NAVAL AVIATION NEWS

THE FLAGSHIP PUBLICATION OF NAVAL AVIATION SINCE 1917 SUMMER 2020

Test Pilot School Alum
REACH FOR THE STARS

WHAT'S INSIDE

An F/A-18F Super Hornet, attached to the "Diamondbacks" of Strike Fighter Squadron (VFA) 102, maneuvers on the flight deck of the Navy's forward-deployed aircraft carrier USS Ronald Reagan (CVN 76).

U.S. Navy photo by MC3 Erica Bechard

NAVAL AVIATION NEWS

SUMMER 2020 VOLUME 102, NO. 3

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ON THE COVER

On the cover: *Astronauts Navy Lt. Cmdr. Matthew Dominick, Marine Corps Maj. Jasmin Moghbeli and Air Force Col. Raja Chari attended the U.S. Naval Test Pilot School before being selected for the NASA astronaut program. They share their journey on page 30. Included in the illustration is the SpaceX Falcon 9 rocket launch of the Crew Dragon on May 30. (Cover photo illustration by Fred Flerlage; photographic images courtesy of NASA)*

Our first 60-page issue includes several personnel, command and acquisition milestones. Medical team members of the Physiological Episodes Action Team share their increased understanding of the physical challenges experienced by aircrew in one of the harshest work environments and how to mitigate them, starting on page 25. On page 20, USS Gerald R. Ford (CVN 78) and her crew continue testing and trials to prepare the ship for deployment. In the second installment of Strike Test News, Air Test & Evaluation Squadron (VX) 23 updates the fleet on major flight test programs on page 49.

On the back cover: *Lt. j.g. Madeline Swegle completes the Tactical Air (Strike) aviator syllabus with Training Squadron (VT) 21 "Redhawks" at NAS Kingsville, Texas, on July 7. Swegle received her Wings of Gold July 31 and is the Navy's first Black woman TACAIR pilot. (U.S. Navy photo by Anne Owens)*

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

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Airscoop

Compiled by Andrea Watters and Rob Perry

CVW-7 Commander Logs 5,000 Hours in E-2D Advanced Hawkeye

NORFOLK, Va.—The commander of Carrier Air Wing (CVW) 7 logged his 5,000th flight hour in the E-2D Advanced Hawkeye May 19 at Naval Station Norfolk.

Capt. William Reed is the only Hawkeye pilot currently on active duty to fly 5,000 flight hours, an exceptionally rare accomplishment for military aviators. He is also qualified to pilot the F/A-18 E/F Super Hornet and E/A-18G Growler and has logged 720 carrier-arrested landings.

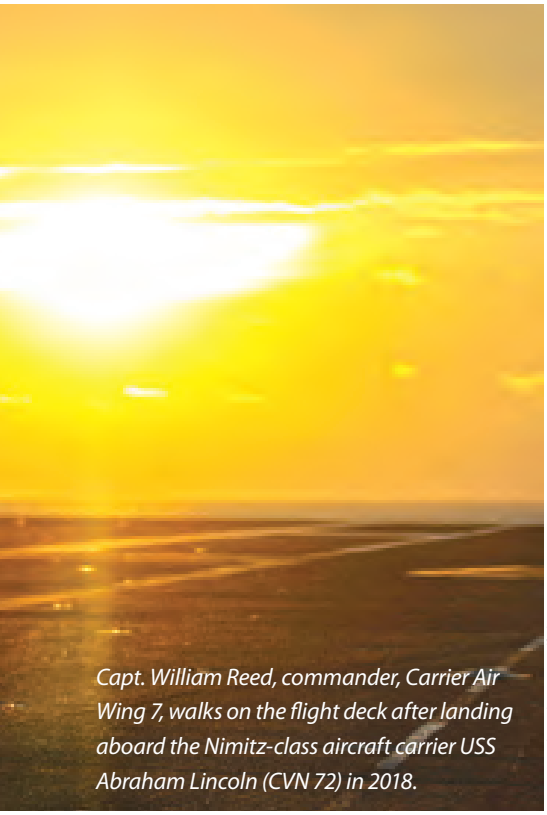
"The fun of flying never goes away," Reed said. "The recognition for this achievement is shared with all the great Americans I've served with, who put the energy and effort into providing an up aircraft for the mission."

Reed has accrued 1,100 combat flight hours during 300-plus missions in support of Operations Allied Force, Enduring Freedom, Iraqi Freedom and Inherent Resolve. With the Enterprise Carrier Strike Group, he was among the first American forces to respond immediately following 9/11, flying combat sorties in Afghanistan in October 2001.

"It doesn't matter how much experience you have, you're always training," he said. "It's a thrilling job, flying around the aircraft carrier in a big plane like the E-2. But the best part is seeing the team achieve excellence day in and day out."

Cmdr. Neil Fletcher, executive officer, Airborne Command & Control Squadron (VAW) 121, who served with Reed during his junior officer tour, emphasized the achievement of reaching this milestone.

"Achieving 5,000 flight hours in the E-2C/D Hawkeye is an incredible mile-



Capt. William Reed, commander, Carrier Air Wing 7, walks on the flight deck after landing aboard the Nimitz-class aircraft carrier USS Abraham Lincoln (CVN 72) in 2018.

U.S. Navy photo by MC3 Jeff Sherman

stone, and, although not unprecedented, is an extremely rare achievement in this community, which speaks to Capt. Reed's long and distinguished career in Naval Aviation," Fletcher said.

Reed was designated a naval aviator in 1996 and has deployed seven times, most recently returning in January from the record-breaking 10-month deployment onboard USS Abraham Lincoln (CVN 72).

Earlier in May, Rear Adm. John Meier, commander, Naval Air Force Atlantic, emphasized the important milestones achieved by Naval Aviation. Meier also emphasized the importance of people, such as leaders like Reed, who pave the way for the next generation of naval aviators.

"For the people who have paved the way of Naval Aviation for the past 109 years, to those who stand the watch today, our people are in fact our greatest resource. Our collective actions and deeds should reinforce that sentiment each and every day."

From Commander, Carrier Air Wing 7 Public Affairs.

Navy's Unmanned Aircraft Flies Indo-Pacific Skies

GUAM—Three months after arrival, two MQ-4C Triton unmanned aircraft systems (UAS) are quickly becoming invaluable assets across the Indo-Pacific, integrating into a series of missions that showcase its increased range and flight time.

In addition to supporting current operations across the Indo-Pacific, the Triton recently participated in advanced training evolutions with multiple warfare areas interacting simultaneously.

It also took part in an "elephant walk," a parade of taxiing military aircraft in close formation, prior to takeoff on Anderson Air Force Base, Guam. The demonstration, which included a Triton and more than a dozen other aircraft, showcased the breadth of military air power available in the 7th Fleet area of operation.

The two Tritons deployed to Guam are operated and maintained by Unmanned Patrol Squadron (VUP) 19, the first Triton UAS squadron. The highly trained crews underwent multiple examinations, simulator events and flights to become fully qualified in their operator role of the Navy's persistent intelligence, surveillance and reconnaissance (ISR) capability.

"Bringing Triton forward creates a complex problem set for our adversaries," said Cmdr. Michael Minervini, VUP-19's Commanding Officer. "Our ability to provide persistent ISR to fleet and combatant commanders is unmatched in Naval Aviation. The Sailors, chiefs and officers of VUP-19 are among the most professional warfighters throughout the fleet."

Commander Task Force (CTF) 72, 7th Fleet's patrol, reconnaissance and surveillance force, worked closely with VUP-19 to provide Indo-Pacific focused expertise to each crew prior to executing their mission.

"It's been a long road to get to 7th Fleet, but it's an exciting time to show off what our sophisticated sensor suite can do," said Naval Aircrewman (Operator) 1st Class Ryan Gray, VUP-19's operations lead petty officer.

VUP-19 is the first and only squadron to operate the MQ-4C Triton aircraft, the first unmanned Maritime Patrol and Reconnaissance Force asset.

Written by Mass Communication Specialist 1st Class Glenn Slaughter, CTF-72 Public Affairs.

U.S. Air Force photo by Senior Airman Michael S. Murphy

An MQ-4C Triton taxies at Andersen Air Force Base, Guam.

New CH-53K Simulator Ready for Training

U.S. Navy photo

Marine pilot Lt. Col. Lucas "Amber" Frank takes the new CH-53K simulator, Containerized Flight Training Device (CFTD), for a test drive after the Marine Corps took delivery of the CFTD in April.

PATUXENT RIVER, Md.—The H-53 Heavy Lift Helicopters Program Office took delivery of the first training device for the CH-53K King Stallion helicopter on April 14.

The Containerized Flight Training Device (CFTD) is housed at Marine Corps Air Station (MCAS) New River, Jacksonville, North Carolina.

The CFTD provides realistic cockpit or system displays (i.e. visual resolution, tactile, spatial, audio and functionality) and can simulate weather and tactical environments. It is also capable of connectivity with other simulators for enhanced attitude control and other aircraft training scenarios.

"The CFTD is an amazingly capable training device," said Col. Jack Perrin, program manager. "It is a much less expensive practice than using operational equipment and provides near-aircraft fidelity into a state-of-the-art training simulator for the fleet."

The simulation software continuously updates, so as the program team makes necessary modifications to the CH-53K into the future, the CFTD will also change.

The CFTD is the first in a series of new training devices being developed for the CH-53K. All training devices will eventually be located at the Center for Naval Aviation Technology Training (CNATT) at MCAS New River, where all of the aircraft's aircrew and maintenance maintainers will be trained.

Delivery of two other CH-53K training devices—the Helicopter Emulation Maintenance Trainer and the Composite Maintenance Trainer—are expected this year.

The CH-53K is completing development tests, leading to Initial Operational Test and Evaluation in 2021. First fleet deployment of the aircraft is scheduled for 2023-2024.

From Program Executive Office (Air, ASW, Assault and Special Mission Programs) Public Affairs.

VX-31 Earns CNO Naval Aviation Safety Award

U.S. Navy photo by Mike McGinnis

Air Test and Evaluation Squadron (VX) 31 team members pose with their aircraft.

CHINA LAKE, Calif.—The "Dust Devils" of Air Test and Evaluation Squadron (VX) 31 won the Chief of Naval Operations Aviation Safety Award for fiscal 2019.

The honor, also known as the CNO Safety "S" Award, was announced April 20 and recognizes squadrons for "exceptional professionalism, commitment to excellence, solid leadership and teamwork, the high-velocity outcomes, and in-depth risk management culture which resulted in safe and effective operations."

"VX-31's submission highlighted our impeccable safety record for 2019, our safe and expedient return to accomplishing mission after the July 2019 earthquakes and our continued safe operations under challenging post-earthquake conditions," said Capt. Andrew Gephart, VX-31 Commanding Officer. "The squadron is proud to receive this award as it recognizes the focus and effort of 485 squadron personnel every day over an entire year that it took to achieve what we did."

The July 2019 earthquakes in Ridgecrest, California, where the squadron is based, measured 6.4 and 7.1 magnitude. They disrupted operations and damaged facilities—VX-31's hangar will need complete replacement.

"I don't think the earthquake was the total factor here, but I think it probably did factor in," said Kolin Campbell, VX-31 safety officer.

The move to temporary facilities added complexity to everyday processes, he said, noting that disruptions to routine are often factors in safety incidents. But even with that, the team pulled together and pulled through, Campbell said.

In addition to VX-31's responsibilities with test and evaluation, the squadron also includes a search-and-rescue helicopter department, which primarily exists for SAR missions in the event of a military aircraft accident in the area but will also help with non-military rescues if needed.

"The squadron took on the severe challenges caused by the earthquakes and still found a way to execute their test and evaluation and search-and-rescue missions safely," said Capt. Andrew McFarland, Naval Test Wing Pacific commodore. "I'm so proud of the Dust Devils, showing everyone how it's done."

Written by Air Test and Evaluation Squadron (VX) 31 Public Affairs Office.

VAW-120 Conducts First Rhino Aerial Refueling

NORFOLK, Va.—The "Greyhawks" of Airborne Command & Control Squadron (VAW) 120 successfully conducted the first fleet aerial refueling dry-plug certification between an E-2D Advanced Hawkeye and an F/A-18F Super Hornet from Strike Fighter Squadron (VFA) 211 on May 11.

"With contact between probe and basket, VAW-120 achieved the latest in a litany of significant milestones as Greyhawk 642 became the first fleet E-2D Advanced Hawkeye to complete F/A-18 aerial refueling," said Capt. Matthew Duffy, commander, Airborne Command & Control and Logistics Wing.

VFA-211 aircraft from Carrier Air Wing One (CVW) 1 embarked aboard the Nimitz-class aircraft carrier USS Harry S. Truman (CVN 75) participated in this refueling evolution.

"This ground-breaking achievement represented the culmination of more than three years of test and evaluation to include over 500 hours of evaluation flight time developing the Advanced Hawkeye airborne refueling capability," Duffy said.

VAW-120 has been tasked with initial qualification of aerial refueling for the E-2D fleet and is currently developing the techniques and procedures to train pilots in the new skill set.

"This milestone was the result of detailed coordination between an embarked carrier strike group and a shore-based training command that truly exemplifies the ethos of teamwork that permeates across Naval Aviation," said Cmdr. Aaron Rybar, Commanding Officer, VAW-120.

In September 2019, VAW-120 took delivery of the E-2D Advanced Hawkeye with an aerial refueling capability that allowed for this Initial Operational Capability. VAW-120 marked a second milestone in the E-2D legacy in April 2020 by achieving its 1,000th aerial refueling contact for the squadron.

Lt. Michael Harrigan and Lt. David Carroll represent the first two fully qualified E-2D fleet replacement squadron (FRS) instructors qualified in aerial refueling.

Harrigan and Carroll completed 39 refueling evolutions with both VFA-211 and VFA-81.

"This latest modification of the Advanced Hawkeye will allow for vastly improved on-station time and significantly increase the mission reach and influence of the world's premier command-and-control platform," said Duffy, who added that this month's tested capability serves to increase the lethality for America's Navy.

The aerial refueling modified E-2D Advanced Hawkeye is another key component to the carrier air wing of the future. Currently, the squadron's E-2D aerial refueling instructor pilot cadre are increasing proficiency and experience in preparation for training and transitioning the first fleet squadron later this summer.

Written by Chief Petty Officer Michael Cole, Commander, Naval Air Force Atlantic Public Affairs.

U.S. Navy Photo by MC3 Nikita Custer

An E-2D Advance Hawkeye being received by the "Greyhawks" of Airborne Command & Control Squadron (VAW) 120 completes landing procedures at Naval Station Norfolk. This is the first E-2D Advanced Hawkeye with aerial refueling capability to join the fleet.

FRCSW Components Program Nominated for SECDEF Mason Award

NORTH ISLAND, Calif.—Fleet Readiness Center Southwest's (FRCSW) F/A-18 Super Hornet and EA-18G Growler Components Team earned the Chief of Naval Operations nomination to represent the Navy in the 2020 Secretary of Defense (SECDEF) Robert T. Mason Award for Depot Maintenance Excellence.

The announcement was made via naval message on May 8.

The artisans assigned to the components team played a crucial role in meeting Commander, Naval Air Forces (CNAF) fiscal 2019 initiative to achieve 341 mission-ready F/A-18E-F Super Hornets and 93 EA-18G Growlers.

The CNAF goal was aligned to a mandate by SECDEF to increase the mission availability of tactical naval aircraft by more than 80 percent by 2020.

To meet the requirement, the Secretary of the Navy initiated the Navy Sustainment System-Aviation (NSS-A), a program designed to evaluate and improve processes to increase production and speed.

In October 2018, FRCSW's components program became the Navy's first to apply NSS-A methods.

Beginning with the hydraulics shop, the components program targeted Issue Priority Group One (IPG-1) aircraft—aircraft that are down for a component.

Within six months, the remaining three components shops followed: canopies and windscreens, generator and generator converter units (GCU) and landing gear shop.

Combined, the four shops reduced IPG-1 component supply backorders by more than 50 percent and provided more than 1,800 components for F/A-18E/F and EA-18G aircraft in fiscal 2019.

Selected as Naval Air Systems Command "Best FRC Shop" for fiscal 2019, the hydraulics shop increased its throughput by 28 percent, while decreasing repair turn-around time (TAT) by 39 percent.

The canopy and windscreen shop managed a combined throughput increase of 38 percent for canopies and windscreens. It also decreased the TAT for double canopies by 69 percent and windscreens by 21 percent.

The generators and GCU shop not only doubled its GCU throughput in fiscal 2019, but also achieved a zero balance of backordered IPG-1 GCUs. The shop also increased its throughput of silicon-controlled rectifiers (which convert alternating current to direct current) by 36 percent.

The landing gear shop accomplished a 65-percent reduction in its TAT, and with the addition of two new milling machines to expand its capacity, resolved bottleneck issues that were hampering sub-component production.

In addition to the depot-level Mason Award, the annual SECDEF Maintenance Awards also recognize six winners from field-level maintenance units within three DOD categories: large, medium and small.

A SECDEF selection board will select the winners who will be honored in December.

Written by Fleet Readiness Center Southwest Public Affairs.

U.S. Navy photo by Jim Markle

Sheet metal mechanic Pierre Nguyen removes fasteners from an F/A-18 Super Hornet windscreen. (Note: Photo taken before COVID-19.)

Landing Systems Certified, FMS Installs Despite Pandemic Restrictions

PATUXENT RIVER, Md.—The Naval Air Traffic Management Systems Program Office completed precision approach and landing system (PALS) certification on USS Essex (LHD 2) in April and began installation of two landing systems aboard the Italian Navy ship, ITS Cavour, despite restrictions due to the Coronavirus pandemic.

"Thanks to dedicated, knowledgeable personnel who persevered with limited resources, changing ship schedules and the unseen specter of Coronavirus, we've successfully completed USS Essex's PALS certification," said Cmdr. Jarrod Hair, Ship Air Traffic Management deputy program manager.

After achieving first flight day confirmations for three USS Essex PALS systems, teams from Naval Air Warfare Center Aircraft Division Webster Outlying Field (NAWCAD WOLF) Atlantic Air Traffic Control and Landing Systems (ATC&LS), Naval Test Wing ATC&LS Test, Air Test and Evaluation Squadron (VX) 23, and Strike Fighter Squadron (VFA) 147 aligned the systems to support the warfighter.

"Due to the complex nature of the systems, it is a rare occasion when a system does not need adjustment between flights; this time we rose to the challenge and had all three [PALS systems] ready on the first day," Hair said. "Their efforts have ensured a U.S. Navy capital ship's PALS capability is available to support their primary mission as the flagship of an amphibious ready group."

The program's International Landing System (ILS) and NAWCAD WOLF teams have also been working diligently on a compressed schedule to install and to facilitate full systems capability on ITS Cavour.

"The program schedule was threatened when COVID-19 travel restrictions were enacted," said Casey Edinger, International Programs deputy program manager. "U.S. personnel typically provide onsite technical assistance and oversight for the installation of both systems. Since Italy was the European hotspot for the outbreak, the team was already preparing contingency plans when DOD suspended all travel."

With onsite technical assistance no longer advisable, the teams looked to provide assistance remotely.

The program office, along with NAWCAD WOLF and contract support service personnel, created a first-of-a-its kind Virtual Install Technical Assistance Guide for the AN/USN-3 and the AN/SPN-41, which serves as a checklist for both U.S. and foreign military sales (FMS) shipyard installers.

"This critical time calls for a creative solution, and this is the first Virtual Install Technical Assistance of an Aircraft Carrier Landing System on a foreign ship," said Clay Smeal, program Landing Systems deputy case manager. "This guide enables all installations to proceed on schedule."

To ensure a successful install and subsequent PALS certification on ITS Cavour, the program office holds daily communications with the ship to monitor progress and mitigate technical issues.

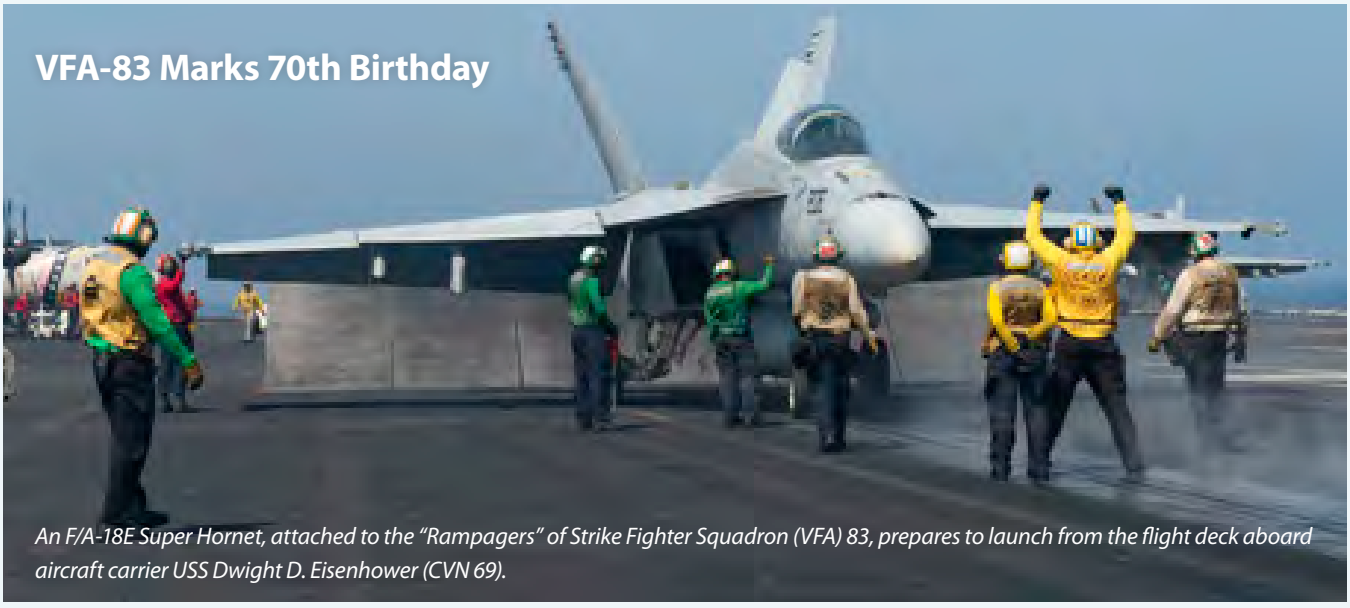
This guide is currently in use for the ITS Cavour AN/USN-3 and AN/SPN-41 installs and may also be used for future installations on the United Kingdom's new aircraft carrier, HMS Prince of Wales, if COVID-19 travel restrictions remain in place.

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

U.S. Navy photo

An MH-60S Seahawk helicopter, attached to the "Blackjacks" of Helicopter Sea Combat Squadron (HSC) 21, sits on the flight deck of USS Essex (LHD 2) during flight operations in the Pacific Ocean. Naval Air Traffic Management Systems Program Office completed precision approach and landing system (PALS) certification on Essex in April.

VFA-83 Marks 70th Birthday



An F/A-18E Super Hornet, attached to the "Rampagers" of Strike Fighter Squadron (VFA) 83, prepares to launch from the flight deck aboard aircraft carrier USS Dwight D. Eisenhower (CVN 69).

U.S. Navy photo by MC2 Ashley M.C. Estrella

ARABIAN SEA—The "Rampagers" of Strike Fighter Squadron (VFA) 83, were on the battlefront aboard aircraft carrier USS Dwight D. Eisenhower (CVN 69) as they celebrated the squadron's 70th birthday April 25.

According to VFA-83's Command Master Chief Shane Edwards and numerous Rampager team members, the squadron has been known for excellence throughout history.

"Whether in 1950 or 2020, our aviators and maintainers bring a focused chaos and precision to our missions that is second to none," Edwards said. "We're defending our country's and Navy's interests around the world. We'll continue to do that as long as those requirements are placed upon us."

The Rampagers continue to exhibit skill and mentality to defend the United States' interests.

"The life of a Navy strike fighter squadron is full of rigor and change," said Cmdr. Bryce Abbott, VFA-83's executive officer. "The Rams have operated in every major combat theatre, deployed from such historic decks as the Saipan, Midway and Coral Sea, and flown everything from the F4U Corsair to our modern F/A-18E Super Hornet."

In 2018, the squadron received its first F/A-18E Super Hornets as it transitioned from flying F/A-18 Hornets, which they have flown since the late 1980s.

"Right before we transitioned to Super Hornets, we had Battle E, Safety S, the Maintenance Wrench awards," said Aviation Structural Mechanic (AM) 2nd Class Kane Meyer. "That was us just trying to complete the mission the best we could. Now that we have Super Hornets, we're out here training other people to take care of their jets better, because we're all part of the same team."

Not only has the squadron adjusted to maintaining and flying a new model of jet, they have done so safely.

"We just eclipsed over 100,000 flight hours without a Class A mishap," said Cmdr. Luke Johnson, VFA-83's Commanding Officer. "That tells me that the Rampagers have been professional this whole time, and the folks we have now continue to be."

Aviation Machinist's Mate (AD) 1st Class Matthew Knox attributes morale and integrity as the one of many reasons the Rampagers are an exceptional team.

"I've actually come to learn why they have their reputation on the flight line," Knox said. "They have a lot of integrity and take care of each other from the top down, which makes them like a family."

Upon his arrival, AD1 Kadeem McFarland was impressed with the close-knit community and how well the team works together.

"When I first got to this command, I walked through the door and felt like I was already at home with family," McFarland said. "I've never seen a command move as a unit the way the Rampagers do. Everyone I've met who's come and gone says this is one of the best commands they've been assigned to, and I'm proud to say that this is the best command I've been a part of."

Johnson is proud of the Rampagers and wants to preserve the positivity of their team.

One thing that the Rampagers take pride in is their tag line—Ram on. It is a battle cry to motivate Sailors to get stuff done, eagerness and resiliency, a sense of community, identity and team pride, a form of camaraderie and includes everybody.

"We stand ready to take the fight to the enemy," Edwards said. "Happy Birthday, Rampagers. Ram on!"

Written by Mass Communication Specialist 3rd Class Ashley Lowe, USS Dwight D. Eisenhower Public Affairs.

U.S. Navy photo by MC1 Jason Pastrick

Sailors assigned to USS Dwight D. Eisenhower (CVN 69) man the rails as the ship returns to Naval Station Norfolk, Va.

Eisenhower Carrier Strike Group Returns from Deployment

NORFOLK, Va.—Ships with Carrier Strike Group (CSG) 10 returned home to Norfolk Naval Station on Aug. 9 after seven months operating in U.S. 5th and 6th Fleet.

Returning ships include Nimitz-class aircraft carrier USS Dwight D. Eisenhower (IKE) (CVN 69) and Ticonderoga-class guided-missile cruiser USS San Jacinto (CG 56). More than 1,800 Navy aviators from nine squadrons from Carrier Air Wing (CVW) 3 returned Aug. 6-7 to their home bases in Naval Air Station (NAS) Oceana, Virginia, Norfolk Naval Station, NAS Whidbey Island, Washington, and NAS Jacksonville, Florida.

Ticonderoga-class guided-missile cruiser USS Vella Gulf (CG 72), Arleigh Burke-class guided-missile destroyers USS James E. Williams (DDG 95) and USS Truxtun (DDG 103) returned to Norfolk on Aug. 10. USS Stout (DDG 55) remains on deployment and will return to Norfolk at a future date.

CSG-10 ships departed Norfolk on Jan. 17 for the strike group's Composite Training Unit Exercise and follow-on deployment.

As the COVID-19 pandemic spread across the globe, CSG-10 continued operations to maintain maritime stability and security and ensure access, deter aggression and defend U.S., allied and partner interests.

CSG ships each sailed more than 60,000 nautical miles, operating dynamically through multiple exercises with allies and partners and dual-carrier operations with French aircraft carrier Charles de Gaulle and USS Harry S. Truman (CVN 75). The ships completed multiple strait and choke point transits, including the Strait of Gibraltar, Suez Canal, Strait of Hormuz and Strait of Bab el Mandeb.

"Words cannot express the admiration I have for each and every Sailor onboard. These young men and women were thrust into a situation no one could have predicted, and they responded as only Navy Sailors can—they adapted and overcame the adversity. I witnessed their excellence day in and day out as they accomplished repairs never before attempted at sea," said Capt. Kyle Higgins, IKE's Commanding Officer.

Carrier Air Wing (CVW) 3 conducted 166 sorties and 1,135 flight hours in support of Operation Freedom's Sentinel, and 112 sorties and 492 flight hours in support of Strait of Hormuz transits and Deliberate Presence Patrols. During deployment, CVW-3 completed 10,466 rotary- and fixed-wing sorties, 7,751 traps with more than 21,995 mishap-free flight hours.

Squadrons of CVW-3, commanded by Capt. Trevor Estes, embarked on Eisenhower include the "Fighting Swordsmen" of Strike Fighter Squadrons (VFA) 32, "Gunslingers" of VFA-105, "Wildcats" of VFA-131 and "Rampagers" of VFA-83; the "Dusty Dogs" of Helicopter Sea Combat Squadron (HSC) 7; "Swamp Foxes" of Helicopter Maritime Strike Squadron (HSM) 74; "Screwtops" of Airborne Command & Control Squadron (VAW) 123; "Zappers" of Electronic Attack Squadron (VAQ) 130; and a detachment from Fleet Logistics Support Squadron (VRC) 40 "Rawhides."

Sailors made several complex repairs to vital equipment and systems, correcting more than 500 issues that would normally be conducted at depot level or require onboard technical assist visits.

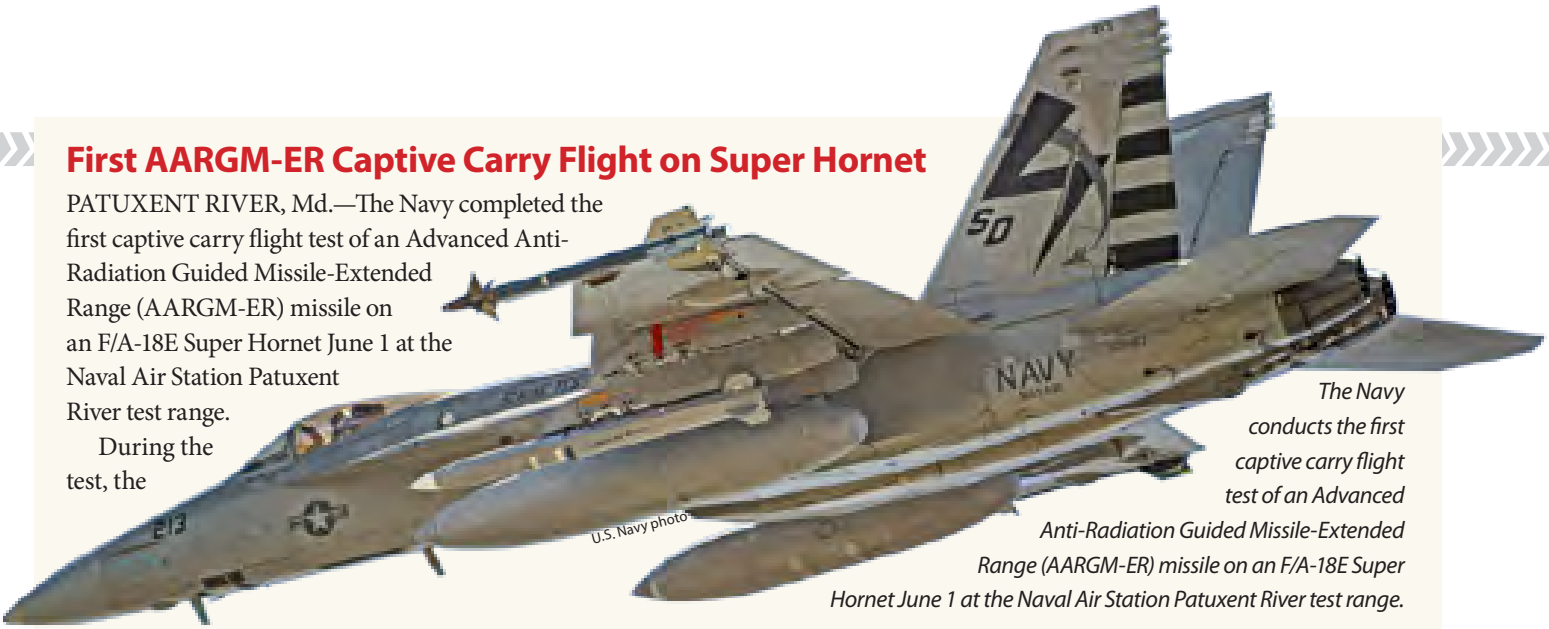
"I could not have asked for greater effort from the CVW-3/IKE team during this challenging deployment. The professionalism of my aircrew and the Sailors sweating through seven months of no port visit operations was simply eye-watering," Estes said.

From Commander, U.S. 2nd Fleet.

First AARGM-ER Captive Carry Flight on Super Hornet

PATUXENT RIVER, Md.—The Navy completed the first captive carry flight test of an Advanced Anti-Radiation Guided Missile-Extended Range (AARGM-ER) missile on an F/A-18E Super Hornet June 1 at the Naval Air Station Patuxent River test range.

During the test, the Super Hornet conducted a series of aerial maneuvers to evaluate integration and structural characteristics of the AARGM-ER. Test points were completed across a range of flight conditions to demonstrate carriage compatibility of AARGM-ER with the Super Hornet.



The Navy conducts the first captive carry flight test of an Advanced Anti-Radiation Guided Missile-Extended Range (AARGM-ER) missile on an F/A-18E Super Hornet June 1 at the Naval Air Station Patuxent River test range.

"This first flight represents a significant step in the AARGM-ER Engineering and Manufacturing Development phase," said Capt. Mitch Commerford, who oversees the Direct and Time Sensitive Strike Program Office. "Data collected from this testing will inform the planned build-up and overall expansion of flight testing with AARGM-ER."

Testing will continue over the next few years in preparation for Initial Operational Capability in fiscal 2023, he said.

The extended range variant, which leverages the AARGM program that's currently in Full Rate Production, has been upgraded with a new rocket motor and warhead. It will provide advanced capability to detect and engage enemy air defense systems.

AARGM-ER is being integrated on the F/A-18E/F and EA-18G Growler and will also be compatible for integration on the F-35A/B/C Lightning II.

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

CH-53K King Stallion Completes First Sea Trials

PATUXENT RIVER, Md.—The CH-53K King Stallion completed a two-week period of sea trials in the Atlantic during June.

This was the first opportunity to see the aircraft working in a modern naval environment, and testing took place aboard USS Wasp (LHD-1), a landing helicopter dock, amphibious assault ship.

"I'm very pleased with how the ship tests went," said Col. Jack Perrin, H-53 Heavy Lift Helicopters Program manager. "We were able to assess the 'K' taking off and landing day, night and with night-vision goggles, and it performed extremely well."

According to the CH-53K integrated test team, the sea trials are a series of tests to evaluate the performance of the aircraft at sea. Tests performed included: launch and recovery, rotor start and shutdown, blade fold and shipboard compatibility testing—all in increasing wind speed and varying wind directions relative to the aircraft.


U.S. Navy photo

The CH-53K King Stallion prepares to take off from the deck of USS Wasp (LHD-1) at sea during its first sea trials in June.

"The bulk of the testing was in launch and recovery, and we nailed it every time, no matter what the wind/sea conditions were. The 53K is now a 'feet-wet' warrior from the sea," Perrin said.

Ship compatibility testing includes towing the aircraft around the deck and in the hangar, performing maintenance aboard the ship, ensuring the aircraft fits in all the locations it needs to and evaluating chain/tie-down procedures.

The CH-53K program continues to execute within the reprogrammed timeline, moving toward completion of developmental test followed by Initial Operational Test and Evaluation in 2021 and first fleet deployment in 2023-2024.

From H-53 Heavy Lift Helicopters Program Office.

V-22 Joint Program Delivers 400th Aircraft

U.S. Air Force photo by Airman 1st Class Nathan LeVang

Air Commandos with the 801st Special Operations Aircraft Maintenance Squadron accept delivery of a new CV-22B Osprey tiltrotor aircraft at Hurlburt Field, Fla., on June 2.

PATUXENT RIVER, Md.—The Air Force Special Operations Command received its 53rd CV-22 Osprey June 2, marking the 400th delivery of a V-22 in the history of the joint program.

"It's been over 20 years since the first production V-22 was delivered and we are proud to reach another milestone in our 400th delivery. V-22s continue to be in high demand, protecting our country and our allies around the world through combat operations, international training partnerships and humanitarian missions," said Marine Col. Matthew Kelly, program manager for the V-22 Joint Program Office. "This platform's impact can't be overstated."

The Marines received the first production V-22 on May 24, 1999, and today, deliveries continue under the Multi-year Procurement III contract, valued at $5 billion through 2024. The contract includes all variants of the aircraft: Marine, Air Force, Navy and the first international customer, Japan.

The V-22 is the world's first tiltrotor aircraft in production, combining the vertical takeoff, hover and vertical landing qualities of a helicopter with the long-range, fuel efficiency and speed characteristics of a turboprop aircraft. For the Special Operations Forces, the CV-22 supports long-range infiltration, exfiltration and resupply missions. The Marine Corps' MV-22B provides assault support transport of combat troops, supplies and equipment—day and night—under all weather conditions during expeditionary, joint or combined operations.

From V-22 Joint Program Office Public Affairs.

First Japanese V-22 arrives at Kisarazu Air Field

U.S. Marine Corps photo by Cpl. Lauren Brune

PATUXENT RIVER, Md.—The first international variant of the V-22 Osprey aircraft flew from Marine Corps Air Station (MCAS) Iwakuni to the Kisarazu Air Field July 10, where the Japan Ground Self-Defense Force (JGSDF) will now operate, train with and maintain the aircraft.

Since 2016, pilots, crew chiefs and maintainers with the JGSDF have been training with Marine Medium Tiltrotor Training Squadron (VMMT) 204 and Center for Naval Aviation Technical Training Marine Unit at MCAS New River.

The JGSDF procured the V-22 in 2015 through foreign military sales to modernize its transport fleet and support its defense and special mission needs. The V-22s will enhance their humanitarian and disaster relief capabilities and support amphibious operations.

The Japanese V-22 is the first of the two aircraft transported from the U.S. to Iwakuni via ship in May. The second aircraft is expected to ferry to Kisarazu soon.

From V-22 Joint Program Office Public Affairs.

First CMV-22B Delivered to Fleet

SAN DIEGO, Calif.—The Navy's first CMV-22B Osprey for operational use arrived at Naval Air Station North Island on June 22.

The new carrier onboard aircraft is assigned to the "Titans" of Fleet Logistics Multi-Mission Squadron (VRM) 30, the Navy's first CMV-22B squadron. VRM-30 was established in 2018 to begin the Navy's transition from the C-2A Greyhound to the CMV-22B.

"Today marks our birthday as a squadron," said Cmdr. Trevor Hermann, VRM-30's Commanding Officer. "We have relied on our Marine Corps brothers and sisters to help us in our training. Today our efforts are tangible, as you can see with the landing of our first aircraft."

For the last four decades, the C-2A Greyhound has been providing logistic support to aircraft carriers throughout the Navy. With its increased operational range, faster cargo loading/unloading, increased survivability and enhanced beyond-line-of-sight the CMV-22B will take over this essential mission.

Herman also emphasized the importance of the highly trained Sailors who will work in and on these aircraft.

"This is the instrument that will bring lethality to the fleet," Hermann said. "Without the maintainers, air crewman and pilots this aircraft is nothing more than carbon fiber and steel. We are the heart and soul of this aircraft. We are carrier on-board delivery; we are Naval Aviation and we carry the fleet."

The CMV-22B is a variant of the MV-22B Osprey and will be responsible for conducting high priority cargo and passenger transport services in support of carrier strike groups and task forces. The Osprey is a tiltrotor aircraft that is capable of vertical take-off and landing, but transits as a turboprop aircraft.

Capt. Dewon Chaney, commodore, Fleet Logistics Multi-Mission Wing, said that this aircraft is a major upgrade and he is proud of everyone's hard work to deliver it in such a difficult time.

"Between COVID-19 and the aircraft delivery schedule, everyone stayed focused to deliver this chariot to us," Chaney said. "It is so amazing that we have this capable machine to deploy in the fleet to continue developing combat lethality. I am just glad that I get to witness this as your commodore."

The CMV-22B is a critical component of the "air wing of the future" and provides the versatility, flexibility and capabilities needed in a high-end fight.

Written by Mass Communication Specialist 3rd class Shane Bryan, Commander, Naval Air Forces Public Affairs.

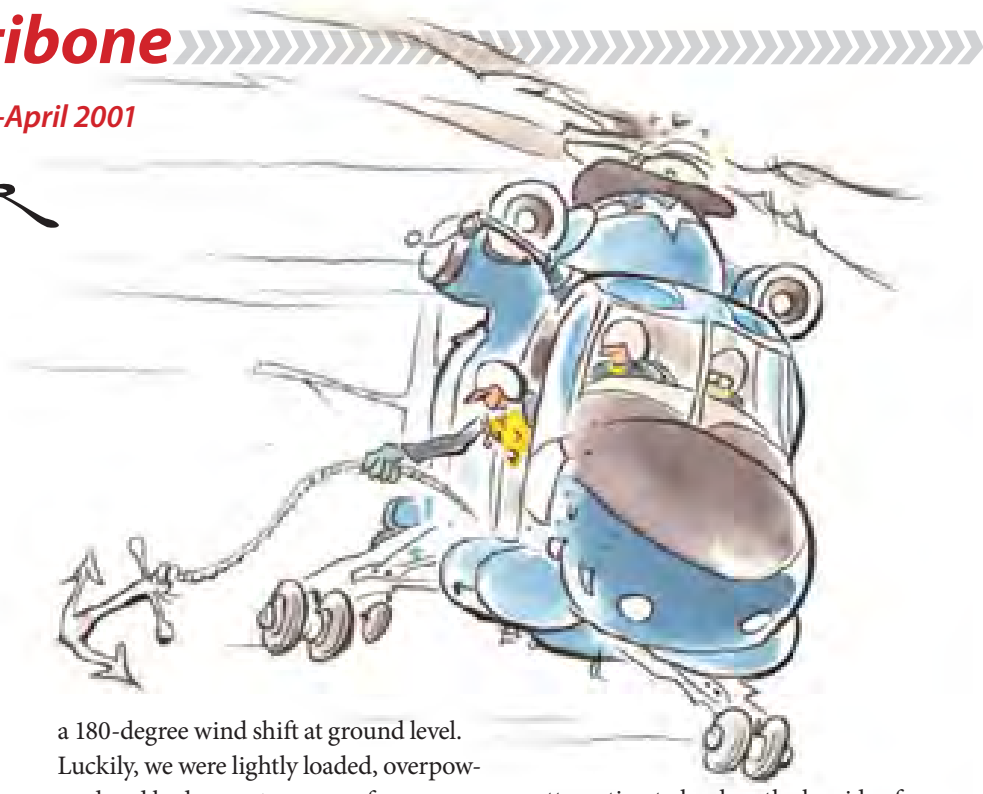
U.S. Navy photo

The first CMV-22B Osprey assigned to Fleet Logistics Multi-Mission Squadron (VRM) 30 lands at Naval Air Station North Island in San Diego, Calif.

Grampaw Pettibone

Gramps from Yesteryear: March-April 2001

Illustration by Ted Wilbur



Wild Winds

Editor's note: *Lt. Cmdr. Howard M. Tillison, USNR (Ret.), was officer in charge of Helicopter Antisubmarine Squadron (Light) (HSL) 30 Det A aboard USNS Harkness (T-AGS-32) in 1982 during the incident he describes here.*

We were inbound in our HH-2D Seasprite to a promising landing zone (LZ) which was on a gently sloping coastal plane in the lee of a mountain range that rose from sea level to 3,000 feet within a couple of miles. Inbound to the LZ from the ship at 1,500 feet we had a 25-knot head wind, shown by comparing our airspeed and doppler ground speed indications. When I reached a good spot to begin a straight-in landing approach to the LZ, I started a normal descent and began reducing airspeed from 100 to 70 knots for a straight-in to final. We were attempting to land as closely as possible to a road which ran along the base of the mountains at the spot where they began their upward thrust from the coastal plain.

I suddenly noticed that things didn't feel right. I looked down to see a 1,500-feet-per-minute rate of descent on the vertical speed indicator. My ground speed was also increasing and the mountains were getting bigger all the time. In the space of about a mile, the wind had shifted 180 degrees and was now dead on the tail. Instead of a straight-in to the LZ, I ended up button-hooking around. I landed uneventfully, facing back toward the ocean.

After analyzing the situation, my copilot and I realized that the easterly tradewinds were spilling over the ridge and forming a rotor in the lee of the mountains, which resulted in both a downdraft during our approach and a 180-degree wind shift at ground level. Luckily, we were lightly loaded, overpowered and had room to recover from a potentially hazardous situation by making a 180-degree turn prior to landing. If we had been heavy and failed to notice the wind shift prior to short final, we could just as easily have been in a settling-with-power, or power-settling (remember the tailwind) situation.

After that experience, we either had our ground party pop a smoke flare every time we approached an LZ in mountainous terrain, or we conducted a flyover at 1,500 feet and tossed out a roll of toilet paper to see what the winds were doing at ground level before commencing our approach.

Mountain flying is a different environment, even when the mountains are right there next to the friendly ocean and flat tropical beaches. Helo drivers should be aware of this potential problem before attempting to land on the lee side of a mountain and ending up with a tailwind instead of a head wind while trying to pull into a hover.

Gramps blamed the CH-53D Sea Stallion crew in "Lava Lament" (see Grampa Pettibone, Spring 2020) for failing to "determine the wind direction," but it's not always apparent when the wind has shifted 180 degrees as it did with me and probably did to the CH-53D pilots that day, in a relatively small space. If a Hornet is on final to a carrier and the winds go out of limits, the air boss or the landing signal officer can wave it off. It ain't the same ball game when you're in a helo trying to make it into an LZ without the benefit of having somebody on the ground to put up a windsock before you arrive.

Grampaw Pettibone says …

"Welcome advice for rotary wing pilots."

Test Squadrons Receive Two Next-Gen Super Hornets

By Carrie Munn

Photo courtesy of Boeing

F/A-18 Block III flight test aircraft F287 prepares for its flight to Naval Air Station Patuxent River, Md.

The Navy welcomed its next-generation multi-mission tactical fighter June 17 with delivery of the first two Block III F/A-18E/F Super Hornet test jets.

Like every aircraft slated for the fleet, the Boeing-produced two-seat (F287) and single-seat (E323) models will undergo comprehensive testing, said Capt. Mike Burks, F/A-18 E/F deputy program manager.

Air Test and Evaluation Squadron (VX) 23 will perform shore-based carrier testing, focusing mainly on the hardware and aeromechanical aspects of the F model at Naval Air Station Patuxent River, Maryland. Across the country, VX-31 teams will examine the software functionality and network architecture at Naval Air Weapons Station China Lake, California.

Once testing is complete at VX-23, the two-seated model will ferry to VX-31 to complete Block III flight testing, Burks said.

"Now it's up to our test squadrons and our integration team to verify requirements are met and ensure the engineering behind the Block III is validated prior to full-scale production and delivery of the Block III to the fleet," Burks said.

While the jet's exterior appearance remains largely unchanged, Block III's increased service life of 10,000 flight hours and reduced radar signature are accompanied by a new avionics suite that brings the Common Tactical Picture into the cockpit.

F/A-18 Block III flight test aircraft F287 makes its first flight in May. Boeing delivered the first two Block III flight test aircraft to the Navy in June.

Photos courtesy of Boeing

F/A-18 Block III flight test aircraft F287 returns from its first flight to a water salute, a sign of respect for all aircraft making inaugural flights.

Block III is also equipped with an Advanced Cockpit System, with large touchscreen displays for improved user interface and more powerful computing using the latest technology.

Block III started as an unconventional acquisition program to support improved aviation readiness and speed-to-the-fleet initiatives, said Capt. Jason Denney, program manager, F/A-18 and EA-18G Program.

After leveraging nearly two decades worth of cost and production data, the Naval Air Systems Command contracts team awarded a roughly $4 billion multiyear procurement contract to Boeing in March 2019. For taxpayers, this provides significant cost savings in the form of bulk purchasing and long-range planning. The contract also capitalizes on existing production lines that will allow the Navy to acquire a minimum of 24 strike fighters each year through fiscal 2021.

In addition to the Block III delivery, Boeing will also perform service life modifications (SLM) to hundreds of Block II Super Hornets, which will extend their service life and integrate

"I have no doubt that the test squadrons and flight test engineers are eager to put these jets through their paces and make sure we're bringing a highly capable and adaptable platform to the fleet with Block III."

Block III capabilities. SLM are key to ensuring the Navy has jets ready to fight into the mid-2040s.

"These new capabilities are essential for ensuring we maintain the tactical advantage in the great power competition," Denney said. "Block III production and SLM for our Block IIs also demonstrate contracting efficiency and solid partnerships with industry—an all-around win for the Navy, for Boeing and for the warfighter."

The first squadron deployment of Block III Super Hornet is anticipated in mid-2023, with a plan to have two Block III squadrons, composed of new production and Block IIs that have undergone SLM, accompanying each carrier air wing by 2027.

"It's been an outstanding effort by thousands of people throughout the Navy and industry across America to reach this milestone, and their work is far from done," Denney said.

"I have no doubt that the test squadrons and flight test engineers are eager to put these jets through their paces and make sure we're bringing a highly capable and adaptable platform to the fleet with Block III."

Written by Carrie Munn F/A-18 and EA-18 Program Office Communications.

Photo courtesy of Boeing

The final F/A-18 Block II aircraft E322 sits on the Boeing ramp in St. Louis prior to delivery.

Final Block II Super Hornet Delivered

Since 2005, F/A-18 Super Hornet Block II aircraft have been rolling off Boeing's production line and serving as the Navy's multi-mission capable workhorse.

The service took delivery of the final Block II Super Hornet April 17, closing out a run of 322 one-seater F/A-18Es and 286 two-seater F/A-18Fs.

"Aircraft E322 will leave Boeing's production line and head straight to Strike Fighter Squadron (VFA) 34, based in Naval Air Station Oceana," said Cmdr. Tyler Tennille of the Defense Contract Management Agency, which oversees acceptance testing.

"When the Super Hornets first came online, they were a game changer," he said, pointing to the Block II's active electronically scanned array radar, as well as larger displays, upgraded sensors and avionics, and increased range and capability to employ an arsenal of precision weapons that delivered advanced lethality and mission flexibility for the service.

The robust airframe was built with an open mission systems architecture, which has enabled easy integration of new weapons and technologies. The Block II Super Hornet serves as the Navy's responsive aircraft, fully capable across the full mission spectrum, which includes air superiority, fighter escort, reconnaissance, aerial refueling, close air support, air defense suppression and day/night precision strike.

This aircraft is the backbone of the Navy's carrier air wing and has proven itself repeatedly during numerous operations, where it has been the preeminent platform performing multiple missions, sometimes reconfiguring rapidly on the fly.

Even though it is substantially larger—roughly 7,000 pounds heavier with a 50 percent higher range—the Super Hornet delivered with fewer parts and lower maintenance demands than its predecessor, the Hornet.

"Delivery of this last production Block II Super Hornet is hardly the end of an era, but rather, a stepping stone along the path to continuously evolving our platforms to meet the Navy's ever-evolving needs," said Capt. Jason Denney, program manager, F/A-18 and EA-18 Program Office.

After the delivery of these aircraft, Tennille said he expects the transition from Block IIs to Block IIIs to be seamless.

— Carrie Munn

Ford Makes Post Delivery Test and Trials Progress Despite Pandemic

Editor's Note: Sailors aboard USS Gerald R. Ford (CVN 78) adapted to unusual circumstances amid the COVID-19 pandemic to stay on schedule and deliver the Navy's latest carrier to the fleet. Milestones included the ship's largest aircraft embark after carrier qualifications to train aviators on various take-off/landing techniques on the upgraded deck, conducting the ship's incline test and certification of two of her lower stage weapons elevators.

This intense testing and trials period is crucial to ensure the overall deployment readiness of CVN-78 as well as improving upon the construction and ship trial process for follow-on carriers in the class: the future USS John F. Kennedy (CVN 79), Enterprise (CVN 80) and Doris Miller (CVN 81).

USS Gerald R. Ford (CVN 78) steams in the Atlantic Ocean while underway conducting carrier qualifications.

U.S. Navy photo by MC2 Ruben Reed

Student Logs 2,000th Trap, Ship Undergoes Second Round of Carrier Quals

By Lt. Michelle Tucker

On April 8, a student naval aviator landed a T-45C Goshawk aboard USS Gerald R. Ford (CVN 78) as it was undergoing carrier qualifications, marking the 2,000th trap for the ship. A month later, Ford completed a second round of carrier qualifications (CQ).

Lt. j.g. Cade Warlick, assigned to the "Redhawks" of Training Squadron (VT) 21 under Training Air Wing (TW) 2 at Naval Air Station (NAS) Kingsville, Texas, completed the milestone trap with the Ford's new flight deck technology. He joined a group of 25 student naval aviators and five instructor pilots who carrier qualified during the training detachment conducted April 4-11 in the Atlantic Ocean off the Florida coast.

Ford, the first-in-class aircraft carrier, is equipped with unique state-of-the art Aircraft Launch and Recovery Equipment (ALRE): the Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG).

"Carrier qualifications are a pivotal and most challenging phase of aviation training before students move on to their fleet platforms," said Cmdr. Michael Poe, VT-7 Carrier Qualification Det. Officer in Charge and Commanding Officer.

The detachment included students and instructors from TW-1 and TW-2, located at NAS Meridian, Mississippi, and NAS Kingsville, respectively. Together, the two wings conduct all undergraduate strike fighter training for the Navy, Marine Corps and selected international military partners.

Executing CQ on Ford was a coordinated effort among the training air wings, the Ford crew, civilian aircraft maintainers, Chief of Naval Air Training headquarters staff and aerial support from the "Tridents" of Helicopter Sea Combat Squadron (HSC) 9 and the "Rawhides" of Fleet Logistics Support Squadron (RC) 40, both based in Norfolk. Aircraft operated out of Cecil Field in Jacksonville, Florida.

CQ provides student naval aviators essential practical experience in daylight launch (catapult-assisted take off) and recovery (arrested landing known as a "trap")

on a Navy aircraft carrier at sea. Before progressing to the aircraft carrier, students must complete field carrier landing practice (FCLP), which occurs on land.

After completing the strike pipeline, students earn their Wings of Gold and proceed to postgraduate training at fleet replacement squadrons to master aircraft including the F/A-18E/F Super Hornet, F-35C Lightning II, E/A-18G Growler, E-2C Hawkeye, E-2D Advanced Hawkeye and C-2A Greyhound.

Second Round of CQ

A month later, the Ford commenced its second round of CQ for fleet replacement squadron (FRS) pilots from Airborne Command & Control Squadron (VAW) 117 and VAW-120 and Strike Fighter Squadron (VFA) 106.

"Our crew is tough and has adapted quickly to the acute changes we've made to our operating procedures and day-to-day life onboard," said Commanding Officer Capt. J.J. Cummings. "Their resiliency, their grit allows us to get underway and accomplish the mission."

"Getting underway knowing that our crew will be generating readiness for the fleet, along with the four other carriers at sea, is extremely rewarding," Cummings said. "We are also proud that several of these aviators who carrier qualify on our ship will be heading over the horizon soon to join deployed carriers throughout the world."

Lt. Michelle Tucker is the Chief of Naval Air Training Public Affairs Officer.

U.S. Navy photo by MC5N Conner Foy

Lt. j.g. Cade Warlick lands a T-45C Goshawk, attached to Training Air Wing (TW) 2, on USS Gerald R. Ford's (CVN 78) flight deck marking the 2,000th trap on Ford's advanced arresting gear (AAG).

U.S. Navy photo by MC3 Rebekah M. Rinckey

An MH-60S Seahawk attached to Helicopter Sea Combat Squadron (HSC) 9 conducts a vertical replenishment exercise aboard CVN-78 in the Alantic Ocean.

U.S. Navy photos by MC3 Zachary Melvin

An E-2D Advanced Hawkeye, attached to the "Greyhawks" of Airborne Command & Control Squadron (VAW) 120, prepares to launch during flight operations.

An F/A-18F Super Hornet, attached to the "Gladiators" of Strike Fighter Squadron (VFA) 106, takes off during flight operations.

Ford Completes Aircraft Embark with CVW-8

From USS Gerald R. Ford Public Affairs

During USS Gerald R. Ford's (CVN 78) largest aircraft embark in early June, Carrier Air Wing (CVW) 8 completed critical milestones on the first-in-class ship, testing secure communications and tactical data links, supporting the use of network enabled weapons, combined fixed- and rotary-wing close air support integration, and cyclic operations with ordnance.

While in port for Ford's 10th window of opportunity for maintenance (WOO-10), Sailors accomplished necessary maintenance and construction projects required to embark personnel from CVW-8 and Carrier Strike Group (CSG) 12. This independent steaming event (ISE) aboard Ford—also its 10th—brought the total ship's company to more than 3,700 personnel.

WOO-10 was used as a launch pad for integrated operations for the upcoming at-sea period. CSG-12, with experience from its recent record-breaking deployment with USS Abraham Lincoln (CVN 72) and CVW-7, sent CVW-7 operations and intelligence officers to assess Ford's ready rooms and mission planning spaces to provide recommendations on how to best execute command and control (C2) with Ford's unique capabilities.

During ISE 10, CVW-8 operated more than 30 fixed-wing aircraft and MH-60R/S Seahawk detachments from both Helicopter Sea Combat (HSC) squadrons and Helicopter Maritime Strike (HSM) squadrons.

Once underway during Post Delivery Test and Trials (PDT&T) operations, CVW-8 conducted day and night cyclic flight operations totaling 324 catapult launches and arrested landings, qualifying 50 pilots, including Ford's Commanding Officer Capt. J.J. Cummings.

As of July 15, Ford has conducted 3,480 catapult launches and arrested landings with EMALS and AAG.

Cyclic Ordnance Operations

Additionally, during flight operations with CVW-8, Ford moved thousands of pounds of inert ordnance via Advanced Weapons Elevators (AWE) to F/A-18 Super Hornets, employed during close air support and air-to-ground training missions. Executing cyclic operations and arming aircraft with bombs from the ship's magazines were firsts for the team.

Cummings said the embark served as an opportunity to stress and test Ford's unique design and demonstrate her ability to conduct integrated air wing operations.

"This is a historic underway—we embarked nearly 1,000 Sailors, and we were

U.S. Navy photo by MC1 Jeff Trotman

Curtis Houchins, right, one of Commander, Naval Air Force Atlantic's (CNAL) watertight door school supervisors, trains Airman Darian Wallace how to properly check the integrity of a watertight door onboard Ford as part of a hands-on damage control training petty officer course.

U.S. Navy photo by Chief (MCC) RJ Stratchko

Sailors assigned to the Weapons Department move MK-82 500-pound class inert bombs onto one of Ford's Advanced Weapons Elevators.

U.S. Navy photo by MC3 Zachary Melvin

An E-2D Advanced Hawkeye, attached to the "Greyhawks" of Airborne Command & Control Squadron (VAW) 120, prepares to land on USS Gerald R. Ford's (CVN 78) flight deck.

VAW-117 Transitions to E-2D

While completing carrier qualifications (CQ) on the Ford's deck, 10 pilots with the "Wallbangers" of Airborne Command & Control Squadron (VAW) 117 finalized their transition to the operation of the E-2D Advanced Hawkeye from the E-2C on May 12.

The pilots successfully completed CQ with assistance from the "Greyhawks" of VAW-120 in the operation of the E-2D. VAW-117 completed 151 catapults and 158 traps over the course of three days. The completion of the CQ prepares VAW-117 for the finalization of their transition between aircraft.

Lt. Cmdr. Jeremiah Caldwell, a pilot assigned to VAW-117, explained some of the differences between the E-2C Hawkeye and the E-2D Advanced Hawkeye, and how his squadron is making the transition between aircraft.

"The E-2D is our latest and greatest aircraft that has a lot of good equipment and a really good radar that's going to allow us to see our enemies at distances that we really haven't seen before," Caldwell said. "The training process for us is about three years just to get to the fleet, so we are here aboard Ford training fleet aviators that are making the transition from the Charlie to the Delta."

With the completion of their CQ, VAW-117 is one step closer to being a fully-designated E-2D Advance Hawkeye squadron. — *MC2 Ryan Seelbach*

able to commence cyclic operations and it's proven successful," Cummings said.

Commander CVW-8 Capt. Josh Sager said the embark was the first time CVW-8 squadrons were able to execute all of their missions aboard Ford.

"We're thrilled to be here dropping light and heavy inert ordnance; but the biggest thing for the air wing to do is our primary mission: war at sea, air defense, air superiority and power projection," Sager said. "We're taking [Ford] from carrier qualification to a mission that focuses on combat operations and expanding that capability."

The air wing's embark provided the first opportunity for Ford's weapons department to execute a full ordnance movement using lower stage weapons elevator No. 5.

U.S. Navy photo by Chief (MCC) RJ Stratchko

U.S. Navy photo by MC2 Ryan Seelbach

An F/A-18F Super Hornet, attached to the "Black Lions" of Strike Fighter Squadron (VFA) 213, launches off Ford's flight deck during flight operations.

Aviation Ordnancemen assigned to the Weapons Department bring inert training bombs up to the flight deck during flight operations.

U.S. Navy photo by MC3 Zachary Melvin

An F/A-18F Super Hornet, assigned to VFA-106, prepares to land on the flight deck during flight operations.

Performing as advertised, Ford's AWE conducted more than 1,300 cycles that enabled the transfer of 176 inert bombs in support of air wing operations. Ford's AWEs have conducted more than 10,000 cycles to date.

CSG-12 conducted all intended command and control operations and coordinated with Ford and Truman Strike Group assets as well as higher headquarters. Rear Adm. Craig Clapperton, commander CSG-12, noted that the strike group and ship were ahead of schedule in this important command and control domain.

Clapperton emphasized that this PDT&T phase was all about operating Ford systems with fleet operators and discovering anomalies and working solutions. These solutions will be key to ensuring that when Ford enters the fleet after operational testing, the ship is ready to support the warfighter.

For example, the crew and embarked EMALS experts were able to troubleshoot and repair a fault in the launch system's power handling elements. While loss of EMALS curtailed flight operations to some extent, the strike group, ship and air wing team still accomplished significant goals scheduled for the carrier.

"The ship's response to these EMALS challenges underscores our ability to identify and to correct issues impacting flight operations quickly. That's the purpose of the PDT&T phase," Clapperton said. "The learning and improvement that results from pushing the systems will make the ship and air wing team better and more effective in future underway events."

Ford Finds Center of Gravity

U.S. Navy photos by MC Jeff Troutman

Personnel from Huntington Ingalls Industries-Newport News Shipbuilding Division measure and record inclination readings on CVN-78's flight deck during the ship's weighted incline experiment at Naval Station Norfolk on April 16.

Before its underway with its largest aircraft embark to date, USS Gerald R. Ford (CVN 78) Sailors performed an inclining experiment and tested both the ship's advanced weapons and stores elevators to ensure proper function.

For three hours April 16, Ford pulled away from its homeport at Naval Station Norfolk, Virginia, and into the Elizabeth River to conduct a rare weighted inclining experiment.

The purpose of the inclining experiment was to calculate the ship's weight and center of gravity. Information from the test was also used to determine the ship's stability in a variety of design loading conditions.

"This testing of the ship's weight will become the baseline for which it is measured for her life of service," said A.J. Bierbauer, the deputy chief engineer for Newport News Shipbuilding, during the test. "As the ship gets older, there will be alterations made to her, and, as is the case with many ships, they tend to get heavier through the years."

While many smaller naval ships such as cruisers and destroyers incur frequent inclining tests throughout their lifespan, Bierbauer said that carriers typically only see a total of three inclining experiments in their lifetime, although other types of stability tests can be done when necessary. — *Lt. j.g. Nick Spaleny*

PHYSIOLOGICAL EPISODES: UNDERSTANDING THE HUMAN SYSTEM

By Andrea Watters

U.S. Navy photo illustration by Fred Flerlage, U.S. Marine Corps photo by Cpl. Jason Jimenez

Fleet aviators have not experienced a significant physiological event (PE) in more than a year due in part to increased understanding of breathing dynamics and how to mitigate symptoms in the cockpit, according to the Navy's flight surgeon on the Physiological Episodes Action Team (PEAT).

Cmdr. Allen "Doc" Hoffman said he celebrated that milestone May 31, which is one of the PEAT's many contributions toward resolving PEs since 2017 when they became Naval Aviation's No. 1 safety priority.

In addition to technological improvements, the PEAT attributes the decline of PEs to educating and communicating directly with aviators during roadshows. Over the last two years, these roadshows have evolved from presentations in large auditoriums to briefings in less formal settings—squadron ready rooms (see article on page 28).

Focused on Navy's High-Performance Athletes

Hoffman is a residency-trained flight surgeon who is board certified in aerospace and occupational medicine. He joined the PEAT in September 2018 to help unravel the mystery behind PE

"We don't train pilots how to fly the aircraft, we train pilots on how to fly their bodies. People tend to forget that the human system is the most important part of the aircraft system."

symptoms and develop a long-term treatment plan designed to return aviators to flight status.

Hoffman chairs the Air Medical Action Team (AMAT) created by the U.S. Navy Bureau of Medicine and Surgery (BUMED) in 2017 to evaluate the human side of the equation. Comprised of more than 40 specialists, the team meets monthly to plan and analyze research studies and develop clinical practice guidelines to treat and prevent PEs.

"Treatment accessibility and quality are key successes. It's one thing to treat people once they've been injured, but it's the gold standard to prevent the injury. And that's what we've done for the last year," Hoffman said.

The AMAT's investigations have shifted the emphasis from the aircraft to the men and women who fly those aircraft.

"PEs happen to people, not to aircraft," Hoffman is quick to point out.

Renewed emphasis is on increasing stakeholder's understanding of what aircrew experience physiologically in the inherently stressful flight environment in the cockpit as well as training and equipping naval aviators as professional athletes.

"We don't train pilots how to fly the aircraft, we train pilots on how to fly their bodies. People tend to forget that the human system is the most important part of the aircraft system," said Capt. James R. Linderman, the aeromedical physiologist on the PEAT and AMAT. Linderman, who earned his Ph.D. in physiology, has brought his experience in molecular, cellular and human physiology to the effort since 2019.

"Flights are basically athletic events where you need more oxygen. Your heart's racing, you're pulling Gs; it's an athletic event and you need a constant supply of oxygen," Hoffman said.

Acknowledging the physical demands of flight, the Navy holds pilots to a higher physical and mental standard than the general Navy population, Hoffman said. To be an aviator, one must meet the general duty standards plus the specific physical and functional requirements to fly, including perfect vision and hearing. Psychological requirements include an even-keel mentality with the ability to stay in control to solve problems in an emergency.

Aviators must also "fit" into their aircraft. Depending on the platform, one may be too tall, weigh too much or have arms that are too short or too long.

"We look at all those things to make sure that the right people go into the right aircraft, and they have the right physiological margins to tolerate that abnormal work environment," Hoffman said.

A student naval aviator prepares her flight gear at Training Air Wing (TW) 4 aboard Naval Air Station (NAS) Corpus Christi, Texas, on June 23.

U.S. Navy photo by Lt. Michelle Tucker

U.S. Navy photo by MC2 Robyn B. Melvin

Aircrew Survival Equipmentman Airmen, assigned to the "Sunliners" of Strike Fighter Squadron (VFA) 81, test oxygen flow in pilot gear in a paraloft aboard aircraft carrier USS Harry S. Truman (CVN 75).

Re-Examining Hyperventilation, Breathing Dynamics

Prior to recent findings, the aeromedical community and aviators believed hypoxia—oxygen deprivation at the tissue level—and decompression sickness (DCS) were the two major threats to aviators in the tactical air cockpit, Linderman said.

"While those are two conditions to be concerned about, they may not be what we're seeing with respect to physiological events," he said.

During its investigation, the AMAT analyzed the 57 reported symptoms and narrowed them down to two categories of physiological events—pressure-related or non-pressure-related, Hoffman said.

"Once we ruled out hypoxia and decompression sickness, it took us about 14 months to identify the two types of PEs and develop treatment," he said. [The physiology and treatment of pressure-related PEs will be covered in a future issue.]

In the non-pressure related category, the AMAT discovered other contributing physiological states such as respiratory alkalosis—a decrease in blood carbon dioxide (CO_2) levels called hypocapnia can lead to a rise in blood pH and create an area of regional hypoxia in the brain.

"Initially, people were saying 'the aviators are hyperventilating; they're causing their own problem,'" Hoffman said. "People associate hyperventilation with a conscious choice to breathe too fast because you are anxious or scared, but that's not the case for aviators. Just by putting on your flight gear and sitting down in the aircraft, you have decreased your respiratory ability and your body will naturally start breathing faster to compensate. It's not a conscious choice; it's an involuntary reaction to maintain your physiological margins."

In 2017, student pilots were reporting inadequate oxygen during their T-45 Goshawk flights. While investigators found no contaminants or toxins in the Onboard Oxygen Generating System (OBOGS), they did, however, find and resolve inadequate air flow caused by a 90-degree bend in the pipe.

What can happen in a low flow state is that chemoreceptors send signals to the brain triggering an unconscious response to breathe slightly faster, Linderman said. "That increase in breathing, again, not in a normal situation, could lead to a cascade of events that ultimately ends in this person getting hypocapnia."

Hypocapnia is caused by an increase in blood pH, which must remain between the very tight range of 7.35 and 7.45. Anything above that causes a structural change in the hemoglobin causing it to hang on to oxygen instead of releasing it.

"It has nothing to do with not breathing in enough oxygen. You have plenty of oxygen, you just don't release it to the tissue because your hemoglobin is 'being selfish' and holding onto it because of that high blood pH," Hoffman said.

Airflow was improved in the T-45 by adjusting the engine idle and straightening out the bend in the OBOGS pipe, an earlier effort by the PEAT.

"We haven't seen issues of low airflow in the T-45 since the [OBOGS] pipe was straightened," he said.

The lungs' ability to exchange oxygen and carbon dioxide is also affected by two of the most physically demanding aspects of flying a tactical aircraft: high altitudes and pulling Gs, Hoffman said.

Since these two situations occur above 10,000 feet cabin altitude, aviators breathe supplemental oxygen at 94 percent, which is a much higher concentration than the 21 percent oxygen and 78 percent nitrogen in ambient air, Hoffman said. Cockpit ambient air with adequate partial pressures of oxygen are found at sea level and below 10,000 feet cabin altitude.

Studies have found that one of the negative effects of breath-

ing 94 percent oxygen is the potential for nitrogen to be washed out of the lungs which leads to atelectasis, Hoffman said. Atelectasis is the complete or partial collapse of a part of the lungs called alveoli. Nitrogen keeps the alveoli—the little sacs in the lungs that handle gas transfer—inflated. A lack of nitrogen can cause the alveoli to collapse which, in turn, increases the respiratory rate, he said.

BUMED is funding research projects exploring the effects of high levels of oxygen, how long before these effects occur and whether it is beneficial to use a lower percentage, Hoffman said.

The team has also learned more about breathing dynamics and how the position of the body affects one's breathing. For example, while performing on stage an opera singer is standing upright, chest extended, shoulders back with lowered and tightened abdominal muscles, which enables maximum respiratory capacity, Linderman said. A pilot, on the other hand, is sitting in the cockpit wearing aviation life support systems, all of which reduces their respiratory capacity. It can also cause one to unconsciously change their breathing dynamics, ultimately affecting gas exchange and cellular processes within the body, he said.

Strategic Air Breaks Proposed

To mitigate non-pressure related events, BUMED and the PEAT are introducing "strategic air breaks" or periodic breathing techniques to improve aircrew's respiratory function.

One of these breaks includes finding a time during the administrative part of a flight to drop below 10,000 feet cabin pressure, take off the mask and take deep breaths for a period of time to reintroduce nitrogen into the lungs and help re-inflate the alveoli.

"This will help mitigate, not just normal flight, but the physiological effects of pulling Gs. With the physiological margin of fully expanded lungs, the body is in a better position to handle G forces. When you pull Gs you are going to naturally have atelec-

PEAT Communicates with Fleet

The Physiological Episodes Action Team (PEAT) has been relaying its findings to aviators in the form of roadshow presentations. At first, the roadshows occurred in larger settings, but the team realized meeting with aviators in their squadron ready rooms was more effective, and the new approach seems to be resonating with aviators, according to Cmdr. Adrian "Catfish" Jope, PEAT lead.

"Initially the PE Roadshows were very much aircraft-centric without much discussion on the aeromedical front," Jope said.

As more information came out regarding the aeromedical aspects involved with PEs during the Naval Air System Command's (NAVAIR) Root Cause Corrective Action (RCCA) investigation, the team decided to shift some of its roadshow focus to address these important aeromedical findings.

U.S. Navy photo

Flight Surgeon Cmdr. Allen "Doc" Hoffman discusses the aeromedical impacts of flight on human physiology with the "Cougars" of Electronic Attack Squadron (VAQ) 139 during a Physiological Episodes Action Team roadshow at NAS Whidbey Island, Wash., in October 2019.

"Since PEs happen to aviators and not the aircraft, we placed aeromedical professionals who were familiar with PEs at the forefront of the discussion. This enabled us to educate aircrew about the dynamics of aerospace physiology as well as what an aviator could expect should they experience a PE. Additionally, we felt that it was vital to help strengthen the relationship and restore trust and confidence between aircrew and flight surgeons, especially when it came to the subject of PEs," Jope said.

In March, the PEAT held its first round of what Jope refers to as the "PE TED Talk" at ready rooms across the Naval Air Station (NAS) Oceana, Virginia, flight line.

"Utilizing the same tools that aviators use on a daily basis to conduct flight briefs and debriefs, namely a whiteboard and dry erase markers, the team was able to communicate with aircrew in a way that is familiar to them," he said.

During the discussions, the PEAT shares in depth information about the aircraft systems often associated with PEs, specifically the Environmental Control System (ECS) and the On-Board Oxygen Generating System (OBOGS) and how they function in a normal and degraded fashion. Additionally, the

> "We believe educating the pilots and the medical professionals is so significant that we've rewritten the entire physiology chapter in CNAF 3710."

tasis; you can't mitigate the effect from centrifugal force. However, if your lungs are at 100-percent capacity when you start, you're going to be able to handle it much better," Hoffman said.

Strategic air breaks and more information on breathing dynamics will be introduced in a new section in the Naval Air Training and Operating Procedures Standardization (NATOPS) General Flight and Operating Instructions Manual CNAF M-3710.7, Hoffman said. The updated instruction is expected to be finalized in August.

"While aviators have been trained in this all along, what we've found is that they haven't been trained extensively enough. We believe educating the pilots and the medical professionals is so significant that we've rewritten the entire physiology chapter in CNAF 3710. It is about twice the size of the original, and once published, it will do a great job in educating new aviators and re-educating veteran aviators on exactly what their bodies are experiencing in flight," Hoffman said.

Armed with this knowledge, aviators will become more aware of symptoms, correlate those symptoms to what happened in the cockpit and know how to mitigate them, Hoffman said.

Andrea Watters is editor in chief of Naval Aviation News.

PEAT's flight surgeon systematically breaks down human physiology as it relates to the harsh aerospace environment, but at a level that everyone can easily understand.

"By doing this, we have been able to take a lot of the mystery out of PEs and dispel many misconceptions or concerns that aircrew have coming into the conversations," Jope said.

Positive Feedback

"I initially was skeptical about how the Navy was handling PEs, mostly because of 'word of mouth' and other aircrew's experiences. I was fortunate enough to sit through a PEAT roadshow in March which changed my mind completely," said Cmdr. Anthony "YoYo" Scigliano, Strike Fighter Wing Atlantic (SFWL) Safety Officer. "After the PEAT's roadshow, I went around talking to aircrew to get their perspectives. Everyone I talked to had the same view I did and came out much more informed."

Lt. Cmdr. Kyle "Mooch" Jones, Safety Department Head with Strike Fighter Squadron (VFA) 106 at NAS Oceana, had a similar reaction.

"That roadshow was great because everyone was there, from the admiral down, and it was an honest assessment of what we, as a Navy, knew to that point. That type of delivery plays well with aviators and I think that helped change some perspectives," Jones said.

The PEAT plans to continue its PE roadshows once COVID-19 travel and social distancing restrictions are lifted.

Changing the Culture

Part of the challenge in mitigating PEs is the reluctance of aircrew to talk to the doctors because of their apprehension of being placed in a down status or "grounded," Jope said.

"While it's not necessarily right, it's a cultural thing. Many aviators have Type A personalities, and, like athletes, they want to be involved in the game. If they're on the sidelines, they feel like they're not helping the team.

"To begin to change the culture, the new message has to be 'if you're not playing at 100 percent, you're not only hurting yourself, but the entire team,'" Jope said. "This goes beyond feeling sick, too. Similar to athletes, aviators need to make sure that they are getting the proper nourishment, exercise and rest to keep themselves in top condition to take on the harsh and sometimes unforgiving environment in which they work. If they don't, they are risking injury, or if already playing hurt, they risk making the injury worse and possibly finding themselves out of the 'game' for weeks or even months."

There have been multiple PE reports over the past few years that could have been prevented had aviators taken an honest assessment of their overall fitness for flight prior to stepping into the cockpit, Jope said.

The Naval Aviation Enterprise is encouraging aviators to take themselves off the flight schedule if they're not up to it, and that is happening more frequently at SFWL.

"I think that aircrew feel comfortable enough to take themselves off the flight schedule if they aren't feeling up to snuff. They will get respect for owning up to the fact that they don't want to put others at risk," Scigliano said. *— Andrea Watters*

U.S. Navy photo

Lt. Cmdr. Kyle "Mooch" Jones, Safety Department Head with Strike Fighter Squadron (VFA) 106, prepares for a flight in an F/A-18F Super Hornet.

Test Pilot School Alum

REACH FOR THE STARS

By Rob Perry and Paul Lagasse

The first group of NASA astronauts since the announcement of the Artemis program graduated from the Johnson Space Center in Houston during a ceremony Jan. 10. Among the graduates were two men and a woman who attribute their success, in part, to attending the U.S. Naval Test Pilot School (USNTPS).

Matthew Dominick, a Navy lieutenant commander, graduated from USNTPS, based at Naval Air Station Patuxent River, Maryland, and served on USS Ronald Reagan (CVN 76) as department head for Strike Fighter Squadron (VFA) 115. Dominick was one of 11 NASA and two Canadian Space Agency astronauts in the recent graduation class.

Raja Chari, an Air Force colonel, served as the commander of the 461st Flight Test Squadron and the director of the F-35 Integrated Test Force at Edwards Air Force Base in California following his USNTPS graduation.

Jasmin Moghbeli, a Marine Corps major, is a distinguished graduate of USTPS. Moghbeli tested H-1 helicopters and served as the quality assurance and avionics officer for Marine Operational Test and Evaluation Squadron (VMX) 1.

Speed and man's interaction with machines sparked Dominick's early interest in flying and, ultimately, his decision to enlist in the Navy.

"[As a child] I was always building things in my backyard or in my garage and probably breaking my dad's tools and figuring out how to work things," Dominick said. "I am fascinated by human-machine integration and how we interact with machines. And I was always interested in going faster and higher … but I quickly realized there are limits to what you can do without an education, and the Navy presented me with that opportunity."

Like many of his colleagues, Chari first knew he wanted to fly as a career in late middle school, but his inspiration was perhaps a little different from theirs.

"I was really into 'Star Wars' at the time, but at some point, I realized that I couldn't fly an X-Wing in real life and fighter jets seemed like a logical Plan B," Chari said with a laugh. "And being an Air Force guy, I'm probably going to catch a lot of flak for saying this, but I can't lie that 'Top Gun' didn't play a role in it, too."

Moghbeli, who cut her aviation teeth piloting helicopters for the Marine Corps, said her first flight aboard a Cessna with a family friend cemented her desire to fly. Around the same time, she decided to pursue a career in the Marine Corps.

"Both my grandparents served in the military in Iran. My Mom's father served in the Iranian Navy, so I think from an early age, I started having an interest in the military," Moghbeli said. "I was initially looking at the Navy and then, in my junior year of college at a career fair, I talked to an officer at a Marine Corps booth, and ended up going to officer candidate school that same summer and enjoyed getting commissioned after that.

"I have always liked the idea of service to country and traveling and adventure, and I've always played sports," Moghbeli said. "Rivalry really appealed to me."

Test Pilot School Offers Path to Space

The path to exploring beyond the Earth's atmosphere was different for each of the newly minted astronauts, but these three share a special bond having completed the unique training experience at USNTPS.

Dominick earned a bachelor's degree in electrical engineering from the University of San Diego and a master's degree in systems engineering from the Naval Postgraduate School in Monterey, California. His thirst to continue learning and a desire to contribute to the fleet in a more effective way led to him to apply to USNTPS.

"I was in my fleet squadron and I realized that what was right for me—based on what I love to do—was to go to test pilot school because that would be a place where I could explore further how [to] make things better for the fleet," Dominick said, remarking that USNTPS pilots actively participate in testing aircraft and troubleshooting issues that arise in order to repair and improve systems.

"Test pilot school is about a way of thinking about problems and a way to communicate issues. Most of test pilot school is really just understanding complex things and distilling them down into a way that people can understand, so that problems can get resolved. Most people think about test pilots like, edge of the envelope, keeping an airplane flying, conducting these really extreme high-risk test points. That's kind of the glamour shot. But 95 percent of test piloting is reading and writing—and writing very well."

After graduating from the Air Force Academy and earning his master's degree in aeronautics and astronautics from the Massachusetts Institute of Technology, Chari was considering whether to pursue a career in engineering or aviation when a friend gave him some valuable advice.

"He said, 'Did you know there's this place called the U.S. Naval Test Pilot School where you can actually do engineering work and fly, too?'" Chari recalled. "To me, that sounded like a perfect blend of my interests."

Chari applied to USNTPS while assigned to an F-15 Strike Eagle squadron in England, and was thrilled when, the following year, the school offered him a place.

U.S. Navy photo illustration by Fred Flerlage; photographic images courtesy of NASA

"Founded in 1945, the U.S. Naval Test Pilot School trains the world's finest developmental test pilots, flight officers, engineers and industry and foreign partners in the full-spectrum test and evaluation of aircraft and aircraft systems."

"It was a pretty amazing experience, and I made friends that I still keep in touch with today," Chari said. "It's definitely not a walk in the park, but it's also fun when you remember to take a step back and look at it. You'll be grumbling that you have to write this huge paper, but then you remind yourself that you're doing it because tomorrow, you'll get to fly a plane you've never flown before."

USNTPS also opened up another career path for Chari that, until then, had seemed only a distant possibility—being an astronaut.

"Honestly, I didn't really think it was realistic until I got selected for test pilot school," he said. "That's when it dawned on me that this astronaut idea was now actually within the realm of possibility."

Moghbeli earned her bachelor's degree in aerospace engineering with information technology at MIT and a master's degree in aerospace engineering from the Naval Postgraduate School before being accepted to USNTPS, which she admits was more challenging than she anticipated.

"I think I underestimated a bit," Moghbeli said. "I remember when I first got there, we received this email about the 'You'll Be Sorry Party.' I was like, 'what do you mean 'you'll be sorry?' You know, like, it can't be that bad. The long-standing joke is you spend half your day in class, half your day flying and half your day writing reports. It was very, very time consuming trying to do everything to the level that I wanted."

Teamwork and Troubleshooting: Key Ingredients

What is it that makes USNTPS one of the key pipelines for people who seek to become astronauts?

Marine Lt. Col. Rory Feely, Commanding Officer, USNTPS, said that in addition to the school's comprehensive curriculum, top-notch instructors and highly competitive application process, it is the school's emphasis on teamwork that benefits future astronauts.

"When you look at the qualities and characteristics of those who are successful in applying to NASA and becoming astronauts, I think it is the teamwork side of their personality that sets them apart," Feely said. "And we foster that trait here because close collaboration between aviators and engineers is a critical part of flight test, not just here at the school but throughout the Navy's other test squadrons."

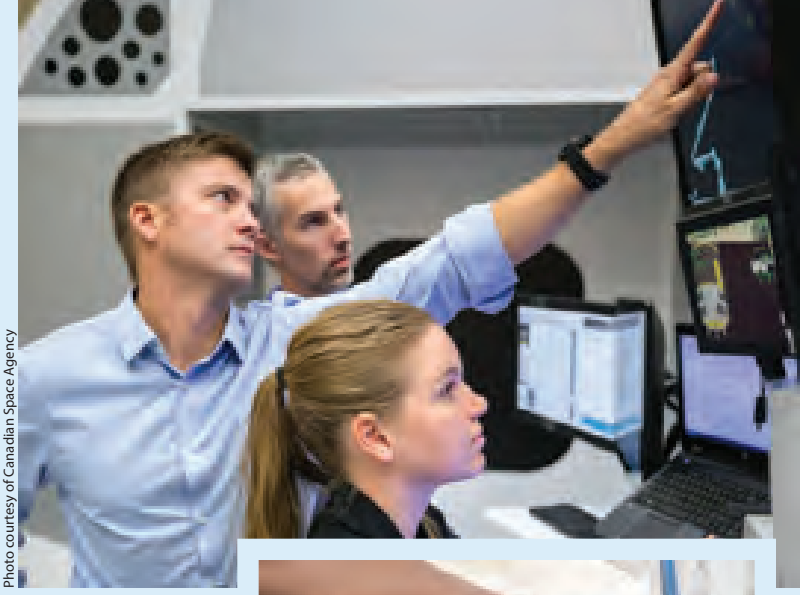
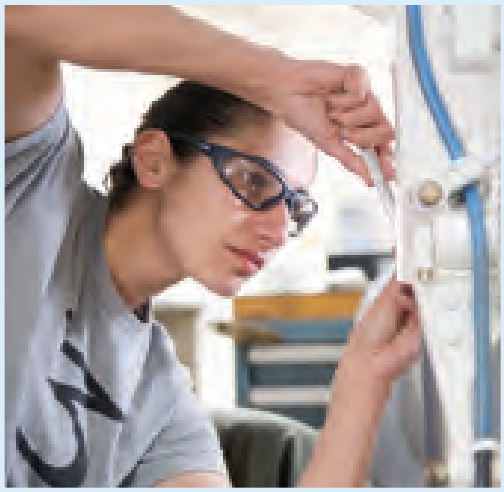


Photo courtesy of Canadian Space Agency

Canadian Space Agency (CSA) astronaut Jennifer Sidey-Gibbons (right) and then-NASA astronaut candidate Matthew Dominick (left) participate in Canadarm2 robotics training at CSA headquarters in Saint-Hubert, Quebec.



NASA photo by Josh Valcarcel

Then-NASA astronaut candidate Jasmin Moghbeli conducts T-38 engine maintenance training at Ellington Field in Houston.

"There's nothing we do in life these days that we do by oneself," Feely said. "Our disciplines and our endeavors are just far too complicated for one person to be able to cover all the bases. USNTPS graduates learn from experience that their success is dependent on their ability to work with and to trust others as a team."

Feely speaks from experience; he worked with Moghbeli in early 2012 when both were assigned to the operations department of Marine Light Attack Helicopter Squadron (HMLA) 367 at Camp Pendleton, California—and, in fact, Feely wrote a letter of recommendation in support of her application to USNTPS.

"She never, ever quit, which is a fantastic attribute to have," Feely said. "I used to tell people that the only reason she's working for me is because I outranked her, otherwise I'd be working for her."

Founded in 1945, the USNTPS trains developmental test pilots, flight officers, engineers and industry and foreign partners in the full-spectrum test and evaluation of aircraft and aircraft

NASA photo by James Blair

Then-NASA astronaut candidate Raja Chari readies for T-38 flight training at Ellington Field.

NASA photo by Josh Valcarcel

Moghbeli wears a Liquid Cooling and Ventilation Garment prior to underwater spacewalk training at NASA Johnson Space Center's Neutral Buoyancy Laboratory (NBL). The cooling garment runs water throughout the suit to keep her cool during training.

NASA photo by Josh Valcarcel

Wearing a Liquid Cooling and Ventilation Garment, Dominick helps himself into a spacesuit prior to underwater spacewalk training at the NBL.

NASA photo by Robert Markowitz

Chari is helped into a spacesuit prior to underwater spacewalk training at the NBL.

systems. The school is in the forefront of developing modern test techniques, and is a leader in the standardization of flight test. It is the only source of rotary-wing test pilots in the United States and serves as the Army's test pilot school. Graduates leave the program prepared to meet the wide range of requirements necessary to conduct research, developmental and operational test and evaluation activities in support of U.S. military services, government agencies and many foreign nations.

For military pilots, flight officers and engineers who want to become astronauts, USNTPS isn't the only gateway, but it is one of the most successful, Feely said. But those people have to really want it, he said.

"USNTPS is very selective about who is allowed to participate in the program, both on the staff side and the student side, and those who make it through the doors are already very accomplished in many areas of their careers not only academically, but also in terms of their flight performance," Feely said. "A person may have hopes of becoming an astronaut when they become a pilot in the military, but first they have to build their reputation by aiming higher and seeking out greater challenges."

Dominick said his USNTPS experience prepared him for uncertainties while in the air and ways to quickly troubleshoot issues as they arise.

"[USNTPS] puts you in situations in which you are uncomfortable. When you first get there, the first aircraft you fly is one you are unfamiliar with," said Dominick, who had experience with fixed-wing aircraft, but found himself in the cockpit of a helicopter as his first flying experience at USNTPS. "They want to make you uncomfortable and to assess what is going on. I think that was really valuable experience.

"Also, if you want to have influence, if you want to be there in the early stages of development and make the fleet have better tools to do the job, then go to USNTPS."

Moghbeli reiterated that having an immediate impact to the fleet was a fulfilling reward for those who attend USNTPS.

"Something I loved about it was that it allowed me to combine that operational experience I had from the fleet with [my] engineering background. And the cool thing about it is you graduate from test pilot school and you're immediately having impacts to aircraft systems, weapons systems, avionics, things that are going to be going out to the fleet," she said. "I remember I was working on an electrical warfare pod as the project manager after graduating. I would give feedback, the engineers

NASA photo by Josh Valcarcel

From left, NASA astronaut candidates Dominick, Chari and Moghbeli take time to bond on their hike during wilderness survival training at the Navy's Survival, Evasion, Resistance and Escape School in Brunswick, Maine.

NASA photo by Josh Valcarcel

Dominick wears a spacesuit prior to underwater spacewalk training at the NBL.

NASA photo by Norah Moran

Dominick during earth and planetary science training in Rio Grande del Norte National Monument Upper Gorge Area near Questa, N.M.

NASA photo by Josh Valcarcel

NASA astronaut candidates Jasmin Moghbeli and Frank Rubio discuss their next plan of action while fellow astronaut candidates and their instructor study their topographical maps during wilderness survival training.

"The new graduates may be assigned to missions destined for the International Space Station, the Moon, and ultimately, Mars. According to NASA, the organization has plans to send the first woman and next man to the surface of the Moon by 2024."

would incorporate it, and I would test again. That iterative process, of seeing the active change in that product and giving the fleet something that I felt was a better product, was a very satisfying experience for me."

Chari agreed with his colleagues about the value of finely honed problem-solving skills in day-to-day military service. "If you've ever been frustrated with a system because it doesn't work the way it should, the way to deal with that is to go to test pilot school and become part of the solution," he said. "You will develop the ability to influence future systems and make them better for the operators who come after you."

Solving Space Challenges

All three astronauts said they draw on their experiences and knowledge gleaned from USNTPS on a daily basis, mostly their troubleshooting skills and thought processes to improve existing technology.

Dominick, who is currently working with Moghbeli on the Orion lunar lander for NASA's planned return to the Moon, said his skills from USNTPS are directly impacting that program. Specifically, Dominick said he is addressing challenges of being able to dock the Orion spacecraft with the lander, and then have the lander touch down on the Moon and then be able to redock once leaving the Moon's surface.

"We're going to visually fly one spacecraft into another … it's very analogous to some of the tasks we did at test pilot school," Dominick said. "When I was at [Air Test and Evaluation Squadron] VX-23, I was involved with the Precision Landing Mode program, initially called MAGIC CARPET, working on landing [an aircraft] on the ship in a more precise way. And what's really funny is that I am now using the same exact fundamental control laws and human system integration that we were using for landing on a ship … to learn how to land on the moon."

"I'm looking at using my background as a helicopter test

NASA photo by Josh Valcarcel

Moghbeli is helped into a spacesuit prior to underwater spacewalk training at the NBL.

NASA photo by Robert Markowitz

Chari is lowered into the training pool for spacewalk training at the NBL.

pilot to look at how we train for this mission, what trainers can we use and what's out there. And what's cooler than that?" Moghbeli said. "To be able to work on the next lunar lander as a new astronaut is pretty cool."

"It's a natural progression from test pilot school to NASA," said Chari, who is now the test director for NASA's Commercial Crew Program, helping ready the Boeing Starliner and SpaceX Crew Dragon for crewed spaceflights. "A lot of what we're doing with the new vehicles is very much test related. All of the vehicles being developed need people who have test backgrounds and who understand the acquisition process. And we have to be very good at managing many tasks at once. So it's a very translatable skillset."

The new graduates may be assigned to missions destined for the International Space Station, the Moon, and ultimately, Mars. According to NASA, the organization has plans to send the first woman and next man to the surface of the Moon by 2024. Additional lunar missions are planned once a year thereafter and human exploration of Mars is targeted for the mid-2030s.

Rob Perry is a staff writer and editor with Naval Aviation News. Paul Lagasse is a public relations specialist with the U.S. Naval Test Pilot School.

USNTPS Alum Bridges Two Eras

Photo courtesy of SpaceX

NASA astronaut Doug Hurley holds a unique distinction in the annals of space flight. As the pilot of the last Space Shuttle mission in 2011 and a member of the first crewed flight of SpaceX's Crew Dragon spacecraft that launched to the International Space Station on May 27, Hurley and his fellow astronaut, Bob Behnken, are the first American astronauts to have flown to space in two different types of U.S.-built launch vehicles since John Glenn, the first American to orbit the earth in a Mercury spacecraft, flew aboard the space shuttle Discovery in 1998. And, like Glenn, Hurley has the distinction of being a graduate of the U.S. Naval Pilot School at Naval Air Station Patuxent River.

A veteran of two Space Shuttle missions, including the program's final mission in July 2011, Hurley was named to the Crew Dragon Demo 2 mission along with Behnken in 2018. Following his graduation from USNTPS, the U.S. Marine Corps veteran was assigned to Air Test and Evaluation Squadron (VX) 23 where he served as an F/A-18 project officer and test pilot, becoming the first Marine pilot to fly the F/A-18 E/F Super Hornet and serving as the squadron's operations officer.

Another interesting fact: on both his last shuttle flight and his first Crew Dragon flight, Hurley flew from the same location, the historic Launch Complex 39A, from which the first Saturn V moon rocket launch and the first—and last—space shuttle launch took place. In every sense, then, Doug Hurley's space saga is truly historic.

— Paul Lagasse

First F-35C TOPGUN CLASS Graduates

By Lt. Cmdr. Lydia E. Bock

Two pilots from Strike Fighter Squadron (VFA) 125 "Rough Raiders" and VFA-147 "Argonauts" were the first TOPGUN students to complete the Navy Strike Fighter Tactics Instructor (SFTI) course in the F-35C Lightning II.

Maj. Derek Heinz from the Rough Raiders and Lt. William Goodwin III from the Argonauts completed the 13-week course in May at the Naval Aviation Warfighting Development Center (NAWDC) at Naval Air Station (NAS) Fallon, Nevada. The SFTI course, otherwise known as TOPGUN, is an individual-level training course comprised of classroom lectures, labs and simulated and live-fly events focused on the newest advanced tactical recommendations.

During the last few years, NAWDC and TOPGUN have worked together to develop the skill sets, curriculum and experienced instructors required to execute a syllabus that fully integrates F-35C tactics, techniques and procedures. While all F-35C tactics instructors completed the TOPGUN course previously, this is the first time TOPGUN has graduated students who are flying the Lightning II, using a syllabus that has been developed from the ground up specifically for F-35C integrated operations. This was accomplished by introducing F-35C tactics gradually into the training curriculum for previous classes. The result is a cadre of highly trained instructors teaching from a fully integrated F-35C syllabus, providing well-rounded "graduate-level" training for the fifth-generation fighter to take back to the fleet.

"Our focus on the students that go through TOPGUN is not limited to teaching them the tactics, techniques and procedures that are required for them to successfully employ their aircraft, integrated into a larger force," said NAWDC TOPGUN Department Head Cmdr. Timothy Myers. "We are also in the business of teaching our graduates how to instruct other students, so that when they go back to the fleet, they are able to instruct at a very high level.

"Graduating strike fighter tactics instructors allows us to accelerate learning by feeding TOPGUN training back to the fleet, elevating the lethality and survivability of both the individual aircraft, as well as the carrier strike group," Myers said. "The Lightning II proved its value to the Navy during every phase of the TOPGUN course, and its integration with the F/A-18E/F Super Hornet, E/A-18G Growler and E-2C/D Hawkeye demonstrated that the powerful combination of fourth- and fifth-generation fighters, with advanced electronic attack and command and control, is a force-multiplier against advanced threats."

Since completing the TOPGUN course,

Six F-35C Lightning II aircraft from Strike Fighter Squadron (VFA) 147 prepare to conduct aerial refueling en route to Eglin Air Force Base for routine training.

U.S. Navy photo by Lt. Cmdr. Darin Russell

Heinz and Goodwin have returned to instruct and train the fleet in the latest TOPGUN tactics, techniques and procedures, with a particular emphasis on ensuring pilots have the requisite skills to employ the Lightning II effectively during its first operational deployment and beyond.

"Our focus is on assisting the SFTIs at the operational fleet squadron, pushing the big picture tactics and ensuring that everything is ready to go for the first and subsequent F-35C carrier deployments," Goodwin said. "The idea is that VFA-147 SFTIs can use the standards of tactical execution we provide to train their own people and take that knowledge with them through deployment. We are here to ensure that they are set up for success."

"While my role as an F-35C instructor is still primarily focused on the students at the fleet replacement squadron, my perspective on what I teach and how I teach it most certainly has grown since completing TOPGUN," Heinz said. "I'm still training students to fly the aircraft; it's just now, I have the additional responsibility as an SFTI to bring that advanced training while helping maintain the TOPGUN training syllabus and ensuring standardization of training for all instructors."

This milestone is the latest feather in the cap for the Navy's F-35C program. Since the stand up of Commander, Joint Strike Fighter Wing in August 2018, the program has declared safe-for-flight operations certification for both VFA-147 and Marine Fighter Attack Squadron (VMFA) 314. In February 2019, the Navy and Marine Corps both declared Initial Operational Capability for the F-35C, and VFA-125, the F-35C fleet replacement squadron, graduated its first newly winged F-35C aviators. In May 2019, VFA-101 was deactivated, consolidating most of its resources at NAS Lemoore. Additionally, both VFA-147 and VFA-125 continue to meet program requirements, pass inspections and receive certifications while participating in numerous detachments both ashore and at sea.

"The Lightning II proved its value to the Navy during every phase of the TOPGUN course..."

Lt. Cmdr. Lydia E. Bock is the Commander, Joint Strike Fighter Wing Public Affairs Officer.

FRCE FACILITATES H-53 REPAIR IN MIDDLE EAST FROM CHERRY POINT

U.S. Marine Corps photo by Cpl. Gary Jayne III

A CH-53E Super Stallion assigned to Marine Medium Tiltrotor Squadron (VMM) 365 (Reinforced), 26th Marine Expeditionary Unit (MEU), delivers fuel bladders to a forward arming and refueling point on Karan Island, Saudi Arabia, during routine sustainment.

By Heather Wilburn

In May, Marines with Medium Tiltrotor Squadron (VMM) 365 (Reinforced) had a problem. While deployed to the Gulf of Arabia in support of the 26th Marine Expeditionary Unit (MEU), one of the squadron's CH-53E Super Stallions experienced a broken gear in the main rotor gearbox. The damage rendered the aircraft inoperable and awaiting repair aboard amphibious assault ship USS Bataan (LHD 5).

Under normal circumstances, a field team would travel to conduct this depot-level repair aboard the Bataan, a Wasp-class landing helicopter dock deployed for a composite training exercise with 26th MEU. Fleet Readiness Center East (FRCE)-based artisans would arrive on location and get the aircraft up and running aboard ship. However, movement restrictions in response to the COVID-19 pandemic prevented a field team from boarding the ship to tackle the repair.

Another option was needed to replace the sheared accessory drive bevel gear. When the squadron grounded a second aircraft due to a damaged tail gearbox, the need became even more pressing.

Enter the H-53 Fleet Support Team (FST), based at FRCE. Together with a team of aircraft maintainers, these skilled professionals worked to help the Marines identify a solution; obtain the needed parts, tooling and supplies; and successfully repair the aircraft, all within a 20-day timeframe.

"This is what the Fleet Support Team does on a daily basis," said Robert Jordan, an FST air vehicle engineer. "When a fleet activity comes across a problem or situation that is not covered by existing procedures, practices or processes, they contact us. We provide troubleshooting assistance, alternate courses for corrective action, or expanded repair procedures or limits."

With the field team unable to travel to the ship, having the Marines replace the helicopter's entire main gearbox was the second option. Unfortunately, there were no main gearboxes readily accessible for issue and, due to the movement restrictions, the ship couldn't have made port to pick up a spare even if one had been available.

Chief Warrant Officer 2 Jason Hotze, VMM-365 maintenance materials control officer, had an idea. After closely reading the main gearbox depot manual, he felt the squadron's Marines would be able to replace the accessory drive assembly alone, which would limit aircraft downtime and save the fleet more than $1 million. Hotze reached out to FST engineers, who worked with FRCE artisans to develop the technical instruction.

"Changing a main rotor gearbox on a CH-53E is an extraordinarily large task, so much so that LHD-class ships don't carry most of the support equipment required to replace it," Hotze said. "Even the main gearbox itself is not carried on board, and is so large it requires a C-5 (Galaxy) to lift it into theatre. With these logistical constraints in mind, I was determined to at least ask the question on repair options to prevent replacing the entire gearbox."

The FST engineers set to work, gathering diagnostic data to verify the aircraft's issue. Once confirmed, they discussed their ideas with engineers from FRCE's Maintenance, Repair and Overhaul Engineering team, along with David Jones, an FRCE aircraft estimator and evaluator who was once a depot-level mechanic.

Once the FST had the replacement

process formalized in a written format for fleet-level use, the engineers worked with aircraft mechanics from FRCE's gearbox shop to walk through the repair and ensure minute details were captured.

According to Ashley Dixon, an aircraft mechanical parts repairer work leader in FRCE's gearbox shop, the H-53 team tackles four to five main gearbox overhauls each year, although the final number varies based on fleet needs. The accessory drive bevel gear replacement, however, was a different type of repair. Dixon and Ashton Brinson, another aircraft mechanical parts repairer in the gearbox shop, walked through the entire repair process at FRCE in order to identify areas of concern for the Marines.

"The FST came to us and asked if there were any shortcuts they could take—or shouldn't take—and any problems they might run into during the process," Dixon said. "We were looking for a way that would prevent this repair from potentially having a bigger effect on the gearbox."

"The fundamentals of the repair were actually quite typical of standard organizational-level repairs, except the stakes of this repair were far greater," Hotze said. "A small mistake of a dropped nut or tool could have been significant in terms of forcing our hand to change the main rotor gearbox."

The FST sourced a gearbox that was in like-new condition, and Dixon and Brinson began working through the process to provide step-by-step repair instructions.

"It was a very in-depth explanation of what was in the [repair] manual," Dixon said. "Since the manual is very broad, we had to narrow down the instructions. We turned a single paragraph into several pages on a PowerPoint."

"We just wanted to make sure everything was done correctly, and we were doing everything we could to give them all the details," Brinson said.

The information provided by the artisans is the type of thing that can only be learned on the job, Dixon said. Luckily, Dixon and Brinson are fast learners—they have been on the gearboxes team for less than a year, but leaders said they performed like experienced artisans. Their detailed instructions gave the Marines aboard the ship the information needed to perform the repairs quickly and carefully, with no issues arising.

"The Marines of VMM-365 are second to none, and once they were given the go ahead, they attacked the repair process with tenacity," Hotze said. "FRCE, the FST and I spent the time beforehand to ensure all the conditions were set to allow the Marines to do what they do best: maintain aircraft and accomplish the mission."

Now the FST has written instructions to provide to the fleet maintainers, along with supplemental photographs that would help clarify important details.

Logisticians working in the background had been securing the delivery of the necessary parts, tools and consumables to the Bataan, and the H-53 aviation type commander had issued a one-time authorization for the Marines aboard the ship to perform the needed work, who were able to successfully complete the repair. In all, the process took 20 days from start to finish.

Without the efforts of all the stakeholders involved, the repair wouldn't have been possible.

"The most important aspect of this entire effort was to maintain the airworthiness of the aircraft's drive system to ensure the aircraft and fleet personnel are able to successfully complete the assigned missions," said Stuart Clayton, lead engineer with the H-53 FST. "The key supporting factor was the collaboration of all personnel involved, who were working together toward a common goal."

Coordination of the various team entities to get technical data and parts—with spares—into place more than halfway around the world proved challenging but teamwork prevailed, Munroe said.

"The most important factor in the repair's success was undoubtedly the close integration with our team and the FST," Hotze said. "Throughout the deployment, the FST has been an integral part in helping us solve problems, repair aircraft and learn our trade. Across the type/model/series, the FST's easy access and determined bias towards solution has tangibly increased readiness and improved our ability to be ready when needed most."

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

U.S. Navy photo

Fleet Readiness Center East (FRCE) aircraft mechanical parts repairer work leader Ashley Dixon, left, and aircraft mechanical parts repairer Ashton Brinson torque the pinion nuts on a first-stage planetary gear, part of the main rotor gearbox on a CH-53E Super Stallion.

U.S. Navy photo

Marines aboard USS Bataan (LHD 5), forward deployed to the Arabian Sea, unbox an accessory drive bevel gear shipped from FRCE.

Aircraft 135, a long-term down aircraft at Naval Air Station (NAS) Lemoore, Calif., was recently restored by the Naval Aviation Maintenance Center for Excellence (NAMCE) and now operates with fleet replacement squadron, Strike Fighter Squadron (VFA) 122.

U.S. Navy photo by Lt. Cmdr. Lydia Ellen Bock

REBUILDING SUPER HORNET FLEET: NAMCE IMPROVES READINESS

From Strike Fighter Wing Pacific Public Affairs

After more than eight years of dormancy on the flight line, F/A-18F Super Hornet bureau number (BuNo) 166464 returned to operational fleet service April 19 with a functional check flight.

Because of constrained Navy budgets, BuNo 166464, which had contributed some of its parts so other Super Hornets could fly and deploy, sat idle on the Naval Air Station (NAS) Lemoore, California, flight line while some wondered if it would ever fly again.

Now the strike fighter is back doing the job for which it was built, roaring through the California skies and helping train replacement aircrew as a member of the Strike Fighter Squadron (VFA) 122 "Flying Eagles." The jet joins several other "long-term downs" that have also returned to service as NAS Lemoore enjoys a readiness renaissance—more Super Hornets are flying now than in more than a decade.

A key player in this readiness recovery is the Naval Aviation Maintenance Center for Excellence (NAMCE), which was designed specifically in July 2018 as a detachment under Commander, Strike Fighter Wing Pacific (CSFWP) to eliminate long-term down aircraft. In a small corner of the Lemoore flight line sits a 73,800-square-foot tension fabric structure. Inside that air-conditioned makeshift hangar, maintainers rebuild long-term down Super Hornets. Six fully equipped maintenance stations enable this massive undertaking, which has proved vital to maintaining operational readiness in today's high operational-tempo environment.

Less than two years ago, Naval Aviation, and specifically the strike fighter community, faced a seemingly insurmountable problem. Because of many years of heavy operational requirements, F/A-18E/F

Super Hornets were breaking faster than expected. The supply system was stressed, and squadrons were forced to deal with long-term down aircraft that were consuming hangar space and man-hours. By June 2018, more than five fighter squadrons worth of aircraft sat on the flight line at NAS Lemoore unable to fly.

Enter NAMCE, a Naval Aviation Enterprise initiative with a simple goal: reconstitute long-term down aircraft into flyable assets and return them to the fleet. Transferring long-term down aircraft to NAMCE relieves operational squadrons of the burden of maintaining them, allowing those squadrons to focus on accomplishing their mission.

At its inception, NAMCE inducted 66 long-term down aircraft from the Lemoore flight line, but NAMCE doesn't have the space to fix them all at once.

"Up to six aircraft at a time are in the process of being rebuilt, or 'in the oven,' as I call it. The rest are given Level 2 preservation to prevent further issues while they wait in line," said Cmdr. Michael Windom, NAMCE's officer-in-charge.

NAMCE maintainers strip the aircraft down during a detailed assessment process. Because of the nature of long-term down aircraft, fuel cell leaks, environmental system issues, corrosion and worn seals are often discovered, in addition to the original maintenance concerns.

In NAMCE's first year, it returned 11 aircraft to the fleet, averaging 183 days per aircraft to rebuild.

In summer 2019, NAMCE, in conjunction with industry, reassessed their processes and procedures. By adjusting the build flow, remodeling the production control center, establishing a parts control center and reallocating available skill sets, NAMCE recently reduced the average rebuild time to 67 days.

"This 300-percent increase in production has resulted in extraordinary cost savings, and by the end of April, eight mission-capable aircraft were returned to fleet squadrons under this expedited process," Windom said.

NAMCE's efforts are already paying dividends. Of the 66 aircraft initially inducted, 16 have been rebuilt and returned to service, and six more are awaiting work.

"In less than two years, NAMCE has gone from a concept to the successful reconstitution of 16 long-term down F/A-18 Super Hornets, enabling the Naval Aviation Enterprise to achieve and sustain the Secretary of Defense-mandated mission-capable rate for the Super Hornet. This was truly a team effort across all stakeholders, as everyone aggressively leaned in to turn the NAMCE vision into a reality," said Capt. James Bates, commodore, CSFWP.

Rebuilding the long-term down aircraft has enhanced the abilities of both VFA-122, which had dozens of long-term downs, as well as Lemoore's depot, Fleet Readiness Center West (FRCW), to produce more mission-capable jets.

"The successful execution of NAMCE's mission allows VFA-122 to focus on training enlisted maintainers and the production of replacement aircrew and FRCW to focus on aircraft planned maintenance intervals in support of flight line readiness," Bates said.

Although NAMCE's task is far from complete, the more efficient processes will enable the remaining aircraft to be returned to service ahead of schedule.

Written by Strike Fighter Wing Pacific Public Affairs.

U.S. Navy photos by Cmdr. Matt Holladay

NAMCE maintainers rebuild long-term down F/A-18 Super Hornets inside the 73,800-square foot tension fabric structure at NAS Lemoore.

WEAPONS SURVIVABILITY LAB Marks 50 Years

By Aaron Crutchfield

For 50 years, the Weapons Survivability Laboratory (WSL) at China Lake, California, has played a crucial role in making naval aircraft safer and more survivable in a crash.

Since 1970, the Naval Air Warfare Center Weapons Division's (NAWCWD) WSL has discovered and resolved vulnerabilities in aircraft before sending naval aviators into enemy territory. Could a rocket-propelled grenade fired at a flying jet's fuel tank bring the plane down? WSL conducts tests, analyzes what happened and provides data so aircraft designers can do their best to ensure the answer to that question, and many more, is "no."

"I'm always impressed with the passion and dedication of the people working in the survivability discipline," said Chuck Frankenberger, WSL lead. "That passion provided a great foundation, and it's alive and well in the workforce today. We continue to expand that foundation by keeping up with or ahead of new aircraft and threat technologies, providing the most survivable aircraft to our warfighters."

Today, WSL has five primary test sites that can accommodate anything from small, unmanned air vehicles to jumbo-sized transports.

Naval Air Systems Command initiated the Aircraft Survivability Program in 1969 after survivability issues plagued aircraft from World War I through the Vietnam War. In particular, more than 5,000 aircraft were lost to small arms in Southeast Asia, and there were more than 30,000 incidents of combat damage.

That same year, what was then the Naval Weapons Center (NWC) was chosen as the lead laboratory to conduct research and development work to understand vulnerability and survivability on Navy combat aircraft, such as the A-4 Skyhawk, F-4 Phantom, F-14 Tomcat and A-7 Corsair.

In 1970, NWC started the Vulnerability/Survivability Gun Range and completed its first live-fire test site. The A-4 Skyhawk was the first aircraft tested, marking the beginning of a 50-year tradition of evaluating the lethality of foreign threats against U.S. aircraft and finding potential vulnerabilities.

But it soon became obvious there were limits to testing capabilities, mainly, that planes in flight move through the air at hundreds of miles per hour, while planes on the ground are in still air. Enter the High Velocity Airflow System (HIVAS).

The facility's first HIVAS was completed in 1975 to provide realistic conditions for live-fire testing. The system simulates in-flight airflow conditions over aircraft surfaces or through internal compartments or engine inlets.

Over the ensuing years, the Aircraft Survivability Range expanded its focus, combining live-fire testing and analysis for a model-test-model approach to identify and test vulnerabilities, then make recommendations on how to fix them. In 1980, the name changed to the Weapons Survivability Laboratory.

Survivability testing, of which WSL is at the forefront, is so vital that the Department of Defense 5000 series of directives in 1991 mandated survivability as a critical system characteristic when acquiring weapons systems. Also, federal law requires realistic survivability testing be done before production ramps up.

As the times change, so does WSL. The first HIVAS used two turbofan engines; today, WSL has a four-engine HIVAS and a nine-engine Super HIVAS, which allows air to move at up to Mach 0.82. In addition to blowing air over wings, the systems enable testing of aerodynamics, flares and rocket motors, stores ejection and separations, seat ejections and parachute deployment, among others.

By performing these tests on the ground with remote controls and full instrumentation, WSL conducts evaluations that would be difficult or impossible to complete safely and cost effectively. As demonstrated over the last 50 years, WSL will continue to adapt to ever-changing conditions to protect America's forces from threats old and new.

Written by Aaron Crutchfield with Naval Air Warfare Center Weapons Division Public Affairs.

U.S. Navy photo

An A-4 Skyhawk undergoes fuel system evaluations at the Weapons Survivability Laboratory (WSL).

U.S. Navy photo

A T-33B aircraft is set up for a test at the WSL's original two-engine High Velocity Airflow System (HIVAS) circa 1975.

U.S. Navy photo

An F-14 MANPADS (man-portable air defense system) is tested in static condition, tower mounted at the WSL.

U.S. Navy photo by WSL Photo Team

An aerial view of the nine-engine Super HVAS at the WSL.

U.S. Navy photo by Aaron Crutchfield

Wendell Frank White, Jr. (in white shirt), the senior policy advisor and counsel to U.S. Rep. Pete Aguilar, D-Calif., is briefed on earthquake recovery efforts at the China Lake WSL by WSL lead Chuck Frankenberger (in blue plaid shirt) and Harlan Kooima, mission systems integration lead in August 2019. Two earthquakes, magnitudes 6.4 and 7.1, were centered very close to WSL's facilities in July 2019.

Maritime Patrol and Reconnaissance Force Reaches Key Milestones

U.S. Navy photo by MC2 Yolanda Williams

The 100th built P-8A Poseidon lands at Naval Air Station (NAS) Jacksonville on May 14.

By Commander, Patrol and Reconnaissance Group Public Affairs

In May, the Maritime Patrol and Reconnaissance Force (MPRF) marked several milestones: acceptance of the first P-8A Poseidon to a patrol squadron, delivery of the 100th Poseidon to MPRF and deployment of two MQ-4C Tritons.

Acceptance of First Poseidon

Patrol Squadron (VP) 40 completed a safe-for-flight evaluation May 14 for acceptance of their first Poseidon, the culminating event of a six-month transition from the P-3C Orion.

"The 'Fighting Marlins' lived up to the incredibly high standard set by both [the] Naval Air Station (NAS) Whidbey Island and NAS Jacksonville squadrons," said Capt. Erin Osborne, commander, Patrol and Reconnaissance Wing 10. "The ability of these units to learn a completely new aircraft and seamlessly integrate into the battlespace is a testament to the agility, dedication and professionalism of our force."

VP-40 represents the 12th and final active component VP squadron to transition from the P-3C Orion to the state-of-the-art P-8A Poseidon platform, a process that began eight years ago with VP-16 aboard NAS Jacksonville.

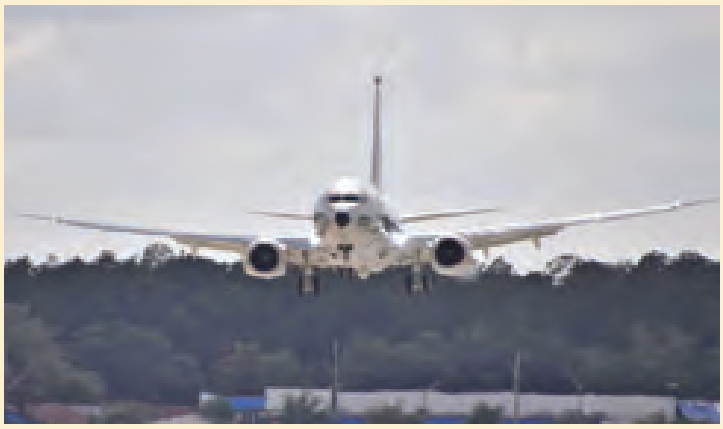
"The completion of all 12 active VP squadron transitions represents a landmark occasion in our storied branch of Naval Aviation," said Rear Adm. Pete Garvin, commander, Patrol and Reconnaissance Group. "I am confident that the men and women of the Fighting Marlins of VP-40 will continue to display the same level of pride and professionalism as each of their predecessors. I remain very proud of their effort to fight to the finish and the distinction they brought upon themselves and our community during the final active duty P-3C deployment."

The last P-3C to return from that deployment, BUNO 162776, resides at the National Naval Aviation Museum in Pensacola, Florida, where museum and MPRF leadership are planning a formal ceremony and display.

The P-3C to P-8A transition has been on course, maintaining the original schedule over the last seven years, all while continuing to meet VP global force management and deployment obligations.

"Employing a mix of legacy and new aircraft, the MPRF demonstrated a tenacious commitment to ensuring forward-deployed fleet and combatant commanders were provided the maritime domain awareness they have come to expect," Garvin said.

U.S. Navy Photo by MC2 Yolonda Williams



U.S. Navy Photo by Kaylee LaRocque

U.S. Navy Photo by Cmdr. Gerald Smith

The Navy's 100th P-8A flies over NAS Jacksonville before preparing to land and be delivered to Patrol Squadron (VP) 30. The maritime patrol and reconnaissance community began the transition from the P-3C Orion to the P-8A in 2012.

Delivery of 100th Poseidon

In the same week, MPRF accepted the 100th Navy P-8A aircraft. Side No. 555 is the 94th addition to the fleet's inventory of mission-capable aircraft, with six additional jets serving in developmental/operational test and evaluation roles.

The P-8A is a proven long-range multi-mission maritime patrol aircraft capable of broad-area, maritime and coastal operations. It combines superior performance and reliability with an advanced mission system that ensures maximum interoperability in the battlespace. With an impeccable service and safety record, the globally proven airframe recently surpassed 297,500 flight hours across the fleet.

Deployment of Tritons

Two MQ-4C Tritons deployed to Guam earlier this year, bringing a long anticipated early operational capability to the fleet. The newest addition to the community's family of systems, Triton entered its operational phase last month and rapidly proved itself a valuable asset across the Indo-Pacific theater of operations. Providing persistent intelligence, surveillance and reconnaissance (ISR) to fleet and combatant commanders, the MQ-4C has the potential to be a game changer in maritime operations.

The Triton is operated and maintained by Unmanned Patrol Squadron (VUP) 19, the Navy's first dedicated unmanned aerial systems squadron.

"The men and women of 'Big Red' are operating and maintaining this new capability forward deployed today," said Capt. Matt Pottenburgh, commander, Patrol and Reconnaissance Wing 11. "Triton is integrating into a series of missions in support of multiple task forces across the Indo-Pacific theater that showcase its unprecedented endurance. Operating at high altitude with a 24-hour flight endurance, the MQ-4C is the perfect complement to the P-8A Poseidon. The pairing of a high-altitude persistent spotter with multi-mission shooter is the epitome of long-range maritime lethality."

Garvin reflected on the MPRF's hard work over the last several years.

"I am extremely proud of how far our community has come, and more importantly, where we are headed. The Maritime Patrol and Reconnaissance Force is not just completing a transition from one platform to another, but a fundamental transformation in the way we operate. What an honor and inspiration it is to see the completion of these three momentous achievements in the span of a few weeks."

The MPRF, comprised of more than 7,000 men and women on both coasts, is the Navy's primary provider of long-range airborne anti-submarine warfare, anti-surface warfare and maritime ISR forces.

From Commander, Patrol and Reconnaissance Group Public Affairs.

NAVY, AIR FORCE COLLABORATE ON ENGINE TESTING REMOTELY

By Donna Cipolloni

A year in the making, engineers from the Propulsion Systems Evaluation Facility (PSEF) at Naval Air Station Patuxent River, Maryland, and engineers at the Arnold Engineering Development Complex (AEDC) at Arnold Air Force Base, Tennessee, will soon be collaborating on a first-of-its-kind endeavor.

In September, Leo Rubio, a test engineer with the Naval Air Warfare Center Aircraft Division's (NAWCAD) PSEF at Pax River, will join forces with engineers at AEDC to run a test and analyze the data on a Pratt & Whitney F135, the engine that powers all three variants of the F-35 Lightning II. What makes this particular test unique is that Rubio will be watching and participating from the new Remote Data Room in Maryland while the other engineers, and the engine, will be 700 miles away in Tennessee.

Located inside PSEF, the Remote Data Room—which currently comprises four monitors and two keyboards—allows a test analyst at Pax River to act as a remote team member during a live engine test taking place at the AEDC and view the data being collected.

"One thing we worried about was the latency when working in real time; will there be dropouts or will we see a number of data points from a minute ago or a second ago," said John Kelly, branch head for Test Operations and Facilities Engineering at Pax River. "But, so far, with just the few trials we've run, it's milliseconds. Now that the proof of concept is real, we're pushing forward and building an actual dedicated room with four work stations and two big screen TVs so we can see the engine running in the test cell; and we'll do a Skype setup so we can also see each other."

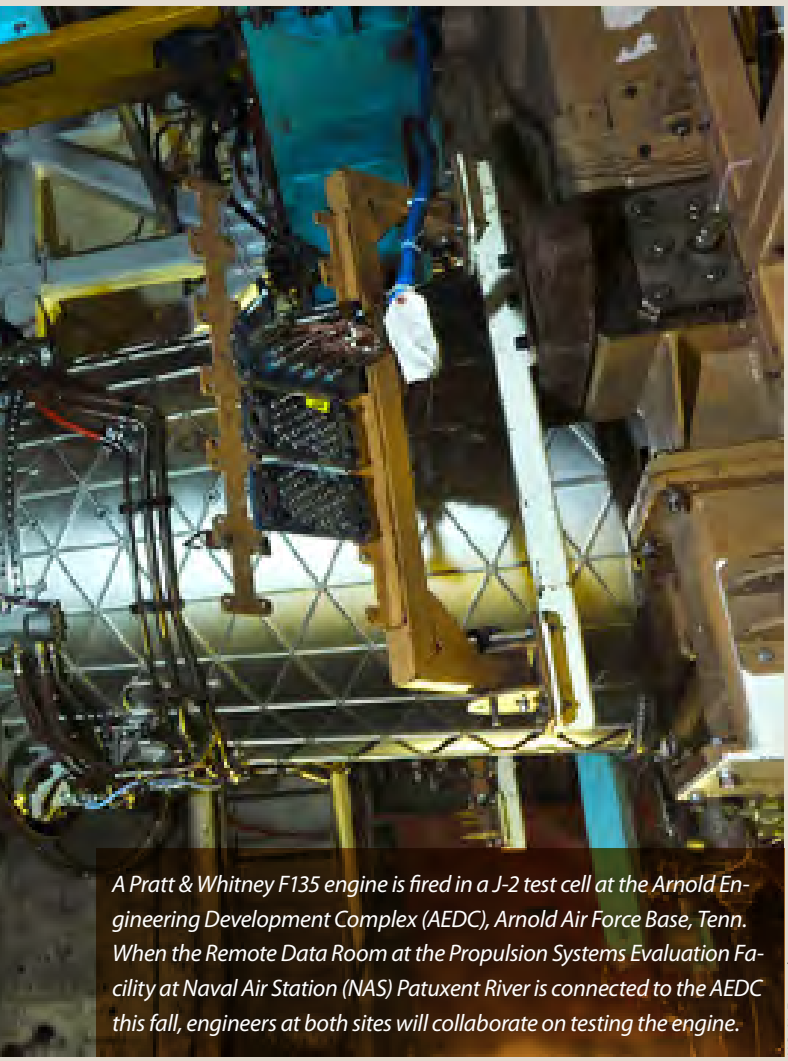
The Remote Data Room is saving time and money. In the past, if the Navy needed to help support an engine test, they would have to pay travel expenses and send personnel to AEDC.

"Even then, we wouldn't be qualified to sit and analyze data with the test team," Kelly said. "We'd be more of an observer, or the customer, waiting for data. But now, we'll be more integrated; we're one of the test team people watching with this data room."

That's where Rubio plays a big part, having recently completed AEDC's Aeropropulsion Combined Test Force Basic-Level Training curriculum.

Advancing Technical Skill Sets

In 2019, Rubio was sent to the AEDC facility—which operates more than 60 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells and other specialized units—to



A Pratt & Whitney F135 engine is fired in a J-2 test cell at the Arnold Engineering Development Complex (AEDC), Arnold Air Force Base, Tenn. When the Remote Data Room at the Propulsion Systems Evaluation Facility at Naval Air Station (NAS) Patuxent River is connected to the AEDC this fall, engineers at both sites will collaborate on testing the engine.

U.S. Air Force photo

support the Navy's MQ-25 Stingray program and observe an altitude test for the AE3007N engine.

"The goal was to work with my counterpart at AEDC, Seth Beaman, to develop a training curriculum to get NAVAIR personnel certified as basic-level analysts," Rubio said. "I ended up integrating myself well with the test team and taking on more of the training and serving as a test analyst during all of their air periods for this test program."

AEDC has training standards they follow, and the engineers worked to determine what portion of those standards applied to Navy employees, whether they are present at AEDC or remotely supporting a test from PSEF, Beaman said. The curriculum the team developed will ultimately help advance the workforce and enable them to more quickly respond to critical evolving requirements of current and future programs like F-35.

"Any engineers [at Pax River] who will be coming down here or who will be remotely supporting will be going through that training program at some point," said Beaman, a test analyst and one of 10 NAVAIR employees with the Aeropropulsion Combined Test Force who work with the Air Force at AEDC.

"The curriculum the team developed will ultimately help advance the workforce and enable them to more quickly respond to critical evolving requirements of current and future programs like F-35."

Improved Speed and Readiness

With the Navy's combined interest in some of the engine testing being done at AEDC, the Remote Data Room offers NAWCAD engineers the ability to access data, not only in real time while seeing the test, but also by accessing historical data without having to call down to Tennessee for assistance.

"[In the past], there wouldn't have been much communication between any type of testing [at AEDC] and what they were doing at Pax," Beaman said. "If they were interested in accessing data, they maybe would've called a branch chief here to request it, but the lead time required gathering, analyzing and reporting the data before sharing. Now, [with the Remote Data Room connection] if Leo wants to access AEDC data, he just has to log in and he'll have access to plot any type of historical data he'd need to reference."

In a move benefitting both sides, the analysis group in Tennessee assigned a certain objective, or portion of the upcoming F135 test, to Rubio, who will analyze fan duct heat exchanger effectiveness.

"We have certain objectives we're trying to accomplish, and with Leo responsible for an objective, it will give him the work he needs to gain experience while [simultaneously] offloading a little of the work from the analysis force here at AEDC," Beaman said. "That gives us time to do a more thorough analysis on the remaining objectives. Ultimately, this will yield more quality and quicker post-test reports."

In fact, the biggest winners in all of this may be the engineers themselves.

"This is a remarkable opportunity for engineers at Pax," Rubio said. "We primarily deal with turboshaft engines in PSEF whereas AEDC deals with turbofan and turbojet engines. This allows our folks to get a greater variety of testing experience and encourages more of a collaborative effort. Also, rather than having data forwarded to our teams here for an engine test they may have some stake in, they can access live test data and perform their own analysis much faster and with some

U.S. Navy photo by Adam Skoczylas

Leo Rubio, seated, Propulsion & Power test engineer, shows John Kelly, Test Operations and Facilities Engineering branch head, data plots from historical engine data acquired at the AEDC using the Remote Data Room set up at NAS Patuxent River.

elaborate tools that AEDC engineers have at their disposal."

Kelly also noted another plus to engineers comes in their role as the voice of the Navy when talking to original engine manufacturers (OEM), such as Pratt & Whitney, Rolls Royce or GE.

"One of the best ways to get a PSEF engineer knowledgeable on an engine is through doing the testing where you can really see how it operates—the good stuff and the faults," Kelly said. "It's a better in-depth understanding of the engine versus just studying what the engine is supposed to do. So, if we have engineers going through this [training] and learning what the engine is, they'll be much more knowledgeable at their job and work better with the OEMs."

Even as the team starts up the Remote Data Room, they're certain it will generate interest beyond their own division.

"It's definitely like a 'Field of Dreams' thing: 'build it and they will come,'" Kelly said. "We know as soon as we get it going, everyone will be saying, 'Really? I want to see this.' I'm expecting it'll keep building the more we use it."

Donna Cipolloni is editor of the Tester newspaper and supports NAS Patuxent River Public Affairs.

Navy Test Engineers to Regain Hands-on Experience

The idea of the Remote Data Room was kicked into action when John Kelly, branch head for Test Operations and Facilities Engineering, arrived at the Propulsion Systems Evaluation Facility (PSEF) a couple years ago. He was tasked by his former boss Tony Miguelez, who is now the Fleet Support Team Executive/Chief Engineer, Fleet Readiness Center Commands, to bring the room to life.

"It was his concept," Kelly said. "Miguelez was from the generation who came through [Naval Air Warfare Center] Trenton and did a lot of testing. He came up through the ranks and I think he recognized the value of the knowledge that [experience] gives a test engineer."

Following a Base Realignment and Closure Act (BRAC) decision that shuttered the Trenton facility in the late 1990s, DOD decided all turbo shaft and turbo prop work would come to the Navy at Pax River, while turbo jet work went to the Air Force at Arnold Air Force Base, Tennessee.

Tom Weiss, division head for Propulsion and Power's Test Methods and Facilities Division, said when Propulsion and Power lost the ability to do altitude testing in house as part of that BRAC, new engineers coming aboard lost the ability to look at data, make decisions based on the data and really understand the inner workings of an engine.

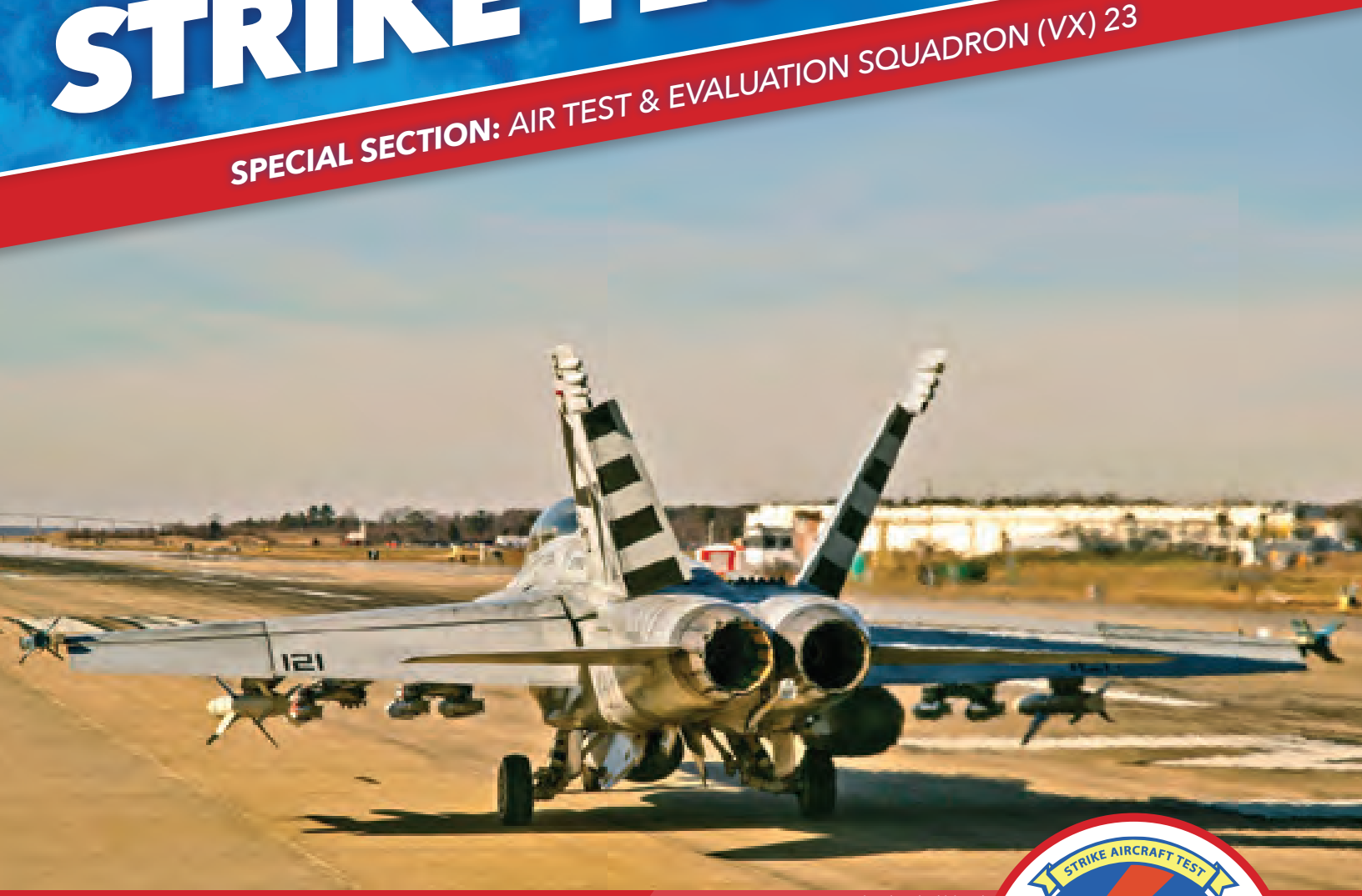
"Anybody who's an engineer who has spent part of their career doing flight test, ground test or anything where you've really had your hands into it understands the product much better than by just watching what others are doing," Weiss said. "With the Remote Data Room, I think we'll get that back."

Weiss also noted with AEDC's shift from contractors toward the government workforce taking over data analysis in reporting, the need for a highly trained government workforce has increased.

"As need continues to grow, AEDC will not be able to staff up because of financial limitations within the Air Force," Weiss said. "This Remote Data Room will come in to play with the Navy augmenting their ability to conduct these tests on time and within budget. This is a great opportunity for both workforces to grow technically and collaborate." — *Donna Cipolloni*

STRIKE TEST NEWS

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



U.S. Navy photo by Erik Hildebrandt

At Air Test & Evaluation Squadron (VX) 23, we enable advancements for the warfighter and the fleet that enhance future operational and combat capability. We work closely with industry and use aircrew input to perform initial testing of emerging technology, advanced weaponry and systems to meet urgent fleet needs. Our goal is to generate the data that provides program managers with the knowledge they need to advance or correct developing technologies and to provide the combatant commanders with the knowledge and capabilities of new systems in order for them to make effective decisions for mission success. Through our focus on kinetic weapons, software integration, electronic attack, carrier suitability and future capabilities exploration, we provide force multipliers necessary for full-spectrum dominance and ensure the continued success of the Navy and Marine Corps fighting force.

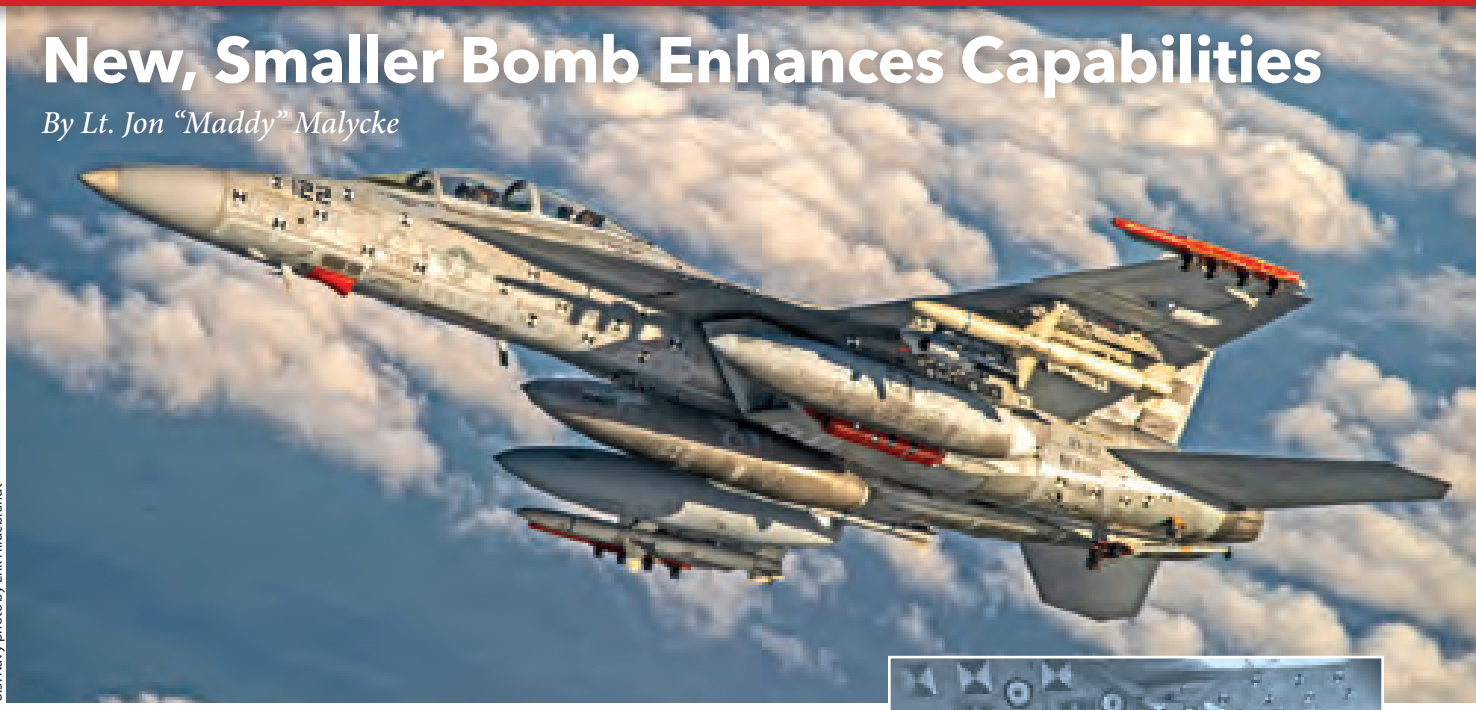
VX-23 is the Naval Air Warfare Center Aircraft Division's largest developmental test squadron and is focused on research, development, test and evaluation of fixed-wing tactical aircraft including the F/A-18C/D Hornet, F/A-18E/F Super Hornet, EA-18G Growler, T-45A/C Goshawk, F-35B/C Lightning II and MQ-25 Stingray.

Interested in shaping Naval Aviation's future strike battlespace? Join the developmental test community starting at the U.S. Naval Test Pilot School. Reach out to me, our Chief Test Pilot or any of the Salty Dogs for insight and advice. Test to Win!

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

New, Smaller Bomb Enhances Capabilities

By Lt. Jon "Maddy" Malycke



U.S. Navy photo by Erik Hildebrandt

The developmental test team from VX-23 conducts carriage envelope expansion with Small Diameter Bomb II at Naval Air Station (NAS) Patuxent River, Md. The smaller warhead provides advanced guidance and enhanced precision to strike pilots.

U.S. Navy photo

SDB II separation test.

Another bomb for the inventory with a smaller warhead—is it even worth it, you might ask? For Small Diameter Bomb (SDB) II, the answer is a resounding "yes."

The weapon that will keep sharpening our air wing's spear comes equipped with deployable wings and various advanced guidance modes. The wings allow aircrew greater standoff, and in today's complex battlefield, the smaller warhead teamed with more precise guidance will allow surgical precision to minimize collateral damage concerns.

SDB II comes as an all-up round out of the box with a Tri-Mode seeker allowing three primary modes of employment—Coordinate Attack, Laser Illuminated Attack and Normal Attack—that utilizes the seeker's millimeter wave radar and imaging infrared tracker to locate and engage moving targets through all weather conditions. The warhead is specifically designed for effects against soft targets, armor and maritime targets.

The VX-23 F/A-18 Air Vehicle Store Compatibility test team is working tirelessly to get this next generation weapon to frontline fighters this year.

Testing to clear the carriage and jettison envelope continues steadily, even amid the global health pandemic. Full-scale employments began late spring and will continue through summer against a vast array of targets.

In conjunction with VX-31, the test plan employs SDB II against multiple moving maritime targets while buddy-lasing with both other F/A-18 and F-35 wingmen.

With each test employment, SDB II is getting closer to Initial Operational Capability. While the SDB II will be operational soon, aspiring testers wishing to join this hard-charging test team can rest assured there is plenty of weapons integration work for the F/A-18A-G for years to come. Though each weapon test event uses similar methods, they are all very challenging and rewarding and—most importantly—keep us a step ahead of our adversaries.

F-35 Test Team Working Hard to Bring New Weapons to Fight

By Lt. Richard "MK" Valenta

As the Navy prepares for its first F-35C Lightning II deployment and the Marine Corps continues to expand its F-35B footprint on landing helicopter assault/landing helicopter dock-class ships, testers at VX-23 and the Patuxent River F-35 Integrated Test Force (ITF) are working hard to add additional weapons to their arsenal.

U.S. Navy photo

VX-23 test pilot Lt. Richard "MK" Valenta executes loads testing maneuver development in an F-35C Lightning II over NAS Patuxent River's restricted airspaces in Southern Maryland.

Currently, the F-35 is cleared to carry the GBU-31, GBU-32 and GBU-49 GPS guided air-to-surface bombs. Testing for a strike force of the future, ITF is evaluating the GBU-38 and GBU-54 500-pound class guided weapons for safe carriage and release from both the F-35B and F-35C variants. The capability will provide Lightning II pilots the option to carry a greater number of guided weapons that still meet recovery weight requirements for shipboard landings.

ITF professionals began testing the new capability in earnest this spring and will continue through the year. The test team revived two specially instrumented test aircraft, CF-2 and BF-3—no small task for the ITF's maintenance department—to record the necessary data surrounding aerodynamic loads, noise and vibrations induced on both the aircraft and weapons. Neither aircraft have flown since 2018, when the F-35 completed system development and demonstration.

The first planned airborne test events consist of envelope expansion flights in which test pilots put the weapons through their paces while flying carefully scripted flight profiles to ensure each weapon will perform as advertised throughout the entire published flight envelope. The weapons will then undergo shake, rattle and roll (SRR) carrier suitability testing. Each test will involve an SRR-qualified Landing Signals Officer to "wave" the aircraft into shore-based arrested landings to execute high sink rate, rolled, yawed and off centerline landings that ensure the weapons are safe for the darkest of pitching deck night traps.

In addition, the test team will measure aircraft handling qualities and weapon dynamics during F-35B short takeoff and vertical landing operations. Finally, each weapon will drop in the Patuxent River's restricted areas under intense analysis using high-speed videography to ensure each store separation is a safe event.

Once the F-35 ITF completes GBU-38 and GBU-54 testing, the weapons will move to operational test at Edwards Air Force Base in California prior to fleet release.

The F-35 test pilots, flight test engineers and engineering staff at VX-23 are excited to bring new capabilities to the fleet and to enhance both the lethality and operational flexibility of the Navy and Marine Corps' first stealth fighter.

MQ-25 Test Team Accelerating Critical AR Capabilities for Fleet

By Lt. David "Poon" Babka

The Navy awarded the contract to build its first operational carrier-based Unmanned Aerial System—the MQ-25A Stingray—in August 2018.

Designed to add an efficient, semi-autonomous refueling capability to our carrier air wing, the aircraft extends the operational range and flexibility of the carrier strike group.

The Chief of Naval Operations and Assistant Secretary of the Navy for Research, Development and Acquisition challenged the MQ-25 program to reach Initial Operational Capability as soon as 2024 to provide a critical capability to the fleet and keep pace with an evolving maritime security environment. In support of that challenge, the MQ-25 Integrated Test Team (ITT) is working in partnership with industry partners to meet the program's accelerated development and test timeline.

Just over one year from contract award, the Boeing-owned MQ-25 prototype, called T1, took its first flight from MidAmerica St. Louis Airport in Illinois. The flight was a successful demonstration of the air vehicle's ability to operate safely and validated the aircraft's basic flight functions and operations with the ground control station. Since then, the ITT conducted approximately 30 flight hours, informing design decisions and supporting early learning.

Testing with T1 before the Engineering Development Model (EDM) aircraft are even built provides valuable insight much earlier than traditional for acquisition programs, yielding lessons in technical areas that advance development of major systems and software.

To support the program's accelerated schedule, the Navy and Boeing adopted a one-team model, with government personnel embedded at the contractor's facility and participating in testing Boeing's T1 aircraft. During the initial T1 test phase, members of the ITT collaborated with Boeing to write test plans, monitor data during flights and analyze that information upon flight completion. During

Photo courtesy of Boeing

The MQ-25 Stingray, the Navy's first operational carrier-based test aircraft, flew two hours to validate the aircraft's basic flight functions and operations Sept. 19, 2019.

Photo courtesy of Boeing

An MQ-25 Stingray, the Navy's new aerial refueler, prepares for landing after a successful first test flight at MidAmerica Airport, St. Claire County, Ill. on Sept. 19, 2019.

flights, a Navy air vehicle operator sat in the second seat at the ground control station.

The ITT is also working to build and test the Unmanned Carrier Aviation Mission Control System (UMCS), the system of hardware, software and infrastructure required to command and control the MQ-25 air vehicle. The UMCS will be located in the Unmanned Aviation Warfare Center, the carrier-based control room. The team built a UMCS for testing at the Atlantic Test Ranges at NAS Patuxent River and has already begun conducting software and hardware in-the-loop integration testing. The test team also facilitated the first UMCS cyber testing to iterate the system's architecture, helping to ensure its future resiliency.

The ITT's logisticians are already hard at work writing the first maintainability and supportability test plans.

T1 is currently undergoing a modification to add the Aerial Refueling Store (ARS) and the logistics group used that opportunity to collect data for operational-level maintenance tasks, including for the engine and wing. The data will support design changes for the EDM aircraft and improve the aircraft's support systems.

Simultaneously, the team executed the first round of maintenance test points for the UMCS to evaluate the initial technical manuals, support equipment, sparing, as well as the initial toolbox for W/C 290 and the maintainer interface. The results will provide improvements to support systems in order to maintain and support the UMCS both ashore and aboard ship. The logistics team's efforts will prove vital in evaluating the measures of suitability for reliability, maintainability, supportability and availability.

It's been a busy two years for MQ-25's ITT.

In the near term, we expect to begin testing T1 with the ARS pod attached. Flight test will focus on conducting wake surveys for the F/A-18E/F. The mission systems team will continue integrating hardware and software updates for the UMCS and prepare for the arrival of the first MQ-25A at NAS Patuxent River by conducting communication surveys of the airfield and local airspace.

Additionally, the test team plans to evaluate the ground-based sense-and-avoid system as a supplemental safety system. Further on the horizon, we're looking forward to completion of the ITT's new MQ-25 hangar at NAS Patuxent River, production of the Navy's first MQ-25A and eventually taking the Stingray to the carrier to conduct sea trials.

U.S. Navy photo by Kevin Teig

An F/A-18F Super Hornet with VX-23 performs a touch-and-go aboard USS John C. Stennis (CVN 74) while engineers monitor testing from the flag bridge.

Precision Landing Mode Upgraded, Makes Strike Pilot Landing Even Smoother

By Lt. Karl "Pigpen" Suabedissen

The first version of Precision Landing Mode (PLM) for the F/A-18E/F Super Hornet and EA-18G Growler did away with much of the stress on pilots flying behind a ship—and PLM Version 40 (V40) intends to do away with most of what remains.

VX-23 continues to test PLM software with a wide array of flight control and other aircraft malfunctions in hopes of delivering a more robust and redundant product for the fleet. The test team's ultimate goal: make PLM the default landing mode for all passes.

Last year, VX-23 executed shipboard testing with a variety of failed flight control surfaces that characterized flying qualities behind a ship. The team also tested the addition of a backup automatic throttle control (ATC) with the ability to control throttle response via communication from the flight control computer (FCC) to the full authority digital electronic control all through the mission computers, as opposed to analog wires in the event that normal ATC is not available.

In December 2019, the VX-23 Carrier Suitability Department took one Super Hornet and one Growler aboard USS John C. Stennis (CVN 74) to test new software changes for incorporation in the fleet's release of PLM V40. Most notably, V40 adds capability that allows pilots to fly PLM with a single angle of attack (AOA) probe failure, in gain override or with an Inertial Navigation System (INS) failure. Additionally, regular ATC is now available in the gain override mode, allowing pilots to fly a "normal PLM" approach even in the case of a complete AOA failure.

To safely test malfunctions such as the failure of an AOA probe or flight control surface, test aircraft are equipped with a unique feature called dial-a-function (DAF) in the aircraft's FCCs. DAF allows the pilot to change individual numerical parameters within the flight control software itself to turn off flight control surfaces or mimic an AOA probe failure by sending a specific AOA value to the FCCs and mission computers. The pilot can remove any of these mimicked failures by pressing the paddle switch or performing a Flight Control System reset, returning the aircraft to a nominal condition.

Every carrier aviator knows that the easiest pass begins with an on-and-on start, but they also know not every pass starts that way. As such, VX-23 pilots evaluated aircraft performance on its ability to respond and correct from various off-nominal starts testing, including instances when a pilot commits intentional deviations at the start or in the middle that require correction prior to touchdown. Even in cases with extreme deviations (i.e., well below glideslope and lined up right in the middle), PLM performed admirably and proved capable of returning to glideslope and centerline prior to the ramp.

The pilot for that particular example pass was flying with the INS in standby mode. After the pass, the pilot stated simply, "I'd rather fly PLM standby than ever fly another manual pass."

Version 40 promises to make PLM available in nearly every degradation that is still recoverable at the ship, greatly reducing a pilot's workload during the final phase of landing and enhancing their concentration on other emergency-related tasks.

Fleet release of PLM V40 begins this year. Although not tied to any particular system configuration set (SCS), the full functionality and redundancy of PLM V40 is only available on aircraft with H10+ SCS or newer.

VX-23 Advances Electronic Warfare with AN/ALQ-249 NGJ Mid-Band

Lt. Jonathon "Zoloft" Parry, Lt. Cmdr. Michael "Tugsy" Dixon and Cmdr. Erica "NOTY" Adkins

The Navy's Next Generation Jammer (NGJ) system will replace the AN/ALQ-99 Tactical Jamming System (TJS) pod to improve airborne electronic attack and electronic warfare capability against rapidly changing threats. The future NGJ mission set includes non-kinetic attack against a full spectrum of agile and adaptive communications, data links and non-traditional radio frequency (RF) targets.

Through early 2020, NGJ's Integrated Test Team (ITT) completed the system's initial testing at Naval Air Warfare Center Aircraft Division's anechoic chamber at NAS Patuxent River using three NGJ Mid-Band (MB) engineering development model pods. The chamber test included effective isotropic radiated power (EIRP) measurements and environmental electromagnetic effects (E3) analysis that ensured electromagnetic compatibility with the EA-18G Growler and confirmed that no hazardous levels of RF reached the cockpit. The team made significant progress integrating NGJ-MB on the Growler, along with first-of-its-kind support equipment, in the chamber ahead of flight test as a means of risk reduction.

Upon completion of chamber test, the team began prepping for first flight of NGJ-MB at VX-23.

Prep included refining test plans with the data collected during chamber test, in

U.S. Navy photo

Salty Dog 531 with VX-23 is shown suspended in the anechoic chamber during initial developmental test of AN/ALQ-249 Next Generation Jammer at NAS Patuxent River earlier this spring.

U.S. Navy photo by Erik Hildebrandt

Salty Dog 122 prepares for a jettison test on Small Diameter Bomb II.

addition to establishment of updated normal and emergency procedures for carriage of NGJ-MB. Mission systems pods will begin flight test with in-flight E3 to verify compatibility with critical flight systems and other capabilities not available in the chamber—all in support of program office decisions to begin Low-Rate Initial Production in late 2020.

Other capabilities tested in flight include EIRP performance, the number of jamming assignments, spatial and frequency coverage and the ability to detect signal and execute pre- and post-detection jamming strategies. Another important metric the test team is working to investigate is NGJ-MB's reliability and maintainability, which is pivotal for understanding fleet maintenance and logistics and for ultimately ensuring the weapon system is ready for operational deployment in 2022.

In parallel, the VX-23 NGJ air vehicle team is working through the final stages of the system's developmental test plan and approval. The NGJ-MB vehicle is unique in that it has a shifting outer mold line that enables ram air to feed its internal power generation system, which makes it an exciting and challenging store to test.

The first aeromechanical pods, modified for specific air vehicle testing, arrived at the test squadron to undergo their initial fit and instrumentation checkouts. Aeromechanical pod testing will focus on airworthiness to include an aeroelastic survey, flying qualities investigation and an envelope expansion effort involving the ram air turbine generator. The test team anticipates initial flight clearance by mid-2020 with a first flight planned this summer. Aircrew can expect the NGJ-MB flight envelope to be similar to the current AN/ALQ-99 TJS pod.

The test team, F/A-18 and EA-18 and NGJ program offices, along with other government and industry partners attended aircrew and operator training provided by Boeing and Raytheon in St. Louis in February. The training ensured test aircrew could effectively employ NGJ-MB for capabilities-based test and evaluation and provided an early opportunity for the electronic warfare community to start evaluating new tactics, techniques and procedures that will prepare warfighters to employ the system to its maximum capability as soon as the first NGJ-MB arrives at NAS Whidbey Island, Washington.

Look for future opportunities to participate in NGJ-MB aircrew training events coming soon.

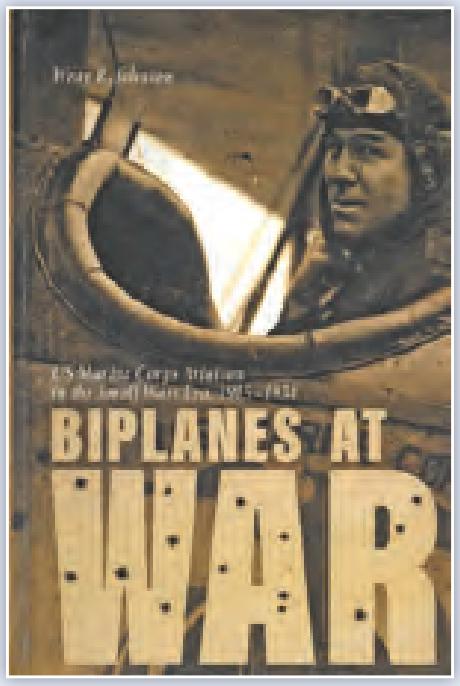
It is a huge opportunity for VX-23's NGJ ITT to be a part of advancing capability for the electronic warfare community and the joint warfighting team. We look forward to continued first flights through the year!

Professional Reading

By Cmdr. Peter Mersky, USNR (Ret.)

Biplanes at War, U.S. Marine Corps Aviation in the Small Wars Era, 1915-1934.

By Wray R. Johnson, University of Kentucky Press, 2019. Ill.



University presses often publish very interesting, somewhat offbeat books that commercial houses won't. The between-wars period of the 1920-1930s was a very active time where military aviation was concerned, both in the development and research areas, as well as the operational area. Brief conflicts occurred throughout the world involving major powers such as Britain and France, or Germany, Italy and Japan, as well as the U.S. Marines, who were fighting in Central America for a long time. The battles were often bloody and unproductive. Rebel groups led by charismatic personalities, who rivaled later Axis leaders in their seeming lack of concern for humanity, were constantly in the field.

The Marines brought small numbers of early aircraft with them, including WWI-era DH-4 two-place bombers and newer types by Curtiss and Vought which brought modern warfare to the arena. The rebels hid from these new weapons, shooting from their protected thickets, sometimes hitting the wood and canvas biplanes, but letting their crews know they were not altogether free from the defenders' fire.

While certainly an unusual and worthwhile book, it is much too wordy. This fault is particularly true of the unusually long section of endnotes that actually doubles the size of the overall book, and could have been better placed in the main text, or shortened and used as footnotes, closer to the text they reference. Many of the endnotes are biographies of particular personalities that, while of certain interest, often fill up more than a half page or more. The author is a retired professor of military history at the School of Advanced Warfighting at the Marine Corps University, as well as a retired U.S. Air Force colonel with experience in Special Ops. The text is often hard to concentrate on and only the most dedicated reader and researcher will get through it all.

There is also a very lengthy bibliography, which makes me question just exactly what of all these books, contacts and other research sources did the author actually use. From my own experience of writing aviation history, I always try to keep bibliographies to a minimum.

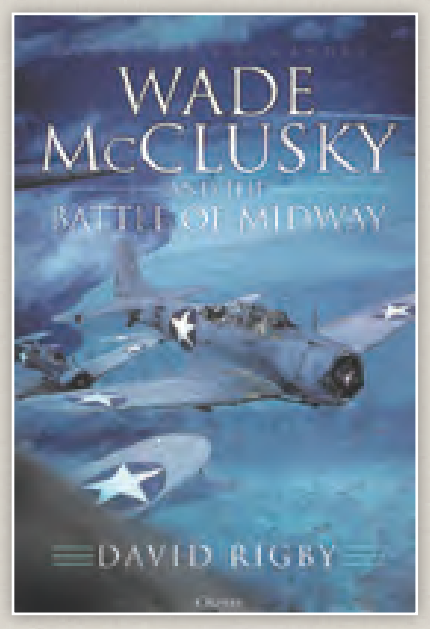
Based on my experience, this book has the field to itself because except for a few monographic treatments and very rare articles on Marine Aviation in the so-called "Banana Republics" after WWI, there is a lot of material here for those interested in this rather little-known subject. It is where several early Marine aviators from the Great War period, those who definitely got Marine Aviation on its feet, or shall I say wings, honed their specialty and were thus available when the Corps desperately needed them as senior leaders after Pearl Harbor at Guadalcanal and afterward to develop what we know today as close air support and more.

There are a few interesting specific errors, one of which occurs in the text and related footnote, pages 99 and 329, respectively. On page 99, the author discusses the development of battlefield extraction, certainly a subject well-worth describing, particularly in view of its accelerated use during the Vietnam War. He mentions a few of the various types of French aircraft used in the 1925 campaign against the colorful Riff factions by French units.

The endnote on page 329, No. 177, mentions a book or article by W. Breyton about French ambulance aircraft in Morocco in 1933, which also mentions aircraft types. These aircraft did not enter service until after the early Marine campaigns in Haiti.

And a quick note about the two folios of photos. They are very good, with several showing aircraft and personalities in different scenes and situations than are usually found in other previously published accounts of varying lengths, from magazine articles to traditional books.

Colonel Wray's book is surely worth reading for those people who want to see how it was at the beginning of time, Marine time, that is.



Wade McClusky and the Battle of Midway

By David Rigby

Osprey Publications, Oxford, UK. 2019. Ill.

There's a lot to be said, pro and con, about this latest book on one of history's greatest naval battles. An occasional problem is the length in which the author often gets slowed down in details that have been either repeated or not properly edited so as not to drag the text out. It also has a rather poor choice of photographs that definitely detract from what could have been an excellent addition to Midway literature.

Conversely, the author is dedicated to presenting his stories and opinions to what he believes is a new cadre of readers seeking to learn about the six-month period following the devastating attack on Pearl Harbor and the events that followed that found the U.S. wallowing in self-guilt and unpreparedness.

Midway seems to bring out annual reassessments of this pivotal engagement where the United States stood up to the Japanese steamroller thrusting through all obstacles in the Pacific. The Japanese strategy for gaining complete control over the vast reaches of the world's largest ocean and all its land and peoples was unstoppable until it met Adm. William Halsey's fleet of ships and aircraft on June 4, 1942.

Things were unsure in those early hours on June 4. The Americans had trouble finding the enemy fleet, and then once they had found it, deciding how to attack its center weapons, the four fleet carriers and their armadas of dive bombers and torpedo bombers set to attack the two-island atoll and the ships bent on defending it.

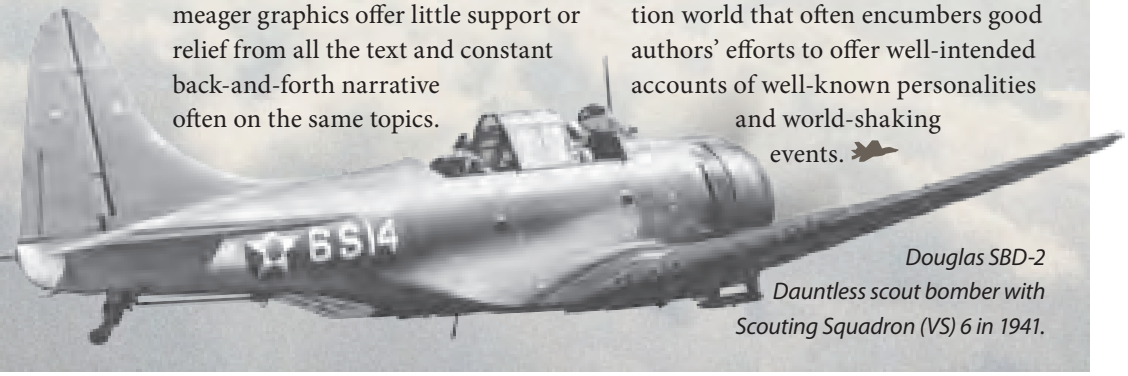
Rigby's heavily researched account focuses on Midway and McClusky's pivotal role in what would be America's first major victory over the Imperial Japanese Navy (IJN). Yes, I know the Battle of the Coral Sea barely a month before Midway kept the IJN from advancing on Australia while losing its fleet carrier USS Lexington (CV-2) and having USS Yorktown (CV-5) badly damaged and repaired only to be sunk at Midway. However, this book's long, drawn-out minutia-filled dissertations on the attacks on the Japanese carriers can try the patience of even the most dedicated reader. The meager graphics offer little support or relief from all the text and constant back-and-forth narrative often on the same topics.

The book has many good discussions that are unfortunately repeated over and over, including just how McClusky got into the overall scheme of the battle. The author obviously wants to credit him largely with the great victory over the IJN carriers, but then reverts to relating how he thinks McClusky was often derided for "bungling" the leadership of the attacks.

Post-Midway pages describe McClusky's career, including command of an escort carrier (CVE), one of the many "Jeep" carriers built to strengthen the Navy's complement of flattops and which did such great work in the Pacific and the Atlantic in the anti-submarine role.

An interesting comparison shows that the disgraced Capt. Miles Browning, an acknowledged martinet who was part of the senior staff at Midway, got command of the Essex (CV-9), while McClusky, who did such great work at Midway, was right in the thick of the battle, received command of the valuable but cookie-cutter-produced CVE. The author gives plenty of space to the administrative confusion that characterized the immediate post-war period after the war, confusion which reduced Navy operation capabilities.

In general, editorial attention could have helped Rigby's work, an affliction many authors suffer, especially in today's computer-ridden publication world that often encumbers good authors' efforts to offer well-intended accounts of well-known personalities and world-shaking events.



Douglas SBD-2 Dauntless scout bomber with Scouting Squadron (VS) 6 in 1941.

U.S. Navy photo illustration by Fred Flerlage, photographic image courtesy of National Archives.

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- Application announcement Issued: October/November
- Applications accepted: Up to mid-November
- Selection Board convenes: mid-December
- Results posted: Early January

Expected arrival dates for pre-arrival training:

- Fixed Wing: March 1
- Rotary Wing: May 1
- Systems: June 1

Dates subject to change

For more information on the U.S. Naval Test Pilot School visit: **navair.navy.mil/nawcad/usntps**

I AM NAVAL AVIATION

Aviator Lt. j.g. Madeline Swegle, assigned to Training Squadron (VT) 21

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