Triton is the first high altitude, long endurance aircraft that can conduct ISR missions to complement the P-8 Poseidon in the maritime domain. The Navy plans to deploy Triton to five orbits worldwide.

From Program Executive Office (Unmanned Aviation & Strike Weapons) Public Affairs.

Ford Completes Two Full

USS Gerald R. Ford (CVN 78) successfully completed the second of three scheduled explosive events for Full Ship Shock Trials (FSST) July 16.

The shock trials are designed to demonstrate the ship's ability to withstand the effects of nearby underwater explosion and retain required capability. Ford is executing required inspections and preparation for the third FSST explosive event, scheduled for later this summer.

On Friday, June 18, CVN 78 successfully completed the first scheduled explosive event, pictured below.

The first-in-class aircraft carrier was designed using advanced computer modeling methods, testing and analysis to ensure the ship is hardened to withstand battle conditions, and these shock trials provide data used in validating the shock hardness of the ship.

The Navy has conducted FSSTs over several decades, most recently for Littoral Combat Ships USS Jackson (LCS 6) and USS Milwaukee (LCS 5) in 2016; as well as for San Antonio-class amphibious transport dock USS Mesa Verde (LPD 19) in 2008, amphibious assault ship USS Wasp (LHD 1) in 1990, and guide missile cruiser USS Mobile Bay (CG 53) in 1987. The last aircraft carrier to execute FSST was USS Theodore Roosevelt (CVN 71) in 1987.

The Navy is conducting the shock trial testing in accordance with Office of the Chief of Naval Operations Instruction 9072.2, and as mandated by the National Defense Authorization Act of 2016.

Ford's shock trials are being conducted off the East Coast of the United States, within a narrow schedule that complies with environmental mitigation requirements, respecting known migration patterns of marine life in the test area. The Navy also has employed extensive protocols throughout FSST to ensure the safety of military and civilian personnel participating in the testing evolution.

The ship closed out a successful 18-month Post Delivery Test & Trials period in April, during which the crew completed all required testing, accomplished planned improvements and maintenance ahead of schedule, and learned valuable lessons to increase the reliability of Ford-class systems. At the same time, the ship also served as the sole East Coast platform for conducting carrier qualifications.

Upon completion of FSST later this summer, Ford will enter a Planned Incremental Availability for six months of modernization, maintenance and repairs prior to its operational employment.

Andrea Watters, editor Naval Aviation News, and Program Executive Office Aircraft Carriers Public Affairs contributed to this article.

U.S. Navy background photo by MC3 Riley B. McDowell

U.S. Navy photo sequence by MCS Jackson Adkins

Ship Shock Trial Events

"The U.S. Navy conducts shock trials of new ship designs using live explosives to confirm that our warships can continue to meet demanding mission requirements under harsh conditions they might encounter in battle."

Ford Closes Out PDT&T

Compiled by Andrea Watters and Rob Perry

USS Gerald R. Ford (CVN 78) completed its 18-month post-delivery test and trials (PDT&T) period April 30, after finishing Combat Systems Ship's Qualification Trials (CSSQT) in mid-April with an exceptional performance.

Since the October 2019 start of PDT&T, the ship completed all required testing, certified the flight deck, embarked the air wing, accomplished work ahead of schedule, and improved system reliability for new technologies, while serving as the primary East Coast carrier qualification platform for fleet naval aviators.

After completing PDT&T, the carrier underwent Full Ship Shock Trials starting in June.

EMALS/AAG Hit Milestone, CSG Integrated

At the start of PDT&T, Ford launched into a demanding battle rhythm of independent steaming

U.S. Navy photo by MC3 Zack Guth

Aircraft attached to Carrier Air Wing (CVW) 8 are positioned on USS Gerald R. Ford (CVN 78) flight deck

events (ISEs), interlaced with shore-based maintenance windows of opportunity (WOOs). Even while operating in a test status—vigorously assessing the performance of combat systems and adding complexity to seamanship and navigation training maneuvers—the ship provided significant operational readiness to the fleet, qualifying or requalifying more than 439 naval aviators.

Rear Adm. James P. Downey, Program Executive Officer for Aircraft Carriers, views Ford's extraordinary progress and accelerated state of operational readiness as the product of years of planning and collaboration among Ship's Force, Navy program offices, and industry.

"When CVN-78 began PDT&T in November 2019, the ship had logged about 800 launches and recoveries. Then we really started stressing the ship's 23 new technologies, especially EMALS [Electromagnetic Aircraft Launch System] and AAG [Advanced Arresting Gear]. Now just 18 months later, the ship has logged more than 8,100 cats and traps, with more than 7,300 during PDT&T alone," Downey said.

The Navy's newest aircraft launch and recovery technology, the EMALS and AAG system, were designed for use aboard Ford-class aircraft carriers, beginning with Ford. Land-based test sites, located at Joint Base McGuire-Dix-Lakehurst, New Jersey, enable test, troubleshooting and Sailor training. 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.

Downey recounted an unrelenting pace of operations, beginning with aircraft compatibility testing in January 2020, followed by flight deck

"As we move forward, we'll continue building on our experience, increase confidence in EMALS and AAG, and do our part to support the warfighter by preparing the systems for whatever Ford's future deployments bring to the table."

U.S. Navy photo by MC3 Robert Stamer

An F/A-18F, attached to the "Black Lions" of Strike Fighter Squadron (VFA) 213, approaches Ford's flight deck April 18.

U.S. Navy photo by MC3 Riley McDowell

Aviation Boatswain's Mate (Equipment) (ABE) 1st Class Andra Coleman stands watch as the safety gear officer April 19.

U.S. Navy photo by MC3 Michael Joseph Flesch

An MH-60S Seahawk, attached to the "Tridents" of Helicopter Sea Combat Squadron (HSC) 9, approaches the flight deck March 7.

U.S. Navy photo by Chief MC R.J. Stratchko

A T-45C Goshawk, attached to Training Air Wing (TW) 1, takes off of the flight deck March 15.

certification in March, when Carrier Strike Group (CSG) 12 assumed operational control. In May, the ship embarked Carrier Air Wing (CVW) 8 and conducted the first fully integrated CSG operations.

Just six months later in November 2020, CVN-78 remained underway for 25 days during ISE 13 to embark CVW-8 and to conduct fully integrated CSG operations under CSG-12's leadership and operational control. CVW-8 completed more than 1,000 launches and arrestments during this steaming event—flying as many as 50 sorties per day, in all weather, and in various sea states.

A reduced air wing of 35 aircraft was embarked, approximately 50 percent of a complete air wing, which trained in delivering light and heavy inert ordnance. As ship's crew and air wing fine-tuned its collaborative expertise, CSG-12 embarked multiple warfare commanders and executed multi-ship operations, demonstrating the growing maturity of CVN-78's command and control systems and architecture across the full spectrum of warfare.

The following month, during a 10-day underway period in December 2020, Ford's crew completed more than 840 launches and arrestments, while qualifying 58 new pilots. The crew supported a new single-day record of 175 launches and 170 arrestments in an 8.5-hour period.

Capt. Kenneth Sterbenz, Aircraft Launch and Recovery Equipment (ALRE) program manager for EMALS and AAG, said ALRE finished PDT&T strong, and they are ready for the next step.

"ALRE's support of EMALS and AAG was admirable throughout the rigorous testing of PDT&T operations," Sterbenz said. "On the way to reaching 8,000 launches and recoveries, we saw many Ford crew trained, learned a great deal

about the systems, and laid invaluable groundwork for future Ford-class ships."

Time and training also enabled a great increase in the efficiency of flight operations. More than 7,000 of Ford's total launches and recoveries were completed in the last 18 months.

Cmdr. Lindsey Buzzell, deputy program manager for EMALS and AAG, said ALRE's accomplishments are the product of years of dedication, expertise and professionalism.

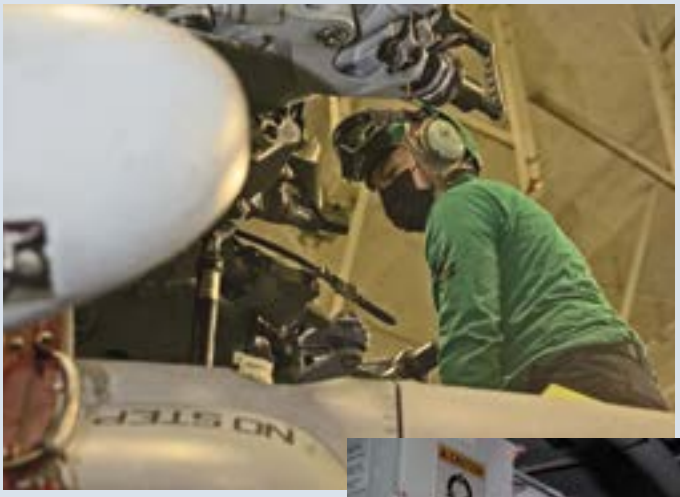
"PDT&T proved extremely valuable for ALRE, as it allowed for extensive test and evaluation, and the opportunity to expose useful learning opportunities," Buzzell said. "As we move forward, we'll continue building on our experience, increase confidence in EMALS and AAG, and do our part to support the warfighter by preparing the systems for whatever Ford's future deployments bring to the table."

"If you just look at this ship in terms of meeting planned goals, the numbers are right on or ahead of plan," Downey said. "In 18 months, we corrected 99 percent of the 9,000-plus work items outstanding at ship's delivery. Work completed during PDT&T averaged 113 percent of the plan. And the crew has cycled the first seven of the ship's 11 Advanced Weapons Elevators [AWEs] more than 14,200 times, with close to half of those evolutions at sea."

Downey added that with each additional elevator certified, the crew has ramped up the velocity of flight deck operations and combat system testing, while proving the resiliency of the system.

"CVN-78's Sailors are mastering the intricacies of each unique elevator," Downey said. "They're testing design tolerances and doing a great job fine-tuning operation and maintenance best practices toward the goal of achieving full combat system certification aboard the ship."

Compiled from Program Executive Office Aircraft Carriers Public Affairs news releases.



U.S. Navy photo by MCSA Curtis Burdick

Aviation Electrician's Mate 2nd Class Nick Vo, assigned to Helicopter Maritime Strike Squadron (HSM) 70, performs routine maintenance on an MH-60R Seahawk helicopter April 15.

U.S. Navy photo by MC3 Robert Stamer

Aviation Ordnanceman 3rd Class Christian Guillen, assigned to HSM-70, performs maintenance on an airborne low frequency sonar.

U.S. Navy photo by MC3 Zachary Melvin

An Evolved SeaSparrow Missile launches from one of Ford's weapons sponsons during combat systems ship qualification trials (CSSQT) April 16.

U.S. Navy photo by MC3 Robert Stamer

A close-in weapons system is tested on Ford's fantail as part of CSSQT, April 15.

U.S. Navy photo by MCSA Curtis Burdick

Fire Controlman 2nd Class Tyler Westbrook, assigned to Ford's Combat Systems Department, operates a close-in weapon system console during a live-fire exercise April 15.

FUELING THE FUTURE:

MQ-25A FIRST TO CONDUCT UNMANNED AERIAL TANKING

By Jamie Haynes

The skies were clear on June 4 when the Navy's first operational, carrier-based unmanned aircraft, the MQ-25A Stingray, took off from MidAmerica Airport in Mascoutah, Illinois, followed by an F/A-18F Super Hornet. A short time later in airspace east of the airport, history was made when the MQ-25 became the first unmanned tanker to refuel another aircraft.

The MQ-25 T1 test asset refuels a Navy F/A-18F Super Hornet during a flight June 4 at MidAmerica Airport in Illinois.

This historic flight demonstrated the MQ-25 can fulfill its primary tanker mission using the Navy's standard probe-and-drogue aerial refueling method.

"This flight lays the foundation for integration into the carrier environment, allowing for greater capability toward manned-unmanned teaming concepts," said Rear Adm. Brian Corey, who oversees the Program Executive Office for Unmanned Aviation and Strike Weapons. "MQ-25 will greatly increase the range and endurance of the future carrier air wing—equipping our aircraft carriers with additional assets to fight our adversaries well into future."

The MQ-25A will provide critical aerial refueling and intelligence, surveillance and reconnaissance (ISR) capabilities that greatly expand the global reach, operational flexibility and lethality of the carrier air wing (CVW) and carrier strike group.

"This is our mission, an unmanned aircraft that frees our strike fighters from the tanker role, and provides the carrier air wing with greater range, flexibility and capability," said Capt. Chad Reed, program manager for the Navy's Unmanned Carrier Aviation Program Office. "Seeing the MQ-25 fulfilling its primary tasking today, fueling an F/A-18, is a significant and exciting moment for the Navy and shows concrete progress toward realizing MQ-25's capabilities for the fleet."

During the test flight, the receiver F/A-18F Super Hornet approached the Boeing-owned MQ-25 test asset, known as T1, at 12,000 feet while flying approximately 220 KCAS. The Super Hornet pilot conducted a formation evaluation, wake survey and drogue tracking, then plugged with the unmanned aircraft's Aerial Refueling Store (ARS). T1 then successfully transferred approximately 300 pounds of fuel from its ARS to the F/A-18F.

"It was a very smooth lead aircraft to fly off of," said weapons systems officer Lt. David Babka, assigned to Air Test and Evaluation Squadron (VX) 23.

The entire test flight lasted four and a half hours, though the actual fuel transfer only lasted about 10 seconds, with the ARS transferring fuel at a rate of approximately 220 gallons per minute. The test was designed to assess multiple test conditions, or specific combinations of speed and altitude.

The VX-23 F/A-18 pilot, Lt. Will Peabody, said it was exciting working with the team to conduct this important testing to "show that manned and unmanned can work together, even with something so close and precise as aerial refueling."

The refueling flight will provide the MQ-25 team with important early data on airwake interactions, as well as guidance and control. The team will analyze the flight data to determine if any software adjustments are needed. Conducting this testing and receiving information so early in the program allows those updates to be made with no impact to the program's test schedule.

T1 was developed by Boeing prior to receiving the 2018 Engineering and Manufacturing Development (EMD) contract for the MQ-25 air vehicle. While the first Navy-configured MQ-25 is not expected to come off the production line

Photos courtesy of Boeing

The unmanned Boeing MQ-25 T1 Stingray test aircraft takes off from MidAmerica Airport to conduct an aerial refueling test with a manned F/A-18F Super Hornet.

until fiscal 2022, the MQ-25 program is conducting rigorous testing with T1 to gather valuable early knowledge that informs design, production and supports a rapid test program. T1 conducted its maiden flight in September 2019 and has completed 26 flights to date.

As the first unmanned aircraft to integrate with the Navy's aircraft carriers, the Stingray is creating the framework for all future unmanned carrier operations and manned-unmanned teaming. Using the Stingray to establish the concept of operations for manned and unmanned systems working seamlessly together within the CVW is foundational to the Navy's Unmanned Campaign Framework and is a crucial step toward a future fleet augmented by unmanned systems to pace the evolving challenges of the 21st century.

The MQ-25A will integrate with the CVW as part of the Airborne Command and Control Logistics Wing, alongside E-2s and C-2s. The fleet replacement squadron, Unmanned Carrier Launched Multi-Role Squadron (VUQ) 10, will begin standing up later this year. The Navy plans to initially establish two MQ-25 squadrons, VUQ-11 and 12, which will deploy detachments aboard aircraft carriers.

Testing with T1 will continue over the next several months to include flight envelope expansion, engine testing and a deck handling demonstration aboard an aircraft carrier later this year.

Jamie Haynes is a communications specialist with the Unmanned Carrier Aviation Program Office.

THE FUTURE IS NOW

With Carrier Air Wing 2

By AT3 Lacy Burke

Carrier Air Wing (CVW) 2 "Broadsword" recently completed the new syllabus for Air Wing Fallon at Naval Air Station (NAS) Fallon, Nevada. This new syllabus fully incorporated two new aircraft, the F-35C Lightning II and E-2D Advanced Hawkeye, into CVW-2. This marks another major step in preparation for their upcoming deployment later this year.

Carrier Air Wing (CVW) 2 "Broadsword" participates in Air Wing Fallon in preparation for its upcoming deployment later this year.

U.S. Navy Photo by Lt. Cmdr. Lydia E. Bock

NAS Fallon operates as the leading training ground for naval air warfare. Their slogan, "train the way you fight; fight the way you train," represents their aim to ensure mission readiness for all carrier air wings. This large-scale training exercise focuses on specific missions the wing may be asked to accomplish underway.

Air Wing Fallon is a part of the Navy's Optimized Fleet Response Plan (OFRP) which outlines maintenance, training, deployment and sustainment operations. Completing Air Wing Fallon is a necessary phase for all carrier air wings to obtain the required qualifications to deploy.

"Our Sailors have worked hard on their qualifications, and this is their opportunity to be a fully integrated air wing accomplishing a mission as a cohesive unit. Air Wing Fallon is the culminating event before joining the strike group on the composite training unit exercise (COMPTUEX)," said CVW-2 Commander, Capt. Matt Thrasher.

CVW-2 is the first carrier air wing to incorporate the Lightnings and the newest Hawkeyes. This is the first time the F/A-18E/F Super Hornet, EA-18G Growler, F-35C and E-2D have been integrated together for an operational deployment. With the integration of organic fourth- and fifth-generation information, survivability and airborne electronic attack capacity, these aircraft will significantly increase the lethality of the Navy's next generation air wing. Additionally, with a robust logistical support platform, CVW-2 is pioneering the future of Naval Aviation, proving the flexibility and resilience needed for the success of carrier operations.

Over the past few years, the Naval Aviation Warfighting Development Center (NAWDC) and Naval Fighter Weapons School (TOPGUN) have been working to develop the skillsets, curriculum and experienced instructors required to execute a syllabus that fully integrates F-35C tactics, techniques and procedures (TTPs), while using the latest capabilities provided by the E-2D.

"Instead of focusing on very narrow problem sets and objectives, Air Wing Fallon now takes those early looks of integrated TTPs that we've worked on and puts it on a broader and larger scale against an entire air defense system" said Deputy Air Wing Commander, Capt. Tommy Locke.

This syllabus was used at Air Wing Fallon to improve interoperability and unit cohesion within CVW-2.

This upcoming deployment with Carrier Strike Group (CSG) 1 aboard USS Carl Vinson (CVN 70) will be the first operational deployment for the F-35C. This aircraft complements the F/A-18E/F and E/A-18G capabilities and enhances the flexibility, power-projection and strike capabilities of the wing. The F-35C was designed with stealth technology, making it a critical addition to the CSG's integrated warfighting package. The ability of this aircraft to penetrate threat envelopes, detect and fuse information from many sources, and link that fused picture to other strike group aircraft, ships and decision makers makes it an unparalleled addition to the CSG.

CVW-2 currently consists of three F/A-18E/F squadrons (Strike Fighter Squadron (VFA) 2 "Bounty Hunters," VFA-113 "Stingers" and VFA-192 "Golden Dragons"), one E/A-18G squadron (Electronic Attack Squadron (VAQ) 136 "Gauntlets"), one F-35C squadron (VFA-147 "Argonauts"), one E-2D squadron (Airborne Command & Control Squadron (VAW) 113 "Black Eagles"), one CMV-22B Osprey squadron (Fleet Logistics Multi-Mission Squadron (VRM) 30 "Titans"), and two MH-60 helicopter squadrons (Helicopter Sea Combat Squadron (HSC) 4 "Black Knights" and Helicopter Maritime Strike Squadron (HSM) 78 "Blue Hawks").

Aviation Electronics Technician 3rd Class Lacy Burkett is with Carrier Air Wing (CVW) 2.

U.S. Navy photo by MC3 Erica Bechard

HhART Helps Super Hornets,

By Carrie Munn

The F/A-18 and EA-18G Program Office has experienced a stretch of readiness control since meeting mission-capable rate mandates in 2019 thanks in part to the Hornet Health Assessment and Readiness Tool (HhART).

As of June 1, the program office also marked 90 days without a reported physiological episode (PE) for all F/A-18s and EA-18Gs—citing HhART as the primary contributor to the notable decrease. HhART has the ability to identify component degradation and enable proactive maintenance planning.

"This is the first time in more than 10 years that we've gone more than three months without a PE reported," said Capt. Stephen May, Growler deputy program manager. "That alone is a great success story and is a direct result of our team's PE Root Cause and Corrective Action investigation and the radical innovation of HhART, which helps prevent component failure before it happens."

Initially derived in 2018 as a "radically different" approach to understanding the PE-aircraft function interaction, HhART was beta-tested by Strike Fighter Squadron (VFA) 213 in February 2019. The following month brought fleet-wide deployment for the Super Hornet and Growler, and it has continued to provide definitive results since.

During HhART's first year of use in the F/A-18 fleet, occurrences of PEs decreased roughly 75 percent, and pressurization-related PEs, which were historically tied to component failure, were reduced by 80 percent, May said.

HhART uses aircraft and Slam Stick data, meshed with advanced data analysis, to identify degradation or exceedance of specification in specific components or sections of a system, then flags it for maintenance action in near real-time. The rapid and successful development and deployment of the tool by an innovative group of engineers and data scientists across the country provided a preventative and diagnostic tool to mitigate PE-related factors; however, HhART quickly proved valuable in supporting readiness and sustainment initiatives as well.

Aerospace engineer Andrew Palek was a core member of the development team and now supports its use and expansion as part of the F/A-18 and EA-18G Fleet Support Team at Naval Air Station North Island, California.

He explained that through this analysis of aircraft and maintenance

An EA-18G Growler, left, and an F/A-18E Super Hornet prepare for launch on the flight deck of aircraft carrier USS Ronald Reagan (CVN 76).

U.S. Navy photo by MC2 Lex T. Wenberg

U.S. Navy photo by MCS Miles McDonough

Aviation Structural Mechanic 3rd Class Drew Werosta inspects the cockpit of an F/A-18F Super Hornet, attached to the "Fighting Checkmates" of Strike Fighter Squadron (VFA) 211, in the hangar bay of aircraft carrier USS Harry S. Truman (CVN 75).

Aviation Electrician's Mate 3rd Class Hugh Ratsch runs a diagnostics program from the cockpit of an F/A-18F Super Hornet, attached to the "Black Aces" of VFA-41, in the hangar bay of aircraft carrier USS John C. Stennis (CVN 74).

Growlers Hit Milestone

data, HhART identifies specific components in degradation and flags specific conditions, then alerts the squadron and provides prescribed corrective actions and a corresponding timeline (i.e. before next flight or within next 10). All of this often occurs prior to any actual failures or in-flight emergencies.

Palek said HhART reduces the maintainer's troubleshooting and resolution time, resulting in faster maintenance actions. The early identification allows squadrons to plan for flagged repairs, order parts that will be needed and, ideally, incorporate the fixes into a jet's upcoming scheduled maintenance—circumventing unplanned downtime and getting any downed jets back up much faster.

Several HhART features and alerts are live in the F/A-18 Automated Maintenance Environment, which enables immediate delivery of post-flight alerts and more are in development, he said. While the early focal point was on the Environmental Control System, the team is rapidly developing and expanding to other air vehicle subsystems, such as fuel, flight controls, hydraulics and propulsion.

Palek said the team is looking at how HhART can help address a fleet maintenance head-hurter, the Generator Control Units, and has conducted some analysis of pods and stores, specifically for the Growler's ALQ-99 Tactical Jamming System. He anticipates HhART will continue to expand and the scope of data will only improve over time.

The software now supports all U.S. Navy and Marine Corps F/A-18 type/model/series, to include EA-18G Growler, as well as international partner Royal Australian Air Force F/A-18Fs and EA-18Gs.

"The aircraft data was there all along, but it wasn't until HhART that we could tap into it and put it to good use," said Don Salamon, program office Data Analytics Integrated Product Team lead, who was also instrumental in HhART's journey from concept to effective tool in the hands of the warfighter.

"It has become a game-changer for the Hornet family and Growler," Salamon said. "HhART has quickly contributed to a stark decrease in PEs with the direct link of far fewer downed aircraft due to unplanned failures, and has certainly been a factor in improving maintenance efficiencies and spares planning, ultimately, helping sustain an increased number of mission capable aircraft."

Carrie Munn is a communications specialist with F/A-18 and EA-18G Program Office.

Bridging Medicine, Engineering to Advance Aerospace Tech

The Naval Air Warfare Center Aircraft Division (NAWCAD) is advancing its human systems technology by combining best practices from the medical and engineering communities.

Recently established, the Aeromedical Monitoring and Analysis Branch is comprised of licensed medical military officers bridging their perspective with engineering disciplines to improve operational capabilities like night vision technology, hearing protection, mission planning software and more.

"Medicine and engineering seldom wholly come together," said NAWCAD Aeromedical Monitoring and Analysis branch head Cmdr. Matthew Doubrava, a Navy Flight Surgeon board certified in Aerospace Medicine and Occupational Medicine.

"Our team of biomedical scientists looks forward to bringing human-oriented science and a medical perspective to enhance our Navy's advanced technology."

The uniformed medical specialists have a broad range of academic expertise including aerospace and occupational medicine, optometry and vision science, audiology, research and aviation physiology and experimental psychology. With these skillsets, they will work directly alongside NAWCAD engineers, testers and aviators to enhance their research, development, tests and evaluation to advance aerospace technology. Adding this expertise will help create technology more relevant to human capability, and fill knowledge gaps where technical professionals typically hold little experience.

"The Navy's challenge with physiological episodes showed us how critically important a medical perspective can be," Doubrava said. "We're working to stay ahead of the curve—what is the next 'physiological episode' on the horizon and how can we prevent it?"

NAWCAD's lineup of clinical scientists completed health care professional and graduate school, and entered the Navy to receive specialized training as aeromedical and research professionals. Most attended the six-month Aeromedical Officer Course that consists of a specialized flight school syllabus and clinical training in Pensacola, Florida.

As an aeromedical officer, they hold a Navy aeronautical rating that requires a monthly minimum of aircrew flight time making them uniquely qualified as aeromedical professionals. While their primary mission is medical research, they are required to accrue flight time with fleet aviators for continued understanding of Naval Aviation's evolving systems.

From Naval Air Warfare Center Aircraft Division Public Affairs.

Hypoxia Training Improved with New Device

The Naval Aviation Training Systems and Ranges Program Office recently delivered a Normobaric Hypoxia Trainer (NHT) designed to eliminate common hypoxia training injuries at Naval Air Station (NAS) Patuxent River, Maryland.

The legacy Low Pressure Chamber trainer used in hypoxia training for pilots and aircrew often caused decompression and barotrauma sickness, the leading causal factors for training injuries in the Naval Aviation Survival Training Program (NASTP). The NHT team, made up of an expert group of research engineers and scientists looking to mitigate those injuries, developed the NHT concept.

"With the critical and innovative work of our NHT team, we no longer need to worry about barotrauma during cold and sinus season that caused trapped gas pain and injury in our fixed-wing non-ejection seat aircrew students at the Aviation Survival Training Centers," said Cmdr. Andy "Lurch" Hayes, NASTP integrated project team lead. "Inside safety observers no longer need to administer nasal decongestants or perform the invasive Politzer maneuver to inflate the middle ear and sinuses by injecting compressed air up one nostril while the other was closed."

U.S. Navy photo

U.S. Navy photo by Charles Freeman

Human systems engineering technicians at the Naval Air Warfare Center Aircraft Division monitor subjects undergoing tests in a temperature-controlled environment supporting engineering efforts aiming to enhance aeromedical technology for aircrew across Naval Aviation.

The NHT design not only eliminates the risk of barotrauma and decompression sickness, but it also can simulate high-altitude flight while accommodating up to 12 personnel including six aircrew and two pilot/co-pilot teams monitored by two inside observers.

Borrowed from the success of students trained on the Reduced Oxygen Breathing Device, the team included flight simulators and controls to add realism and allow aircrew to practice emergency procedures (EP) specific to their Naval Air Training and Operating Procedures Standardization aircraft. This is the first time that fixed-wing non-ejection seat pilots are able to practice EPs in a state of hypoxia.

"Gone are the days of patty cake in the chamber to monitor hypoxia symptoms. We are fortunate to have the aviation physiology expertise on our team that creatively developed a training system that allows the aircrew to experience hypoxia in a safe environment while conducting aviation operator tasks," said Capt. Lisa Sullivan, program manager.

From Naval Aviation Training Systems and Ranges Program Office.

Naval aircrew members participate in a training event in the new Normobaric Hypoxia Trainer located on Naval Air Station Patuxent River, Md., in May.

ONLINE GAMING CONCEPT ENHANCES MARINE AVIATOR TRAINING

U.S. Marine Corps photos

By 1st Lt. Michael Curtis

Before the dawn of online gaming, video games and computer games primarily featured two to four players sitting in the same room looking at the same screen while using a controller or keyboard to either race or battle against each other.

When online gaming came into prominence in the early 2000s, it allowed gamers to play with friends, and mostly complete strangers, from anywhere around the globe. Today, the multi-billion-dollar industry connects more than 2 billion gamers across a broad spectrum of strategy, first-person shooter and role-playing games.

Marine Corps pilots stationed in Cherry Point, North Carolina, have taken a piece of the concept of online gaming to enhance their training.

"COPE JAVELIN," which took place in March, was a simulation that followed a fictional operational scenario that could easily take place in the real world. Marine aviators from units across 2nd Marine Aircraft Wing (MAW) strapped into flight simulators of different aircraft located at different bases across eastern North Carolina. They were able to connect across multiple simulation systems and work together to defend against a fictional enemy force.

This integration gives Marine Air Control Group 28 (MACG-28) Marines and pilots the opportunity to accomplish hard, realistic training without leaving their respective bases while saving money in fuel, ordnance, maintenance and various other costs associated with real-time training.

Lt. Col. Eric Grunke, director of aviation training systems for 2nd MAW, developed this innovative training. He saw the need to integrate all Marine Air-Ground Task Force assets in a virtual training environment to improve aviation combat training.

"Linking [systems] is not new, but we are taking it to a new level by incorporating [command-and-control Marines] training on their own equipment, and we are using a common scenario developed by the Training Support Center—normally a ground-centric agency."

Prior to this integration, the command-and-control Marines of MACG-28 would be located in the Direct Air Support Center (DASC) and the Tactical Air Operations Center (TAOC) running separate simulations with simulated pilots and aircraft. Conversely, when a pilot is conducting simulator training, they would normally be speaking to a single pilot who would

1st Lt. Matthew C. Forman, a replacement pilot with Marine Attack Training Squadron (VMAT) 203, operates the controls and heads-up display inside an AV-8B Harrier training simulator during "COPE JAVELIN."

be acting as both the DASC and TAOC. While that training is effective, COPE JAVELIN provides additional opportunities for key roles within the command-and-control structures manned by Marines who have the requisite skills to act in those specific billets. Normally, two to three integrated systems allow the pilots training in the simulator to conduct realistic communications, albeit with a makeshift TAOC or DASC outside of the simulator. Now, they can integrate more than 10 simulators that bring together integral parts of the MAW, further allowing the MAW to be more effective in providing the six functions of Marine Aviation.

Capt. Tony Megliorino, the lead planner of COPE JAVELIN, described his initial reaction.

"The idea of being able to connect our simulator and simulation systems across the MAW for mutually beneficial training and readiness gains would be a tremendous capability.

"Both the DASC and TAOC have independent internal methods of training to accomplish their various training and readiness requirements. However, collectively, the [Marine Air Command and Control System (MACCS)] trains together during quarterly MACCS Integrated Simulated Training Exercises (MISTEXs) that exercise the MACCS agency's ability to function in various tactical scenarios," Megliorino said.

The initial testing of this capability came with challenges, including communications and connectivity issues, which were expected with so many systems integrating for the first time.

"COPE JAVELIN will ideally lay the foundation for the MAW to utilize both simulated and virtual training methods to increase overall combat readiness," Megliorino said.

Conducting a large-scale virtual exercise that mimics a service-level training exercise at Twentynine Palms or El Centro, California, without leaving the home station, is now achievable. The ability to provide real-time feedback to pilots and the Marines who make up the DASC and TAOC is vital as is the enhanced ability to maintain a high state of readiness thanks to this new capability.

"The aim is not to replace live-fly events for units, but to enhance their performance by demonstrating the capability [all six aviation functions] in a virtual environment first," Grunke said. "Additionally, the goal is [to] eventually train in [overseas] areas, at locations of possible wing employment, not just U.S. training areas."

Later this summer, 2nd MAW will execute a more robust iteration of COPE JAVELIN, which is expected to fill some of the gaps identified during this "walk phase" of the exercise.

1st Lt. Michael Curtis is with 2nd Marine Aircraft Wing.

Advanced Tactical Aircraft Protection Systems Program Awards Contracts, Wins NAVAIR Award

By Rob Perry

A windfall of good news has come to the Advanced Tactical Aircraft Protection Systems Program Office in recent months, with their award of a production contract for one of their defense systems and receipt of a Naval Air System Command (NAVAIR) Commander's Award for another.

The program office, headed by Col. Tamara Campbell, is responsible for analysis, design, development, integration, testing, procurement, transition and sustainment efforts of aircraft survivability equipment (ASE) acquisition programs for fixed-wing, rotary-wing and tiltrotor aircraft defense. It is one with a well-established NAVAIR heritage tracing back to several program offices from the 1960s.

In the constantly evolving field of battle and the ever-changing challenges brought by adversaries, the program office focuses on developing ways to ensure warfighters have the ability to defend themselves while executing their missions and return home safely.

"We deliver affordable airborne defensive, electronic warfare self-protection solutions to enable the global warfighter success against an evolving adversary," Campbell said. "We are ensuring that we can protect aircraft from enemy threats and missiles as they advance through enemy airspace and survive."

The program office manages 20 programs on about 1,500 aircraft across 26 DoN type/model/series and 33 foreign military sales aircraft through three

U.S. Navy photo by Gregory Giacchino

Marines with Aviation Combat Element, Marine Rotational Force-Darwin conduct a practice landing with an AH-1Z Viper at RAAF Base Darwin, Australia. The photo inset depicts a Distributed Aperture Infrared Countermeasure sensor tail-mounted on a Marine Corps AH-1Z aircraft.

U.S. Marine Corps photo by Cpl. Jered T. Stone

integrated product teams (IPT) (assault, common and strike) supporting the Naval Aviation Enterprise as well as joint and international partners.

"We're also looking to potentially expand into protecting unmanned systems as well as protecting high-value assets," Campbell said.

One of the "most sophisticated ASE" lines managed by the Assault IPT Team is the DoN's Large Aircraft Infrared Countermeasures (DoN LAIRCM) systems. In March, the Navy awarded a $115 million production contract to Northrop Grumman Corporation, with installation of the latest version of the DoN LAIRCM system scheduled for fleet aircraft in 2022.

The system enables aircraft to operate across battlefield threat conditions providing maximum aircraft and aircrew survivability. It defends against surface-to-air infrared missile threats using a high-intensity laser beam that automatically detects, tracks and jams the threat.

"The DoN LAIRCM is comprised of an infrared sensing system and a laser countermeasure associated with it," said Dale Gaetano, Assault IPT co-lead. "It's capable of seeing a threat that is shot at it and then defeating it through the use of the laser. It's primarily used for larger aircraft like the C-130 [Greyhound] and the MV-22B [Osprey]; it has been deployed worldwide since 2009."

Award Winning Program

AN/AAQ-45 Distributed Aperture Infrared Countermeasure (DAIRCM) is a newer system also managed by the Assault IPT. It is designed for smaller aircraft—such as an H-60 model helicopter—and performs the same function as the DoN LAIRCM.

The DAIRCM team received the Edward H. Heinemann Award during the 21st NAVAIR Commander's Award ceremony March 31 for its accomplishments in improving, testing and fielding the device. The award recognized the team's accomplishments throughout 2020.

"I could not be prouder of the DAIRCM team and their focus on supporting the DoN and all our partner services and agencies that utilize the DAIRCM JUONS [Joint Urgent Operational Needs Statement] system to protect their aircraft at home and in harm's way," Campbell said. "Their hard work has enabled warfighter success with the ability to operate freely in and control contested battle space."

In 2020, the team completed JUONS testing and improved DAIRCM system performance through multiple hostile fire indication, missile warning, laser warning and integration events. The JUONS system was fielded first on the HH-60G Pave Hawk with roughly 5,000 operational hours on all in-service air-

craft at time of receiving the Heinemann Award.

Following the test events, AN/AAQ-45 received operational test and evaluation accreditation and two fielding decisions, one by the Chief of Naval Operations Air Warfare (N98) for the Navy's MH-60S helicopter, and the other by the Deputy Commandant of the Marine Corps, Aviation for the Marine Corps' UH-1Y and AH-1Z helicopters.

Additionally, the team awarded a $120 million engineering and manufacturing development contract to transition the JUONS to a Program of Record and field this capability on additional DoD aircraft.

ASE Across Multiple Product Lines

The Common IPT's portfolio consists of numerous Air Expendable (active and passive) Countermeasures, Countermeasure Dispenser Systems and Electronic Warfare Tactical Training pods. This product team is also responsible for the Common Carriage effort, the program office's newest Program of Record. It is a significant upgrade in terms of expendable capacity, dispenser system capability and broader platform commonality. Common Carriage is currently slated for carrier air wing fixed- and rotary-wing aircraft with plans to outfit Navy Tiltrotor and Maritime Patrol Aircraft.

The Integrated Defensive Electronic Countermeasures Program is an ACAT IC program and the primary ASE effort residing in the Strike IPT portfolio. The system's components include the ALQ-214 onboard jammer, the ALE-55 Fiber Optic Towed Decoy, and the ALR-67 Radar Warning Receiver, and provides detection to engage functionality for Navy and Marine Corps fixed-wing TACAIR. The Dual Band Decoy is a new Program of Record currently in development and is slated to replace the ALE-55. The Advanced EW Suite is an anticipated ACAT 1C Program envisioned to provide significant survivability upgrades for Navy F/A-18E/F Super Hornet aircraft against modern threat systems.

Pacing the Threat

Campbell and her team agree that the biggest challenge is keeping pace with threats to warfighters, and they look to the fleet to communicate these challenges back to the program office.

"We want [the fleet] to know that we're not just happy with what we have right now. We want to make sure that we're continuing to modernize and optimize our techniques, tactics and procedures in order to win wars tomorrow and make sure that we can provide that level of lethality to the force," Gaetano said.

Campbell expanded on the need for interaction and engagement.

"We put a lot of emphasis on engaging with our community stakeholders: the fleet, our sister services, the science and technology community and our industry partners. It is important that we leverage all available means to gain the necessary technical edge so we can win tomorrow's fight."

Rob Perry is editor and staff writer for Naval Aviation News. Connie Hempel, Public Affairs Officer for Program Executive Officer (Tactical) contributed to this report.

U.S. Marine Corps photo by Lance Cpl. Ashley McLaughlin

A Marine Corps AH-1W Super Cobra, with Marine Aviation Weapons and Tactics Squadron (MAWTS) 1, launches rockets at simulated enemy targets and deploys flares during a tactical demonstration in support of Weapons and Tactics Instructor course 2-18 at Yodaville, Yuma, Ariz.

To contact the Advanced Tactical Aircraft Protection Systems Program Office

Email **PMA-272_Inquiries@us.navy.mil** *or visit* **www.navair.navy.mil/organization/PMA-272**

U.S. Navy photo

The 100th F-35 inducted for modification at Fleet Readiness Center East, an F-35B Lightning II, awaits disassembly prior to modification.

FRCE Inducts 100th F-35

By Heather Wilburn

Fleet Readiness Center East (FRCE) marked a milestone in its support of the F-35 Lightning II program when the depot inducted its 100th F-35 for modifications June 11.

The induction represents eight years of effort to stand up and grow the F-35 modification line at the depot, said FRCE Commanding Officer Col. Thomas A. Atkinson.

"We are very proud to support the F-35 platform and achieve this important milestone," Atkinson said. "The F-35 maintenance concept is different than what we see on other platforms. Our experience on these 100 jets has made us stronger as a command and we look forward to continuing our contribution as more F-35s are fielded."

The depot has been able to meet this milestone through the diligence and commitment of the team servicing the aircraft, said FRCE F-35 Branch Head Ike Rettenmair.

"This platform has challenges that are unlike most others, and the team takes them head on. FRCE is 100 percent behind the partnered effort to make the F-35 program successful and, although we are only one piece of the pie in the enterprise, we take pride in supplying the warfighter with a capable and quality aircraft," Rettenmair said.

The 100th F-35 induction also serves as a steppingstone to the future of the program at the depot, said Matt Crisp, FRCE site lead for the F-35 Joint Program Office (JPO). An additional workload of F-35 components, a new lift fan facility and expansion of the F-35 aircraft line's capacity are on the horizon.

FRCE inducted its first F-35 aircraft for modification in July 2013 after having just eight months to prepare for the workload, said Jeanie Holder, the F-35 JPO induction manager at FRCE. Despite the compressed timeline, the facility was able to induct its first F-35B short takeoff-vertical landing variant on schedule and has since proven capabilities on the remaining two aircraft variants: the F-35C carrier variant and the F-35A conventional takeoff and landing variant.

"There have been a lot of hands-on work and tireless hours executed to make this depot sufficient to support a fifth-generation jet that, at the time, we weren't used to doing here," Holder said.

That team effort has made the program more efficient as relationships between key stakeholders have developed and strengthened, said Allen Williamson, an overhaul and repair supervisor on the F-35 line.

"A lot of our government and industry partnerships have grown, and we're getting buy-in from the partners to be able to turn these jets around as quickly as possible," Williamson said. "We've opened up and taken advice from Lockheed Martin and the Joint Program Office, and when we run into an issue, we now have a consolidated team coming together to address it and figure out a way forward that works for all of us."

While the program has been improving efficiency and strengthening partnerships, the workforce modifying the aircraft has made gains in knowledge, Williamson said, which helps them quickly and competently address any new aircraft issues that might arise.

"We still run into new hurdles all the time, but teamwork has gotten us to the 100th induction and will take us well beyond," he said. "We know where to go when we need help, and who can help us, and we don't delay in going there.

As the F-35 program continues to grow at the depot, Crisp said he anticipates even further development of the key support elements. For example, FRCE declared capabilities on several F-35 components in 2020—meaning FRCE is now a verified source of repair and testing for these items and is on track to declare for additional components this year and in the future. A lift fan facility scheduled for groundbreaking this year will provide FRCE with one of only two sites in the world that can service that system, and the F-35 program has plans for expanding the number of aircraft FRCE can accommodate at once.

Heather Wilburn is a public affairs specialist with Fleet Readiness Center East.

Flexible Manufacturing Cell to Increase Component Readiness

By Jim Markle

A flexible manufacturing cell (FMC) under development is projected to save Fleet Readiness Center Southwest (FRCSW) approximately $2.5 million annually in set-up time within the command's manufacturing and components programs.

The FMC will generate additional savings by creating more efficient re-work processes, according to Gabe Draguicevich, FRCSW New Technology Division Director.

Costing almost $18 million and occupying close to 7,000 square feet of floor space, the FMC is comprised of six computer numerically controlled (CNC) five-axis machines and a pallet system, which are manufactured by DMG-Mori and Fastems, respectively.

U.S. Navy photo by Jim Markle

Above is one of six computer numerically controlled, five-axis machines in the flexible manufacturing cell undergoing construction at Fleet Readiness Center Southwest.

"These six machines with the pallet system replace a total of 12 machines that had less capability, and will replace a number of our [other machines]," Draguicevich said. "With the improvement of manufacturing techniques within the machine tool industry, five-axis machines have improved the accuracy to that of the older, more traditional jig mills."

"The five-axis CNCs are capable of milling, turning and grinding within one machine. They use Siemens Unigraphics NX CAM Software along with Celos Suite of software that manages the CNC machines. The Fastems pallet system software delivers the parts and fixturing to each machine for processing while tracking schedule and the time remaining for project completion. All of this technology will be managed and monitored within a research, development, test and evaluation network called the Industrial Manufacturing System Lab," he said.

Four of the CNCs are installed and can accommodate components up to 55-inches in diameter. The other two machines are designed for larger components and along with the pallet system, should be operational by the end of August.

Draguicevich said that the CNCs are applicable to all type/model/series of naval assets serviced by the command, and that they can be used on parts and components made of aluminum, steel and titanium.

"The fixturing and preprogrammed parts support F/A-18 and E-2/C-2 landing gear specifically," he said.

"This is a game changer for FRCSW and we will be virtually eliminating process variance while improving turnaround time. There is nothing like this system installed anywhere in the DOD," he said. "There are huge opportunities for new workload such as the E2-D and [F-35 Lightning II] landing gear. The possibilities are endless and the opportunity to advance as a command is certain."

The FMC concept was created by combining multiple capital investment programs (CIP) in June 2020. FRCSW's CIP invests in new technologies and equipment to improve production efficiencies.

In the meantime, 12 artisans including machinists, model makers, maintenance technicians and industrial engineers will be trained to run the FMC, which is slated for full operation by December.

Jim Markle is a public affairs specialist with Fleet Readiness Center Southwest.

Photo courtesy of NIPPI Corporation

One of eight MH-60 Seahawk aircraft undergoes scheduled depot-level maintenance at NIPPI Corporation's facility located just outside of Naval Air Facility Atsugi, Japan.

FRCWP Increases Maintenance Capacity

From Fleet Readiness Center Western Pacific Public Affairs

Fleet Readiness Center Western Pacific (FRCWP) and contracted industrial partner, NIPPI Corporation, are working with newly increased capacity to help the U.S. Navy meet their aviation readiness and sustainment goals for the MH-60 Seahawk aircraft.

Eight H-60 aircraft fill NIPPI's aviation facility located just outside Naval Air Facility Atsugi, Japan. The newfound capacity is attributed to a recently awarded $56.1 million, multi-year contract that allows for additional inductions to help meet the readiness requirements of the Naval Aviation Enterprise.

"Our mission here at [FRCWP] is to perform the required depot-level maintenance and return safe, mission-ready aircraft to the fleet as quickly as possible. If there are aircraft in need of repair and we have the capacity to induct it, then we are happy to take on that workload. We pride ourselves on accelerating readiness for the Naval Aviation Enterprise to ensure they're ready for whatever the mission requires. And that goes for any type/model/series that we currently support, not just H-60 aircraft," said FRCWP Commanding Officer, Lt. Col. Kevin M. Ryan.

Last fiscal year, FRCWP performed planned maintenance intervals (PMI) on 10 MH-60 aircraft, and this year are on track to service 14, a 40-percent increase. In addition to scheduled maintenance work increase, the command also performs in-service repair (ISR) work on MH-60 aircraft and has completed 59 repairs so far this fiscal year.

"I am thrilled with the increased performance that we are seeing at FRCWP and the feedback we are receiving from our U.S. Navy and Marine Corps customers deployed around the world. This success is due to the hard work and dedication of the [FRCWP] team and our industrial partners who help carry out the mission," Ryan said.

By the end of fiscal 2021, FRCWP is trending to complete PMI on 35 aircraft, overhaul 140 pieces of support equipment and perform roughly 500 ISR jobs to support deployed U.S. Navy and Marine Corps forces.

Somerville Takes Passion of Flight to Command VX-23

By Kaitlin Wicker and Rob Perry

In a world where engineering, aviation and military defense collide, Capt. Elizabeth Somerville brings a great deal of experience to the table. With bachelor's and master's degrees in aeronautical engineering, two decades of experience between fleet aviation and developmental test, and a love of aviation that began when she was a small girl, she relishes her time in Naval Aviation.

Somerville was most recently the Chief Test Pilot (CTP) for Air Test and Evaluation Squadron (VX) 23 and took the helm as the squadron's Commanding Officer in July at Naval Air Station Patuxent River, Maryland.

"My primary job as the CTP is to work with our chief test engineer to make certain that all of our flight tests are executed safely and effectively," Somerville said. "We have some big changes and big capabilities coming to the squadron. I always keep my eye on the horizon and I am fortunate to be taking command of such a fantastic squadron."

Suiting up to take to the skies is not new for Somerville. Before she received her wings of gold as a naval flight officer (NFO), cloud surfing was her favorite escape. As a young girl, Somerville's grandfather owned a small plane and would take her flying above the New England landscape.

"I was fascinated with all things aviation or space-related," she said. "I was incredibly fortunate that my parents fully supported my passion, driving me to the airport to get in a plane and fly."

Before graduating from high school, she earned her private pilot's license and with a Navy scholarship in-hand, Somerville graduated from the Massachusetts Institute of Technology with a bachelor of science degree in aeronautical and astronautical engineering and went to Pensacola, Florida, for flight training, where she initially thought she might hit a roadblock to her dream of flying.

"In those days there was no Lasik surgery, or corrective action for poor vision," she said. "I had, and to this day, have terrible vision. I didn't even have the choice to be a pilot."

Concerned her vision may even preclude her from being an NFO, Somerville said she was ecstatic when she passed the physical. She thinks she's been a good NFO and made some positive contributions to the community.

"Every time I think the excitement of a deployment, the comradery of a ready room, or flight test environment will wear off and get old, I realize, there's nothing quite like it," Somerville said.

Through deployments in support of Operation

U.S. Navy photos by Adam Skoczylas

Capt. Elizabeth Somerville and Lt. Tyler Vitti discuss their upcoming test flight during a pre-flight brief.

Capt. Somerville inspects the nose of the F/A-18F Super Hornet before the test flight.

U.S. Navy photo by Adam Skoczylas

"Every time I think the excitement of a deployment, the comradery of a ready room, or flight test environment will wear off and get old, I realize, there's nothing quite like it."

Iraqi Freedom and Operation Enduring Freedom, Somerville knew she was in this for the long-haul. As she finished her first fleet tour, she wanted her next assignment to pair her engineering background with her experience and skills in the plane, turning her attention to the pursuit of becoming a test pilot.

"My skipper knew there were a couple of us interested in test pilot school," she said. "So, he called a friend, who called a friend, and next thing you know we had a tour of the schoolhouse and a look at what it's all about. I knew then it was something I really wanted to pursue."

Somerville was accepted to the United States Naval Test Pilot School (USNTPS) Class 130. As part of a cooperative program, she attended the Air Force Institute of Technology and when she graduated with USNTPS, she also graduated with a master of science degree in aeronautical engineering.

In her 22 years of service, Somerville has seen her share of firsts, including becoming the first female aviator in Electronic Attack Squadron (VAQ) 141 while it was on the maiden deployment of both the Navy's EA-18G Growler and USS George H.W. Bush (CVN 77); first female Commanding Officer of a naval developmental test squadron at VX-31 (which is where she went upon graduating USNTPS); and now as the first female Commanding Officer of VX-23. Having spent time out in the fleet, Somerville said she felt a calling to come back home and continue her aviation career in flight test and acquisitions, but also be able to balance her home life.

"After deploying with the Bush in support of several operations, mostly Operation Enduring Freedom in Afghanistan, I knew I wanted to come back. I had a young daughter, and I wanted to explore career opportunities that would allow me to contribute to and focus in areas where I was the best at, where I could leverage my strengths to further Naval Aviation that didn't take me away from home 75 percent of the time," Somerville said, which lead her back to VX-23 at NAS Patuxent River.

Somerville said she is looking forward to leading VX-23 to meet those challenges, including the test squadron's increasing involvement in unmanned aviation as well as emerging technologies to existing aircraft.

"We have some upgrades coming to the Growler, the [MQ-25] Stingray, the F-18s and some other really unique things that are being developed and then delivered to the fleet," she said.

But while those new advances continue to develop, Somerville said her main focus will be to continue finding ways to allow the test squadron to do its day-to-day job of evaluation to ensure safety and effectiveness of the fleet by "breaking down any roadblocks that they may see to accomplishing that job."

"I can't speak to anyone else's experiences, but I can say for mine, I have always worked with phenomenal professionals," she said. "I knew, walking into every squadron, that I had to earn my qualifications and I was given the opportunity to earn them, but neither of those things was unique to me.

"What I hope anyone takes away from my experiences is this: find whatever makes you tick, find what you're really passionate about and make a career of it."

Kaitlin Wicker is a public relations specialist with Naval Test Wing Atlantic, and Rob Perry is staff writer and editor with Naval Aviation News.

STRIKE TEST NEWS

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

U.S. Navy photo by Steve Wolff

The "Salty Dogs" of Air Test and Evaluation Squadron (VX) 23 continued to deliver to the warfighter, even during a pandemic, ensuring the availability of the most capable aircraft, systems and weapons.

The Navy and Marine Corps' largest flight test squadron, VX-23's mission is to execute research, development and test and evaluation of fixed-wing tactical manned and unmanned aircraft. Our test aircraft inventory consists of nine different type/model/series aircraft including F-35 Lightning IIs, F/A-18 Legacy and Super Hornets, EA-18 Growlers and T-45 Goshawks.

However, our greatest asset is our people. We push the envelope each day in support of our nation's warfighters, our friends. We marry expertise and experience to solve challenges and ensure that, when called, naval aviators across the fleet have what they need to execute the mission effectively and efficiently.

We are always looking for fleet insight, a few more good people to join the team. If you are interested in influencing the future of Naval Aviation, solving the challenges you see each day, consider joining our developmental test and evaluation team. Reach out to me, the Chief Test Pilot, or one of our project officers. We welcome the conversation.

Test to WIN!

– Lt. Col. Mark "Ammo" Amspacher, Commanding Officer, VX-23

BACK TO TOC

U.S. Navy photo by Erik Hildebrandt

Air Test and Evaluation Squadron (VX) 23 conducts the first captive carry flight of the AARGM-ER on June 1 at Naval Air Station (NAS) Patuxent River, Md.

Dynamic Testing of Advanced Weapons

By Lt. Cmdr. Brad "Bacon" Tribley

Air Test and Evaluation Squadron (VX) 23 recently completed a rare ground vibration test in support of an underwing integration of the AGM-88G Advanced Anti-Radiation Guided Missile Extended Range (AARGM-ER).

The VX-23 team, working with its industry partner, used an airbag suspension system to lift an F/A-18E Super Hornet off the deck. Three different combat-representative loads were applied to the aircraft and measured. The effort took four months and provided critical response data on mission weapon stations. The results inject a strong dose of "the real world" into theoretical modeling, building a bridge to future flutter flight test efforts.

In addition to the ground vibration test, the

STRIKE TEST TEAM

The VX-23 strike test team is comprised of military test pilots, naval flight officers, engineers and contracted maintenance. Members of the team conduct a pre-flight briefing at right. The following images depict some of the team members and their roles in supporting the VX-23 mission—execute research, development and test and evaluation of fixed-wing tactical manned and unmanned aircraft.

U.S. Navy photos by Adam Skoczylas

AARGM-ER developmental testing covers airborne noise and vibration testing, weapon jettison/separation test events, and aircraft carrier suitability tests.

Currently, the team is using noise and vibration testing to gather data on how AARGM-ER responds to vibration and acoustic elements of flight, as well as its general compatibility with the F/A-18E/F.

These dynamic flight tests include maneuvering at elevated load factors with heavily instrumented measurement vehicles, a variant of the AARGM-ER to characterize weapon and aircraft interfaces. The results are critical in refining weapon carriage and employment envelopes for the warfighter.

Future AARGM-ER test efforts will include weapon jettison and separation flight test events this summer to evaluate weapon post-launch flight characteristics. Additionally, AARGM-ER will undergo structural suitability testing in the carrier environment during shore-based catapult launches and arrested landings to the limits of the F/A-18E/F aircraft.

VX-23's integrated testing of the AGM-88G with the program office and industry partners provides critical data in support of AARGM-ER Initial Operating Capability, scheduled for 2023.

The dynamic nature of weapon integration testing at VX-23 offers an unmatched opportunity to evaluate the weapons of tomorrow, ensuring the best weapon solutions for warfighters.

U.S. Navy photo by Steve Wolff

Taking a Rhino Skiing

By Lt. Jonathan "Brawny" Williams

The F/A-18E/F Super Hornet, carrier suitability and industry partners teamed up to make history in the execution of performance takeoffs using the F-35 Lightning II ski jump facility at Naval Air Station Patuxent River, Maryland.

Over the past year, the team performed eight successful ski jumps at mission representative weights to validate the model in response to interest from the Indian Navy in potentially purchasing Super Hornets. The demonstration was completed to ensure the jets could launch from India's aircraft carriers, configured with Short Take-Off but Arrested Recovery (STOBAR), commonly referred to as a ski jump.

Future testing could entail demonstrations at India's test facility in Goa, as well as on an Indian aircraft carrier.

India first considered the Super Hornet as a viable option for their ski jump-equipped aircraft carrier, the INS Vikramaditya, in the early 2000s. The sale of the Super Hornet to the Indian Navy brings the potential to share future upgrade costs and further Super Hornet production.

Lt. Col. Mark "Ammo" Amspacher, VX-23 Commanding Officer from 2019 through June 30, 2021.

Capt. Elizabeth Somerville, Chief Test Pilot, and VX-23 CO effective July 1.

Lt. Jonathan "Brawny" Williams, F/A-18 Super Hornet Test Pilot.

F-35B Integrated Test Force Completes Sea Trials for ITS Cavour

By Maj. Brad "HJOP" Leeman

Test pilots, engineers and support staff from VX-23's F-35B Lightning Integrated Test Force (ITF) recently partnered with Italian sailors to complete sea trials for the ITS Cavour–the Italian Navy's first F-35 aircraft carrier.

The four weeks of flight test in the western Atlantic Ocean were preceded by two years of detailed test planning—efforts nearly derailed by COVID-19 mitigation and international travel restrictions. The detachment hinged on merging both U.S. and Italy's COVID policies during a time when those policies were as dynamic as ship motion. The risk of failure from one positive viral case was high, but aggressive testing and quarantine proved sufficient to ensure success.

The team conducted 125 test ski-jump takeoffs during 60 flight hours of day and night operations. Lineups varied from 250 to 525 feet, and up to 53,000 pounds gross weight. Vertical landing weights were achieved with burn downs in afterburner while ship conditions were varied between each landing to ensure the entire wind envelope was

U.S. Navy photo

Maj. Brad "HJOP" Leeman (BF-19) and Lt. Cmdr. Barry "Baz" Pilkington (BF-5) pilot two F-35B Lightning IIs from NAS Patuxent River to the Italian Navy carrier ITS Cavour for sea trials in March. Leeman accomplished the first landing of an F-35 on the ITS Cavour in BF-19, followed by Pilkington in BF-5.

U.S. Navy photos by Adam Skoczylas

Pictured from left are Richard Garner, Brandon Worra, Lt. Jonathan "Brawny" Williams, Tyler Hendrick, Maj. Dylan "Bilbo" Nicholas, Jeff Breckenridge, Santosh Jain, Ben Braudaway, Lt. Jonathon "Zoloft" Parry, Liz Van Zandt and Lt. Jon "Maddy" Malycke.

covered at every landing spot, and the entire envelope was systematically cleared.

Establishing comprehensive goals, strategy and procedures was key to mission success. Initial planning was twofold: ensuring the ship had the required F-35 compatibility modifications and support equipment and building the modeling and simulation data required to support the flight test effort.

Mid-phase efforts zeroed in on differences between previous sea trial testing and analysis of the data gathered from modeling and simulation. This yielded specific areas of concern such as potential hot gas ingestion areas, potential gear overloads and nose wheel steering issues due to the ski-jump ramp profile, and air wake issues impacting both handling qualities and performance. Final planning focused on aircrew and test team training, emergency preparedness, the ship's company training and integration with the Italian crew. The result was a fully trained team prepared for sea trial test execution.

In response to Italy's request to immediately execute limited F-35 operations on its return home, planners crafted a unique test plan—a "Sail Home Envelope"—as priority one, allowing initial data collection and generation of a limited flight clearance. Subsequent priorities were generated for heavy weight launches, high winds, port/starboard winds, high deck motion, aft-facing vertical landings and vertical take-offs with the ultimate objective of clearing as much envelope as possible given the limited duration of the detachment.

The team met all test objectives in part due to good weather and maintenance—ultimately, adding another class of ships cleared to conduct F-35B operations.

Next-Generation Jammer Mid-Band: A Year of Firsts

By Lt. Cmdr. Michael "Tugsy" Dixon and Lt. Jonathon "Zoloft" Parry

The Next-Generation Jammer Mid-Band (NGJ-MB) program is pressing toward the fleet with a series of events executed by the NGJ Integrated Test Team (NGJ-ITT) at VX-23.

In spring 2021, the team executed mission systems testing that evaluated output power and the ability to maintain jamming energy on a ground target. It also executed simultaneous, dual-coast developmental flight test at VX-23 and VX-31, collecting data

U.S. Navy photo by Steve Wolff

VX-23 conducts an aeromechanical test flight of Next-Generation Jammer Mid-Band (NGJ-MB).

Richard Garner, Airborne Electronic Attack (AEA) Engineer, NGJ.

Lt. Jonathon "Zoloft" Parry, EA-18G Growler Test Pilot.

to support the transition of the NGJ-MB to initial operational test and evaluation.

The Navy's airborne electronic attack (AEA) community first witnessed the beginning of the next generation of electronic attack in 2020 when VX-23's "Salty Dogs" began testing the NGJ-MB, led by Cmdr. Joshua "Donny" Hattery and test engineer Kurt Marburger. After three months of anechoic chamber testing in early 2020, NGJ-MB finished the first portion of its developmental chamber test. This included 400 hours of basic functionality testing, electromagnetic environmental effects data collection and performance testing.

On Aug. 7, 2020, Lt. Jonathan "Brawny" Williams and Christopher "Linda" Lovelace were the first aircrew to fly the NGJ-MB weapon system onboard an EA-18G Growler. Just three months later, the Aeromechanical Pod version of NGJ-MB launched. The aeromechanical program wrapped up the first phase of testing when the team completed the NGJ-MB flying qualities evaluation in the powered-approach configuration. In early 2021, the Atlantic Test Ranges at NAS Patuxent River finished construction of the mobile adversary radar simulators from commercial components to facilitate capabilities test and evaluation of the NGJ-MB program.

The NGJ-ITT's dedication received recognition from the highest levels. The team won the Department of the Navy's Test and Evaluation award for its accomplishments on two Acquisition Category I programs in 2020, including NGJ-MB and NGJ Low Band.

"The team moved mountains in 2020 to support critical test efforts for NGJ mid- and low-bands," said Capt. Michael Orr, program manager for the AEA Systems Program Office. "What is truly remarkable is that they accomplished these efforts simultaneously and during a worldwide pandemic."

U.S. Navy photo by Steve Wolff

An EA-18G Growler from VX-23 conducts a NGJ-MB flight test over Southern Maryland.

Brandon Worra, AEA Engineer, NGJ.

Jeff Breckenridge, F/A-18 Propulsion and Mechanical Systems Team Lead.

U.S. Navy photos by Adam Skoczylas

U.S. Navy photo

VX-23 test pilot Maj. Dylan "Bilbo" Nicholas executes a safe separation test release of a GBU-53 Small Diameter Bomb Increment II over Naval Air Station Patuxent River, Md.

Pushing Stormbreaker to the Lightning Fleet

By Maj. Dylan "Bilbo" Nicholas

One of the top priorities of the F-35 Lightning II follow-on modernization effort for Navy and Marine Corps B and C model aircraft expands the arsenal of cleared weapons the fighter jets can carry. The GBU-53 Small Diameter Bomb Increment Two (SDB II)—called Stormbreaker—is currently undergoing flight test at VX-23 so it can be added to the collection.

The Stormbreaker is a guided munition with a target acquisition seeker. Deploying wings and control surfaces provide significant standoff for the employing aircraft. Additionally, the Stormbreaker is a net-enabled weapon, allowing for tracking and control. Coupled with the F-35B and C capability of carrying multiple Stormbreakers in the internal weapon bays while maintaining the aircraft's low-observable characteristics, this weapon will greatly enhance flexibility, lethality and survivability.

Over the past year-and-a-half, the F-35 Integrated Test Force (ITF) gathered the required data necessary to support Stormbreaker certification. In January 2020, the team conducted static separation testing that provided model correlation as well as ejector pitch valve settings that resulted in nominal in-flight safe separation characteristics.

After that, testers used a variant, specially modified with flight test loads instrumentation, to gather weapon, carriage and release equipment, and airframe data throughout the carriage and release envelopes. Leveraging the data gathered during short-takeoff and vertical landing operations, they used this information to determine the ability of the weapon to tolerate and function appropriately throughout the flight regime.

Following pit testing and the external environment testing, the ITF and VX-23 team moved on to safe separation testing which is ongoing. Testers will execute a number of Stormbreaker separations from the internal bays across the planned jettison and release envelopes. During these releases, the wings and control surfaces are locked and focus is exclusively on ensuring the weapon will fall away predictably without impacting the releasing aircraft.

Maj. Dylan "Bilbo" Nicholas, F-35B Lightning II Test Pilot.

Tyler Hendrick, Boeing Engineer, NGJ.

Concurrent with environment and safe separation testing, the ITF team has been working on weapon and aircraft integration, as well as pilot vehicle interaction testing. These tests ensure the Stormbreaker weapon system conforms to the universal armament implementation scheme employed by all F-35 weapon systems, and is able to appropriately communicate weapon targeting and status information.

The test team is working with VX-23's F/A-18E/F Super Hornets to complete testing of in-flight weapon datalink operations to confirm post-launch control ability by both third-party ground and airborne assets.

Following a limited number of full weapon delivery tests from release through impact, the Stormbreaker will move to operational test for more employment testing prior to its fleet release.

Block III Super Hornet: Ready to Rock 'n' Roll

By Lt. Cmdr. Karl "Pigpen" Suabedissen

The F/A-18 Super Hornet Block III is ready to rock and roll—or, rather, shake, rattle and roll (SRR), the name for testing that mimics the aircraft carrier environment.

Each new system and weapon installed on an F/A-18 must demonstrate that it can withstand the intense forces of both a catapult-assisted launch and a ship-based arrested landing. Though modern flight control software has significantly improved carrier landings, VX-23 still tests any new system to ensure it can handle life underway. In January 2021, the first Super Hornet Block III

Cmdr. Tyler "Launchpad" Hurst and Adam Kassulke perform catapult launches in Salty Dog 287, the first production Block III F/A-18F Super Hornet.

U.S. Navy photo by Atlantic Test Range

Lt. Jon "Maddy" Malycke, F/A-18 Test Pilot.

Santosh Jain, F/A-18 Flying Qualities Team Lead.

U.S. Navy photos by Adam Skoczylas

aircraft successfully completed SRR testing at NAS Patuxent River.

The Block III Super Hornet brings a number of updates to the Super Hornet including an advanced crew station with a large area display, a low-profile heads-up display and engine fuel display. A high-definition video recorder provides longer recordings of more displays than the current recording mechanism. The large area display, although appearing as a single seamless display, is controlled by two display computers for redundancy. Should one side of the display fail, the aircrew will still have nearly full functionality on the other side. The layout is aircrew selectable. Overall, presentation is a familiar picture with a much larger multi-purpose color display replacement area for greater situational awareness.

Shake testing replicates the extreme forces of shipboard launches and recoveries that jets experience. NAS Patuxent River is home to a steam catapult and set of arresting gear equipment that allows for shore-based testing at a much lower risk without many of the planning challenges.

SRR testing consists of two phases with several different test points. The catapult phase of testing subjects the aircraft to the maximum horizontal acceleration it can expect aboard the carrier, as well as off-center launches, in the event that the aircraft is not perfectly aligned with the catapult track.

The arrestment phase is more varied, as there are a multitude of ways the aircraft can touch down. Some of the key test points captured in the arrestment phase include maximum sink rate testing, where the jet must touch down significantly off-center at a high rate of descent and requires rapid deceleration.

Block III aircraft are scheduled to reach the fleet in fiscal 2022, bringing enhanced situational awareness to both single- and two-seat Super Hornets.

U.S. Navy photo by Atlantic Test Range

Lt. Cmdr. Karl "Pigpen" Suabedissen and Adam Kassulke perform Mk 7 free flight arrestment test points in Salty Dog 287, the first production Block III F/A-18F Super Hornet.

Liz Van Zandt, Platform Coordinator, F/A-18E/F.

Ben Braudaway, F/A-18 Air Vehicle Stores Capability Engineer.

Professional Reading

By Cmdr. Peter Mersky, USNR (Ret.)

Korean Air War: Sabres, MiGs and Meteors 1950-53

By Michael Napier, Osprey Publishing, UK. 2021. 320 pp. Ill.

Contrary to what many authors, this author included, claim, the Korean War 1950-1953 is definitely not forgotten. It's a shame that this conflict has acquired such a reputation over the years. However, sandwiched between World War II and the Vietnam War of the 1960s and early 1970s, it may be understood how little younger generations of historians and writers may have preferred to discuss and write about Korea, and how apparently they may have just rediscovered this intense and bloody conflict. That said, the war on the Korean peninsula definitely deserves to be remembered, and this large new publication will help, especially in the area of the war fought in the skies between air forces of the Allied coalition and that group of communist countries supported by the Soviet Union, mainly North Korea and Communist China.

Surprisingly, it is only in recent years how deep the USSR's support has been understood, from supplies and arms to squadrons of Soviet MiG pilots, many of whom were experienced WWII veterans, and not always the beginners of North Korean and Communist Chinese pilots who could barely handle their MiGs and other early Soviet jet fighters as well as leftover Russian prop fighters and light bombers. The conflict of the early 1950s is very much in the minds of today's writers, politicians and other very interested parties on both sides of the world.

That said, there are certainly lesser-known aspects of the three-year conflict that has not yet officially ended by the signing of a treaty. That is where this very well-illustrated volume finds a place. The author is a former Royal Air Force Tornado pilot of squadron leader rank (major or lieutenant commander in other services).

The reader quickly realizes this is not another compendium of just U.S. F-86s vs. MiG-15 stories, but rather it takes on the experiences of British and Commonwealth squadrons that are often ignored or only briefly mentioned in other histories. There is now the history of the Royal Australian Air Force's (RAAF) No. 77 Squadron, which flew many missions throughout the war first in WWII retread P-51 (later F-51) Mustangs and then Gloster Meteors, the first Allied jet fighters that appeared only in the closing months of the war almost at the same time as

Photo courtesy National Archives and Records Administration

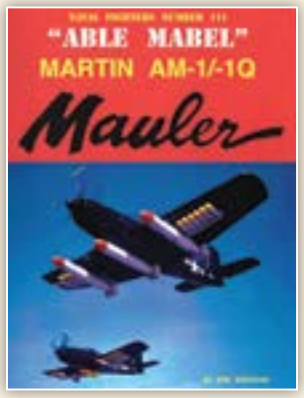
U.S. Marine Corps ground crew service a visiting Royal Navy Hawker Sea Fury FB11 on loan to the Royal Australian Navy operating from the carrier HMAS Sydney (R-17) for operations over Korea in late 1951.

the German Me 262. The twin-jet Nazi fighter actually showed much greater potential than the British fighter but never met the Meteor in what would have been the first confrontation between jet fighters.

An interesting sidebar to the Meteor's use and small rate of success against MiGs in Korea—generally speaking—poses the question: If the RAF had managed to get the Meteor into general

"Able Mabel," Martin AM-1/-1Q Mauler

By Bob Kowalski, Steve Ginter, Simi Valley, CA. 2020. 153 pp. Ill.



As World War II slowed down then ended first with the Italian and German surrenders in September 1943 and May 1945, respectively, then that of the Japanese in September 1945, many programs that had begun to gather steam such as the massive American carrier-production schedule, also began to slow down and finally halt soon after the war and the actual fighting had also stopped. However, a few aircraft designs and programs continued development, perhaps to keep companies employed and to maintain the Allied, especially the American, programs that had contributed so much to ultimate victory. One of these abbreviated programs was the successor to the SBD Dauntless dive bomber that had seen the Navy through so much

Photo courtesy of Andrew Thomas

Armed with bombs, and using RATOG (Rocket Assisted Take-Off Gear) pods atop the wing, a Fairey Firefly FR. 5 of Royal Navy No. 810 Squadron launches from HMS Theseus (R-64) for a mission over Korea in March 1951.

service and it had met the German Me 262, how well would the Meteor have performed against the swept-wing Nazi fighter?

The South African Air Force's (SAAF) No. 2 squadron was also in the van of the Allied air effort in Korea, also flying Mustangs, and then F-86s trying to keep the North Korean forces at bay.

Chapters describing the role of Royal Navy carriers and their Fairey Firefly fighter-bombers and Supermarine Mk 47 Seafires, barely recognizable variants of the iconic Mk 1-9 Spitfires and Seafires of WWII five years past add to the book's scope and perhaps the interest of American readers.

Chapters dealing with U.S. Navy and U.S. Marine Corps aviation are an integral part of the central narrative and give full credit to these hard-pressed services' crews' special skills in close air support with several F4U-equipped units supplemented by F9F Panther and F2H Banshee carrier squadrons, although there is a minor error on page 7 saying no Marine squadrons were aboard carriers, which most readers will instantly recognize as false.

Aerial combat between Soviet-built Yakovlev and Lavochkin prop-driven fighters and Allied prop and jet aircraft was surprisingly more frequent than has been reported. Even WWII Il-10 ground-attack Sturmoviks—two-seat variants of the iconic Il-2 single-seat models that decimated Nazi tank columns—were involved in communist operations.

Korean Air War is a fairly good effort, especially for its format size and word length. Its main appeal is the number and quality of its selection of photographs, one of the best I have seen. To be sure, the captions and curious sidebars really need to be edited for content and relation to the main text. Many times the subject of the photos, especially the individuals shown, needs to be clarified. An example of a lack of enough

of the terrible immediate post-Pearl Harbor action when the Japanese seemed virtually unstoppable until the middle of 1942.

The Curtiss SB2C Helldiver eventually replaced the SBD, although it never gained the affection and reputation for dependability of the Dauntless. The Marines flew the SBD almost to the war's end in 1945 in the Philippines. However, a few programs continued after the surrender, one of which was Martin's huge single-engine, single-seat AM-1 Mauler, which used a 3,000-horsepower Pratt & Whitney to pull itself and its heavy load through the air. Occasionally referred to as the "Able Mable," the AM-1 was an incredible weight-lifter that saw an abbreviated career in the fleet and even the Naval Air Reserve, which is understandable with only 150 aircraft being eventually constructed, including prototypes. Douglas' AD Skyraider found its eventual place in the fleet and reserves flying through the Vietnam War from carriers and shore bases but the AM-1 was eventually out of service by the early 1950s.

Nevertheless, Steve Ginter's latest Naval Fighters book (No. 111) shows the big aircraft in all its glory, with bombs and rockets, as well as a short-lived Electronic Countermeasures variant, the AM-1Q, six of which were modified to the ECM mission. Like many of the volumes in this series, this new book is full of photos that show all the details inside and out of its subject, including graphics from the operator manuals that preceded the NATOPS system of the mid-1960s, and there are photos of the many stores the Mauler could carry. There are only a few models of the AM-1, several of which are a little difficult to find now, but they present a challenge to modelers who want something different to build and this new book would certainly help add details to the basic kit.

Photo courtesy National Archives and Records Administration

A Martin AM-1 Mauler from the Naval Air Test Center, located at Naval Air Station Patuxent River, Maryland, in May 1949.

information in the text appears on page 248: Cherokee strikes were named for their originator, then-Rear Adm. (later Admiral) Joseph "Jocko" Clark (1893-1971), a full-blooded Cherokee, a member of Annapolis class 1917, and a designated Naval Aviator (1925). A British author might not care too much about who Jocko Clark was but American readers certainly would be interested, and a few moments further research would have been of value as a dedicated historian and writer.

Looking at the bibliography and list of sources, it is plain the author has researched from other published sources as well as from government material from both sides perhaps not previously available either in person historians or on the web.

In today's market, $40 is not too great an expense for a book of this format and scope, which seems to be in keeping with Osprey's ongoing philosophy of providing entertaining and informative accounts of aviation history for today's readership.

Airpower Over Gallipoli, 1915-1916

By Sterling Michael Pavelec, U.S. Naval Institute Press, Annapolis, MD. 2020. 215 pp. Ill.

The Gallipoli Campaign of World War I is probably one of the so-called Great War's least remembered, or at best seldom-discussed events. And yet, upon closer examination, it is definitely worthy of consideration when describing just how monumental this four-month conflict really was. The duration of the battle, the horrific casualty count on both sides, the uniqueness of various aspects and if nothing else, the overall effect it had on the psyche of the people of Australia and New Zealand, who until then might have been said to have been outside the realm of most world conflicts and national considerations. Indeed, one might be surprised to find how many songs have been written about Gallipoli and involvement and terrible body count of Australian troops under the guns of their Turkish (or more correctly Ottoman) opponents. His phrase "that hell they called Suvla Bay" stays with you after you hear songwriter Eric Bogle's 1971 ode to Gallipoli, "The Band Played Waltzing Matilda."

For such a small book, it is full of deeply researched historical facts, geography and political setups that will probably be new to most readers. With a very small, but interesting folio of period photos and only two maps when another such graphic would have greatly enhanced or complemented the text, it is still a good, though brief examination of this lengthy battle that cost so many lives but served to introduce airpower to a more strategic role.

The book explores the beginning understanding of the use of airpower with the early formation of small squadrons equipped with only a few simple aircraft of fragile construction whose small engines gave them limited performance and were flown by men with singular capabilities. Indeed, the planes' speeds would be considered today comparable to city speed for today's automobiles.

It is amazing how complicated this brief war within a war was planned and fought by the participants. The role of early military aviation using land-based and water-based aircraft was mainly that of reconnaissance and light attack. The author has obviously conducted major research to gather information with which to write this unusual account.

Gallipoli was not an easy campaign for either side, most especially the Allies, namely France and England, who much like their counterparts in the future war in the Falklands with Argentina in 1982, had to stretch their supply lines very thin to adequately fight no less determined enemy, the Ottoman Turks.

Chapter Five describes the early problems of coordination between the fleets and new but important developments involving aviation seem to appear during the Gallipoli campaign beginning in April and May of 1915. As the campaign comes to an end, the exhausted combatants take stock. The Allies—the British French, and the ANZAC (Australia, New Zealand Army Corps)—pull their troops, ships and aircraft out of the bloody combat zone while the equally tired Central Powers (Germany, Austria-Hungary and Turkey) also relieve their troops.

The Gallipoli fighting saw the beginning of national awareness that Australia and New Zealand had rarely considered. Each of these countries, as well as the Irish who were still fighting for their independence from the British Empire had suffered grievous losses. Many young men were killed or were maimed and returned home to live out their lives remembering the terrible time and personal losses.

The author is a professor of airpower history at the Air Command and Staff College at Maxwell Air Force Base in Alabama, and has written four earlier books and other articles on various aviation-oriented subjects.

Airpower Over Gallipoli is an original look at this "modern" war of a century ago that we have forgotten but which deserves to be recalled and studied in today's new arena of conflict.

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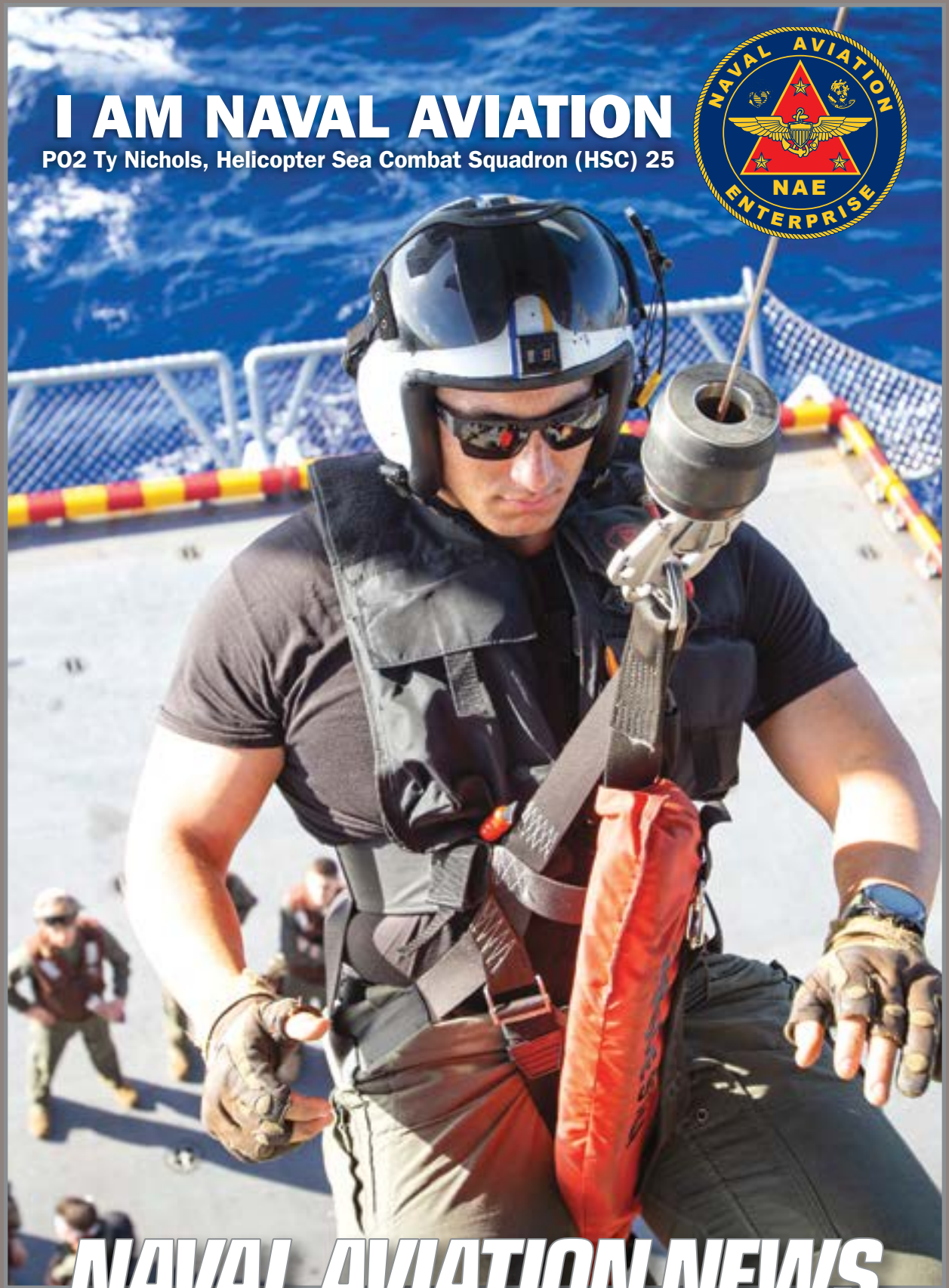

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