

## Carrier Onboard Aircraft Delivers Navy Welcomes First CMV-22B



### WHAT'S INSIDE

- ▶ Investigators Identify Physiological Degraders
- ▶ USS Gerald R. Ford Achieves Milestones
- ▶ VMFA-314 'Safe-for-Flight'



*Pilots Rob Pupalakis, with Sikorsky, and Maj. J. Willett, with Air Test and Evaluation Squadron (HX) 21, fly the CH-53K during its first aerial refueling from VX-20's KC-130J Tanker April 6.*

U.S. Navy photo by Erik Hildebrandt

# NAVAL AVIATION NEWS

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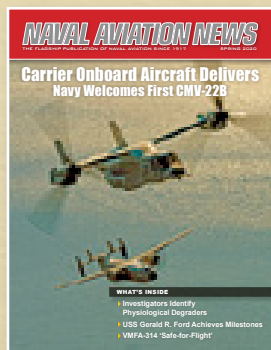
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## ON THE COVER



**On the cover:** Air Test and Evaluation Squadron (HX) 21 pilots fly the Navy's first CMV-22B Carrier Onboard Delivery variant in a farewell formation with the last VX-20 C-2A Greyhound on March 9. (U.S. Navy photo by Erik Hildebrandt)

This issue highlights several beginnings and endings for Naval Aviation. The CMV-22B arrived at Naval Air Station Patuxent River, Maryland, to begin developmental and operational flight test and conducted a farewell flight with Air Test and Evaluation Squadron (VX) 20's C-2A Greyhound in March, page 26.

Rear Adm. Fredrick Luchtman, Commander, Naval Safety Center, discusses the conclusions reached by the Physiological Episodes Action Team and the importance of physiological margins, equipment fit and aircraft mitigations for aviators starting on page 12. Recent operational milestones achieved by USS Gerald R. Ford (CVN) 78 and her crew begin on page 18.

Continuing with our series on the Navy's test squadrons, we share recent achievements of the first unmanned aircraft systems test squadron—UX-24—on page 43.

**On the back cover:** Aviation Boatswain's Mate (Handling) Airman Christopher Nardelli arranges the "Ouija board" in USS Gerald R. Ford's (CVN 78) flight deck control room during flight operations in the Atlantic Ocean on March 22. (U.S. Navy photo by MC2 Ryan Seelbach)

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



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# **Airscoop**

Compiled by Andrea Watters and Rob Perry

## **Navy Tests Unmanned Growlers**

PATUXENT RIVER, Md.—Aircraft typically operated by pilots were altered last fall to test their ability to be controlled without a human being at the controls.

The Manned-UnManned Teaming (MUMT) conducted a demonstration with modified EA-18G Growlers in October 2019 at Naval Air Station Patuxent River, the result of a successful collaboration between the U.S. Navy and industry partners. Three Growlers were modified to support an open architecture processor prototype and an advanced networking prototype, which allowed for two Growlers to be transformed into unmanned air systems surrogate aircraft while the third Growler acted as a controller. The unmanned Growlers were flown in multiple preset formations and provided air-to-air sensor data back to the manned fighter. Each unmanned Growler had a safety pilot on board who performed the takeoff and landing. The MUMT concept supports interoperability between manned aircraft and unmanned autonomous systems to conduct missions. Such collaborative endeavors are imperative for resource and requirements planning and ensuring the warfighter is equipped with best-in-class capabilities.

The Navy conducts exercises like this with industry partners to evaluate developmental capabilities and analyze data captured during these events, which further informs development and refinement of technologies that could be incorporated into future Navy platforms.

## **First Super Hornet to Undergo Service Life Modification Returns to Fleet**

PATUXENT RIVER, Md.—The first Service Life Modification (SLM) F/A-18E/F Super Hornet rolled off the production line in St. Louis, marking a major milestone for the Navy.

After undergoing DOD operational readiness review inspections, the jet was released to Strike Fighter Squadron (VFA) 106 on Jan. 21 in a fully mission capable status. The jet completed a functional flight check within three business days of arrival.

“In light of recently achieving our mission capability goal, this SLM jet delivery comes at the perfect time when the focus has now shifted to sustaining our aircraft,” said Capt. Jason Denney, F/A-18 and EA-18G Program Office manager.

The first SLM jet underwent various inspections, modifications and repairs before being restored to mission capable status. These modifications extended the service life for this jet to 7,500 flight hours.

Currently, 15 aircraft have been inducted into SLM with another two inductions scheduled in February. Prior to undergoing SLM, Super Hornets’ service life is 6,000 flight hours.

“The Super Hornet is and will continue to be the backbone of the U.S. Navy carrier air wing for decades to come,” said SLM integrated product team lead Sarah Banagan. “This first SLM jet delivery is a critical milestone paving the way for enhanced aviation readiness in support of the Naval Defense





U.S. Navy Photo by Liz Wolter

Air Test and Evaluation Squadron (VX) 23 EA-18G Growlers fly in formation above the Atlantic Ocean during flight test.

Collaborative endeavors are imperative for resource and requirements planning and ensuring the warfighter is equipped with lethal and flexible capabilities.

Delivery of advanced technologies and improved operability are essential to the warfighter's ability to compete and win.

The U.S. Navy and industry partners continue to invest in advanced Growler capabilities to ensure it continues to protect

all strike aircraft during high-threat missions for decades to come.

The data from this MUMT demonstration is being analyzed for future consideration.

The MUMT concept is intended to provide seamless integration and interaction between manned and unmanned systems, which can increase flexibility and lethality in executing missions.

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



Photo Courtesy of The Boeing Company

An F/A-18 Super Hornet undergoes Service Life Modification at The Boeing Company's St. Louis facility in late 2019.

Strategy by delivering ready, relevant and reliable FA-18 E/F Super Hornet aircraft to the warfighter.”

Beginning in December 2022, SLM kits will reach full maturity, extending the Block II Super Hornet's service life to 10,000 flight hours and incorporating Block III capabilities. These include enhanced network capability, reduced radar

cross-signature and an enhanced communication system. Incorporation of the full kits increases the lethality, longevity and interoperability of the Super Hornet platform, Banagan said.

SLM was initiated in 2018 and is anticipated to continue for the next 20-plus years, with the schedule of inductions increasing in the next few years until the

steady induction rate of 40 aircraft per year is reached.

The SLM was designed with a “learn as you go approach,” with throughput and efficiency expected to improve, Banagan said.

The current turnaround time of 18 months, from induction to return, is expected to be reduced to 12 months by fiscal 2023.

As SLM ramps up over the next two years, the mission capable rates will hold steady with delivery on new Block III aircraft from the production line.

In March 2019, the Navy awarded Boeing a multi-year contract to build 78 new F/A-18E/F Block III Super Hornets fit to fly for 10,000 service hours, which provides the fleet with the latest advances while SLM continues to mature.

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

## Program Office Leverages Rapid Acquisition to Complete F-16A Mod

PATUXENT RIVER, Md.—The Specialized and Proven Aircraft program office recently completed a modification on several U.S. Navy F-16A Fighting Falcon aircraft to increase readiness and service life.

The FalconUp modification improves F-16A readiness by extending their fatigue lives by more than 500 hours and provides the configuration baseline to incorporate the funded Falcon Star program, which adds an additional 3,750 hours to the service life of the aircraft.

The Navy uses the F-16A as “red” or adversary aircraft in advanced tactical and aerial combat training.

“The FalconUp upgrade incorporates structural improvements that extend the service life of the aircraft from 3,665 hours to 4,250 hours,” said Capt. Ramiro Flores, program manager. “The program procured and installed proven structural modification kits on 10 Navy aircraft that enhanced and strengthened their internal structure.”

The program office used a rapid acquisition approach, in this case a build-to-print strategy to minimize risk and eliminate the need for test plans, systems engineering plans and design reviews. Build-to-print is a process in which a manufacturer produces products, equipment or components according to the customer’s exact specifications.

The program office leveraged existing designs that the Air Force and international partners have used to install the modi-



U.S. Navy photo

*An F-16A Fighting Falcon in the execution of a maneuver during an exercise over Naval Aviation Warfighting Development Center at Naval Air Station Fallon in Nevada.*

fication and have been including it in production of the F-16 for over two decades.

“Since the proven design has flown thousands of hours in this configuration, and it doesn’t require expansion of the current flight envelope, we were able to deliver this training capability to the warfighter much faster than a traditional program,” said Lt. Cmdr. Heather Bliss, adversary program team co-lead.

“The upgrade allows the Navy to provide mission ready adversary aircraft for Naval Aviation advanced tactical and aerial combat training, extending the operational life of the F-16A through 2025,” said Boyd Forsythe, adversary program team lead.

The program office is responsible for life cycle cradle to grave management of several legacy and out-of-inventory aircraft and engines, assigned by NAVAIR and contracted air services.

*From Common and Command Systems Public Affairs.* 🇺🇸

## Carrier Strike Groups Conduct Dual Carrier and Joint Air Wing Operations



U.S. Navy photo by MC3 Maxwell Higgins

The Dwight D. Eisenhower and Harry S. Truman Carrier Strike Groups conduct dual carrier and joint air wing operations with a B-52H Stratofortress in the Arabian Sea, March 21. The Eisenhower and Truman strike groups are deployed to the U.S. 5th Fleet area of operations in support of naval operations to ensure maritime stability and security in the Central Region, connecting the Mediterranean and Pacific through the Western Indian Ocean and three strategic choke points. 🇺🇸

## Navy's Newest Instrument Landing System Operational

PATUXENT RIVER, Md.—The Navy's newest instrument landing system (ILS) is fully operational at Naval Air Station (NAS) Patuxent River's Trapnell Airfield.

"ILS is becoming a Program of Record for the Navy because we've finally reached the point where more than 50 percent of the Navy's fleet of aircraft are capable of using this equipment," said Lt. Steve Palmer, Pax River's Air Traffic Control Facility Officer.

ILS is similar to precision approach radar (PAR) in that both provide lateral and vertical guidance to a pilot for landing, but PAR requires verbal instructions from an air traffic controller, Palmer said.

ILS, however, utilizes radio beam signals that are interpreted by an aircraft's computer systems, which then relay the information to pilots enabling them to make corrections to their flight path and ensuring their aircraft remains in line with the runway and descends at the correct rate.

"ILS allows pilots to see through needles and numbers in their cockpit without having someone in their ear telling them they're above or below, or left to right, of where they need to be in relation to the runway," Palmer said.

While the new system somewhat removes the "middle

man," it does not mean the 81 military and civilian air traffic controllers at Pax River are no longer necessary.

"You may not need to use PAR as frequently, but you still need someone to clear the airspace and clear the runway," Palmer said. "There are other parts to air traffic control, not only that final critical phase of flight; and for any aircraft not capable of using ILS, air traffic control comes back into play with precision approach."

There are also platforms in the Navy that don't have room in the cockpit or don't have the capability to receive the other end of ILS they need in the cockpit, so air traffic control remains vital on precision approaches.

The system's installation provided an increased capability at NAS Pax River and is estimated to save the Navy more than \$8 million a year, said Jason Zimmerman, integrated program team lead for Shore Landing Systems, the program office that oversaw the installation.

"It will allow test aircraft at Pax to use the ILS, which will reduce the flight hours required to go to a different location, saving both time and money," he said.

Two more significant advantages of ILS are its low maintenance relative to some of the other systems in use that aid in precision landing, and its proximity to the program office, Palmer said.

"Because of fewer parts with the system, it won't go down for maintenance as much as the bigger, older systems we have, and having the ILS engineering team down at Webster Outlying Field is a plus," Palmer added. "If they need to take measurements or want to check on the installation, it makes it so much easier, and the response they can provide if there is a problem is rapid fire. It's very helpful in that aspect."

The project was a team effort that required multiple stakeholders working together to get the system in place at Pax River.

"By having the system as a Program of Record, it will include the sustainment and training that was not available to the fleet before," Zimmerman said. "To date, the plan is to have all the current systems installed by 2028."

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



U.S. Navy photo by Patrick Gordon

*The Navy's newest instrument landing system is fully operational at Naval Air Station, Patuxent River, Md.*



## CH-53E: Testing Prototype for 'Brownout' Environments

PATUXENT RIVER, Md.—The CH-53E Super Stallion has begun initial testing/development of a new low speed precision control (LSPC) system to provide aircraft stabilization in a degraded visual environment (DVE).

The LSPC system will improve safety and prevent damage or loss of aircraft. It provides flight control augmentation to reduce the workload on the aircrew in landings and external lift evolutions during brownout environments—the most difficult flight regimes.

Issues flying in degraded visual environments (or brownouts) became more transparent during operations in the Middle East and areas with sandy landing areas. This environment increased the probability for aircraft drift during landing and takeoff.

Though LSPC was already in development, a contract needed to be put in place expeditiously to ensure the continued development of a prototype. Accelerating the implementation of the system is a priority for Naval Air System Command (NAVAIR) leadership and the H-53 Heavy Lift Helicopters Program Office.

“Our job was to contract and develop the LSPC system and prepare it to integrate into the CH-53E and eventually other legacy

rotorcraft,” said Lt. Col. Michael J. Shull, air vehicle integrated product team co-lead.

The outcome of the project is to design and demonstrate a prototype of the LSPC in a representative “hardware-in-the-loop” system integration lab, where the actual box containing the LSPC software is tested in a simulator. The prototype will then be integrated and tested on a CH-53E in brownout environments.

“The fleet needs LSPC and we were determined to get the process underway so it could get to them as soon as possible,” Shull said.

“We were able to contract the LSPC effort in four months using an other transaction authority (OTA),” said Shull. The OTA was executed under the Agile Acquisition Center using the Naval Air Warfare Center Aircraft Division (NAWCAD) OTA consortium.

Other transaction authorities provide DOD a means to access state-of-the-art technology solutions within the commercial arena; connecting the government with non-traditional and traditional con-

tractors in a collaborative and business-based approach.

According to Shull, the team began the acquisition process in September 2019, coordinating with NAVAIR and the NAWCAD Air Vehicle Engineering Department to generate the required documentation, white papers and then to select a contractor.

“We spent a good deal of time coordinating with business financial managers and the comptroller to ensure the continuing resolution funding was in place,” Shull said. “We were able to go under contract in January 2020 about 4.5 months from idea to contract.”

LSPC will provide a significant capability and safety improvement to the fleet once fielded and it is a leadership priority within NAVAIR.

“My team is proud to have a part in getting LSPC to the fleet,” Shull said. “The sooner it is out there, the safer our Marines will be!”

*Written by Victoria Falcon, Strategic Communications, H-53 Heavy Lift Helicopters Program.* ✈

*A Marine Corps CH-53E Super Stallion assigned to Marine Heavy Helicopter Squadron (HMH) 464 conducts a touch and go exercise during Integrated Training Exercise 3-18 at Marine Corps Air Ground Combat Center, Twentynine Palms, Calif.*



U.S. Marine Corps photo by Cpl. Koby I. Saunders

## CVW Commander Completes Rare 1,200th Arrested Landing

ARABIAN SEA—The commander of Carrier Air Wing (CVW) 1 completed his 1,200th career arrested landing Feb. 1 on the flight deck of aircraft carrier USS Harry S. Truman (CVN 75), a rare occurrence among naval aviators.

Capt. Robert Gentry, a naval flight officer, landed in an F/A-18F Super Hornet assigned to the “Fighting Checkmates” of Strike Fighter Squadron (VFA) 211 while deployed with Harry S. Truman to the Arabian Sea.

Cmdr. Kenneth Hockycko, VFA-211 Commanding Officer, was the pilot in the two-seat, F-variant Super Hornet for Gentry’s 1,200th carrier arrested landing, also known as a “trap.” Hockycko said Gentry’s flight was significant for several reasons.

“To share his 1,200th trap was an honor and, to me, symbolic of what we hold dearest as naval aviators—commitment to our craft, commitment to mission accomplishment and commitment to one another,” Hockycko said.

Few aviators in naval history have achieved what the Tailhook Association, an independent, fraternal organization supporting sea-based aviation, has defined as membership in “The Grand Club.” These are aviators who have completed 1,000 traps. Fewer still, perhaps in the single digits, according to Hockycko, have surpassed 1,200.



U.S. Navy photo

*Cmdr. Kenneth Hockycko, Commanding Officer of the “Fighting Checkmates” of Strike Fighter Squadron (VFA) 211, left, shakes hands with Capt. Robert Gentry, commander, Carrier Air Wing (CVW) 1, on the flight deck of aircraft carrier USS Harry S. Truman (CVN 75) after Gentry’s 1,200th career arrested landing.*

“The Navy doesn’t keep people around and flying long enough to get to 1,200 traps unless they are worthy of being placed in leadership positions,” Hockycko said. “An aviator’s trap count is a measure of sea time, airmanship and leadership. To reach quadruple digits, one must have deployed and worked-up many times.”

Lt. Peter Toy, a pilot assigned to VFA-211, further emphasized the significance of reaching 1,200 arrested landings.

“That number seems daunting and far-off for most junior officers who are just hoping to break 200 by the end of their first sea tour,” Toy said. “To provide some perspective from a junior officer, CAG has more landings on a ship than I have hours of flight time in naval aircraft.”

*From USS Harry S. Truman Public Affairs.* 🦅

## CH-53K Conducts Aerial Refueling

PATUXENT RIVER, Md.—The CH-53K King Stallion aced an air-to-air refueling test in April, successfully demonstrating long-range logistics support capabilities for the Marine Corps. The 4.5-hour test was accomplished over the Chesapeake Bay with a KC-130J aerial refueling tanker.

“The aircraft went to the tanker this week and it was very successful, proving it is a long-range vertical logistic workhorse,” said Col. Jack Perrin, H-53 Heavy Lift Helicopters Program manager.

According to the test team, the wake survey test assessed the performance of the aircraft when flying behind the tanker in strong, turbulent air. The aircraft’s crew successfully plugged the drogue, a funnel-shaped basket towed behind the KC-130J. These tests were performed at increasing closure rates to ensure the CH-53K can handle the forces on the refueling probe when contacting the drogue during aerial refueling.

“The aircraft was able to meet the

desired performance for all engagements,” Perrin said. “The ‘K’ is the long-range enabler that we need now and into the future.”

The CH-53K King Stallion continues to execute within the reprogrammed CH-53K timeline, moving toward completion of

developmental test, leading to initial operational test and evaluation in 2021 and first fleet deployment in 2023-2024.

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



U.S. Navy photo

*The CH-53K King Stallion successfully plugs into a funnel-shaped drogue towed behind a KC-130J during aerial refueling wake testing over the Chesapeake Bay.*

## VAW-120 Makes 1,000th Aerial Refueling Contact



U.S. Navy photo

*An E-2D Advanced Hawkeye conducts aerial refueling initial qualification training with a KC-707 Omega.*

NORFOLK, Va.—The “Greyhawks” of Airborne Command & Control Squadron (VAW) 120 achieved a significant milestone April 16 by achieving its 1,000th Aerial Refueling (AR) contact for the squadron.

The E-2D Advanced Hawkeye aircraft and crew were conducting an initial AR qualification flight off the East Coast while training fleet replacement squadron (FRS) instructors in aerial refueling procedures.

Aerial refueling will nearly double the available on-station time and significantly increase the mission effectiveness, scope and reach of the world’s most dominant Airborne Command & Control platform.

“This milestone marks a true transformation in our community and will extend the immense reach and influence of this platform,” said Capt.

Matthew Duffy, Commander, Airborne Command & Control and Logistics Wing. “I am immensely proud of the men and women in uniform and our industry partners who have contributed to this overall effort.”

Increasing lethality for America’s Navy, the aerial refueling-modified E-2D is another key component to the carrier air wing of the future.

“As we look to start the transition of two fleet squadrons this year to AR-equipped Hawkeyes, the Carrier Air Wing will soon gain another measure of lethality,” Duffy said.

VAW-120, the Norfolk-based FRS for both the E-2 Hawkeye and C-2 Greyhound, is part of Airborne Command & Control and Logistics Wing and tasked with providing aerial refueling initial qualifications for the operational E-2D fleet. Currently, the

squadron’s AR instructor pilot cadre are increasing proficiency and experience in preparation for training and transitioning the first fleet squadron later this spring.

In September 2019, the first aerial refueling capable E-2D Advanced Hawkeye landed at Naval Station Norfolk officially marking the arrival of this upgraded aircraft to the fleet.

During 2020, the fleet will transition two operational fleet squadrons to aerial refueling capable E-2Ds.

VAW-120 is a fleet replacement squadron attached to Airborne Command & Control and Logistics Wing. Its mission is to train naval aviators, naval flight officers, Navy aircrewmembers and qualified maintainers to safely and effectively operate E-2 and C-2 aircraft.

*From Naval Air Force Atlantic Public Affairs.* 🦅



# Grampaw Pettibone

Gramps from Yesteryear: March-April 2000

Illustration by *Ted Wilbur*

## Lava Lament

A CH-53D Sea Stallion with a full load of troops on board was conducting insertion missions from an Army airfield to a landing zone in a lava field 6,560 feet above mean sea level. The pilot and copilot conducted hover power checks before departing the airfield. Winds at departure were 300 degrees at 10 knots, gusting to 15. The helo proceeded to the landing zone, dropped off the troops, returned to the airfield, took on another load and returned to the lava field.

On final approach, the copilot, who was at the controls, began a descent rate to establish the aircraft on glide slope for landing. Both the pilot and copilot were unaware they were experiencing a tailwind. The copilot slid the Sea Stallion to the left to avoid ground support vehicles located along the approach path.

The combined effects of being slow, with a tailwind, in an environment of high density altitude, and in a high gross weight configuration, placed the CH-53D in a hover-out-of-ground effect

situation without sufficient power. The induced rate of descent exacerbated the situation, and the CH-53D began dropping to the ground uncontrollably. This is sometimes called "settling without power."

Realizing the severity of the helo's condition,

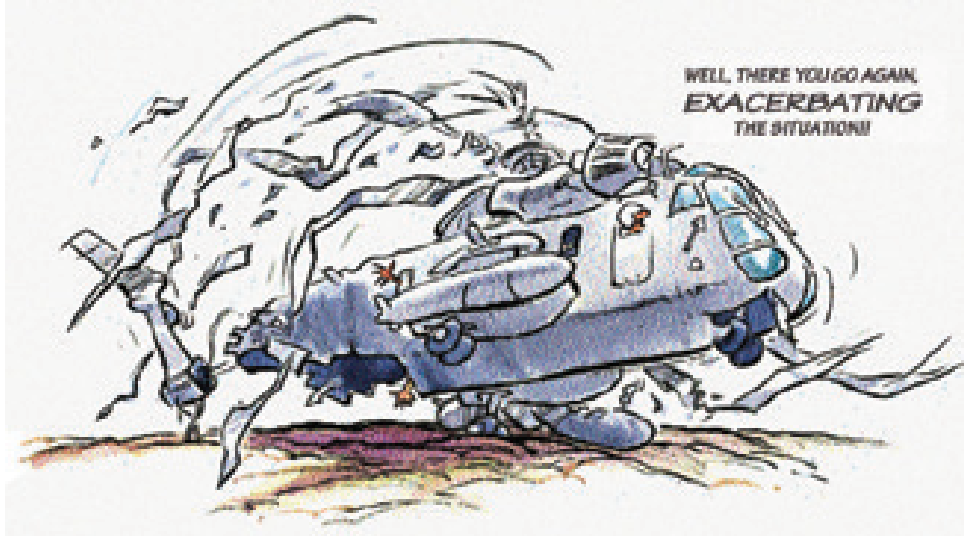
the pilot (aircraft commander) pushed both speed control levers full forward in an attempt to increase power. The crew chief called for power and the aerial observer called for a waveoff. The collective was already at its upper limits as the pilot took over the controls. He tried to regain control by pushing the nose over and lowered the collective to execute a waveoff.

Instead, the helo struck the lava field short of the landing zone with little forward airspeed or vertical velocity. The tail rotor and left main mount struck lava rock. Simultaneously, the tail skid lodged in the lava rock causing it to fail aft. The tail rotor blades disintegrated on impact. The tail pylon separated from the aircraft, which then lifted 10 feet off the ground and began rotating counterclockwise.

The Sea Stallion struck the ground a second time and rolled nearly inverted. The engines continued to drive the main gear box and rotor head throughout the sequence, arcing the fuselage around until all the blades were completely sheared off

from the rotor head.

Fortunately, this helo was equipped with three-point-restraint troop seats, and vertical deceleration forces were not sufficient to dislodge the seats. As a result, none of the crew and passengers sustained serious injuries. 🦋



## Grampaw Pettibone says ...



than one heart leapt from chest to throat during that spin-around atop the lava field.

The helo was flying at 30 to 40 knots at 100 feet above the ground on the approach. These numbers are consistent with a Sea Stallion when its hitting its Naval Air Training and Operating Procedures Standardization-prescribed parameters. Technically, it was the aerodynamic limitation imposed by the tailwind that did in the CH-53D. The pilots failed to determine the wind direction. Had they done so, they could have adjusted approach direction and stayed within the proper flight envelope. Situational awareness went by the board at a perilous moment. 🦋

What a carousel ride that musta been! I'll bet more



# Investigators Find No Root Cause of **PHYSIOLOGICAL EPISODES**

Identify Physiological Degradors

*By Andrea Watters*

Naval Aviation's Root Cause Corrective Action (RCCA) analysis teams concluded their investigations in December and found no single root cause for Physiological Episodes (PEs) experienced by naval aviators.

**T**hey determined, however, that PEs may result from a “stacking of physiological degraders,” according to Rear Adm. Fredrick Luchtman, Commander, Naval Safety Center, and Physiological Episodes Action Team (PEAT) lead.

Each RCCA core team—one for the T-45 Goshawk training jet and another for F/A-18 Hornet and Super Hornet and EA-18G Growler jets—includes Naval Air Systems Command (NAVAIR) engineers along with instructor pilots, indepen-

His focus now is on air crew awareness, proper equipment fit and educating aviators on how to maximize their physical condition to better withstand the hostile environment in the cockpit.

### Physiological Margins

“We have validated that there are some factors—such as hydration, nutrition, sleep, physical conditioning and stress—that enable one to be more resilient in the cockpit,” he said.

“If you can maximize hydration, nutrition



U.S. Air Force photo by Staff Sgt. Daniel Snider

*The rate of physiological episodes has gone down 59 percent since its peak in November 2017 for the F/A-18E/F Super Hornet.*

dent doctors and scientists, along with support from dozens of other subject matter experts.

PEs remain Naval Aviation’s No. 1 priority, Luchtman said.

To mitigate risk, the PEAT and program offices have developed tools and upgraded equipment in the T-45, the F/A-18 and EA-18G.

“The good news is the rate of PEs in the T-45 has gone down 90 percent since the peak rate in March of 2017. For the F-18, the rate has gone down 59 percent since the peak rate in November 2017,” Luchtman said.

He attributes those decreases to new tools and upgrades specific to each aircraft.

and rest, and minimize stress, you make yourself more resilient and able to handle the hostile cockpit environment,” he said.

He compared an aviator’s physiological margin to a suit of armor.

“We call the depth of that armor the physiological margin. It is how well you are prepared to handle an anomaly in the cockpit. Like professional athletes, we need to understand our own physiology and how to maximize our own physiological margin.”

While it is difficult to quantify human performance aspects, the topic of physiological margins and equipment fit have been the focus

U.S. Navy photo illustration by Fred Fierlage



**"If you can't take a deep breath, that becomes a physiological degrader and reduces one's physiological margin. It adds up with everything else one might be taking into the cockpit, such as dehydration, hyperglycemia, stress or lack of sleep."**

of the PEAT's roadshows. The roadshows are designed to keep aviators informed of the PEAT's findings and aware of upcoming changes before they are published in the Naval Air Training and Operating Procedures Standardization.

Feedback from pilots during the roadshows on the human performance aspects have been mixed, he said.

"There is some level of frustration that there is no single root cause, no smoking gun. But when we walk through the

scenario and talk about how one can get to a degraded state in the cockpit based on these physiological aspects adding up, they start nodding their heads," he said.

Naval Aviation has made it look effortless, he added.

"We have done ourselves a disservice in Naval Aviation by making this look so easy, when in fact this is a hard job in a very demanding and hostile environment where incredible G-forces, temperature variations and an almost

overwhelming amount of sensory input are placed upon you. The better physical shape you are in, the better you'll be able to withstand those demands," he said.

When physiological degraders add up, they may result in a PE, which applies to either breathing dynamics and hypoxia events, or pressure-related events that result from fluctuating cabin pressure caused by sub performing parts in the Super Hornet's Environmental Control System (ECS).

"We want to keep parts from failing, but in the event they do fail, aviators can protect themselves even more by making sure they've stacked up their physiological margin," Luchtman said.

## **Equipment Fit**

In April 2018, the RCCA team identified gear fit as a contributing factor to PEs.

If the flight harness is worn too tight or the straps are in the wrong places, it can inhibit the aviator's ability to take a full, deep breath.



*Rear Adm. Fredrick Luchtman, Physiological Episodes Action Team lead, visited Naval Medical Research Unit Dayton (NAMRU-Dayton) Nov. 4 and experienced the scientific force that is the one-of-a-kind research device called the Kraken. A pilot himself, Luchtman donned his flight suit and strapped into the capsule to experience a profile that addresses pilot spatial disorientation.*



*Rear Adm. Bruce Gillingham, Navy Surgeon General and Chief, U.S. Navy Bureau of Medicine and Surgery, visited NAMRU-Dayton Feb. 25 to check out their \$19 million disorientation research device, the Kraken.*

"If you can't take a deep breath, that becomes a physiological degrader and reduces one's physiological margin. It adds up with everything else one might be taking into the cockpit, such as dehydration, hypoglycemia, stress or lack of sleep," Luchtman said.

The proper fit of the mask around the pilot's face is also critical. As the pilot moves his head around there could be small leaks around the edge of the mask, which can impact the Onboard Oxygen Generating System's (OBOGS) ability to provide the proper amount of air, he said.

During the squadron roadshows, a team of experts from the Aircrew Systems Program Office spot checks aviators' flight gear and suggests how to get a better fit.

## F/A-18E/F Mitigations

There are several efforts underway in the Super Hornet community: updates to the PE reporting guidance implemented in Fall 2019; introduction of the Hornet Health Assessment and Readiness Tool (HhART) to the fleet last year; and the ongoing installation of a digital pressure gauge, which will increase air crew awareness.

"We are in the process of replacing the analog pressure gauge with a digital pressure gauge that will record data and provide a digital readout of cabin altitude for the pilot. It will indicate whether or not the cabin altitude is on or off schedule or is too high or too low," he said.

Modifications are underway and are expected to take 10 days to two weeks per aircraft.

One of the most effective mitigations to date is HhART, he said.

To reduce fluctuations within the aircraft's Environmental Control System, the program office has developed a tool to identify sub performing parts before they fail.

The tool uses data collected via Slam Sticks worn by pilots during flight and evaluates how well parts are functioning. (For more on HhART, see article on page 17.)

"Since we instituted HhART, along with a couple of other changes, we've

## Onboard Oxygen Generating System



U.S. Air Force photo by Lt. Col. Kyle

*Location of the T-6 Texan aircraft on-board oxygen generating system.*

The Onboard Oxygen Generating System (OBOGS) was the first target of the root cause corrective action (RCCA) analysis process to understand physiological episodes (PEs).

"There was a lot of theory and discussion of contamination early on," said Rear Adm. Fredrick Luchtman, Navy lead for the Physiological Episodes Action Team (PEAT).

"We took our OBOGS concentrators apart and put them through rigorous testing. We collected more than 21,000 samples of air and determined that the OBOGS air is extremely clean and not prone to contamination," he said.

He attributes some of the early confusion to the fact that the OBOGS does not technically generate oxygen.

Ambient air is pulled into the system and passes through two sieve beds. The filters hold the oxygen and purge the nitrogen, then the system allows the concentrated oxygen to pass to the pilot.

"There's no chemical process in which

chemicals or contaminants could be introduced. The system doesn't work in reverse and it cannot deliver anything less than 21 percent concentrated oxygen because that's what's in ambient air," Luchtman said.

All Navy tactical aircraft, including the T-6 Texan, T-45 Goshawk, F/A-18E/F Super Hornet, EA-18G Growler and F-35C Lightning II, use OBOGS concentrators, and several replacement systems are in the works, he said.

The T-6 currently is flying with the 105 model and has begun taking delivery of the 106A Concentrator, which allows for some data recording, Luchtman said.

The T-45 currently flies with the GGU-7 and will upgrade to the GGU-25 concentrator beginning in second quarter fiscal 2022.

The F-18 currently flies with the GGU-12, which will be upgraded in 2023 to a Life Support Systems Integration, which will provide scheduled delivery of a graduated amount of oxygen that increases as altitude increases. — Andrea Watters 🦅

**"We are very thankful, not only to Naval Aviation leadership, but naval leadership as a whole and Congress for their support. There's never been a question about resources when it comes to anything related to PE, and I do not see that changing."**

driven the rate down in F-18s significantly," he said.

### **T-45 Goshawk Mitigations**

Early in its investigation, the T-45 RCCA identified a primary contributing factor to oxygen-related PEs: low inlet pressure to the OBOGS concentrator, Luchtman said.

Program office engineers straightened the 90-degree bend in the inlet pipe and increased idle RPM on the engine.

"With the engine moving faster, it provides more air on the inlet side of the OBOGS concentrator. Those two things really eliminated the air-flow pressure issues with the OBOGS concentrator," he said.

Another upgrade to the T-45 was the installation of the CRU-123 solid-state oxygen monitor in summer 2017.

"As the air comes out of the OBOGS

concentrator, it passes through the monitor first. It's a check on the quality of the air to make sure we're delivering the appropriate oxygen concentration. If it's incorrect, it gives the pilot a warning," he said.

All T-45s have the CRU-123 and it's working well, he added.

### **Physiological Monitors**

"While the formal investigation has concluded, we are continuing to explore how we can optimize the human in the cockpit," Luchtman said.

He is pushing for the development of physiological monitors that will show how the human is performing in real time, under temperature variances, under Gs, under pressure.

But he has learned that it is not as easy as it sounds.

"I've had to temper my enthusiasm

because it takes a new approach to design sensors that will fit within the confines of the cockpit, survive the hostile environment and provide useable data," he said.

Anything new must also be verified and validated before introduction to the fleet.

Despite the challenges, the Aircrew Systems Program Office is currently exploring five monitoring devices, which are in various stages of test, he said.

The Navy is also working closely with the Air Force to identify a sensor for tactical aircraft that will not only provide useful data but will warn of an impending condition.

"We are depending on industry to help us develop and integrate the sensors into the cockpit, onto our flight gear and into our existing aircraft systems," he said.

### **Way Forward**

With the conclusion of the RCCA investigation, the functions of the PEAT will roll under the auspices of the Naval Safety Center at the end of April.

On April 28, Luchtman took command of the Naval Safety Center and will ensure continued flag oversight of physiological episodes.

"We are very thankful, not only to Naval Aviation leadership, but naval leadership as a whole and Congress for their support. There's never been a question about resources when it comes to anything related to PE, and I do not see that changing.

"This remains Naval Aviation's No. 1 safety priority and will continue to be until we've driven this rate down as low as we can."

Andrea Watters is editor in chief of Naval Aviation News. ✈



U.S. Navy Photo by Liz Wolter

*All of the Navy's T-45 Goshawks have been upgraded with the CRU-123 oxygen monitoring system, which checks the quality of air as it comes out the OBOGS concentrator to make sure it's delivering the appropriate oxygen concentration.*





U.S. Air Force photo by Staff Sgt. Matthew Lotz

*The ultimate goal is to integrate the Hornet Health Assessment and Readiness Tool into the aircraft's numerous complex systems to help improve supply, maintenance and readiness postures for F/A-18s and EA-18Gs.*

## Fleet Finds Unique F/A-18 Diagnostics Invaluable

One year after first hitting the fleet, a unique F/A-18 analytical tool, Hornet Health Assessment and Readiness Tool (HhART), continues to benefit the warfighter and demonstrate how a mix of data analytics and engineering can serve as an accelerator for naval aircraft readiness.

"This cutting-edge technology will reduce unscheduled maintenance and make diagnostics and maintenance planning easier for the warfighter," said Don Salamon, an engineer for the Physiological Episodes (PE) Integrated Product Team within the F/A-18 and EA-18G Program Office.

"While the inception of HhART stemmed from PE investigations, the resulting tool puts data to use in a practical, proactive way, directly supporting the ability to maintain increased aircraft readiness as well as maintenance and supply postures," Salamon said.

HhART leverages aircraft and sensor data, maintenance information and advanced data analytics to create a health and performance dashboard display of the aircraft's critical Environmental Control System (ECS).

This information provides the fleet with enhanced prognostic and predictive capabilities to facilitate better troubleshooting and more efficient maintenance of this complex system of aircraft components.

Naval Air Systems Command (NAVAIR) employed the tool and began surveilling the fleet in March 2019, providing squadrons with direct, proactive feedback and maintenance recommendations on flagged aircraft.

HhART became the top corrective action taken to combat PEs and after great initial success, the program rapidly expanded, leveraging data correlations and unique features identifying underperforming or failing systems ahead of the onboard aircraft prognostics, Salamon said.

He attributes its success to program office and NAVAIR leader-

ship empowering and providing resource support to the multifaceted HhART Team, led by the PE IPT and comprised of data scientists and technical experts from NAVAIR, Naval Air Warfare Center Training Systems Division, Naval Sea Systems Command, the Carderock Division of the Naval Surface Warfare Center, the Center for Naval Analyses and The Boeing Company.

"This cross-functional and collaborative effort between industry and government highlights the Navy's organic capabilities to execute true applications of 'big data' and produce actionable results and outcomes," said Capt. Jason Denney, F/A-18 and EA-18G Program manager.

After a successful year in the fleet, the HhART team is transitioning this same methodology to other aircraft systems that are primed to benefit from similar data analysis, such as fuel systems, flight controls, propulsion systems and generator control units—the current number one degrader for both the F/A-18E/F Super Hornet and EA-18G Growler.

The tool provides operators and maintainers with an indication of issues or degradation of systems in near real-time, enabling a more proactive approach and quicker identification of trends that often inform supply chain management decisions.

The ultimate goal for HhART is integration directly into the aircraft's numerous complex systems, further supporting improved supply, maintenance and readiness postures for F/A-18s and EA-18Gs. The team behind it is currently digging into the data analysis and engineering challenges to bring that plan to fruition.

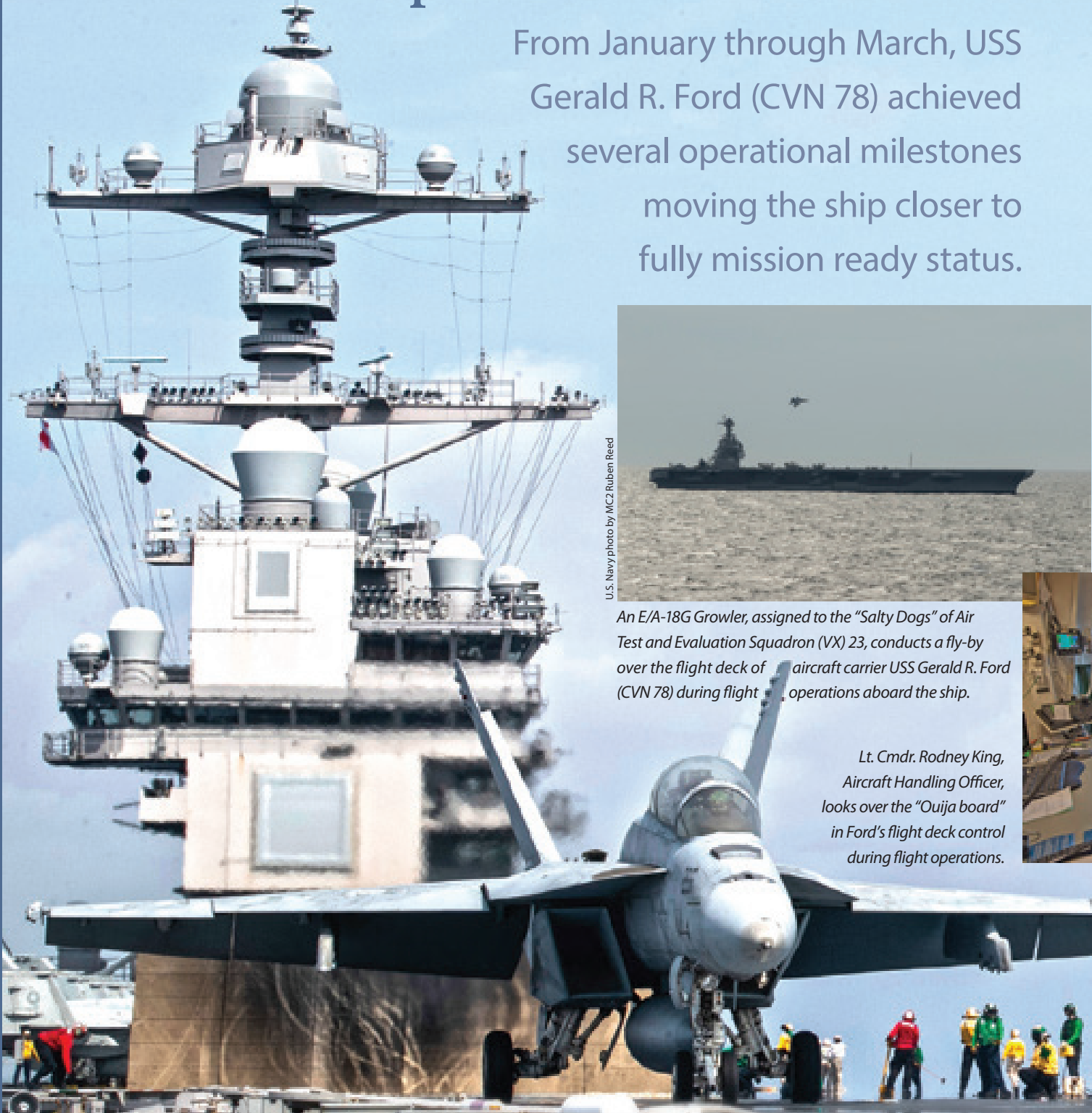
"The HhART Team has done an amazing job in creating this program and we expect, with its continued development and expansion to other aircraft systems, that it will become an indispensable tool for maintaining increased readiness for our aircraft platforms," Denney said.

*Written by Erin Mangum with the F/A-18 and EA-18G Program Office.* ✈️

# USS Gerald R. Ford

## Achieves Operational Milestones

From January through March, USS Gerald R. Ford (CVN 78) achieved several operational milestones moving the ship closer to fully mission ready status.



U.S. Navy photo by MC2 Ruben Reed

An E/A-18G Growler, assigned to the "Salty Dogs" of Air Test and Evaluation Squadron (VX) 23, conducts a fly-by over the flight deck of aircraft carrier USS Gerald R. Ford (CVN 78) during flight operations aboard the ship.

Lt. Cmdr. Rodney King, Aircraft Handling Officer, looks over the "Ouija board" in Ford's flight deck control during flight operations.

Entering the sixth month of an 18-month Post Delivery Test and Trials (PDT&T) period in March, the ship has performed extremely well while underway for 54 of 110 days since completing its Post-Shakedown Availability in October 2019.

As of April 23, Ford milestones include the following:

- Completed Aircraft Compatibility Testing Jan. 31
- Achieved 1,000th Aircraft Arrestment and Launch March 19
- Completed Flight Deck and Carrier Air Traffic Control Center Certifications March 20
- Now serves as the primary carrier qualification CVN on the East Coast
- Completed its first vertical replenishment March 24

Final construction of the ship's Advanced Weapons Elevators is also progressing. The four elevators previously

turned over to the crew continue to perform well, with Sailors conducting more than 8,000 cycles. Lower Stage Elevator No. 5, which provides aft magazine access, has progressed into final testing and is on track to turn over in May. Lower Stage Elevator No. 1, which provides forward magazine access, is on track to turn over in fourth quarter fiscal 2020. The remaining five elevators are on track to be turned over by Full Ship Shock Trials, scheduled for fiscal 2021.

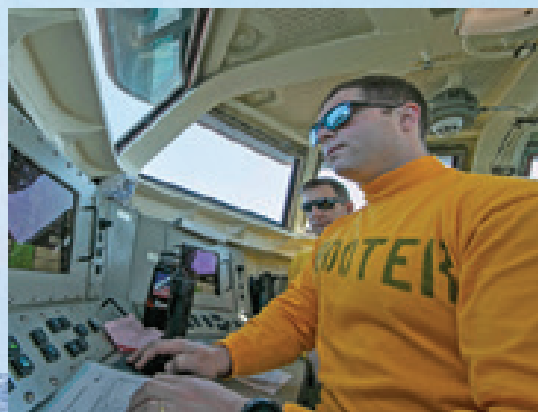
In May, Carrier Air Wing (CVW) 8 is scheduled to embark Gerald R. Ford and begin conducting cyclic flight operations. This will include the first end-to-end movement, loading and launch of inert ordnance from the ship's aft weapons magazine to an F/A-18 on the flight deck.

Eight of the remaining nine at-sea periods will involve flight operations and carrier qualification events, which, when completed, will add significant operational readiness to the fleet. — *Andrea Watters* 🇺🇸

U.S. Navy photo by MC3 Brett Walker



A C-2A Greyhound, attached to the "Rawhides" of Fleet Logistics Support Squadron (VRC) 40, prepares for takeoff March 23.



U.S. Navy photo by MC2 Ryan Seelbach

Lt. Joseph Dejunco, with the Air Department, verifies an aircraft's weight in the ship's integrated catapult control system room during flight operations March 29.



U.S. Navy photo by MC2 Sean Rinner



U.S. Navy photo by MC1 Gary A. Prill

An E-2C Hawkeye, assigned to the "Bear Aces" of Carrier Early Warning Squadron (VAW) 124, launches from the flight deck March 24.



An F/A-18F Super Hornet, attached to the "Gladiators" of Strike Fighter Squadron (VFA) 106, launches off USS Gerald R. Ford's (CVN 78) flight deck during flight operations March 29.

U.S. Navy photo by MC2 Ryan Seelbach

# Ford Passes Aircraft Compatibility Testing

*By USS Gerald R. Ford Public Affairs*

**USS Gerald R. Ford (CVN 78) completed Aircraft Compatibility Testing (ACT) Jan. 31, following 16 days at sea, during which the crew launched and recovered 211 aircraft while testing five different airframes, using its state-of-the-art flight deck systems—the Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG).**



*A T-45C Goshawk, assigned to the "Eagles" of Training Squadron (VT) 7, taxis on Ford's flight deck April 7.*



*An E-2D Advanced Hawkeye, assigned to VX-20, lands on the flight deck.*

**T**he testing phase included the first underway catapult launches and arrested landings for the T-45 Goshawk and E/A-18G Growler from Air Test and Evaluation Squadron (VX) 23, along with the E-2D Advanced Hawkeye and C-2A Greyhound from VX-20. Crews also tested F/A-18F Super Hornets from VX-23, which had conducted initial compatibility tests onboard Ford in 2017.

By completing T-45 testing, the Ford will be able to provide carrier qualification support to the Training Command and to student naval aviators in the jet/E-2/C-2 pipeline.

"There are so many firsts happening, and many of them we frankly don't even really realize," said Ford's Air Boss Cmdr. Mehdi Akacem toward the end of the testing evolution. "We've had the first ever T-45, E/A-18G Growler, E-2D Advanced Hawkeye and C-2A Greyhound. There are pilots onboard this ship right now who will forever be able to say that their contribution to the Navy was to be the first pilot or NFO [naval flight officer] to come aboard Gerald R. Ford-class in that type aircraft."

Capt. Kenneth Sterbenz, Aircraft Launch and Recovery Equipment (ALRE) program manager, noted that ACT's success demonstrates the capability and versatility of the ship's EMALS and AAG systems.

"This success is the result of the hard work and collaboration of the men and women in the entire ALRE team, including our government personnel and industry partner, General Atomics, and fleet," Sterbenz said. "I am extremely proud of what we have accomplished together and am fully confident in our ALRE systems moving forward, especially with the backing of our highly dedicated and professional ALRE team."

The shipboard events confirmed more extensive testing previously conducted ashore in Lakehurst, New Jersey, ensuring the operational safety of both aircrew and flight deck Sailors.

ACT began on Jan. 16 and concluded with 211 successful launches and arrestments using EMALS and AAG technology. ACT also allowed the crew and embarked test personnel to qualitatively evaluate the effect of the Ford-class air wake, or burble, and its compatibility with all types of fleet aircraft the Navy uses on an aircraft carrier.

Aircraft were launched and recovered in different environmental conditions and sea states and with varying aircraft weights—from heavy aircraft in light wind conditions to light aircraft in heavy wind conditions.

The information captured during ACT will continue to inform improvements and modifications for the Ford and follow-on Ford-class aircraft carriers.

*From USS Gerald R. Ford Public Affairs.* 🦅

U.S. Navy photo by MC Sawyer Connolly

U.S. Navy photo by MC3 Ryan Carter





Lt. Scott Gallagher lands an F/A-18F Super Hornet, attached to the “Blue Blasters” of VFA-34, for the 1,000th trap aboard Gerald R. Ford.

## Ford Achieves 1,000th Aircraft Arrestment, Launch

By MC2 Ryan Seelbach

**An F/A-18E Super Hornet, attached to “Blue Blasters” of Strike Fighter Squadron (VFA) 34, landed aboard the flight deck of USS Gerald R. Ford (CVN 78) March 19 marking the 1,000th recovery of a fixed-wing aircraft using Ford’s Advanced Arresting Gear (AAG).**

Minutes later, the crew celebrated a second milestone by launching an F/A-18E Super Hornet, attached to the “Warhawks” of VFA-97, from Ford’s Electromagnetic Aircraft Launch System (EMALS) catapults for the 1,000th time.

These significant milestones began on July 28, 2017, with Ford’s first fixed-wing recovery and launch using its first-in-class AAG and EMALS technologies.

Capt. John J. Cummings, Ford’s Commanding Officer, explained how the entire Ford crew has worked together over the last few years to reach this achievement.

“I couldn’t be more proud of our crew, their motivation is amazing,” Cummings said. “We’ve been working extremely hard to get here today, and to see this 1,000th trap completely validates their efforts and the technology on this warship.”

Boasting the Navy’s first major design investment in aircraft carriers since the 1960s, Ford’s AAG and EMALS support greater launch and recovery energy requirements of future air wings, increasing the safety margin over legacy

launch and arresting gear found on Nimitz-class carriers.

Lt. Scott Gallagher, assigned to VFA-34, has landed on five other carriers, but became a part of Ford’s history with his—and the ship’s—1,000th recovery.

“There are a lot of people who are working night and day to make sure that this ship is ready to go be a warship out in the world,” Gallagher said. “To be a part of that—and this deck certification—is super cool. Also getting the 1,000th trap helps the ship get one step closer to being the warship that it needs to be.”

*Written by Mass Communication Specialist 2nd Class Ryan Seelbach with USS Gerald R. Ford Public Affairs.* ✈️



U.S. Navy photo by MC Riley McDowell

Sailors assigned to the Air Department prepare to launch an F/A-18E Super Hornet from the flight deck on March 24.

# Ford Certifies Flight Deck, Carrier Air Traffic Control Center

By MC1 Gary Prill, USS Gerald R. Ford (CVN 78) Public Affairs

**“Man all flight quarters stations!” These words were heard across USS Gerald R. Ford (CVN 78) March 20 as she prepared to launch (cat) and recover (trap) aircraft from Carrier Air Wing (CVW) 8 as part of Flight Deck Certification (FDC) and Carrier Air Traffic Control Center (CATCC) Certification.**



U.S. Navy photo by MC2 Ryan Seelbach

Aviation Boatswain's Mate (Handling) 1st class Jawann Murray, assigned to USS Gerald R. Ford's (CVN 78) air department, signals an F/A-18E Super Hornet, attached to the “Blue Blasters” of Strike Fighter Squadron (VFA) 34, on Ford's flight deck during flight operations.



U.S. Navy photo by MC2 Ruben Reed

F/A-18E and F Super Hornets assigned to Carrier Air Wing (CVW) 8, stack up in preparation for launch from the flight deck of USS Gerald R. Ford (CVN 78) during flight operations.

To certify Ford's flight deck and CATCC, the ship was required to complete a Precision Approach Landing Systems (PALS) certification and conduct two consecutive days of flight operations with 50 day traps on day one, followed by 70 day traps and 40 night traps on day two. Together, the crews of Ford and CVW-8 exceeded those minimum requirements.

Over a two-day period, F/A-18E and F/A-18F Super Hornets from four squadrons assigned to CVW-8 conducted 123 day and 42 night cats and traps.

“Our Sailors performed at a level that was on par with a forward deployed aircraft carrier, and this was a direct result of the hard-core training and deployment ready mentality we have pushed every day for the past year,” said Capt. John J. Cummings, Ford's Commanding Officer.

Prior to FDC and CATCC certification, Ford received its PALS Mode IA and Mode II certification from Naval Air Warfare Center Aircraft Division. PALS, through the assistance of air traffic controllers, aids pilots as they execute night or bad weather landings and guides them to a good starting position for approaches.

“PALS cert was a critical step toward achieving our Flight Deck Certification,” said Cmdr. Phil Brown, Ford's Air Operations Officer. “Our system performed really well during our approaches and provided a solid level of confidence in our ability to recover jets.”

Ford's CATCC certification was the culmination of a three-phase process that began in October 2019 at the

Naval Air Technical Training Center (NATTC) in Pensacola, Florida. Since then, NATTC instructors have been alongside Ford Sailors for every phase, testing their practical knowledge, re-viewing their checklists and observing their recovery operations.

According to Chief Air Traffic Controller Lavese McCray, the NATTC CATCC team trainer was an essential factor to Ford's success.

"We had no rust to knock off," McCray said. "We've tested and trained for so many operations that it made the [certification] scenarios look easy."

The recovery scenario Ford completed during certification required aircraft to be stacked up behind the ship in 2-mile increments, in order to land on the flight deck every minute—a challenging task required of deployment-ready carriers. Ford was able to trap aircraft 55 seconds apart.

In its certification letter, Commander Naval Air Forces Atlantic (CNAL) inspectors provided shout-outs to the Sailors who performed exceptionally well during the certification.

"All CATCC functional areas were outstanding. Additionally, the leadership and expertise exhibited by the Air Operations Officer and his staff were extremely evident throughout the course of the entire week," the letter said.

Air Traffic Controller First Class Scott Torres, Ford's CATCC chief, was recognized in the certification letter for his accomplishments and shared the credit with his teammates in Air Department, noting that the certification was a group effort.

"Our success was a testament to Air Department and their ability to quickly move aircraft from catapults to arrestments," Torres said. "The cert is about safety and efficiency, and their efficiency was really high."

*Written by Mass Communication Specialist 1st class Gary Prill with USS Gerald R. Ford Public Affairs.* ✈️



U.S. Navy photo by MC3 Brett Walker

*An E-2D Advanced Hawkeye, attached to VAW-124, prepares to land on CVN-78's flight deck March 23.*



U.S. Navy photo by MCSA Riley McDowell

*Chief Air Traffic Controller Michael Knecht, with the Operations Department, monitors flight operations and tracks aircraft from Ford's Carrier Air Traffic Control Center.*

*ABH1 Vincent Cardente prepares to move an F/A-18F Super Hornet aboard Ford's flight deck.*



U.S. Navy photo by MC2 Sean Elliott



U.S. Navy photo by MC Sawyer Connolly

*A T-45C Goshawk, assigned to VT-7, is launched from the Ford on April 7.*



# FROM BLUE TO YELLOW:

*By USS Gerald R. Ford Public Affairs*

**Cool, calm and coordinated.** These are words that characterize the finesse that qualified “yellow shirts” display when directing aircraft, whether it be maneuvering through a busy hangar bay or on the fast-paced flight deck.

“It is an honor to be a qualified yellow shirt,” said Chief Aviation Boatswain’s Mate (Handling) Jarell Holliday. “You are entrusted with the lives of the pilots in aircraft as well as the personnel on the flight deck. You are entrusted to execute the flight plan from the first aircraft launch to the last recovery, and do it safely. Most days are long and challenging, but it is rewarding and fun when we have completed the mission and made it home safely.”

Aviation boatswain’s mates (Handling), or ABHs, that are a qualified yellow shirt are aircraft directors who are able to direct

aircraft without being shadowed by a seasoned qualified yellow shirt.

“Everyone starts off as a blue shirt, but you have to get your Flight Deck Observer and Plane Handler qualifications to become a qualified yellow shirt,” said Aviation Boatswain’s Mate (Handling) 1st Class Kiara Harris. “In addition to earning qualifications, you also have to gain the trust from your chain of command and show you can uphold the responsibility of the job. You have to take tests and boards after you have received the training, too.”

ABHs that are E-5 and below are required to attend an ABH refresher course

every five years to stay up-to-date on the rate basics, and aircraft firefighting school every four years which covers firefighting techniques used on the flight deck and in the hangar bay. For yellow shirts on the flight deck, Landing Signalman Enlisted School is a requirement to learn the proper hand signals to give to pilots during launch and recovery, as it is the primary means of communication during flight operations.

When ABHs are ready to begin stepping into the yellow shirt role, they become an under instruction (UI) yellow shirt. UI yellow shirts are shadowed by an



# LIFE of an ABH



*An Aviation Boatswain's Mate (Handling) 1st Class, assigned to USS Gerald R. Ford (CVN 78), directs an F/A-18F Super Hornet on the flight deck.*

U.S. Navy photo by MC2 Ruben Reed

experienced yellow shirt who ensures they are making the right calls when directing aircraft.

"The UI yellow [shirt] is a tough process with many new procedures and responsibilities," said ABH Airman Timothy Ojeda. "Some responsibilities of mine are getting the flight plan and going over it with my work center, and ensuring my shipmates understand what is going to happen throughout flight operations, as well as directing, parking and spotting aircraft under the supervision of a qualified yellow shirt. My journey to becoming a yellow shirt has only begun and I am ready to take on the flight deck with a clear mind and open ears."

ABHs are known for not wearing ranks on their jerseys to signify the importance

of being qualified as opposed to what rank they are.

"Yellow shirts do not wear rank on their sleeves due to the increased responsibility and position of authority sometimes given to junior E-3s and E-4s who have shown they are competent and capable of being a yellow shirt," Holliday said. "Yellow shirts are the flight deck supervisors that keep the flight deck flowing. It is a yellow shirt's job to keep the flight deck as safe as possible with procedural compliance in everything we do."

Becoming a yellow shirt does not happen overnight and is not simply given to ABHs after a specific time-in-rate. It takes hard work, long hours of training and working on qualifications to earn the right to wear a yellow shirt. On average, it can

take an ABH a few years to become a fully qualified yellow shirt.

"My biggest advice for someone who is trying to make yellow [shirt] is to hit the ground running and don't let anyone negative get in your head," said Aviation Boatswain's Mate 3rd Class Alexis Apodaca. "On Ford, it may take a little longer to obtain in-rate qualifications as an ABH because we're just starting to ramp up and catch aircraft, but if you want to make it happen, you can. Just do it to the best of your ability and stand out."

Finally, receiving a yellow shirt is a significant moment in the career of an ABH. When flight operations are being conducted and the yellow shirts are on deck, rest assured they are doing what they do best because they trained for it. 🦅

# Navy V-22 Program Demonstrates 'Speed to the Fleet' with First Delivery

By Liz Mildenstein

The Navy accepted the first CMV-22B Osprey in February and began testing at Naval Air Station Patuxent River, Maryland.

**T**he government-industry team celebrated the acceptance milestone during a reveal ceremony Feb. 7 at Bell's Assembly Center in Amarillo, Texas. The delivery milestone comes after only four years of design, production and first flight.

"There is nothing more important than delivering capabilities to the fleet with speed," said James F. Geurts, assistant secretary of the Navy for research, development and acquisition. "I am proud how the program and industry team have leveraged non-traditional approaches such as using existing MV-22 testing data to shrink the time in the CMV-22B acquisition cycle. The speed to get to this delivery milestone is a testament to the rigor and energy they put into the acquisition strategy and risk reduction initiatives during test and design."

The CMV-22B is a variant of the MV-22B and is the replacement for the C-2A Greyhound for the carrier onboard delivery mission. The aircraft will be used to transport personnel, mail, supplies and

high-priority cargo from shore bases to aircraft carriers at sea.

To meet the Navy's needs, the test program proactively sought risk reduction opportunities leveraging the MV-22B for shipboard and high gross weight testing.

In addition, the integrated test team is focused on delta testing, differences between the MV-22B and CMV-22B, which will shorten the overall test program.

The Navy stood up a Naval Aviation Training Support Group (NATSG) at MCAS New River in North Carolina, enabling the CMV-22B to utilize the infrastructure at Marine Medium Tiltrotor Training Squadron (VMMT) 204. These, combined with other speed to the fleet initiatives, allow for a streamlined path to Initial Operational Capability.

The first of two CMV-22B aircraft intended for developmental test recently ferried to NAS Patuxent River. The aircraft is assigned to Air Test and Evaluation Squadron (HX) 21, the squadron leading the developmental test efforts for the program. The first operational squadron, Fleet Logistics Multi-Mission Squadron (VRM) 30, is scheduled to receive the aircraft this summer.

"Accepting the first aircraft and ferrying it to Patuxent River to continue developmental testing is a critical step forward for the program," said Col. Matthew Kelly,



This angle highlights one of the new expanded sponson tanks on the CMV-22B on the flight line at Naval Air Station Patuxent River, Md.

U.S. Navy photo by Peter Fitzpatrick





*The CMV-22B is capable of internally transporting the F-35C Lightning II engine power module via its cargo bay.*

program manager for the V-22 Joint Program Office. “Our government-industry team can be proud of this milestone as we prepare to put the CMV-22B through testing which will ensure it is ready to support

the Navy anywhere around the world.”

HX-21 and Bell conducted the aircraft’s first flight in December prior to transiting cross-country to continue developmental test. The integrated test team, which

includes pilots, aircrew, engineers and maintainers from HX-21, Naval Air Warfare Center Aircraft Division, Boeing and Bell, will conduct developmental testing over the next couple of years.

“The CMV-22B will enable the Navy to supply the carrier strike groups with what they need to project sea power, anytime, anyplace,” Kelly said.

The CMV-22B is designed to transport up to 6,000 pounds of cargo and/or personnel over a 1,150 nautical mile range. This expanded range is due to the addition of two new 60-gallon tanks installed in the wing for an additional 120 gallons of fuel, and the forward sponson fuel tanks were redesigned for additional capacity.

The CMV-22B variant has a beyond line-of-sight high frequency radio, a public address system for passengers and an improved lighting system for cargo loading. The aircraft will also be capable of internally transporting the F-35C Lightning II engine power module.

*Liz Mildenstein is the public affairs officer for the V-22 Program.* ✈️



*Air Test and Evaluation Squadron (HX) 21 pilots in the Navy’s first CMV-22B Osprey prepare to fly a farewell formation with VX-20’s last C-2A Greyhound March 9.*

U.S. Navy photo by Erik Hildebrandt



# CMV-22B Ferry Flight Fuses Developmental, Operational Testing

By Paul Lagasse

The recent cross-country flight of the Navy's new CMV-22B Carrier Onboard Delivery (COD) variant of the Osprey tilt-rotor aircraft was not only a milestone for the program, but also demonstrated the effective fusion of developmental and operational test in a real-world environment.

Over a two-day flight totaling just over 6.5 hours in the air, pilots Lt. Cmdr. Steve "Sanchez" Tschanz, Air Test and Evaluation Squadron (HX) 21, and Cmdr. Kristopher "Junk" Carter of Air Test and Evaluation Squadron (VX) 1, along with crew chief Naval Aircrewman (Mechanical) 1st Class Devon Heard flew the first CMV-22B from the Bell Military Aircraft Assembly & Delivery Center in Amarillo, Texas, to Naval Air Station (NAS) Patuxent River, Maryland, in early February.

The first flight of the aircraft outside of the manufacturer's test area mirrored many of the conditions that the aircraft will encounter when operational.

"It was a great opportunity for operational and developmental testers to work together on the same flight," said Tschanz.

Carter agreed with Tschanz' assessment. "The biggest litmus test I have when we start out on operational tests is to find a mission that is representative of what we're going to do with the aircraft once it is in the fleet," Carter said. "With this flight, we got an early look at operational testing while we're also doing developmental tests."

"From a crew chief's perspective, on this trip I was able to see both the developmental test side and the operational side integrated in one," said Heard, who was a 2nd class at the time of the flight and has since been promoted.

The role of developmental testing, which is the mission of HX-21, is to identify whether an aircraft or system meets the promised specifications. Operational testing, which is what VX-1 does, focuses on the ability of an aircraft or system to operate in the environments that it will encounter once it is deployed to the fleet.

Prior to the flight, Tschanz, Heard, Bell test pilot Andrew Bankston, and Naval Air Crewman (Mechanical) 2nd Class Trenton Olsheski conducted a series of developmental test flights to ensure the aircraft met its specifications. Following those test flights, it was time to deliver the aircraft to NAS Patuxent River.

Or, more accurately, almost time—the crew ended up waiting nearly a week for the weather to open up between Texas and



U.S. Navy photo by Liz Mildenstein

The CMV-22B Osprey lands at NAS Patuxent River Feb. 2 after completing a ferry flight from Bell's Military Aircraft Assembly & Delivery Center in Amarillo, Texas.



Maryland. Because the aircraft was fitted with extensive test equipment, the flight was limited to clear weather and daylight hours.

On Saturday, Feb. 1, the weather finally cooperated and Tschanz, Carter and Heard flew first to Millington, Tennessee, for a refueling stop before continuing on to Patuxent River. Having flown together before, the three men quickly fell into a routine: while Tschanz was flying the aircraft, for example, Carter would be busy monitoring communications and Heard kept his eye on the weather.

The Osprey's high-visibility paint scheme, which the Navy uses to help make it easier to identify noncombatant aircraft, was part of the attraction when the aircraft landed in Millington, where the Naval Support Activity Mid-South base is located.

"There's usually a certain amount of interest when a unique aircraft flies into any airport where that type normally doesn't operate," Tschanz said. "But in this case it was even more fun because we landed and people said, 'Oh, that's a V-22,' and then immediately you can see the gears start turning in their heads as they start to realize that something is different about it."

After refueling, the crew departed in the afternoon, expecting to arrive at Patuxent River in the late afternoon. But approximately nine-tenths of the way home, the weather started closing in over their destination, and the crew diverted to Lynchburg, Virginia, to wait out the rain overnight. And like in Millington, Tschanz, Carter, and Heard found themselves instant celebrities as pilots



U.S. Navy photo by Erik Hildebrandt

*The first Navy CMV-22 Carrier Onboard Delivery Variant of the V-22 Osprey flies above the Chesapeake Bay March 9.*

and aviation enthusiasts descended on them to ask questions about their unique Osprey.

The following morning, Tschanz, Carter, and Heard flew through clear skies to land at NAS Patuxent River, bringing a successful close to the aircraft's first cross-country flight.

"We have a lot of tests to do before we know everything about the airplane, but this initial look was great," Carter said of the flight.

"There was a lot of excitement, eagerness and anxiousness to be able to fly the first CMV-22B back to HX-21," Heard said. "Now we own it and we're ready to move forward."

*Written by Paul Lagasse, Naval Test Wing Atlantic Communications.* ✈️



U.S. Navy photo by Erik Hildebrandt

## **VX-20 Sunsets Its C-2A Greyhound**

C-2A Greyhound BuNo 162142 made its final flight March 19 after 27 years with Air Test and Evaluation Squadron (VX) 20. The Navy is retiring the C-2A from the carrier onboard delivery role which is being replaced by the CMV-22B Osprey. There are currently 33 C-2s in the fleet, operated by the "Providers" of Fleet Logistics Support Squadron (VRC) 30 located at Naval Air Station North Island, California, and the "Rawhides" of VRC-40 at Naval Station Norfolk, Virginia. The CMV-22B is expected to reach full operational capability in 2023 and replace the C-2A by 2024. ✈️



*"The Marines who transitioned to VMFA-314 from various units across the Marine Corps were the right men and women for the job. They are disciplined, intelligent and they completely understand the importance of their mission."*

# VMFA-314

## First Marine F-35C Squadron 'Safe-for-Flight'

*By Gunnery Sgt. Jon Holmes*

Marine Fighter Attack Squadron (VMFA) 314 celebrated the results of more than five months of F-35C Lightning II transition training when it received its Safe-For-Flight Operations Certification (SFFOC) at Marine Corps Air Station Miramar in San Diego on March 20.

**V**MFA-314 and the Navy's F-35C fleet replacement squadron, Strike Fighter Squadron (VFA) 125, worked together toward this historic accomplishment even while conducting precautionary measures to stem the spread of novel coronavirus (COVID-19).

SFFOC is an important milestone for VMFA-314's transition to the F-35C from the F/A-18 Hornet. It marks the end of the squadron's oversight by VFA-125, which was responsible for ensuring that the "Black Knights" received quality training during their temporary relocation to Naval Air Station Lemoore, California, from September 2019 to January 2020.

The SFFOC process ensures the squadron is manned with qualified personnel to implement maintenance and safety programs in support of fleet operations. All transitioning squadrons are required to complete this certification prior to independently conducting flight operations.

"The achievement of this certification represents years of hard work and detailed coordination across the entire Marine Corps and Naval Aviation Enterprise," said Lt. Col. Cedar Hinton, VMFA-314 Commanding Officer.

"The Black Knights have met or exceeded every challenge faced during this transition, and I am extremely proud to be a part of this fantastic squadron. Today's achievement marks a significant milestone and the beginning of a new chapter in our storied legacy. The F-35C advances our capability well into the next generation of fighter-attack aircraft and will keep our squadron, and our service, relevant for decades to come."


The certification process encompasses areas such as equipment, personnel and programs. Requirements include the installation and operation of management information systems and their accompanying support networks. There is also a requirement for operational F-35C squadrons to maintain robust maintenance programs and complete various inspections

ranging from conventional weapons technical proficiencies to safety. Squadron personnel complete a transition curriculum and maintain specific competencies in accordance with Naval Air Training and Operating Procedures and Standardization guidelines.

"I am honored to serve alongside the Marines who make this squadron's operations run smoothly every day," said Sgt. Maj. Lorenzo Williams Jr., sergeant major of VMFA-314. "The Marines who transitioned to VMFA-314 from various units across the Marine Corps were the right men and women for the job. They are disciplined, intelligent and they completely understand the importance of their mission. We have mature staff, non-commissioned officers who have a great deal of experience, which made the transition happen seamlessly. I know they will carry on our proud legacy from being the first F/A-18 squadron in the Department of Defense to fly the Hornet tactically to becoming the first operational F-35C squadron in the Marine Corps."

Aviation history was made when 3rd Marine Aircraft Wing (MAW) welcomed its first F-35C Lightning II to MCAS Miramar on Jan. 21. The fifth-generation aircraft—piloted by Hinton—marked the arrival of the Marine Corps' first F-35C to Fleet Marine Force.

The "C" variant of the F-35 is the first fifth-generation long-range stealth strike fighter designed to operate from both land bases and aircraft carriers. The Lightning II's control surfaces and landing gear are better equipped for carrier operation than the A and B variants flown by the Air Force and Marine Corps, respectively. The F-35C is also equipped with larger internal fuel storage, which when combined with its ability to refuel in-flight, extends its range and allows for enhanced flight time when compared to other aircraft.

*Written by Gunnery Sgt. Jon Holmes, Marine Corps Air Station Miramar/3rd Marine Aircraft Wing.* 





# 75

## U.S. NAVAL TEST PILOT SCHOOL

### *Celebrates its Diamond Jubilee*

By Paul Lagasse



*Between 1958 and 1975, the F8U/F-8 Crusader supersonic air superiority fighter provided students with experience testing high-speed flying and maneuvering characteristics.*

U.S. Navy photo

When Navy Cmdr. Sydney S. Sherby received orders in March 1945 to assume command of a brand-new Flight Test Training Program at Naval Air Station (NAS) Patuxent River, he might not have guessed that 75 years later the program would grow into one of the world's premier flight test institutions.

**T**oday, the U.S. Naval Test Pilot School (USNTPS) graduates more pilots, flight officers and engineers each year than the other three major domestic and international flight test schools combined and has supplied nearly 100 astronauts to the American space pro-

gram. But he probably would not have been surprised.

Sherby, a naval flight instructor with a degree in aeronautical engineering from the Massachusetts Institute of Technology, had reported to NAS Patuxent River as chief project engineer the previous year. Almost immediately,

the base's commander handed Sherby a tough assignment: develop an understanding of how the Navy conducted flight test and how it could do it better.

During World War II, the Navy had consolidated its units for flight test, radio systems, armament and experimental aircraft at NAS Patuxent River. Sherby



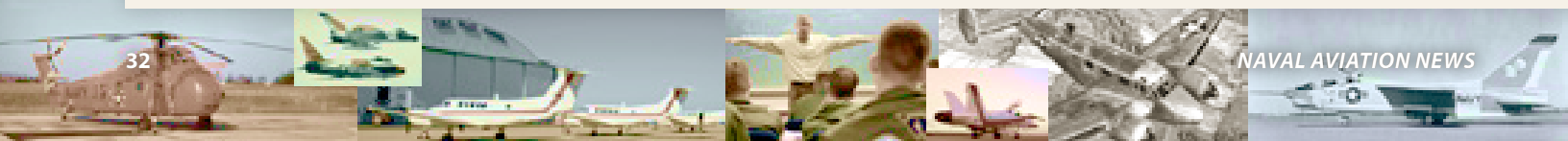
*The Chance Vought F4U Corsair was at USNTPS from 1949 to 1952.*

*A Grumman F6F Hellcat, which students flew for test evaluation during World War II, in flight near Naval Air Station (NAS) Patuxent River, Md., 1944.*

U.S. Navy photo



U.S. Navy photo





suggested the Navy take advantage of that consolidation by establishing a formal program of education for test pilots and engineers who would then go on to staff those units.

Cmdr. C.E. Giese, the base's flight test officer, agreed with Sherby's recommendation and tasked him with drafting a plan for the future flight test school—in just seven days. With the help of two other officers, Sherby developed the school's first curriculum, which covered aerodynamic fundamentals and procedures for testing aircraft performance and assessing aircraft stability and control, plus a roster of necessary air and ground tests and a standardized reporting form. The proposed 10-week course involved 37 hours of classroom work and nine hours of flying over the course of three days a week.

Less than two weeks later, Sherby and his sole flight instructor, Lt. H.E. McNeely, welcomed the first group of 14 pilots and engineers—retroactively dubbed Class 0a—to the USNTPS' first semester, during which the test pilots under instruction flew a motley assortment of fighters, bombers and trainers borrowed from the base's flight test unit. At the end of May, each of the graduates received a diploma and a slide rule.

Another key figure in the school's early history, Capt. Frederick M. Trapnell, arrived at Pax River to assume command of the Naval Air Test Center in 1946. Trapnell, a former flight test officer who had flown fighters from the Navy's giant dirigible airships in the 1930s, attended Sherby's classes and quickly recognized the program's need for additional funding and resources. He recommended sufficient resources be allocated to establish a full-time course for about 30 students, with classes convening every nine months. Trapnell got his wish, and the school soon went into business full-time. NAS Patuxent River's airfield is named Trapnell Field in his honor.

*Written by Paul Lagasse, U.S. Naval Test Pilot School Communications.* ✈️



*An aerial view of NAS Patuxent River with an F9F Panther, circa 1950s.*

U.S. Navy photo

*Douglas A-4D Skyhawk single-seat fighters were used for flight training from 1963 to 1994.*



U.S. Navy photo



U.S. Navy photo

*The backbone of jet flight training at USNTPS, the two-seat T-38 Talon, has been flying in its A, B and C variants since 1969. The school currently has 10 T-38Cs.*



U.S. Navy photo

*Established in 1961, the military rotary syllabus is the only one of its kind in the U.S. and serves as the Army's test pilot school. Here, a student and instructor conduct a preflight inspection of an OH-58 Kiowa.*



U.S. Navy photo

*USNTPS has been flying the F/A-18 Hornet since 1984. Today, four F/A-18F Super Hornets are flown as part of the airborne systems syllabus for radar and weapons delivery evaluation.*

## U.S. NAVAL TEST PILOT SCHOOL

# Training Test Pilots of the Jet and Space Ages

In 1957, the flight test school formally changed its name to the U.S. Naval Test Pilot School. That same year, Marine Corps Maj. John Glenn Jr. (Class 12) set a new coast-to-coast speed record at an average of 725.55 miles per hour flying an F8U-1P Crusader fighter, and the Soviet Union launched the first artificial satellite, Sputnik 1.



The Jet Age reached a peak, and the Space Age had begun—and USNTPS was there to make sure that the nation's flight test pilots, flight officers and engineers were ready for both.

In the 1950s, the depth and breadth of the curriculum expanded to include jet performance, irreversible flight controls and armament and electronic testing. In 1958, the school extended the course of instruction to eight months. And when NASA announced its seven Mercury astronauts in 1959, USNTPS was very well represented with four alums on the roster: Alan Shepard, John Glenn, Scott Carpenter and Wally Schirra.

The early 1960s saw the first major additions to USNTPS' curriculum with the creation of a separate syllabus for rotary-wing instruction, an introduction to vertical takeoff and landing techniques and a soaring program.

USNTPS also saw its first Army graduate, Capt. John Foster (Class 28). During this time, the school also published its first manuals for helicopter performance testing and rotary flying qualities.

Today, the school's rotary syllabus for military pilots is the only one of its kind in the U.S., and for this reason serves as the Army's test pilot school.

The end of the decade saw an entire Apollo mission crewed by USNTPS graduates when Apollo 12 took Pete Conrad (Class 20), Richard Gordon (Class 18) and Alan Bean (Class 26) to the moon in November 1969.



U.S. Navy photo

*The Douglas F4D/F-6A Skyray jet fighter was in the school's inventory from 1958 to 1969.*



*USNTPS pilots flew the iconic Bell UH-1 Iroquois as part of the rotary-wing curriculum from 1963 to 1975.*

U.S. Navy photo



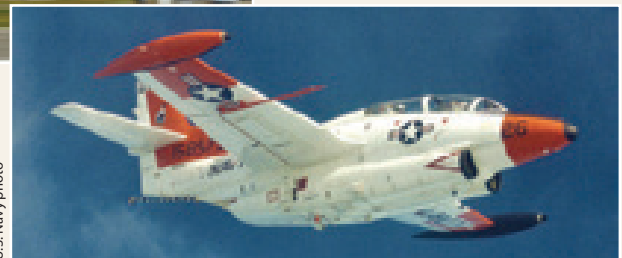
*The school's two X-26A Frigate gliders fly an average of 40 hours per year teaching students about high lift-and-drag evaluations, unpowered flying qualities and even aerobatics.*

U.S. Navy photo

*The variable-stability Learjet Model 24, developed by Calspan, appeared at USNTPS for the first time in mid-1981.*



U.S. Navy photo



*USNTPS students flew the North American T-2 Buckeye trainer from 1972 to 2007. Today, one of these aircraft is preserved on the school grounds.*



Advances in computer technology had an impact on training at USNTPS beginning in the 1970s with the introduction of aircraft capable of variable stability including the Calspan Learjet, which remains a cornerstone of flight training at the school today. Advancements in technology during that decade required the school to expand its curriculum again to incorporate airborne systems and to lengthen the syllabus from eight months to the current 11 months, which the school deemed sufficient to allow more flight opportunities and time to absorb class instruction and apply it in the air.

In 1983, the USNTPS family proudly received the Navy Unit Commendation for “extraordinary standards of excellence in safety, maintenance, curriculum advancement, and overall multi-nation test pilot training”—a citation that would have undoubtedly pleased Sherby. That same year, Lt. Colleen Nevius (Class 83) became the first female aviator to complete training at USNTPS.

The fall of the Soviet Union provided a unique opportunity for USNTPS technical collaboration when the Gromov Flight Research Institute near Moscow—Russia’s equivalent of Edwards Air Force Base—hosted nine instructors and staff in the summer of 1994. USNTPS returned the favor a year later when it hosted a Russian delegation.

That same year, the doors of USNTPS’ new schoolhouse first opened to welcome its first classes of students after its official dedication the previous year. The decade also saw the inauguration of the Short Course Department, which offers two-week introductory courses to the developmental flight test community.

In 2003, the Short Course Department added an Unmanned Aerial Vehicle course and considered the unique test requirements associated with fielding such systems. As the Navy significantly increased its investment in unmanned aircraft systems (UAS) over the decade, USNTPS maintained its leading edge by incorpo-

rating unmanned test concepts into its syllabus for test pilots and engineers of the future.

In the 2010s, small UAS platforms such as the ScanEagle and MQ-8 Fire Scout gave way to larger UAS platforms like MQ-4C Triton and MQ-25 Stingray, and the establishment of the Navy’s first dedicated squadron to unmanned platforms—Air Test and Evaluation Squadron (UX) 24. UAS systems are increasingly being incorporated into the syllabus, culture and organization of USNTPS, today helping ensure students are up to speed on the growing field of unmanned aviation.

As another decade dawns, USNTPS continues to evolve its curriculum to ensure graduates are capable of confronting the technical and programmatic challenges of the Naval Aviation Enterprise of today and tomorrow.

Today, USNTPS proudly provides instruction to Navy, Marine Corps, Army and Air Force aviators, in addition to aviators and engineers from 17 partner nations, and civil service engineers across Naval Air Systems Command. The school accepts around 36 students at a time and runs two courses of 11 months each year. Its fleet of 44 fixed-wing, rotary-wing and unmanned aircraft is the most diverse in the Navy, encompassing 14 different type/model/series.

As it has since Sherby’s time, USNTPS continues to innovate in order to maintain its status as one of the world’s pre-eminent flight test educational institutions, dedicated to providing cutting-edge educational and flying opportunities.

*Sources: United States Naval Test Pilot School Narrative History and Class Information, 1945 to 1982 and 1992 supplement; United States Naval Test Pilot School: 75 Years and Counting, 1945 to 2020.* ✈️



The school operates two U-6A Beavers as part of the Qualitative Evaluation program, which exposes students to the handling characteristics of a wide variety of unique aircraft.



The 11-month curriculum includes 530 hours of academic instruction in fixed-wing, rotary-wing and airborne/unmanned systems.

An early-model F/A-18 Hornet taxis at NAS Patuxent River.



The T-38C Talon is USNTPS’ primary fixed-wing trainer; the school’s 10 aircraft fly a combined average total of 1,100 hours per year.





# Global Sustainment Vision Overhauls I-level

By Kaitlin Wicker

Global Sustainment Vision and Commander, Fleet Readiness Centers (COMFRC) have standardized intermediate level (I-level) maintenance qualification, certification and licensing (Q/C/L) processes within the Advanced Skills Management (ASM) system.

**Q**ualifications for Sailors are now recognized across all Fleet Readiness Centers (FRCs), detachments and Aircraft Intermediate Maintenance Departments (AIMDs) ashore and afloat, eliminating the need for remediation with a change in duty station and enabling quicker delivery of maintenance, repair and overhaul services to the fleet.

ASM was first introduced to the FRCs and detachments in

methodologies between similar units. ASM couldn't translate the variances and there was no central authority controlling the naming and descriptions of each Q/C/L.

During Aviation Electronics Technician 2nd Class (AT2) Logan Watts' first change of command, he lost two of his qualifications.

"It took me two to three months at my second command to



Aviation Electronics Technician 2nd class (AT2) Logan Watts, left, setting up calibration for De-Ice Test set at Fleet Readiness Center West (FRCW) DET Fallon, Nev. Right, Aviation Ordnanceman 2nd class (AO2) Ian Courtney and AO2 Tristan Rice complete a ready for issue inspection and move a SUU-79B/A to K-pool for issue.

2010, followed by the AIMDs. The system changed the qualification, certification and licensing processes for I-level maintainers. It provided real-time access to training records that are critical for assigning qualified personnel to repair and maintain aircraft.

"ASM changed the way business was done. It gave us the ability to see the current qualifications of a Sailor in real-time allowing them to get to work more quickly," said Mike Walter, the standardization team lead for the Global Sustainment Vision program.

Prior to the recent standardization, each individual unit was responsible for the development and upkeep of all qualifications. The unintended consequence of this was the need to retrain military maintainers due to variations in naming and

get back up to speed. I thought a lot of that training was repetitious," Watts said.

The Global Sustainment Vision team recognized the need for maintainers to be able to transfer their qualifications from one site to another and made ASM standardization a priority.

Walter and his group gathered all of the information in ASM, consulted with subject matter experts from each site and created a democratic process to standardize naming conventions, configuration groups, titles, descriptions and training.

"The first wave migrated 20 percent of Q/C/Ls into similar and already active Q/C/Ls. Another 20 percent were deleted because they were unnecessary," Walter said. "We went on to review the remaining 60 percent and found more work could be done."



# Maintenance Training by Standardizing ASM

By standardizing the requirements for certain qualifications the team was able to delete 40 percent of the listed requirements because they were repetitive. All qualifications are now under the sole control and responsibility of the I-level model manager at COMFRC and the fleet administrators at each site to maintain consistency and standardization moving forward.

A reduction in time required to requalify translates to an increase in time on task which can directly increase readiness.

Watts changed commands again in February, checking in at the Fleet Readiness Center West detachment in Fallon, Nevada. The ASM standardization allowed him to start work right away.

"I'm already set to take my exams for Collateral Duty In-

spector. All I needed this time was a little on-the-job training," he said.

"With this standardization initiative completed, Sailors and Marines reporting to a new I-level unit with previously held qualifications will have those reinstated. Removing the variance of training processes between units will have an average 90-percent reduction in time required to requalify," Walter said.

"While we're not done yet, I am encouraged by the improvements people are already seeing. When this is complete, it'll be a game changer."

*Kaitlin Wicker is a communications specialist for the Global Sustainment Vision.* 🦋



AD2 Adam Sack, left, performs oil analysis checks on the spectrometer. Center, Aviation Machinist's Mate Airman, (ADAN) Juvonni Headd disassembles a LAU-17F/A for inspection at FRCW DET Fallon. AT2 Zachary Smith, right, performs calibration checks on a De-Ice Test set.

## New Name, Same Commitment: Global Sustainment Vision

To better align its focus with the Naval Sustainment System-Aviation (NSS-A), the Sustainment Vision 2020 program is now called the Global Sustainment Vision.

Global Sustainment Vision continues the program's reforms at the Fleet Readiness Centers, engineering and maintenance, organizational-level and surge areas to complement NSS-A initiatives.

"The program has not changed its mission nor its focus, only its name. Our teams are still creating products and processes

to equip military members and civilians to sustain Naval Aviation readiness," said Keith Johnson, Global Sustainment Vision director.

"NSS-A really brought to light much of what we were already working on. It was great to have another program come alongside us and say, 'yes, we need to fix this system,'" Johnson said.

In addition to the efforts spearheaded by NSS-A, Global Sustainment Vision continues refining and improving initiatives such as the Aircraft on Ground Cell and Mainte-

nance Operations Center, total resource visibility, the capacity model, a web-enabled capabilities database, depot-level certification of military personnel, standardization of the Advanced Skills Management software, training gap closure, readiness modeling and parts forecasting, and logistics and engineering sustainment.

Each of these threads is interwoven with those of NSS-A to fill the seams and produce sustained readiness for Naval Aviation.

—Kaitlin Wicker 🦋

# FRCE Finds Innovative Ways to Keep H-53 Airborne

**Editor's Note:** Improving readiness of the Navy and Marine Corps' heavy lift helicopter fleet is a top priority at Fleet Readiness Center East (FRCE). The following three articles demonstrate how artisans and engineers are applying innovation to produce parts necessary to maintain these helicopters.

U.S. Marine Corps photo by Lance Cpl. Kolby Leger

## FRCE Produces H-53 Fitting to Fill Supply Gap

By Heather Wilburn

**When supply system shortfalls led to a work stoppage on two H-53 heavy-lift helicopters at FRCE, the depot's manufacturing and engineering teams closed the gap.**

**M**anufacturing and material procurement issues prevented the helicopter's original equipment manufacturer from producing the vital 522 fitting FRCE artisans needed to continue work on the aircraft, said David Rouse, an H-53 aircraft planner and estimator at the depot.

The 522 fitting is one of the aircraft's main structural supports and carries the load for the helicopter's tail and tail pylon—about 30 percent of its volume—during flight operations.

After several attempts to acquire the part through standard channels, the H-53 line turned to FRCE's manufacturing branch for assistance—and the team came through. To date, they have completed one of two fittings needed.

*Model maker Chris McCoy, right, demonstrates to machinist apprentice Collin Grummert how to use a FaroArm coordinate measuring machine to verify the dimensions of a 522 fitting for an H-53 heavy-lift helicopter.*

"These deficiencies would have driven the aircraft into long-term work stoppage, thus decreasing fleet readiness," Rouse said. "To date, there has not been another manufacturer that has been successful in manufacturing the fittings within tolerances."

The collaborative efforts of FRCE's Manufacturing and Maintenance, Repair and Overhaul (MRO) Engineering branches have continually removed barriers and developed workarounds when there are issues in the supply chain. This time was no different, Rouse said.

Keith Linton, MRO Manufacturing branch head, said his team often receives requests to manufacture unique parts that are not in high demand nor financially viable for commercial suppliers.

The multi-step process starts with procuring the necessary materials and prepping them, in this case a block of aluminum. At the same time, the team works

with engineers to verify the part's model or drawings. Programmers then write the manufacturing code for the milling machine and the manufacturing process begins, Linton said.

Writing the program involves transferring the part's measurements and specifications from the drawings into a computer-aided manufacturing file that assigns a tool path to the milling machine, which cuts the component out of a solid block of material.

The machinist then sees the part through until the milling is complete. The complex 522 fitting took about 100 hours of milling time, which required long hours and weekend work for the machinists, Linton said.

"They're a dedicated team that really takes to heart their mission of supporting the fleet."

Once machined, the product is measured to ensure it meets the standard and the machinist hands it off to Quality Assurance to verify the measurements.

The part is then subjected to cleaning, non-destructive inspection, plating, paint, labeling and more. The entire process can take up to 200 hours of work.

Chris McCoy is the model maker responsible for shepherding the 522 fittings through the machining process.

"Every little detail has to be just right. You've got to be on point, because if one of these parts fail, an aircraft could fail—that's somebody's life in your hands," McCoy said. "There's a big sense of pride and accomplishment that goes along with it."

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



U.S. Navy photo by Heather Wilburn

## Teamwork, Ingenuity and Hard Work Overcome Production Challenges

By John Olmstead

An organizational realignment, ingenuity and collaboration between FRCE's aviation maintenance professionals and engineers is addressing supply chain shortfalls for critical components.

**F**RCE underwent a major restructuring when it transitioned to the Mission Aligned Organization (MAO), which re-aligned resources and skills, delegated and empowered the workforce and allowed decision-making at lower levels. For the H-53 component shop, this equated to an increase in communication and problem-solving to overcome production challenges.

"MAO literally brought all the team players together," said Lenny Domitrovits, Components Division director. "We now have aviation maintenance professionals, engineers and Defense Logistics Agency (DLA) personnel working together to remove barriers to production."

Three high-priority fleet components had supply chain issues, including the H-53 tail skid actuator, the H-53 main engine starter and the H-53 main engine fuel control; all were resolved.

The H-53 tail skid actuator raises and lowers the tail skid. The component line was faced with a shortage of motors needed to repair the actuator. DLA immediately started working on awarding the contract to expedite the delivery of the item. However, the time it would take for the vendor to deliver would result in an ever-increasing backlog.

"The solution came from one of our aviation maintenance professionals," said William Wilkinson, Components Branch head. "He said he could repair the motor. We normally replace the motor with a new one, and repairing it was not part of our normal workload."

Working closely with the engineering team, the maintainer was able to repair the motor using technical engineering instructions provided by the engineering department. The motor was disassembled, reworked, certified and made fully functional—a first with this type of motor.

"Instead of waiting for the part that would have taken weeks if not months to get, we were able to repair them in-house," Wilkinson said.

Another innovative solution involved FRCE coordinating



*Richard P. Boyd, an electrical equipment repairer at Fleet Readiness Center East (FRCE), works on the motor for an H-53 tail skid actuator.*

with Davis-Monthan Air Force Base in Tucson, Arizona, Naval Supply Systems Command and the H-53 Program Office to see if there were any like motors available. Davis-Monthan is the largest aircraft boneyard in the world and was able to salvage 35 motors. Each was thoroughly tested and the good motors were disassembled, reworked and made fully functional, and then installed on the actuators.

"Not only did our maintenance professional come up with the idea to repair the motor, but individually trained others. We now have six people repairing the motors," Wilkinson said.

The second component, the H-53 main engine starter, involved the time on wing—the length of time the motor can remain on the aircraft before it needs to be routinely replaced—making the demand a high priority.

"We were again faced with a critical supply chain shortage of the parts we needed," said Scott Lee, Components Branch head.

The component shop looked into reusing parts from other H-53 main engine starters that passed stringent tests.

"We are only able to do this because engineering is working



with us as part of the team to get those starters out,” Domitrovits said.

The third component plagued by parts shortages is the H-53 main engine fuel control.

“It is the No. 1 component that is impacting the fleet the most,” Lee said. “The parts must come from vendors who are certified to make all these little pieces that go into the fuel control.”

Facing critical supply chain shortfalls once again, the

component shop looked at the possibility of reusing parts that passed testing from engineering to assemble reworked fuel controls, and found they could repair it successfully.

“Before the changes under the Mission Aligned Organization, the backlog was above 60 for the fuel controls. Now it is in the 20s,” Domitrovits said.

*John Olmstead is the Fleet Readiness Center East Public Affairs Officer.* ✈

## Industry-Government Partnership Revives H-53 Rotor Head Program

*By Kimberly Koonce*

**FRCE is breathing new life into the depot’s H-53 rotor head program with a partnership agreement with Sikorsky that is generating positive results.**

In early 2019, fleet demand for H-53 main rotor heads exceeded the number the contractor could produce. While FRCE hadn’t conducted extensive production of H-53 rotor heads in several years, the depot had the facilities, skilled artisans and historical knowledge to produce the component.

To re-establish the rotor head program at FRCE, the depot entered into a partnership agreement with Sikorsky: Sikorsky continues to supply completed rotor heads

to the fleet, but also supplies FRCE with rotor head parts. The depot’s mechanics then provide the labor required to generate the additional rotor heads needed to meet fleet demand.

Since the agreement went into effect in March 2019, the shop has completed three rotor heads. The shop’s goal is to induct six rotor heads per quarter in calendar year 2020.

“We’re excited that FRCE can step up and help increase production numbers on these H-53 main rotor heads, which are a critical requirement for the fleet,” said Commanding Officer Capt. Mark E. Nieto. “Aircraft maintainers here at FRCE and across the fleet will be able to complete maintenance on these aircraft and get them back to the warfighter without delays.”

Allen Broadway, Dynamic Components Maintenance, Repair and Overhaul branch head, noted that while there was some uncertainty about resuming the program, they took a proactive approach to identify and address production barriers.

A comprehensive logistical assessment was initiated to include key stakeholders such as supervisors, program managers, engineers, hazardous material supply personnel and Defense Logistics Agency employees. Team members brainstormed to plan for any possible hurdles that could get in the way of success.

Since parts availability had previously created challenges for the program, the team looked for ways to guarantee that artisans would have the parts they needed, Broadway said.

One strategy was to set aggressive “full-kit” dates to gather all the individual elements that make up the entire rotor head. The kits had to include every part that made up the rotor head, so the artisans had everything they needed to complete the rotor heads.

Workforce training was another concern the planning team addressed.

“There had been a lot of employee turnaround; a lot of knowledge had been lost due to retirements or promotions,” Broadway said.

Although many artisans had not performed the cleaning and non-destructive inspection processes before, senior mechanics shared their expertise with newer artisans to ensure everyone was ready to work on the rotor heads.

*Kimberly Koonce supports Fleet Readiness Center East Public Affairs.* ✈



U.S. Navy photos by Kimberly Koonce

*Lora Vidana, an aircraft mechanical parts repairer in FRCE’s Rotor Head/Landing Gear Shop, inspects a sleeve and spindle that will be installed on an H-53 main rotor head.*



*Joseph Farr, an aircraft mechanical parts repairer at FRCE, inspects a completed H-53 main rotor head. FRCE recently revived its H-53 main rotor head program through a partnership with Sikorsky.*



# UX 24 UNMANNED AIRCRAFT TEST



*Air Test and Evaluation Squadron (UX) 24 is the Navy's first test squadron dedicated to research, development, test, evaluation and experimentation for Navy and Marine Corps Unmanned Aircraft Systems (UAS).*

*Commissioned in 2018, the blended team of military and civilian pilots, operators and testers support a range of fixed- and rotary-wing UAS for Programs of Record including the RQ-20 Puma, RQ-21 Blackjack and MQ-8 Fire Scout. The "Ghost Wolves" also support counter-UAS testing for naval bases across the country, as well as test support for urgent fleet needs, research institutions and other federal agencies.*

*—Cmdr. Matthew Densing, former Commanding Officer, and  
Cmdr. Daniel Martin, Commanding Officer*

**SPECIAL SECTION: AIR TEST & EVALUATION SQUADRON (UX) 24**

## UX-24 Expands Fire Scout's Operational Flexibility



*The first MQ-8B and MQ-8C Fire Scout shipboard detachment took place onboard the Littoral Combat Ship (LCS) USS Independence (LCS-2) with aircraft assigned to UX-24.*

U.S. Navy photo

*By Cmdr. Jennifer “Chewie” Thomas*

Fire Scout’s first combined MQ-8B and MQ-8C shipboard detachment took place aboard the littoral combat ship (LCS) USS Independence (LCS-2) in the spring of 2019. Working through challenging conditions, UX-24 successfully expanded the UAS’ launch and recovery wind envelope aboard LCS-class ships, thus expanding the operational flexibility of the MQ-8.

**A**head of the dual detachment, testing during a solo LCS shipboard detachment with MQ-8C revealed significant issues with an uncommanded lateral drift on take-off. With a tight timeline, the original equipment manufacturer rapidly designed and deployed a software change that corrected the problem for successful flight test.

The UX-24 detachment faced numerous coordination challenges including the need to coordinate requirements with Fire Scout’s program office, shipboard resources, schedules and scope of each test period that constantly changed before and during underway test periods.

The team completed shore-based testing of the new software version addressing the drift issue that occurred just three weeks before the underway period. Operational tasking received by the ship compounded the complex coordination during the test team’s planned underway period.

After the team expedited shipping the aircraft and personnel

transport to support early departure, the ship was re-tasked in support of Portland’s Rose Festival during which UX-24 supported MQ-8 static displays.

UX-24 completed 17.9 hours of test over five fly-days during the 24-day embarkation—and still accomplished nearly all the required test points despite tasking that changed rapidly and unfavorable winds. In addition, the detachment collected valuable data on the targeting system’s payload video and datalink performance at longer ranges from the ship.

The UX-24 test team’s perseverance helped the development of both the revised launch and recovery wind envelope for the MQ-8C as well as an expansion of the fleet’s current MQ-8B launch and recovery wind envelopes aboard Independence-class LCSs. These outcomes have improved the operational flexibility of the Fire Scout aboard ship and paved the way for future successful Fire Scout detachments. 🌀



## UX-24 Participates in Logistics Test Exercise

By Mark Richardella, UX-24 Flight Test Engineer

In March 2019, the Naval Air Warfare Center Aircraft Division (NAWCAD) Rapid Prototyping, Experimentation and Demonstration (RPED) Office hosted the first NAWCAD Advanced Naval Technical Exercise (ANTX)/Test-Exercise (ATE). This comprehensive mission-based event hosted various live, virtual and constructive (LVC) experiments to support several key fleet initiatives.

UX-24 hosted and supported a limited operational experiment for the Blue Water Maritime Logistical Unmanned Air System (BWUAS). The BWUAS experiment was designed to allow industry competitors to operate and showcase the ability of their UASs to autonomously transport a small payload from Webster Outlying Field (WOLF), St. Inigoes, Md., to an underway ship located several miles away on the St. Mary's River.

Vendor UASs included the Schiebel S-100 Camcopter RW system and the Skyways V2.20b Electric VTOL system. Extensive coordination with Georgia Tech Research Institute, Industry Competitors, NAWC Atlantic Test Ranges and Targets and the RPED Office was required to execute this set of events.

To mitigate the risk to vendor UAS operations, UX-24 project officers, flight test engineers and leadership created and approved a detailed test plan.

Throughout the process of developing the plan, UX-24 personnel diligently reviewed UAS documentation, including operating manuals and RCC 323-99 Range Safety Questionnaires, to appropriately assign safety mitigations to each UAS. Team members coordinated airspace, shipboard operations and procedures and provided course rules briefs to contractor operators.

During the experimentation period with the NAWCAD ship USNS Relentless (T-AGOS-18), UX-24 project officers performed system inspections and provided oversight and support to contractor UAS operations as well as overflight support with UX-24 RQ-20B Puma assets to aid in overall operational situational awareness. With this support, vendor operators were able to safely and successfully monitor multiple build-up flights and, more impressively, multiple autonomous land and sea-based launches and recoveries at WOLF and aboard Relentless, respectively.

UX-24, through its support in the ATE BWUAS, helped evaluate the potential to meet the Military Sealift Command's requirement for logistical replenishment. As a result, NAWCAD has contracted one prototype Skyways V2.50 heavy fuel variant for further prototyping and experimentation, which is scheduled for delivery to UX-24 in fiscal 2020. Upon its delivery, UX-24 will provide test and operational support of an expansion of BWUAS experimentation efforts with the Skyways V2.50 UAS. 🐾



U.S. Navy photo

*Skyways V2.20 Logistics UAS in flight. UX-24 will provide test and operational support of the Skyways V2.50 UAS.*

## Exploring Fire Scout's Operational Potential Onboard ESB-Class Ships

By Lt. James "Grumpy" Stranges

The MQ-8 Fire Scout has had several deployments on multiple Oliver Hazard Perry-class frigates and is now operating exclusively aboard littoral combat ships (LCSs). This year, a new and exciting opportunity presented itself for the Fire Scout to expand its operational concept to include the Navy's Expeditionary Sea Base-class (ESB) ships.

**T**he ESB-class ships provide the Navy with floating sea bases that can be prepositioned off any coast, anywhere in the world. Built on the hulls of oil tankers, these ships provide highly flexible platforms from which a

wide range of military operations can be conducted. They are optimized to support a variety of maritime-based missions, including Special Operations Force and Airborne Mine Countermeasures. ESB has a massive, mid-ship flight deck

*Ghost Wolf 306 conducts launch and recovery wind envelope expansion testing at Webster Outlying Field (WOLF), St. Inigoes, Md., to prepare for the ESB-4 detachment.*



U.S. Navy photo by Paul Lagasse



U.S. Navy photo

*The UX-24 MQ-8 Fire Scout Dynamic Interface team embarked on USS Hershel "Woody" Williams (ESB-4) to develop launch and recovery wind envelopes for MQ-8B/C Fire Scout in 2020.*

with four spots, a hangar and mission bay. The ship is crewed by the Military Sealift Command, commanded by a Navy Captain and has the ability to support a military component of up to 250 personnel.

This March, the UX-24 Dynamic Interface (DI) team embarked on USS Hershel "Woody" Williams (ESB-4) for a 10-day test evolution. Months of planning culminated in the first launch and recovery of the MQ-8C onboard an ESB-class ship. The UX-24 team completed 19.1 flight hours, 45 launch and recovery operations and collected data to support the development of two launch and recovery wind envelopes that will enable the fleet to operate from ESBs.

The ESB presented several unique challenges. Unlike the LCS, the ESB did not come with control stations built into its combat control rooms. To operate the Fire Scout, a modular control room called the Mobile Mission Control Station (MMCS) was installed on the bow of the ship. The MMCS is a standalone control station, located in an air-conditioned container, where the air vehicle operator and mission payload operator control the air vehicle (AV) and its payloads.

Due to the unique mid-ship flight deck between a forward and aft super structure, the standard stern approaches used by the Fire Scout on every other class ship are not feasible on the ESB. To counter this challenge, a new approach was developed that requires the AV to make its approach to a position over the water, adjacent to the flight deck. From this position, the AV then conducts a lateral slide to a position over the flight deck prior to landing—a flight profile that had never been attempted with a shipboard landing.

To prepare for integrating this new flight profile, the DI team first conducted the planned shipboard approaches on shore. During the shore-based test, the team used telemetry to monitor AV



flight parameters and control margins in real-time, ensuring the AV would be able to conduct the approaches without exceeding any limits or running out of control authority during actual ship-board landings. After successful shore testing, the military and civilian team with a truck full of telemetry equipment took the MQ-8C to sea on “Woody,”

where the team successfully completed the first launches and recoveries of the Fire Scout on the ESB while evaluating how the AV handled the newly designed ship approaches.

UX-24 is extremely excited to expand the operational capability of the Fire Scout by incorporating it into the ESB’s concept of operations. Fire Scout has a

history of providing the special operations community with a reliable and organic intelligence, surveillance and reconnaissance platform. The combination of the increased endurance of the MQ-8C and the capability to operate from ESB-class ships will provide tremendous new opportunities to support the warfighter in the future. 🐺

## MQ-8C’s Surface Warfare Upgrade: Integrated, Capable and Ready to Fly!

By Lt. Neil “Shivo” Whitesell

UX-24, in support of the MQ-8 Fire Scout program, set an aggressive goal to deliver a fully tested surface warfare (SUW) upgrade to the MQ-8C Fire Scout fleet at an accelerated pace.

**T**he SUW increment is designed to integrate the new AN/ZPY-8 maritime surface search radar with the proven BRITE Star Block II (BSBII) targeting turret, and the powerful Minotaur processing suite aboard the MQ-8C.

The radar will provide long-range detection and tracking and radar imaging capabilities. Fielding of the AN/ZPY-8 equipped MQ-8C will enhance the aircraft’s current maritime intelligence, surveillance and reconnaissance (ISR) capabilities and enhance the lethality of the new Littoral Combat Ship-based Naval Strike Missile by providing an unmanned,

organic over-the-horizon targeting platform. The AN/ZPY-8, in concert with Minotaur’s track and mission management system, will also provide increased overland ISR capability through moving-target detection and BSBII video moving target indications.

UX-24 fully embraced a capabilities-based test and evaluation approach that focused its efforts on the capabilities most desired by the fleet using direct, inclusive coordination with the operational test community and Naval Aviation Warfare Development Center experts to accelerate the capability’s delivery. The test squadron developed an optimized, tactically focused test program that will serve the needs of both fleet operators and the test organizations and expects evaluation of the SUW increment to continue through summer 2020 in support of an initial fleet deployment in early 2021.

The test team is cleared to launch and ready to test! 🐺



U.S. Navy photo by Paul Lagasse

Ghost Wolf 304 conducts an Electromagnetic Compatibility Safety of Flight Test in advance of flight testing of the AN/ZPY-8 Maritime Search Radar.



U.S. Navy photos by Paul Lagasse



The X-UAV Talon in flight at WOLF. The Talon is capable of carrying multiple payloads and sensors during counter-UAS exercises like Checkmate.

## ‘Ghost Wolves’ Host Counter-UAS Experiments

*By Lt. Ameer “Jabroni” Mulcahy and  
Flight Test Engineer Richard Dinio*

In March 2019, the Naval Air Warfare Center Aircraft Division (NAWCAD) Rapid Prototyping, Experimentation and Demonstration (RPED) Office partnered with UX-24 to host the first in a series of exercises, designated Checkmate. These exercises are designed to allow multiple Navy systems commands and industry partners to experiment with using small unmanned aircraft systems (sUAS) and other systems to assess counter unmanned aircraft systems (CUAS) capabilities. UX-24 is a key player in exploring, developing and assessing CUAS capabilities for the fleet.

“We specifically designed this event to be representative of the real world and simulate challenges that the warfighter faces,” said Christina Allee, NAWCAD’s director of systems experimentation. “Events like these go a long way in bringing home our naval forces safely.”

The latest Checkmate exercise involved experiments carried out in three phases throughout 2019. Phase one involved UX-24 sUAS red team threats that targeted a blue team land-based virtual ship, with co-located CUAS systems acting as defense. Phase two involved the squadron’s sUAS red team threats targeting a surrogate surface ship, also co-located with blue team land-based CUAS systems acting as defense. Phase three involved “burning” a weaponized sUAS threat. The final phase featured flight of an armed DJI Mavic Pro and



U.S. Navy photos by Paul Lagasse

*Lt. Cmdr. Kyle "Sock" Matthew conducts preflight, launch and recovery of the E-Flite Optera UAS with assistance from flight test engineer Todd Stubblebine.*

three incendiary demonstrations that ignited on ship-representative materials (i.e. steel, fiberglass) to assess threat effectiveness.

"As we stepped through the Checkmate phases, we learned many lessons that will have an incredible impact on naval vigilance," said Jim Tomasic, RPED's lead experimentation engineer. "The test team really came together to support this event. Without their dedication and ingenuity, we wouldn't have seen such progress."

In total, the test team supported nearly 30 hours of flight test, more than 15 UAS platforms and over 50 UAVs that flew from six launch sites in support of the exercise.

The multi-phase effort required meticulous communication and coordination among all event participants including NAWCAD, Naval Surface Warfare Center, U.S. Naval Research

Laboratory, industry partners and more. The team's successful planning provided effective blue and red team site locations and system standoffs from the beginning to align priorities and resources for optimal facilities and test operations.

Execution began with UX-24's initial test plan that evolved in iterations to support the three demonstration periods. Air traffic control was of significant concern since both the red and blue teams required dual operations in an active airspace. To mitigate risk, UX-24's test team developed specialized briefs to address airfield management, environmental concerns and fire hazards for safe and transparent experimentation.

The test team also verified the configuration and capability of multiple Group 1 and 2 commercial UASs provided by industry participants to ensure successful flight strategy and accurate performance of aerial payload

attacks and reconnaissance. Phase three required the team's platform installation of payload drop mechanisms, the design and fabrication of 3-D printed unguided bomblets, and the preparation of mission profiles and plans in support of concurrent operations across multiple sites.

Checkmate speaks to the heart of developmental flight test—it enabled both red and blue teams to improve their systems' characterization and identification and to refine tactics, techniques and procedures as both aggressors and defenders. The exercise also provided an opportunity to integrate multiple CUAS systems for joint Navy systems commands operations within the ever-changing sUAS threat architecture.

UX-24 is excited for the new capability CUAS will bring the fleet as we continue experimentation through 2020 and beyond. 🐺

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# Professional Reading

By Cmdr. Peter Mersky, USNR (Ret.)



## ***Hellcat vs Shiden/Shiden-Kai, Pacific Theater 1944-45***

By Tony Holmes, Osprey Publishing, Oxford, UK. 2019. III

Stepping out of his role as Osprey's premier aviation book editor, Tony Holmes wrote this authoritative view of two of the late Pacific War's most capable fighters, the U.S. Navy's F6F-

3/5 Hellcat and the Imperial Japanese Navy's (IJN) late-war design Kawanishi N1K1/2 Shiden and upgraded Shiden-Kai.

While Grumman was responsible for several of the Navy's fighters of the war, Kawanishi designed the IJN's heavy flying boats that fought throughout the Pacific War. Thus, it was unusual that Kawanishi would come up with one of that time frame's potentially premier naval fighters that threatened to strip a few cogs in the U.S. Navy's now-well organized and equipped machine that was running almost unchecked across what had once been something of a Japanese lake in 1942. Indeed, had there been enough of these rather chunky but well-armed fighters in the few remaining IJN fighter squadrons to confront the oncoming Allied fighter fleet, the U.S. might have suffered quite a few more lost Hellcats and Corsairs at the hands of the few remaining Japanese aces that knew what to do with their new fighter.

Using the established format of the Duel series, which he designed—this being No. 91—Holmes describes each fighter's gestation and eventual service introduction. The Hellcat's history is fairly well known, but that of the Shiden's may not be in the detail that the author offers. How it came to be and its eventual final design is a very unusual story.

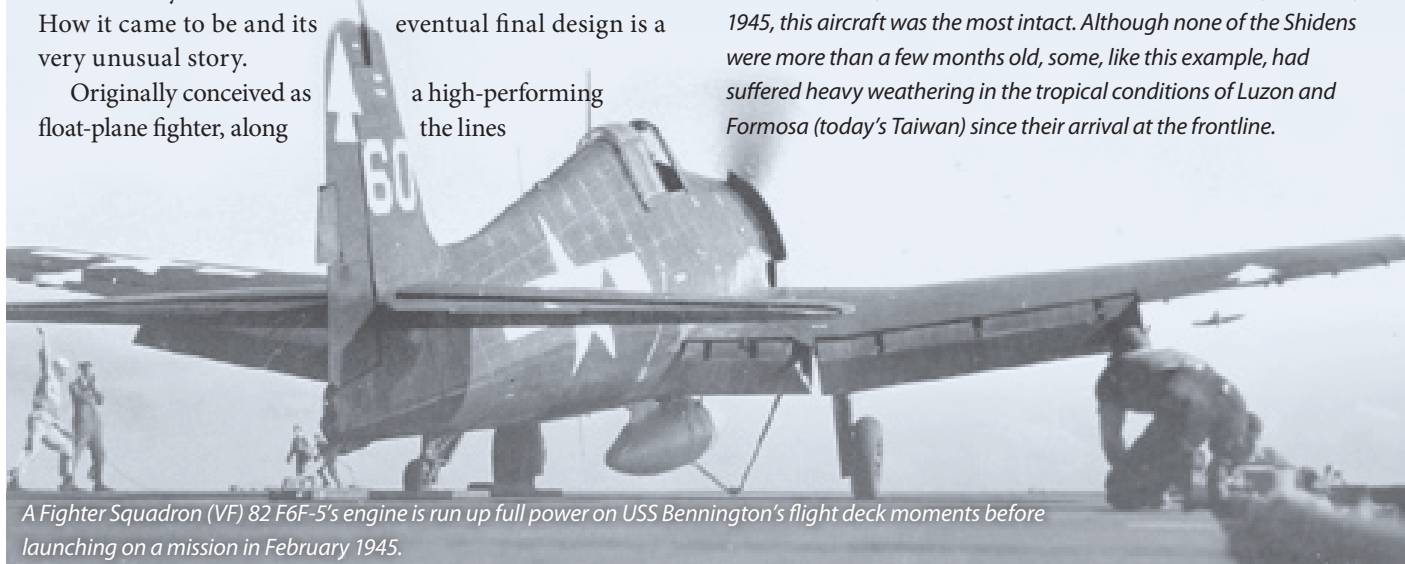
Originally conceived as a high-performing float-plane fighter, along the lines



*Bombing Squadron (VB) 17's Lt. Fred Prinz crash-lands back onboard USS Hornet after his F6F-5 was hit hard in the port wing by cannon rounds fired by the N1K2-J of Lt. Takashi Oshibuchi during the Kura strike on March 19, 1945.*



*Of the handful of 341st Kokutai (Naval Air Group) N1K1-Js found at Marcott (an outlying field on Luzon, Philippines) in January-February 1945, this aircraft was the most intact. Although none of the Shidens were more than a few months old, some, like this example, had suffered heavy weathering in the tropical conditions of Luzon and Formosa (today's Taiwan) since their arrival at the frontline.*



*A Fighter Squadron (VF) 82 F6F-5's engine is run up full power on USS Bennington's flight deck moments before launching on a mission in February 1945.*



Artist Gareth Hector's fine cover scenes, left, shows VF-82 F6F-5 Hellcats in combat with Shiden-Kais on April 7, 1945. Right, a Shiden-Kai fights with Hellcats on April 12, 1945.

of Mitsubishi's A6M2-N Zero float fighter—codenamed “Rufe”—that fought in the Solomons campaign of 1942, the N1K1 Kyofu, named “Rex,” served in fairly small numbers and was rarely engaged by Allied aircraft. Whereas the Rufe saw combat with U.S. Navy Wildcats over Guadalcanal and its vicinity. On the other hand, as Holmes notes, the Hellcat saw its first combat in September 1943 and kept going, the Dash-3 soon giving way to the Dash-5.

The interior graphics by Osprey artist Jim Laurier are at their usual superior level, as are the cover graph-

ics and the two-page “battle scene engagement” by Scottish artist Gareth Hector. Laurier's three-views and depiction of each type's cockpits—something of unusual hard-to-find references—continue to be interesting high-points of this series.

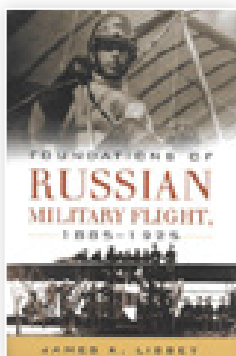
The people who flew and fought these aircraft are certainly not ignored and biographies and brief descriptions of a few of each side's representative aviators round

out this book, one of the best in the long-lived *Duel* series. Highly recommended. 🛩️



An instructor from the Tsukuba Kokutai runs up his Shiden's Homare engine while ground crew keep an eye on the aircraft's fragile undercarriage legs.

Photo courtesy of Tony Holmes Collection



## ***Foundations of Russian Military Flight, 1885-1925***

By James K. Libbey  
Naval Institute Press  
Annapolis, MD. 2019.

This mini history is unusual in its time frame and scope of Russian social and political events and how they applied to early aviation activities and developments of the transitional period

between the 19th and 20th centuries.

We normally consider specific periods such as World War I and World War II and the troublesome years of the Korean War and its aftermath where the world was divided between the western side of American and NATO allies against the Soviet Union and its bloc of European puppet states.

With the fall of the USSR in the last decade of the last century, Russia had a very active aviation-oriented society that strove to place its country in the leadership of aviation

design and development. Such lofty aspirations were not easy to realize.

This author wrote a well-received biography (Potomac Books 2013) of Russian-born aviation pioneer Alexander P. de Seversky, a Russian Navy World War I ace who emigrated to the U.S. There he began an aviation manufacture company that eventually became Republic Aircraft, makers of the P-47 Thunderbolt and jet aircraft like the Korean War F-84 Thunderjet and F-105 Thunderchief that flew thousands of sorties during the Vietnam War. His company was responsible for several pre-World War II designs such as the P-35 single-seat fighter, a few of which saw brief action in the days following Pearl Harbor.

His new book opens a window into aviation activities in Czarist Russia and follows those groups into the revolutions that changed Russia and the world in so many ways. The book discusses what became of the Soviet Union in the mid-1920s and how it formed the nearly monolithic nation and society the world came to know during the late 1930s. Russia then allied itself somewhat uncertainly with its western neighbors to fight and defeat Nazi Germany in World War II. 🛩️

# Squadron Spotlight

## Air Test and Evaluation Squadron (UX) 24

**Established:** Oct. 18, 2018

**Based:** Naval Air Station Patuxent River, Maryland

**Commanding Officer:**  
Cmdr. Matthew Densing

**Mission(s):** *Execute developmental flight test for a variety of unmanned aircraft systems (UASs) including flying qualities, performance, mission systems, reliability and maintainability, high-fidelity simulation and flight control software development.*

**Brief History:** Formerly the Unmanned Aircraft Systems Test Directorate, UX-24 is the Navy's only dedicated UAS test unit. UX-24 provides research, development, test and evaluation and acquisition services for Groups 1-4 UAS, including fielded platforms such as RQ-20B Puma, RQ-21 Blackjack and MQ-8 Fire Scout. Located at NAS Patuxent River's Webster Outlying Field (WOLF) in St. Inigoes, Maryland, the squadron takes advantage of WOLF's unique capabilities including two 5,000-foot runways, direct entry into restricted operating areas with no FAA coordination needed, exclusive-use areas available for small UASs, proximity to water for UAS maritime operations, and a dedicated UAS operations center.

UX-24's team is comprised of experts in the unmanned aircraft test community from engineers and air vehicle operators to United States Naval Test Pilot School graduates. In addition to supporting Programs of Record, the team also supports warfighter Urgent Needs Statements as well as test demands from sister services, other government agencies and research institutions.

**Aircraft Flown:** MQ-8B/C, RQ-20, RQ-21, RQ-26 and numerous commercial-off-the-shelf UASs

**Number of People in Unit:** 24 military (Navy and Marine

Corps); 19 civilians and 8 contractor aviators, 41 contractor maintenance, 21 civilian engineers

**Significant Accomplishments:** In 2019, UX-24 executed 370 sorties totaling 941.8 hours across its assigned platforms while conducting its RDT&E mission during shipboard detachments for dynamic interface testing, providing carrier strike group counter-UAS (CUAS) support, and participating in numerous training exercises with Navy, Joint Force and civilian partners.

MQ-8 Fire Scout conducted two firsts with the Littoral Combat Ship community. The Dynamic Interface test period aboard the USS Milwaukee (LCS-5) in January 2019 was the first MQ-8C detachment to a Freedom-variant LCS. The test team developed an initial MQ-8C starboard wind envelope. The second Fire Scout shipboard detachment to USS Independence (LCS-2) in June 2019 was the first combined MQ-8B and MQ-8C shipboard detachment. The team developed a new port departure envelope for the MQ-8B.

The squadron's Small Tactical UAS (STUAS) team completed several test events during the year. For RQ-21A Blackjack, they conducted regression testing on a major software update that was fielded within three months of test completion. The team coordinated the integration and testing of the Battle Management System weapons delivery payload and Stellar Beam Beyond-Line-of-Sight command and control datalink. Using the RQ-26A Aerostar, the team supported a high-visibility event for the E11 laser program. Finally, using the RQ-20B Puma, they determined the impact accelerations imparted to an i45 payload during operationally representative landings.

In December 2019, UX-24 established a STUAS CUAS test team to support the program office tasked with handling acquisition and sustainment of CUAS systems. This test team will be responsible for ground and flight test using small UAS against CUAS equipment emplaced at DOD bases across the U.S. and abroad.



U.S. Navy photo

# I AM NAVAL AVIATION

Aviation Boatswain's Mate (Handling) Airman Christopher Nardelli, CVN-78



# NAVAL AVIATION NEWS