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An F/A-18E Super Hornet from Strike Fighter Squadron (VFA) 136 flies over the California coast.

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On the cover: An F-35C Lightning II attached to the “Argonauts” of Strike Fighter Squadron (VFA) 147 completes a flight over Eglin Air Force Base in Fort Walton Beach, Fla. (U.S. Navy photo by MC Chief Shannon E. Renfroe)

The F-35C Lightning II graces our cover again this issue after achieving initial operating capability Feb. 18. Strike Fighter Squadron (VFA) 147 shares how they transitioned from the F/A-18 Super Hornet to the F-35C.

Most of this issue focuses on readiness reforms implemented as part of the Naval Sustainment System initiative. We follow the progress made at Fleet Readiness Centers and the operational-level reforms at Naval Air Station Lemoore, California.

On the back cover: Aviation Structural Mechanic Airman Javier Perez performs a daily turnaround inspection on an MH-60S Seahawk helicopter, assigned to the “Chargers” of Helicopter Sea Combat Squadron (HSC) 14, aboard aircraft carrier USS John C. Stennis (CVN 74). (U.S. Navy photo by MC Joshua Leonard)
Naval Sustainment System: Fleet Readiness Centers Improving Readiness

By Rear Adm. Mike Zarkowski, Commander, Fleet Readiness Centers

As we move into the third quarter of the fiscal year, we continue to keep our sights set on increasing the mission-capable rate of F/A-18E/F Super Hornets.

Part of the Naval Sustainment System (NSS) model, Fleet Readiness Center (FRC) reform is driving our efforts on the Super Hornets, and those reforms and process improvements will be applied across other type/model/series (TMS) aircraft as we continue the push to increase readiness.

Commander, Fleet Readiness Centers (COMFRC) has a three-pronged approach:

- **Kitting**—having materials sorted in the receiving area and ready for use
- **Demand Management**—treating the artisan as a surgeon with all his tools, equipment and parts available around the aircraft prior to beginning the work
- **Built-in Quality**—communicating more openly and frequently with fleet squadrons

It’s all about velocity and getting aircraft, engines, components and support equipment through repair lines and back on the flight line as quickly as possible.

At FRC Southwest (FRCSW), the first depot to undertake NSS, they saw an initial 30-percent reduction in the number of issue-priority-group-one backorders or unfilled high-priority requisitions, and it continues to improve.

Depot-level transformation at FRCSW is focused around three activities:

- **Shop transformation**—prioritized by shops that most affect Super Hornet readiness, including the hydraulics, landing gear, canopy and generator convertor unit shops
- **Piece-part availability**—addressing issues inhibiting repairs and resolving material delays
- **Sustainability enablers**—creating necessary changes to people, processes and systems to ensure gains are sustainable

At Naval Air Station (NAS) Lemoore, California, FRC West (FRCW) has applied the same best practices, resulting in significant changes to their Planned Maintenance Interval (PMI) line. Planned maintenance is a proactive approach in which specific maintenance is scheduled on a regular basis.
Improvements at FRCW include the following:

- Maintaining standards designed to ensure the safety of the workforce
- Creating spaces and processes that maximize an artisan’s time spent on an aircraft
- Starting work on an aircraft only when the full work package is understood
- Ensuring supplies are in stock or easily ordered and tracked
- Staffing PMI lines with appropriate numbers and capabilities to meet the demand
- Providing engineering and analysis resources for faster turnaround times
- Inducting only mission-capable aircraft

In addition, each aircraft is assigned a dedicated work crew—along with a crew lead—and all the tools and equipment required to do the job. The creation of a PMI Planning Cell and Production Control Center (PCC) have also contributed to overall improvements. The stakeholders meet once or twice a day as a PMI Planning Cell to discuss the progress and barriers as well as plan for maintenance prior to aircraft induction. The PCC houses a status board that tracks all outstanding work orders and days to completion.

Results include a reduction in the PMI work in process from 10 to six aircraft, a significant reduction in engineering turnaround times and an increased focus on expediting delivery of needed parts. The frequency and depth of communication with squadrons and the air wing has also improved.

**NSS changes are working**

The average turnaround time for the last four aircraft processed at Lemoore, which were all returned to squadrons as mission capable, was 58 days, a marked improvement over the previous rate of 120 to 150 days. The early returns give us confidence that we are moving in the right direction and will be able to achieve our readiness standard for the Super Hornet.

While the reforms started officially at FRCSW and FRCW, we sent our folks from the other FRCs to North Island and Lemoore to observe and learn the new processes. This has enabled the other sites to hit the ground running and they are making significant improvements already.

On April 30, Naval Aviation kicked-off the local NSS initiative at FRC Mid-Atlantic (FRCMA) located at NAS Oceana, Virginia. FRCMA implemented the lean manufacturing 5S process—shine, sort, standardize, straighten and sustain—at all sites and has increased their workload to include operational level (O-level) maintenance in order to return the aircraft to the fleet “ready to fly.”

At Marine Corps Air Station Cherry Point, North Carolina, FRC East (FRCE) started its NSS reforms May 20, setting up PCCs and installing issue boards with metrics, analysis and data visualization in their Super Hornet shops. They launched rapid problem-solving shop support teams and instituted daily meetings to discuss equipment status and issues and update workflow boards.

The pre-planning benefits seen at FRCE include:

- Improvement in team synergy and support personnel integration
- Resolution of 115 issues
- Improved production rates
- Reduction in back orders

FRCE will continue to refine the three Super Hornet shops—valves and regulators, starters and turbines, and auxiliary power units and fuel accessories—based on lessons learned from their benchmarking trip to FRCSW and implement tier-two-elevation process improvements.

FRCE is also implementing NSS on the F-35 modification line with PCCs and aircraft status and issue boards, plus aggressively focusing on 5S.

At NAS Jacksonville, Florida, FRC Southeast (FRCSE) is implementing a visual management system in four phases: components and industrial processes, engines, Super Hornet line, and trainer and vertical-lift aircraft. In addition, FRCSE developed value-stream maps of Super Hornet processes showing the flow of products through value added and non-value added activities, including aircraft, engines and components, current state maps, standardized visual equipment status boards and standardized signage. FRCSE is scheduled to begin its NSS initiative in late July.

FRCSE also established a PCC for F414 engines, with plans to do the same for TF34 and F404 engines.

The FRCs are making tremendous progress, and I am confident that the
The number of mission-capable Super Hornets will continue on an upward climb because of these efforts.

The integration of each NSS pillar to address all elements of aviation maintenance—people, parts and processes—to make permanent changes is essential. Each piece of the model has made significant improvements, and to have all of us pillar leads—the FRCs, supply, engineering, O-level, surge cell—talking to each other and working together to support the long-term sustainment of mission-capable Super Hornets is paramount to our success.

We will continue to make improvements. I am proud of the great work our FRCs have accomplished in the seven months since implementation of NSS. The goal we have been tasked with is a lofty one, but I don’t know of another group of individuals who could do it better. Keep fixing for the fight!

Rear Adm. Mike Zarkowski is a native of Bucks County, Pennsylvania, and a 1987 graduate of Millersville University of Pennsylvania. He was designated an aerospace maintenance duty officer in 1988.

He attended the U.S. Naval Postgraduate School in Monterey, California, and received his Master of Science in material logistics support management in June 1998. In 1999, he was designated an Acquisition Corps member.

Zarkowski’s operational assignments include tours as a maintenance material control officer (MMCO) in Airborne Early Warning Squadron (VAW) 123, MMCO/assistant maintenance officer in Fighter Squadron (VF) 32, carrier air group maintenance officer in Carrier Air Wing (CVW) 17 and aircraft intermediate maintenance department officer aboard USS Harry S. Truman (CVN 75). During these tours, he participated in Operations Desert Storm, Enduring Freedom and Iraqi Freedom aboard USS America (CV 66), USS Dwight D. Eisenhower (CVN 69) and USS George Washington (CVN 73).

His shore tours include airframes/avionics division officer, Aircraft Intermediate Maintenance Department, Norfolk, Virginia; assistant chief of staff for logistics, Commander, Strike Force Training Atlantic and Aviation Readiness; support equipment director, and Commander, Naval Air Force Atlantic Fleet, Norfolk; Commander, Fleet Readiness Center (COMFRC) Mid-Atlantic, Oceana, Virginia.

Zarkowski’s acquisition tours include deputy program manager, Consolidated Automated Support System Electro-Optics Plus in Aviation Support Equipment; aide to the Commander, Naval Air Systems Command; Autonomic Logistic Systems Engineering Integrated Product Team lead, the Joint Strike Fighter Program Office; and COMFRC Mid-Atlantic.

He assumed command of COMFRC at Naval Air Station Patuxent River, Maryland, in June 2016. He previously served as vice commander, COMFRC, from 2014 to 2016.

Zarkowski earned his Professional Aviation Maintenance Officer Wings and has been awarded the Legion of Merit (two awards), Defense Meritorious Service Medal, Meritorious Service Medal (four awards), Navy/Marine Corps Commendation Medal (three awards), Navy/Marine Corps Achievement Medal, Battle Efficiency Award (two awards) and the Thomas Hudner Leadership Award.
I’m just sadly shakin’ my head with downcast eyes over this fiasco. Never were truer words spoken than when somebody etched in stone the following: “Flying is inherently dangerous, but it is mercilessly unforgiving of human error.”

The Harrier pilot simply failed to keep track of his angle of attack. Do that down low and slow in the traffic pattern and you’re invitin’ trouble—and trouble will have absolutely no problem findin’ you.
USS Gerald R. Ford Accepts Two Advanced Weapons Elevators

NEWPORT NEWS, Va.—The Navy’s newest aircraft carrier, USS Gerald R. Ford (CVN 78), marked major milestones with the recent deliveries of its first two advanced weapons elevators (AWEs), setting the tone for more positive developments in the year ahead.

AWE Upper Stage No. 1 was turned over to the ship Dec. 21 following testing and certification by engineers at Huntington Ingalls Industries-Newport News Shipbuilding (NNS), where the ship is currently working through its post-shakedown availability (PSA). The second elevator, AWE Upper Stage No. 3, followed Feb. 14.

Ford is the flagship of the Navy’s new class of aircraft carrier, the first new carrier design in more than 40 years. Unlike weapons elevators on Nimitz-class carriers, which use cables for movement, Ford-class elevators work via electromagnetic, linear synchronous motors, allowing for greater capacities and faster movement of weapons.

The new design will allow the ship to move up to 24,000 pounds of ordnance at 150 feet-per-minute. Nimitz-class elevators can move 10,500 pounds at up to 100 feet-per-minute.

“This will allow us to load more aircraft faster and, in the long run, increase our overall sortie generation rates,” said Lt. Cmdr. Chabonnie Alexander, Ford’s ordnance handling officer.

Beyond the new AWEs, the ship’s design offers additional opportunities to streamline the overall movement and assembly of weapons. Ford features three upper-stage elevators that move ordnance between the main deck and flight deck, and seven lower-stage elevators that move ordnance between the main deck and lower levels of the ship.

An additional benefit of the ship’s design is a separate utility elevator that can serve as a dedicated lift to move both ordnance and supplies, and also serve as a means to medically evacuate injured personnel from the flight deck to the hangar bay. This allows the 10 main AWEs and Ford’s three aircraft elevators to be dedicated to their primary missions of ordnance and aircraft movement during real-world operations.

Though the first two elevators have been accepted, work still remains on the remaining nine. Acceptance of the AWEs offer an opportunity for Ford Sailors to become acquainted with the equipment during the PSA, said Cmdr. Joe Thompson, Ford’s weapons officer.

“This gives us more time to learn and become subject matter experts,” Thompson said. “All of us are learning on brand new systems and brand new concepts. This acceptance gives us the opportunity to have that ‘run time’ on the physical aspects of the elevator, but also in evaluating the technical manuals, and learning the maintenance required to keep them operational.”

With two elevators in hand, Thompson explained that Sailors training on these new systems will be able to take the lessons learned from Upper Stage No. 1, and apply them to Upper Stage No. 3, thereby streamlining the learning process and lessening the learning curve.

“This is going to allow us to progress faster,” he said. “As we get smarter on one, we move on to the next and apply the lessons learned not only with regard to elevator operation, but also in the testing and certification and maintenance processes.”

“We are glad to be able to accept the second AWE,” said Chief Machinist’s Mate Franklin Pollydore, leading chief petty officer for G-4 division, the team currently training on the AWEs. “Having a second AWE will give us the opportunity to apply everything we have pre-

Navy Awards Contract for Construction of Two Carriers

WASHINGTON—The Navy has awarded a contract for the construction of CVN 80 and CVN 81 to Huntington Ingalls Industries-Newport News Shipbuilding. This contract award delivers significant savings to the government—exceeding $4 billion when compared to the Navy’s original cost estimates to procure these CVNs separately.

“This day marks a great team effort to drive out cost and maximize efficiency in government procurement,” said Secretary of the Navy Richard V. Spencer. “Focusing on optimizing construction activities and material procurement, the team was able to achieve significant savings as compared to individual procurement contracts. One contract for construction of the two ships will enable...
pared for while allowing us to utilize all the experience gained since AWE Upper Stage No. 1 was turned over to the ship.”

Upper Stage No. 3 is located in the ship’s aft weapons handling area, giving the ship two upper stage elevators in each of its handling areas—Upper Stage No. 1 is in the forward handling area.

“This is a huge step for us,” Thompson said. “With one forward, and now one aft—this brings us one step closer to being a truly lethal weapons department.”

The dedicated weapons handling areas between the hangar bay and the flight deck are unique to the Ford-class and eliminate the need for a “bomb farm” like those of Nimitz-class carriers while reducing horizontal and vertical weapons movements to various staging and build-up locations. This ultimately offers a 75-percent reduction in the distance ordnance must travel from magazine to aircraft.

With more than two decades of weapons handling experience, Thompson explained that while the dedicated weapons handling areas offer advantages in speed and lethality, they also offer gains in the safe handling of ordnance.

“From a weapons safety perspective, this is a huge advantage,” he said. “We have two dedicated locations that are not on the flight deck or in the hangar bay that have 24-7 overhead sprinkler coverage and the ability to jettison in the case of an emergency. To have these locations that allows us to operate without interfering with flight operations or in the hangar bay makes our ship that much safer.”

Acceptance of the second elevator was accelerated due to a merging of the test programs between NNS and the Naval Surface Warfare Center, which removed redundant steps and moved certification up by 10 days. The team has identified other areas where redundancy can be removed to make the acceptance timelines more efficient.

For Ford Commanding Officer Capt. J.J. Cummings, the process improvement again showcases the talent of the collective team of professionals working to bring these elevators online and bring Ford closer to operational employment.

From USS Gerald R. Ford Public Affairs.

This Fixed Price Incentive (Firm Target) contract limits the Navy’s liability and incentivizes the shipyard’s best performance. The contract guarantees a single technical baseline for both ships, which allows the shipyard to re-use engineering rollover products, minimize changes between the two ships and leverage economic order quantities for equipment and material procurement.

Enterprise (CVN 80) is the third ship of the Ford class and the numerical replacement for USS Eisenhower (CVN 69). CVN 81, not yet named, will be the fourth ship of the class and will be the numerical replacement for USS Carl Vinson (CVN 70). CVN 80 began advanced planning and initial long lead time material procurement in May 2016.

From the Office of the Navy Chief of Information.
VFA-101 Deactivates, NAS Lemoore New Home for F-35C

SHALIMAR, Fla.—The last F-35C Lightning II assigned to the “Grim Reapers” of Strike Fighter Squadron (VFA) 101 left Eglin Air Force Base (AFB) for Naval Air Station (NAS) Lemoore, California, May 23 as the squadron deactivated after more than seven years of training F-35C pilots, Sailors and Marines.

NAS Lemoore is the Navy’s West Coast Master Jet Base and home to Commander, Joint Strike Fighter Wing (CJSFW), the Navy’s F-35C fleet squadrons and F-35C fleet replacement squadron (FRS), VFA-125.

The majority of F-35C pilots from VFA-101 will remain in the F-35C community, transferring to VFA-125, VFA-147, Air Test and Evaluation Squadron (VX) 9 or Commander, Joint Strike Fighter Wing (CJSFW). Approximately 50 percent of Sailor maintainers from the Grim Reapers will remain in the F-35C community either at NAS Lemoore with VFA-125 or VFA-147, or at VX-9 at Edwards AFB, California.

To accommodate the F-35C program at NAS Lemoore, the Navy built or remodeled several facilities to meet F-35C requirements, including a pilot fit facility, centralized engine repair facility, pilot training center and a newly remodeled hangar. Future projects are planned as additional Navy squadrons transition to the F-35C. Marine Corps F-35C squadrons will be based at Marine Corps Air Station Miramar, California.

“When we assessed the requirements to establish and mature the F-35C community, NAS Lemoore was the right place to home-base our Sailors and aircraft,” said Capt. Max McCoy, CJSFW. “Consolidating resources enables leadership to better support fleet replacement squadron training and operational squadron transitions, both for the Navy and Marine Corps.”

Integrating F-35C assets with existing F/A-18E/F Super Hornet aircraft currently stationed at NAS Lemoore is a win for the Navy, McCoy said.

“Home-basing the F-35C at NAS Lemoore also gives Sailors the flexibility to move from sea to shore billets without leaving NAS Lemoore,” he said. “The F-35C is part of the Navy’s strike fighter community. Co-locating fourth- and fifth-generation aircraft accelerates carrier-air-wing integration, making our carrier strike groups more lethal and survivable. NAS Lemoore is a catalyst for how we will train, maintain and sustain future carrier air wing capability.”

“The contributions that VFA-101 has made to the F-35C community will not diminish as this program grows,” said Cmdr. Adan Covarrubias, VFA-101 Commanding Officer. “The original cadre of maintainers and pilots have left a legacy that is evidenced in all aspects of this community. Their influence will continue long after the squadron’s doors are closed.”

The Grim Reapers’ origins trace back to 1942. Originally, under the call sign of VF-10, the Grim Reapers flew the F4F Wildcat off USS Enterprise (CV 6) in the Pacific during World War II. At the end of the war, VF-10 deactivated at NAS Alameda, California, and in 1952, VF-101 was commissioned at NAS Cecil Field, Florida, assuming the nickname and traditions of the previous Grim Reapers. VF-101 was deactivated in September 2005 after serving as the FRS for the F-14 Tomcat.

VFA-101 reactivated in May 2012, the 60th anniversary of the re-establishment of the Grim Reapers, as the first FRS for the F-35C. Since then, the squadron has trained more than 75 Navy and Marine Corps F-35C pilots, accepted more than 30 aircraft, trained more than 1,200 F-35C maintainers and flown more than 11,000 flight hours.

From Commander, Joint Strike Fighter Wing Public Affairs.
Joint Testing Clears F-35B/C for Night Refueling

EDWARDS AIR FORCE BASE, Calif.—The F-35 Lightning II program recently completed testing on an improved lighting assembly with the KC-135 that will enable the Navy and Marine Corps F-35 variants to refuel behind the tanker at night. Flight testing of the redesigned light, which attaches to a refueling probe, was led by the Patuxent River Naval Air Station, Maryland, test team and supported by the team at Edwards Air Force Base (AFB).

The test evolution demonstrated teamwork across three services and two test units located on opposite coasts, all focused on quickly evaluating this lighting fix under specific nighttime conditions to ensure that F-35 operators can expand their night refueling operations to include all configurations of the KC-135.

The purpose of the probe light on Navy and Marine aircraft is to illuminate the refueling receptacle, or “basket,” to ensure that the F-35 pilot can see adequately and make contact to begin refueling. However, the existing lighting design made it difficult for the KC-135 boom operator to see the silhouette of the F-35. Under the Air Force requirement, the boom operator monitors refueling operations and helps the F-35 pilot maintain safe separation from the refueling boom. One of the redesign’s objectives is to ensure better visibility for the KC-135 boom operator.

“The current probe light was too bright, blinding the KC-135 aerial refueling boom operators,” said Michael McGee, 418th Flight Test Squadron (FLTS), aerial refueling project manager at Edwards AFB. “The new light was designed to be less bright, but still bright enough for the F-35 pilot to see clearly.”

For this test, an F-35B from Air Test and Evaluation Squadron (VX) 23 at Patuxent River deployed to Edwards AFB and paired up with a KC-135 and test aircrew from the 418th FLTS. Both ground and flight tests posed interesting challenges for the teams.

“For the ground test we used a hangar,” McGee said. “The environment needed to be completely dark. We had to remove emergency lighting from the facility and place mats on the floor to reduce light glare. The boom operators were on a scissor lift to simulate the KC-135 tanker. The team had to simulate the drogue basket approaching the F-35B so the 461st FLTS maintainers mounted the basket onto a B-4 stand. Since the stand is on wheels, we could simulate the basket approaching the probe while the F-35 pilot assessed the brightness of the light.”

The ground test evaluated two types of lights with different color tones—a warm white light and an amber light—across various brightness levels. The warm white light was determined to be the best choice for both boom operators and pilots, McGee said.

The first flight test lasted four hours and accomplished all of the required test points.

“Our biggest concern was completing the test during the lowest moon illumination; worst-case lighting scenario timeframe, which was March 1-11,” McGee said. “For the flight test, we planned a minimum of two flights, but captured all test points on our first flight.”

Based on favorable results, the design is being evaluated by the Air Refueling Certification Agency this summer and, once approved, will be incorporated into a revised flight clearance for the Navy and Marine Corps.

The F-35A—the Air Force variant—does not have a probe so no light change is required for that model.

Written by Kenji Thuloweit, 412th Test Wing Public Affairs.
NAWCAD Adapts Weapons Loader for F-35B

LAKEHURST, N.J.—Teamwork and co-location at Naval Air Warfare Center Aircraft Division (NAWCAD) Lakehurst resulted in modified support equipment (SE) that gives the F-35B Lightning II more capability.

When the Marine Corps chose the GBU-49 weapon system for the F-35B, they needed a piece of SE to load the weapon onto the aircraft.

The GBU-49 provides new capability that will enable the F-35B to engage moving ground targets. However, the conduit on the GBU-49 did not fit the current weapons loader, until a team from NAWCAD Lakehurst modified the adapter, the ADU-894A/E, and delivered it to the Marine Corps on schedule in November.

“The teams at Lakehurst and Patuxent River, Maryland, did a fantastic job in finding a solution to a fleet problem quickly,” said Kathleen P. Donnelly, director of the Naval Air System Command (NAVAIR) SE and Aircraft Launch and Recovery Equipment engineering department. “Their hard work and ingenuity has led to an increase in capabilities and improved lethality of our forward deployed Marines.”

In February 2018, the NAWCAD Lakehurst Airborne Weapons Support Equipment (AWSE) branch was tasked by the NAVAIR Direct Attack Weapons program office to develop an adapter that could not only provide loading capability for the GBU-49, but for all MK-82 “smart” bombs to be loaded on the F-35B. The goal was to develop, test, build and deliver the adapters within nine months.

The AWSE branch is responsible for all equipment that transports weapons through the carrier or land-based environment, presents them to the aircraft and loads them on to the aircraft, said David Page, AWSE branch head.

“For those airplanes that their missions are to fly ordnance, it’s our equipment that allows those 18-year-olds out there on pitching carrier decks to safely handle thousands of pounds of weapons, bring them up to an aircraft and load them up in a short time, both day and night. It’s where the rubber meets the road,” Page said.

The AWSE engineering team set out to modify a current adapter to connect the GBU-49 with the Single Hoist Ordnance Loading System, the primary munition loading system of aircraft weapons stations afloat.

The team designed a modified adapter in their lab and worked with NAWCAD Lakehurst’s Prototyping and Manufacturing Division (PMD) to build a prototype.

The co-location of the engineering team and PMD helped speed up the timeline by making sure they got their design right the first time, said Matthew Southard, principle engineer for the project.

“There was a huge benefit in being able to walk over to the shops and not only say ‘this is what we need to do,’ but also ask the artisans for advice and see how we might be able to shrink our schedules based on certain design features,” Southard said.

The AWSE team simultaneously worked with their logistics counterparts at NAWCAD Lakehurst to create the required

AAG Completes First Barricade Test in 23 Years

PATUXENT RIVER, Md.—The Advanced Arresting Gear (AAG) team successfully executed the system’s first exploratory aircraft barricade arrestment Feb. 28 at the Jet Car Track Site (JCTS) at Joint Base McGuire-Dix-Lakehurst, New Jersey.

During the test, a stricken E-2C+ Hawkeye was launched into an emergency barricade to begin qualifying AAG in the barricade configuration for use aboard Gerald R. Ford-class aircraft carriers.

The Navy last conducted such a test more than 23 years ago.

The team hit another milestone April 17 with the first barricade

An F/A-18E Super Hornet is halted by the barricade net attached to the Advanced Arresting Gear (AAG) via extension pendants and held up by stanchions, on April 17, completing the second such test to qualify AAG in the barricade configuration for use aboard Gerald R. Ford-class aircraft carriers.
Integrating Logistics Support Data and Technical Data documents.

Logisticians leveraged legacy adapter information to support accelerated fielding of the equipment, Southard said.

“All our manuals and the standard operating procedures for loading had to be in place, because you could have a perfect system but if it doesn’t say it’s authorized to be used for that specific weapon or platform, then it can’t be used,” Southard said.

In May 2018, the adapter prototype was tested by the NAWCAD SE Test and Evaluation branch located at Patuxent River.

Once testing was completed, PMD manufactured the adapters and delivered them to the program office so they could be validated through verification testing.

The adapters were delivered to the Marines in November 2018, meeting the requested nine-month turnaround time.

“The support equipment team located at Lakehurst played a critical role in the rapid fielding of the GBU-49 weapon system to support an urgent fleet capability gap for our forward deployed Marines,” said John L. Hyatt Jr., Naval Air Warfare Center Weapons Division’s assistant program manager for logistics. “The timeline for this fielding was to be drastically accelerated as compared to a normal acquisition program.

“Without the efforts of the team, the program office would not have been able to deliver this much needed critical capability to the warfighter.”

Written by Allison Murawski, public affairs officer at NAWCAD Lakehurst.

Arrestment of an F/A-18E Super Hornet, which weighed about 44,000 pounds and hit the barricade traveling at more than 112 knots.

With the barricade net attached to the AAG system via extension pendants and held up by stanchions, these tests replicated the approach of an aircraft for an arrestment aboard the carrier’s flight deck. The tests allowed the Naval Air Systems Command (NAVAIR) team to ensure effectiveness of the emergency system and establish settings specific to each type/model/series in the carrier air wing.

“There was a great deal of preparation and coordination involved to conduct the barricade testing and our busy team was able to pull it all together,” said Don Fonner, AAG test and evaluation lead. “While the barricade is only for emergency use when a normal arrestment cannot be made, it’s still critical that AAG in the barricade configuration be qualified.”

The AAG team will conduct a half dozen more such tests in the coming months as they continue to work through a comprehensive test plan to support the revolutionary new system at the two land-based test sites in New Jersey—JCTS and the Runway Arrested Landing Site (RALS)—and aboard USS Gerald R. Ford (CVN 78). No at-sea barricade tests using the AAG installed aboard Ford are planned, although ship personnel as part of their standard training routinely practice rigging barricades for emergency situations.

“We are pleased that AAG performed well in these first barricade test events and the team should be proud of this and all the milestones we’ve reached as we deliver this revolutionary new technology to the fleet,” said Aircraft Launch and Recovery Equipment Program Office Program Manager Capt. Ken Sterbenz.

To date, the AAG system installed at JCTS has conducted more than 2,400 successful dead-load arrestments, with engagement speeds exceeding 155 knots—or more than 178 miles per hour—and at weights of more than 78,000 pounds. At the RALS, the AAG system has successfully completed more than 1,400 manned aircraft traps, including all fleet TMS aircraft. Meanwhile, the AAG installed aboard Ford has completed 747 manned aircraft arrestments.

Written by Carrie Griffin Munn, Aircraft Launch and Recovery Equipment Program Office.
Navy Breaks Ground on MQ-25 Test Hangar

PATUXENT RIVER, Md.—The Navy broke ground April 16 on the hangar that will house the integrated test team for the MQ-25A Stingray, slated to be the world’s first carrier-based unmanned aircraft, at Naval Air Station Patuxent River, Maryland.

The MQ-25A will serve as an aerial tanker, extending the range of the carrier air wing while also freeing up F/A-18 Super Hornets—which currently conduct carrier-based aerial refueling missions—to be dedicated to their primary role as strike fighters.

Designated a Maritime Accelerated Acquisition program, the Stingray is a priority for the Navy “not only because of what it provides, but what it allows our other systems to do,” Unmanned Carrier Aviation Deputy Program Manager Jeff Dodge said during the groundbreaking ceremony.

“Getting this system out there with its massively increased range, endurance and payload, we will be able to use our strike aircraft, our F/A-18s, to focus on that mission as opposed to the tanking mission.”

The hangar will include multiple bays to accommodate up to four aircraft—three with extended wings and one with folded wings—as well as maintenance shops, a laboratory area and spaces for crew and administration. It will come equipped with an Unmanned Carrier Aviation Mission Control System control station to operate the MQ-25A as it undergoes testing.

Construction is set to be complete by the end of fiscal 2020.

“One of the things that the CNO did last August after we were authorized to proceed to the development phase was ask us to deliver this capability as soon as possible,” Dodge said. “So we need this hangar up and we need the aircraft delivered so that we can get these systems out onto aircraft carriers absolutely as soon as possible to meet our nation’s needs.”

Written by Jeff Newman, staff writer for Naval Aviation News.

First Woman Harrier Pilot to Train on F-35B

YUMA, Ariz.—Marine Corps Capt. Kelsey Casey stands in front of an AV-8B Harrier at Marine Corps Air Station Yuma, Arizona, in March. The only female AV-8B Harrier pilot in the Marine Corps, Casey recently deployed with Marine Attack Squadron 311 to the Middle East as part of Special Purpose Marine Air-Ground Task Force-Crisis Response-Central Command. This rotational deployment is one in which Marines support U.S. and allied operations within U.S. Central Command’s area of responsibility, most notably coalition operations against ISIS and other terrorist organizations. After her deployment, Casey will begin training on the F-35B Lightning II.
Blue Blasters Hornet Sundown Ceremony Marks the End of an Era

VIRGINIA BEACH, Va.—Strike Fighter Squadron (VFA) 34 hosted a sundown ceremony and flyover for the legacy F/A-18C Hornet aircraft Feb. 1 at Naval Air Station Oceana in Virginia Beach.

Active duty service members, aviation leadership, local media and visitors were in attendance to commemorate the aircraft’s 35 years of active service in the fleet.

“Today our VFA-34 family bids farewell to an old friend,” said Cmdr. William Mathis, VFA-34’s Commanding Officer. “Born more than 40 years ago, the Hornet entered operational service for the U.S. Navy in 1984, and for the next 35 years she proudly served the nation from the flight deck of aircraft carriers in all the seas across the globe.”

The “Blue Blasters” of VFA-34 were the last squadron in the Navy flying the Hornet, most recently joining USS Carl Vinson (CVN 70) last year to conduct patrols in the South China Sea.

“First, it’s a great feeling being the last squadron to take these Hornets into combat because we made history,” said Master Chief Gene Garland, command master chief of VFA-34. “Secondly, this represents the ending of an era because these jets have been around for a long time and the professionals you see all around you in this squadron maintained our Hornets and kept them flying. I thank God for the mindset of my Sailors. They are hard-workers, dedicated, and they truly are a reflection of the culture of our squadron. This final flight means we and the legacy Hornets have accomplished the mission.”

Lt. Frank McGurk—who piloted one of the three Hornets that were part of the ceremony alongside Mathis and VFA-34 Operations Officer Lt. Cmdr. Benjamin Orloff—shared some details of the historic experience.

“We went out to one of our working areas over the ocean about 80 to 100 miles out,” McGurk said. “From there, we left the area and flew northbound along the coast up past the [Wright Brothers] First Flight Memorial around Kitty Hawk, North Carolina, where we took a few photos over the area, then made our way back to Oceana for the flyover.”

McGurk also spoke on how he felt regarding the Hornet’s last flight.

“This aircraft has been super reliable for us and has proven itself over the years,” he said. “I believe there are many aviators out there who know how good of an airplane this is to fly. Although I’ve only had a taste of it, I can feel the history and lineage of that. There were a lot of people who came here to this base to see this old bird take her last flight, and I think that’s pretty cool.”

The Blue Blasters are replacing the legacy Hornet with the F/A-18E Super Hornet, which is capable of executing the same missions as the Hornet, but with significant advancements in mission systems that dramatically enhance its effectiveness.

“The Hornet is known as many things,” Mathis said. “Legacy, highly reliable, multi-role attack fighter … but to us, she will always be an old friend. The Hornet will continue to serve with the Marine Corps and Navy support units but for the operational Navy, it is time to say goodbye. So, from the men and women who flew and maintained the legendary F-18 Hornet, we say thank you for your service and job well done.”

Written by Mass Communication Specialist 2nd Class K.R. Jackson-Smith, Commander, Naval Air Forces Atlantic Public Affairs.

Pilots from Strike Fighter Squadron (VFA) 34 prepare to fly the F/A-18 Hornet for the final time.
PATUXENT RIVER, Md.—With a $439.6 million contract award, the development of H-1 helicopters is coming to an end for the U.S. military.

The Department of the Navy awarded Bell Helicopter on Jan. 18 a modification to a previously awarded, fixed-price-incentive contract to build 25 new AH-1Z Viper attack helicopters for the Marine Corps.

The modification, known as Lot 16, is the final contract for the AH-1Z. Upon delivery, the Marine Corps will have 189 Vipers in the fleet. The first AH-1Zs were delivered in 2005 and declared combat ready in 2010.

The first AH-1 Cobras were developed in the 1960s when ground forces in Vietnam needed fire support from the air. Bell used the same rotor system and engine as the UH-1—or Huey—to design the “HueyCobra.” The aircraft was given an “A” for attack and considered a variant of the H-1 line, resulting in the designation of AH-1G. The Cobra took to flight over Vietnam in 1967.

The current AH-1Z is a twin-engine helicopter and the only attack helicopter with fully integrated air-to-air missile capability in the world. The aircraft also features upgraded avionics, weapons and communication systems.

“The production of the Zulu is winding down, but there is more work ahead,” said Col. David Walsh, Marine Light Attack Helicopters program manager.

The first AH-1Zs from Lot 16 are expected to roll off the production line in 2021, with final delivery to the Marines scheduled for 2022. In the future, all the aircraft will be upgraded to include an improved interoperability system.

“It's a digital interoperability system that shares information between aircraft,” Walsh said. “We'll continue to add capabilities over the next 20 years. It's a continuous cycle of upgrading capabilities.”

At the cost of about $30 million per aircraft, the AH-1Zs are replacing the aging AH-1W SuperCobras. Walsh said the Viper takes a big bite out of the SuperCobra when it comes to performance.

“It’s faster, carries more weight, holds more weapons and brings much more warfighting capability,” he said.

Some time has passed since Walsh was in the cockpit, but he was impressed when he was behind the controls.

“The way integrated information is presented to the pilot through the glass cockpit and helmet-mounted display, along with the new state-of-the-art sensor, makes it much easier to find and prosecute targets. Plus, it has much more power and it’s more maneuverable. I really enjoyed flying it,” he said.

While the AH-1Z has more avionics, Walsh deemed it a much easier aircraft to maintain. An additional advantage to the AH-1Z is that it is 85-percent interchangeable with its sister aircraft, the UH-1Y Venom. The final production-era Venom was delivered in April 2018 to Marine Light Attack Helicopter Squadron 469 in Camp Pendleton, California.

Although production of H-1s is coming to an end for the military, the work is far from over for the program office.

“We are transitioning to sustainment,” Walsh said. “I see the program office evolving from a large production team to modification and sustainment teams focused on keeping the Zulu ready and lethal for decades to come.”

In the future, as Marine Corps headquarters identifies additional needed capabilities, the program office will work with industry partners to bring those capabilities to the fleet.

Written by Joy Shrum, Marine Light Attack Helicopters Program Office communications.
DoN Shore Sailor of the Year
Promoted to Chief Petty Officer

PATUXENT RIVER, Md.—Less than two months after being named 2018 Shore Sailor of the Year (SOY), chief petty officer Sindy Johnson received her chief’s pin from her four children during a May 16 ceremony at the Navy Memorial in Washington.

Johnson was first selected as SOY at Fleet Readiness Center Southwest (FRCSW), where she serves as a logistics specialist, before going on to compete against Sailors worldwide for the top honor.

“To be the one that received this award was a great honor and a great validation for myself, because if I ever doubted that I could achieve anything, this was a validation that I could achieve anything I set myself to,” Johnson said after winning Shore SOY.

A living embodiment of the American Dream, Johnson moved from her native Nicaragua to the U.S. when she was 15 and joined the Navy at 17.

“Living in Nicaragua, I remember sitting at a table and thinking that I wanted to be part of that [U.S.] Navy, part of that country,” she said. “I serve this country and do my job and help Sailors because it’s an honor to put this uniform on every day. It’s an honor to say I’m in the United States Navy.”

One of four 2018 SOYs meritoriously advanced to chief petty officer during the ceremony, Johnson also received a nominating certificate from Vice Chief of Naval Operations Adm. Bill Moran, who served as guest speaker.

Moran told the newly pinned chief petty officers they are now part of an elite cadre.

“Be confident without arrogance, humble without being shy, tough when you have to be, and empathetic when you need to be,” Moran said. “If you do that, you are essentially following the Chief Petty Officer Creed.”

Johnson has already taken a leadership role in FRCSW—she is serving as acting chief petty officer for the administration department and is in charge of the fleet’s training schedule.

“I always remember why I am doing this. I know that I put this uniform on with pride, because not a lot of people get to serve in the United States Navy,” she said. “And I am fortunate enough that I can serve in the Navy and give it my best. I think that just my personality, and my work ethic, and my pride in my country has led me to this. And that’s not talking about all the mentors, and all the Sailors, and all the support I’ve had in the military. That also has been a big part of why I am here today.”

From Commander, Fleet Readiness Center Public Affairs.
Naval Air Systems Command program executive officers and program managers briefed industry and media attendees May 6-8 at the 54th-annual Sea-Air-Space (SAS) Exposition, the largest maritime expo in the U.S. Featured programs included unmanned aviation, rotary systems, additive manufacturing and weapons.

Panel Discusses Naval Aviation’s Future at Sea-Air-Space Expo

**By Jeff Newman**

Unmanned aircraft systems, or UAS, were a common theme during a May 6 “Future of Aviation” panel discussion featuring three Navy, Marine Corps and Coast Guard leaders at the 2019 Sea-Air-Space Expo.

The Navy’s unmanned portfolio is rapidly expanding, and will soon include the world’s first carrier-based UAS, the MQ-25A Stingray. But unlocking the full potential of these systems requires that they communicate with and work alongside their fellow manned aircraft in the carrier air wing.

“The future air wing is going to be lethal, survivable, networked, sustainable, and increasingly we have to benefit from manned-and-unmanned teaming,” said Angie Knappenberger, deputy director of Air Warfare in the Office of the Chief of Naval Operations.

Knappenberger noted that there are certain mission sets that might be adequately performed by autonomous aircraft, but that for complex warfighting scenarios, it’s best to “leverage some of that autonomy but still be in the loop with a manned system.”

To that end, the Navy has successfully tested scenarios
where the MQ-8C Fire Scout rotary UAS seeks out targets for the MH-60 Seahawk manned helicopter. Knappenberger said the pairing is being reinforced by having MH-60 crews follow up their squadron tours with stints learning how to operate the Fire Scout.

“You learn the business of both,” she said. “You understand the mission set better. You understand exactly how these two aircraft operate both independently and together.”

Knappenberger said the same philosophy will be applied to a second Navy manned-unmanned teaming, the MQ-4C Triton and P-8A Poseidon.

Though the Marine Corps already makes extensive use of small-to-medium-size UAS, the service wants a large, unmanned rotary-wing platform that can land and take off from amphibious ships, said Lt. Gen. Steven Rudder, Marine Corps Deputy Commandant for Aviation.

While the future Marine Air-Ground Task Force (MAGTF) Unmanned Expeditionary system, or MUX, is still a little way off, Rudder said he hopes the system will be ready for early operational capability by 2026. In the meantime, the service has narrowed down on the primary mission it would like MUX to perform.

“What has risen to the top of the list is early warning, to be able to get out and process information for the maritime force,” Rudder said. “We are beginning to prioritize what we want the system to do, and we believe that system will need to create a network of early warning, [intelligence, surveillance and reconnaissance], and [signals intelligence]. We also need to balance exactly how far we want this thing to go, because the strength of any unmanned system is the persistence that it applies. We could have a very capable platform with very low persistence, but we’d like to balance persistence with the systems it has on there.”

Meanwhile, the results since USCGC Stratton first deployed with the ScanEagle, a small reconnaissance UAS, in 2017—the seizure of more than 18 metric tons of cocaine across four deployments—have opened “a whole different paradigm for us,” said Vice Adm. Daniel Abel, the Coast Guard’s Deputy Commandant for Operations.

In June 2018, the Coast Guard awarded a contract to the ScanEagle’s manufacturer to provide the UAS for all national security cutters. In addition, the Coast Guard is also exploring using the ScanEagle ashore, having completed a proof-of-concept in Puerto Rico and completing shore-based operations with the ScanEagle at the Texas-Mexico border, Abel said.

“It’s a game changer, shore and afloat,” he said.

Rudder also touched on the Future Vertical Lift (FVL) program, noting that the Marine Corps would prefer its H-1 helicopter replacement to be a tiltrotor aircraft that could easily pair with the MV-22B Osprey.

“We need something that can keep up with the V-22,” he said.

Rudder also expressed excitement over the planned deployment of Marine Corps F-35B Lightning IIs aboard HMS Queen Elizabeth (R08) during the new British carrier’s first operational tour.

“It’s going to be a wonderful, new way, and I would offer, potentially, a new norm of doing coalition combined allied operations in a maritime environment,” he said.

As for the Navy’s ultimate replacement for the F/A-18E/F Super Hornet, the service just finished its analysis of alternatives for the Next Generation Air Dominance program, with results expected back later this year, Knappenberger said.

“The future air wing is going to be lethal, survivable, networked, sustainable and increasingly we have to benefit from manned-and-unmanned teaming.”

—Angie Knappenberger, Deputy Director of Air Warfare, Office of the Chief of Naval Operations.
Naval Aviation Leaders Brief Rotary, Unmanned Platforms at Sea-Air-Space Expo

The program executive officers heading up the Navy’s air anti-submarine, assault and special mission platforms as well as its unmanned and strike weapons programs briefed industry and media members on their recent accomplishments and future milestones May 6 at the 2019 Sea-Air-Space Expo.

A decision on whether the next presidential helicopter, the VH-92A, can move into production is slated for the end of this month, said Maj. Gen. Gregory L. Masiello, Program Executive Officer for Air Anti-Submarine Warfare, Assault & Special Mission Programs.

Masiello said the program is scheduled for its Milestone C decision on May 30, and that it expects favorable results from a recently completed early operational assessment in which test pilots flew two VH-92As every other day for about a month out of Naval Air Station Patuxent River, Maryland.

“I believe that things went reasonably well, and the reason why I say that is I know where the aircraft took off from and where they landed every day, and it was where they were supposed to,” Masiello said. “The feedback, if you look at the gripes or things that you would write up when you’re flying on the aircraft, it’s relatively positive, so I see no reason to question where we’re going on that program.”

In response to questions after his briefing, Masiello said the Heavy Lift Helicopters Program is addressing technical issues discovered on the CH-53K King Stallion last summer during flight testing at Patuxent River. In addition, the program has sent one King Stallion to Marine Corps Air Station New River, North Carolina, so that the Marines there can learn as much about the aircraft as possible prior to its first deployment.

“We’ve handed it over to the Marines, not to fly it, but to basically take it apart and verify all the maintenance manuals and procedures,” Masiello said.

The Marines largely disassembled the aircraft, put it back together and provided feedback on everything from tools and procedures.

Meanwhile, the first flight of the unmanned MQ-25A Stingray is expected soon following the April 28 transfer of the test vehicle from Boeing’s facility near St. Louis to a nearby regional airport, said Rear Adm. Brian Corey, Program Executive Officer for Unmanned Aviation and Strike Weapons (PEO(U&W)).

“The team is working through the software checks and the clearance with the [Federal Aviation Administration] and the [Federal Communications Commission] to make sure when we operate the aircraft we operate it safely and we bring her home,” he said.

“CNO has made it clear that he wants us to achieve IOC as soon as possible,” Corey said.

The Navy is modifying four of its carriers to be able to integrate the MQ-25A into its air wings, but it is too soon to speculate on which of those carriers will deploy with the Stingray first, he added.

“If we are as successful as we intend to be, and the Navy keeps its focus on ‘as soon as I have it, I want to use it,’ then we’ll go over the horizon as soon as we’re ready,” Corey said.

Corey said a relatively new initiative undertaken by PEO(U&W)—in partnership with the Marines as well as the Army and Air Force—is how to counter the growing threat of adversary unmanned aircraft systems (UAS).

“We’ve been doing [UAS] for a long time; however, it’s a pretty tough problem,” he said. “Much like the [improvised explosive device] threat, it is an adaptable problem.”
procedures to access panels and handholds.

“Things that, normally, we would field an aircraft and send it out on its first deployment, and then we’d get feedback from the fleet and go, why didn’t we catch this in operational test, or why didn’t developmental test get it?” Masiello said. “In this case, I think we’re applying those lessons learned. We’re giving it to the fleet upfront and early and feeding that information in.”

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A youthful workforce is contributing to a cultural refresh at Naval Air Warfare Center Weapons Division (NAWCWD) with an emphasis on speed and efficiency in delivering new capabilities to the fleet.

With $1.7 billion in new orders in fiscal 2018 and a third of its 6,000-member civilian workforce hired in the previous five years, the division has experienced tremendous growth, NAWCWD Executive Director Joan Johnson said May 8 at the 2019 Sea-Air-Space Expo.

In addition, more than half of that workforce has 10 years or less of experience, so they “are basically digital natives who think different, solve problems differently and move with the speed of technology,” Johnson said. “And we’re seeing really positive changes, especially in terms of being able to respond rapidly to needs because of that thinking.”

Johnson briefed several recent speed-to-fleet projects undertaken by NAWCWD, including the BATWING antenna, which increases the range of the ALQ-99 Tactical Jamming System installed on EA-18G Growlers, Johnson said.

Given a two-year project schedule in 2017, the team was able to achieve initial operating capability in just four months. The use of 3-D printers “was important in speeding up our lead-up time to initial flight test, because it enabled us to turn variations of the design around in hours and days instead of weeks and months,” she said.

Johnson also credited empowerment from leadership and, after overcoming some initial angst, a willingness by the BATWING team to assume risk.

“It’s the risk to the warfighter [that matters]. If the warfighter doesn’t have this, we have put them in a disadvantageous point,” she said. “When the mindset shifts from think about risk to the warfighter and not risk to my schedule, you get very different outcomes from a team.”

NAWCWD is also developing a multi-agent trajectory planner (MTP) that combines two numerical techniques into a “one-of-a-kind algorithm,” Johnson said.

“We’ve seen a lot of trajectory planners that can do obstacle avoidance and other types of things, but they haven’t taken into account the actual aerocharacteristics of the agents that have to fly it,” Johnson said. “Because it’s a very flexible, rigorous framework, we can optimize trajectories for coordinated time of arrival.”

What began as a research project resulted in a demonstration at a Yuma, Arizona, range with an objective—set by the Defense Advanced Research Projects Agency—to achieve coordinated time-of-arrival with winds of up to 25 knots, no communication between vehicles during flight, and very limited velocity control, Johnson said.

Utilizing four TigerShark unmanned aerial systems (UAS), the demonstration exceeded all objectives, with all agents arriving within 250 milliseconds of each other, “so we consider that a success,” she said.

The MTP has myriad applications in addition to weapons and UAS, and NAWCWD is exploring how to leverage the algorithm for future autonomous systems, Johnson said.

“What we’re trying to do is build something that’s agnostic to how you want to apply it, because we see many, many applications and that’s the feedback we’re getting from our sponsors,” she added.

Johnson said NAWCWD has also shaved two years off the original plan to develop a 21-inch rocket motor by building and demonstrating the first three prototypes in-house.

“In order to outpace our adversaries, we need longer legs,” Johnson said. “We’re able to accelerate capability delivery in this case by doing the low-rate production and the prototyping in-house.”
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Jeff Newman is a staff writer for Naval Aviation News.

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—Joan Johnson, NAWCWD Executive Director

TigerShark unmanned aerial vehicle.

A Standard Missile-6 (SM-6) launches during a live-fire test. Integration of the NAWCWD designed 21-inch rocket motor will greatly accelerate fielding of a longer range SM-6 at lower cost than traditional acquisition approaches.
Physiological Episodes Action Team. "We still have work to do, especially with F/A-18 and T-45 pilots, the two teams tasked with investigating the issue continue to narrow down the list of possible factors.

NAVAIR Zeroes in on With Contamination Ruled Out,

By Jeff Newman

Utilizing a rigorous Root Cause Corrective Action (RCCA) analysis process to eliminate contaminated breathing gas as a cause of the physiological episodes (PEs) being experienced by F/A-18 and T-45 pilots, the two teams tasked with investigating the issue continue to narrow down the list of possible factors.

By Jeff Newman

Utilizing a rigorous Root Cause Corrective Action (RCCA) analysis process to eliminate contaminated breathing gas as a cause of the physiological episodes (PEs) being experienced by F/A-18 and T-45 pilots, the two teams tasked with investigating the issue continue to narrow down the list of possible factors.
they are healthy and can get back in the aircraft.”

The T-45 team reached its conclusion in September, with the F/A-18 team following in October, after a joint 16-month effort that saw 21,000 samples taken across 11 sites from pilots’ breathing gas, ground sampling and blood analysis. In total, roughly 1,800 compounds were evaluated by an independent panel of toxicologists and multi-disciplinary panel of aeromedical professionals, who determined that none of the compounds played a role in PEs.

“The Naval Aviation Enterprise took this very seriously and went through a rigorous process featuring an independent review by doctors, physiologists and toxicologists that determined definitively that contamination is not the cause of PE,” said Capt. Todd St. Laurent, program manager of the Naval Undergraduate Flight Training Systems Program Office.

The RCCA teams include Naval Air Systems Command (NAVAIR) engineers along with instructor pilots, independent doctors and scientists, along with support from dozens of other subject matter experts.

The F/A-18 team is now focused on two potential factors, one being the maintaining of cabin stability by preventing unexpected pressure fluctuations that have been correlated with PE events but not yet shown to be a causal factor, said Don Salamon, deputy assistant program manager for system engineering for the F/A-18 and EA-18G Program Office.

The second focus is on breathing dynamics and factors that can impact gas exchange during respiration, such as hyper/hypocapnia, hypoxic hypoxia, work of breathing, and adsorption/acceleration atelectasis.

“There is likely no single ‘smoking gun’ that will be found as a result of the investigation,” Salamon said. “However, we have identified multiple contributors that are being aggressively worked through the [F/A-18 program] with near-term corrective actions.”

The T-45 team has closed more than 90 percent of the nearly 350 branches on its RCCA “fault tree,” 50 of which were related to contamination, team lead Ann Dickens said. The team is now focusing on optimal breathing pressure and oxygen concentration as potential factors.

The notion that PEs could be caused by contaminants infiltrating the aircraft’s Onboard Oxygen Generation System (OBOGS) was an early assumption made in the absence of alternative explanations.

“Contamination was an explanation that will be found as a result of the investigation,” Salamon said. “However, we have identified multiple contributors that are being aggressively worked through the [F/A-18 program] with near-term corrective actions.”

But following seven years of data collection where compounds other than oxygen in OBOGS-generated breathing air were consistently measured in the parts per billion—levels so low as to be functionally nonexistent—the RCCA teams determined contamination could safely be ruled out as a root cause of PEs.

“We’ve done challenge testing in the labs with aircraft equipment that shows it is nearly impossible to force anything other than oxygen through the OBOGS,” Salamon said. “Most importantly, the symptomatology of PEs does not match exposure to any type of contaminant.

“We’ve gotten smarter, and now we understand there are other things that could be happening that manifest as those symptoms, but it’s not exposure to contaminants.”

Some other potential factors have also been ruled out—such as electromagnetic exposure—while others have been determined to play a role in F/A-18 PEs, including maintenance-related issues.

Jeff Newman is a staff writer for Naval Aviation News.
A Navy team is developing a solution to detect the symptoms of rapid pressure fluctuations in military jets, moving the Navy closer to preventing physiological events (PEs) in military aircraft.

By Katherine Mapp

Naval Surface Warfare Center Panama City Division’s (NSWC PCD) Fluctuating Altitude Simulation Technology (FAST) team recently delivered an aircraft cabin simulator system to the Navy Experimental Diving Unit (NEDU) to conduct human subject research. The FAST system replicates the rapid cockpit pressure fluctuations observed in F/A-18 Hornets and Super Hornets and EA-18G Growlers.

“The purpose of the FAST system is to characterize the symptoms associated with rapid pressure fluctuation and determine what symptoms may be most closely associated with PEs,” said Navy research psychologist Lt. Jenna Jewell. “This information allows us to conduct future research that can be more targeted, including focusing on specific symptoms and adding in factors present in the cockpit.”

Aircrews experience PEs when there is both a known or a suspected aircraft or aircrew systems malfunction and a loss in performance related to insufficient oxygen delivery, alterations in breathing dynamics, unexpected pressure phenomenon or other human factors.

Research "flights" were conducted at the NEDU from November 2018 to January 2019 to simulate the rapid cabin pressure fluctuations aviators experience during flights in a controlled environment. Medical researchers were then able to investigate whether there are physiological or neurocognitive impacts resulting from the fluctuating pressure.

The team began with a commercial off-the-shelf double occupancy altitude chamber to simulate the cockpit environment and then modified the features to install a control system, develop algorithms and program the NSWC PCD-designed chamber software to meet mission requirements, explained Brian Toole, the team’s project manager.

According to NEDU research physiologist Lt. Travis Doggett, the FAST study is moving the Navy one step closer to solving critical safety concerns.

“This study is the first-of-its-kind human subject research investigating PEs plaguing naval aviators by replicating the cabin pressure fluctuations observed in the fleet. It is also the first-ever study to investigate and identify the physiological responses and symptomology associated with rapid cabin pressure fluctuations at altitude,” Doggett said.

“The FAST system, coupled with the manned testing, will provide Navy leadership vital information needed to help solve the Chief of Naval Operation’s No. 1 aviation safety concern—impacting the Navy’s ability to operate safely in the airspace of its choosing, without physiological hindrance,” Doggett added.

How it works

Before a simulated flight, participants undergo a general medical evaluation to determine their inner ear function, retinal tracking and a neurocognitive exam. They then enter the FAST chamber and fly one of three predetermined flight patterns. During the flight, participants’ vital statistics are tracked constantly, and a Doppler ultrasound test is conducted at four different occasions to determine if venous gas bubbles are present in each participant’s heart. In addition, retinal function is tested mid-flight.

After the flight, participants undergo the same pre-flight testing to see if there are any changes in their physiological or neurocognitive performance after the rapid pressure fluctuations they experienced during the simulated flight.

The FAST team went from refining conceptual requirements in November 2017 to delivering a fully functional system to NEDU in May 2018.

“Our team at NEDU knew what we wanted to accomplish at the end. We had an idea of the question we wanted to answer but did not have anything in terms of how to actually make it happen,” Jewell said. “The partnership between NEDU and NSWC PCD is how we got to a solution. For all of this to come to fruition within 14 months of beginning—and now we have a new system that [the Naval Air Systems Command] is going to continue relying on to use in the future—is huge for us.”

Katherine Mapp is with Naval Surface Warfare Center Panama City Public Affairs.
to Study PEs

NEDU from November 2018 to January 2019 to simulate the rapid cabin pressure fluctuations aviators experience during flights in a controlled environment. Medical researchers were then able to investigate whether there are physiological or neurocognitive impacts resulting from the fluctuating pressure.

The team began with a commercial off-the-shelf double occupancy altitude chamber to simulate the cockpit environment and then modified the features to install a control system, develop algorithms and program the NSWC PCD-designed chamber software to meet mission requirements, explained Brian Toole, the team’s project manager.

According to NEDU research physiologist Lt. Travis Doggett, the FAST study is moving the Navy one step closer to solving critical safety concerns. “This study is the first-of-its-kind human subject research investigating PEs plaguing naval aviators by replicating the cabin pressure fluctuations observed in the fleet. It is also the first-ever study to investigate and identify the physiological responses and symptomology associated with rapid cabin pressure fluctuations at altitude,” Doggett said.

“The FAST system, coupled with the manned testing, will provide Navy leadership vital information needed to help solve the Chief of Naval Operation’s No. 1 aviation safety concern—impacting the Navy’s ability to operate safely in the airspace of its choosing, without physiological hindrance,” Doggett added.

How it works

Before a simulated flight, participants undergo a general medical evaluation to determine their inner ear function, retinal tracking and a neurocognitive exam. They then enter the FAST chamber and fly one of three predetermined flight patterns. During the flight, participants’ vital statistics are tracked constantly, and a Doppler ultrasound test is conducted at four different occasions to determine if venous gas bubbles are present in each participant’s heart. In addition, retinal function is tested mid-flight.

After the flight, participants undergo the same pre-flight testing to see if there are any changes in their physiological or neurocognitive performance after the rapid pressure fluctuations they experienced during the simulated flight.

The FAST team went from refining conceptual requirements in November 2017 to delivering a fully functional system to NEDU in May 2018.

“Our team at NEDU knew what we wanted to accomplish at the end. We had an idea of the question we wanted to answer but did not have anything in terms of how to actually make it happen,” Jewell said. “The partnership between NEDU and NSWC PCD is how we got to a solution. For all of this to come to fruition within 14 months of beginning—and now we have a new system that [the Naval Air Systems Command] is going to continue relying on to use in the future—is huge for us.”

Katherine Mapp is with Naval Surface Warfare Center Panama City Public Affairs.
The Navy announced the F-35C Lightning II had achieved initial operational capability (IOC) Feb. 28. This announcement came shortly after the “Argonauts” of Strike Fighter Squadron (VFA) 147 completed carrier qualifications aboard USS Carl Vinson (CVN 70), making them the Navy’s first operational F-35C squadron.

By Lt. Cmdr. Lydia E. Bock

The Navy announced the F-35C Lightning II had achieved initial operational capability (IOC) Feb. 28. This announcement came shortly after the “Argonauts” of Strike Fighter Squadron (VFA) 147 completed carrier qualifications aboard USS Carl Vinson (CVN 70), making them the Navy’s first operational F-35C squadron.
The F-35C is ready for operations, ready for combat and ready to win,” said Commander, Naval Air Forces, Vice Adm. DeWolfe Miller III. “With its cutting-edge stealth technology, we have an incredible weapon in our arsenal that, up until now, has never before been available from the sea. Our F-35Cs are ready to deploy alongside our combat-proven Super Hornets, ushering in the future of carrier aviation.”

A significant milestone on the road to achieving full warfighting capability for the F-35C, declaring IOC means that the first operational squadron is properly manned, trained and equipped with qualified personnel to implement autonomous maintenance and safety programs to conduct assigned missions in support of fleet operations.

“We’re extremely proud of what our Sailors have accomplished in the F-35C community,” said Capt. Max McCoy, Commodore, Joint Strike Fighter Wing (CJSFW). “Their commitment to this mission delivered fifth-generation capability to the carrier air wing, making us more lethal and more survivable than ever. We shall continue to refine ways to maintain and sustain F-35C as we prepare for first deployment.”

“While IOC declaration is a big milestone for the F-35C, it is, more importantly, one step closer for the Navy as we drive toward our ultimate goal of fully integrating the F-35C in the fleet. Our sights are set on the first operational deployment for this tremendous asset.”

VFA-147, along with CJSFW and VFA-125—the F-35C fleet replacement squadron—are based at Naval Air Station (NAS) Lemoore, California. All fleet operations will be single-sited at NAS Lemoore making it the focal point for Navy F-35Cs and the only air station where both fourth- and fifth-generation squadrons are co-located.

First Deployment Scheduled for 2021

“The F-35C will revolutionize capability and operating concepts of Naval Aviation, using advanced technologies to find, fix and assess threats and, if necessary, track, target and engage them with lethal results in all contested environments,” said Rear Adm. Dale Horan, Director, F-35C Fleet Integration Office. “This accomplishment represents years of hard work on the part of the F-35 Program Office and Naval Aviation Enterprise. Our focus has now shifted to applying lessons learned from this process to future squadron transitions, and preparing VFA-147 for their first scheduled deployment in 2021.”

The mission-ready F-35C is the latest addition to the carrier air wing.

“While IOC declaration is a big milestone for the F-35C, it is, more importantly, one step closer for the Navy as we drive toward our ultimate goal of fully integrating the F-35C in the fleet,” Miller said. “Our sights are set on the first operational deployment for this tremendous asset. However, that is not an overnight accomplishment. Bringing the F-35C to our carrier team is the result of coordination and integration on all levels. The addition of this asset brings an entirely new suite of capabilities to the fight, one in which the Navy team will be well-situated to fly, fight and win.”

Lt. Cmdr. Lydia E. Bock is the public affairs officer for Commander, Joint Strike Fighter Wing.
By Commander, Joint Strike Fighter Wing Public Affairs. When Strike Fighter Squadron (VFA) 147 wrapped up its 2017 combat deployment aboard USS Nimitz (CVN 68), the “Argonauts” knew they were rolling right into the task of transitioning from their battle-tested F/A-18E Super Hornets to the Navy’s new strike fighter, the F-35C Lightning II.

During their seven-month deployment, the Argonauts flew almost 3,300 hours as part of Carrier Air Wing (CVW) 11, with nearly 2,200 of those hours in support of Operation Inherent Resolve.

An average week for the squadron meant roughly six aircraft launches on six-hour-minimum missions, six days a week for more than three consecutive months. Thoroughly engaged in completing their F/A-18E combat operations, the Argonauts could not shift their focus to the F-35C until they had departed 5th Fleet.

The Navy chose VFA-147 as the first operational F-35C squadron because of its projected operations with regard to deployments, maintenance and existing Super Hornet assets. Their transition to the F-35C actually began toward the end of their time aboard Nimitz, with some Sailors leaving the ship early to begin maintenance training at the Academic Training Center (ATC) at Eglin Air Force Base (AFB), Florida.

Upon the squadron’s return to Naval Air Station (NAS) Lemoore, California in December 2017, the Argonauts began a full-speed transition to the Lightning II. Within a week, they had begun the roughly 10-month process of distributing their 12 single-seat Super Hornets to the fleet, with students arriving in classrooms beginning in the first week of January.

“Since we returned from deployment in December 2017, our team has been driving toward fully bringing this platform online for the Navy,” VFA-147 Commanding Officer Cmdr. Patrick Corrigan said. “During the first few
months of transition at the beginning of 2018, we were really a dual-hatted squadron. We had Sailors and pilots going between Lemoore and Eglin, training on the F-35C while still maintaining F/A-18E qualifications. Senior leadership, LPOs and first-class petty officers were in school as soon as possible to get necessary F-35C qualifications, leaving junior Sailors to manage the transfer of the Super Hornets to the other commands. It was a demanding scenario for every member of our team.”

Pilots began ground school in the spring of 2018 as the pool of F-35C maintainers and aircraft continued to increase. Meanwhile, as the number of Super Hornet maintainers diminished faster than the number of aircraft on the books, workdays lengthened to meet maintenance requirements.

While Sailors were continuing to cycle through the ATC, the last F/A-18E transferred from VFA-147 in April 2018, the same month Argonaut pilots began flying the F-35C. Up to that point, aircrew had been training in one of four state-of-the-art simulators at the Pilot Training Center at NAS Lemoore, where they were exposed to and rehearsed every conceivable situation from basic take-offs and landings to minor emergency procedures and worst-case scenarios.

Aircrew were also fit for gear at the Pilot Fit Facility (PFF) at Eglin AFB. Several F-35C facilities have since opened at NAS Lemoore, including a PFF, a centralized engine repair facility and the remodeled Hangar 5, which houses VFA-147 as well as VFA-125, which was reactivated in January 2017.
as the F-35C fleet replacement squadron. Sailors will continue receiving F-35C maintenance training and instruction at the ATC at Eglin AFB, as there is no plan to build one at NAS Lemoore.

Once the last Super Hornet left the squadron, the Argonauts could focus on the final step in their transition to the F-35C—achieving its Safe-For-Flight Operations Certification (SFFOC), which ensures the squadron has enough qualified personnel to implement maintenance and safety programs in support of fleet operations. All transitioning squadrons are required to complete a SFFOC prior to independently conducting flight operations.

Encompassing areas such as equipment, personnel and programs, the SFFOC requires a squadron to be in physical custody of at least 30 percent of its assigned aircraft. With regard to the F-35C, other requirements include the installation and operation of management information systems such as the Autonomic Logistics Information System (ALIS) and its accompanying support networks. There is also a requirement for operational F-35C squadrons to maintain robust, on-track maintenance programs, as well as complete various inspections ranging from weapons to safety. Aircrew complete a transition flight syllabus and maintain certain proficiencies in accordance with Naval Air Training and Operating Procedures and Standardization.

The Argonauts earned their SFFOC in December 2018, leading to the Navy’s declaration of initial operating capability for the F-35C on Feb. 28.

“The Argonauts safe-for-flight opera-
tions certification was earned through the herculean effort of squadron Sailors and is an acknowledgement that they have developed the skills to safely maintain and operate the F-35C Lightning II,” Joint Strike Fighter Wing Commander Capt. Max McCoy said at the time. “This aircraft is a key component to maintaining the U.S. Navy’s dominance anywhere in the world.”

Pilots transitioning from the Super Hornet to the F-35C remark that the Lightning II still “flies like a fighter.”

“We were told that this jet handles like a Super Hornet with a lot more bells and whistles,” VFA-147 Maintenance Officer Lt. Cmdr. Thomas Bock said. “Having flown both the F/A-18E and the F-35C, I would agree with that statement. The Lightning II has a lot of acceleration, flies very well at high altitudes, rolls quickly and performs better than the Super Hornet and [legacy] F/A-18C.”

However, the process for executing maintenance on the F-35C is indeed generations apart from its Super Hornet predecessor.

“The most significant shift in mindset is the way we do maintenance for the F-35C,” Corrigan said. “The way we were conducting maintenance before, the quick ‘remove-and-replace to see if it works, and if it doesn’t we have to change the part again’ mindset had to change. While that thought process isn’t wrong, it just isn’t a fit for the F-35C. Now, when we go into a panel, we are confident that we have the right part on station and that it works and is good to go. We are definitely armed with more information about the jet, both historical and real-time, when we approach maintenance issues.”

“When getting our maintenance team fully-trained on the F-35C, the biggest challenge was to not only make sure we had received the proper training but also to readjust our perspective on maintenance practices,” said Aviation Electronics Technician (AT) 2nd Class Antonio Sanchez. “We were able to work side-by-side with VFA-125 for our hands-on training. They were there to teach as well as refine the skills we had already learned with the new aircraft and to help us shift our maintenance mindset by taking a more deliberate approach, and completing every step as prescribed.”

Learning a new aircraft also meant a new set of terminology.

“In maintenance, you are flushing all the acronyms of the old platform and picking up the new ones as fast as you can,” AT2 Hugh Rosie said. “Although the systems are similar, the day-to-day procedure goes by a different name under the new maintenance infrastructure.

“It’s a huge point of pride to think that what we do every day will shape Naval Aviation for the next 50 years. As we continue to work through these processes and get to answers on quick and efficient ways to resolve an issue, it will make the process easier for the squadrons transitioning behind us.”

From Commander, Joint Strike Fighter Wing Public Affairs.
O-LEVEL REFORM

LEMOORE STRIKE FIGHTER SQUADRONS RETURNING MORE SUPER HORNETS TO FLIGHT LINE

By Jeff Newman

Two Navy Super Hornet squadrons at Naval Air Station (NAS) Lemoore, California, have reduced maintenance turnaround times and are boosting aircraft readiness as part of Naval Aviation’s maintenance reform initiatives under the Naval Sustainment System (NSS).

The NSS initiative leverages best practices from commercial industry to help reform aspects of Naval Aviation’s fleet readiness centers, organizational-level (O-level) maintenance, supply chain, engineering and maintenance organizations and governance processes. Initially, the NSS is concentrating on getting the Navy F/A-18 Super Hornet fleet healthy before rolling out the approach to every Navy and Marine Corps aircraft.

Strike Fighter Squadrons (VFA) 22 and 122 were the first to implement O-level maintenance reforms following visits from commercial aviation consultants in December and January.

Reforms include assigning crew leads to manage the maintenance on each aircraft and reorganizing hangar spaces, parts cages and tools.

EDITOR’S NOTE Naval Aviation News staff writer Jeff Newman and I had the opportunity to visit Naval Air Station Lemoore the first week of April alongside our visual information counterparts to cover operational-level maintenance reforms for the F/A-18E/F Super Hornet at Strike Fighter Wing Pacific.

O-level reform is one of five aspects of the Naval Sustainment System, which focuses resources and attention on improving readiness across the fleet.

What stood out to us was the openness and willingness of squadron leaders and maintainers to embrace the opportunity to incorporate change, despite some initial resistance. Whether those improvements were recommendations from an industry partner—the Boston Consulting Group—or initiated by the squadrons themselves, leadership took control of the reforms. “We created our own destiny. We saw the opportunity to incorporate changes we had wanted to make,” said Maintenance Officer Cmdr. Kelly Borden, Strike Fighter Squadron (VFA) 122.

We witnessed two recurring themes: the use of visual displays throughout the hangars used to track status and personnel, and the benefits of crew leads—empowered petty officers assigned to oversee aircraft throughout the inspection process. We met several of those petty officers, who were inspired by the responsibility to improve communication and efficiency. All were proud of the job they were doing and eager to share their experiences.

What follows is a series of articles on reform initiatives at Master Jet Base, NAS Lemoore, and the efforts of VFA-22 and 122, the first two squadrons to take on the challenge. Of course, no overview of Lemoore would be complete without introducing the Naval Aviation Maintenance Center for Excellence and the role it plays in fleet readiness.

To follow the latest news articles, videos and podcasts on NSS reforms, visit www.navy.mil/local/nss. —Andrea Watters
The most significant change has been the delegation of ownership over each aircraft in for repairs from the squadrons’ maintenance material control officers, or MMCOs, to individual crew leads comprised mostly of first-class petty officers.

Traditionally, MMCOs must keep track of the status of each aircraft in for maintenance as well as the Sailors working on them, and that’s in addition to deciding what maintenance actions are required for each jet and which aircraft are safe to release for flight. Assigning junior-level crew leads to each jet removes some of that burden from the MMCOs and has led to improved communication and increased accountability.

“The crew leads are not making the maintenance decisions; that’s still done by the maintenance controllers, but what it allows for is it sheds those maintenance control chiefs of having to know every status of every jet, of every person, all day long,” said Lt. Cmdr. Brandon Michaelis, O-level Reform Champion for Commander, Naval Air Forces (CNAF). “So, they can focus on releasing safe aircraft by empowering those first-class petty officers, who can now own that process and know where the people are, know the status of the parts, and brief that up the line.”

For the petty officers accustomed to doing their job a certain way, reform did not come easy. But the benefits have been evident, said Aviation Electronics Technician 1st class Victor Perez, the leading petty officer for VFA-122’s avionics shop and one of the squadron’s selected crew leads.

“At first the changes didn’t feel productive because we didn’t really understand it, but now that we’ve had some time with it, it’s definitely helped improve our processes and communication,” Perez said.

Used to focusing exclusively on avionics, Perez said serving as a crew lead has forced him to approach the maintenance of his assigned aircraft more holistically. The increased responsibility of bringing an entire jet back online ultimately leads to a greater sense of accomplishment, he said.

“You get kind of personal with an aircraft,” he added. “Some aircraft are easy, and some are a struggle to get through. Rather than working on a jet for a couple hours to complete the one thing assigned...
Two F-35C Lightning II aircraft attached to the "Argonauts" of Strike Fighter Squadron (VFA) 147 fly in formation over Naval Air Station Lemoore.

MASTER JET BASE NAS LEMOORE
Home to F/A-18E/F and F-35C Squadrons

As the Navy’s largest master jet base, Naval Air Station (NAS) Lemoore, California, hosts the Navy’s entire fighter/attack capability on the West Coast and is at the forefront of training aircrew and maintainers.

The air station spans 19,225 acres, including 11,000 acres of leased farmland, and is home to Commander, Strike Fighter Wing Pacific (CSFWP) and its 16 Super Hornet strike fighter squadrons, fleet replacement squadron (FRS) Strike Fighter Squadron (VFA) 122 and newly established Commander, Joint Strike Fighter Wing (CJSFW) with its FRS VFA-125. In February 2019, VFA-147 became the Navy’s first operational F-35C Lightning II squadron.

The first F-35C arrived at NAS Lemoore in January 2017, and at the same time, the VFA-125 “Rough Raiders” were reactivated as the FRS for the platform.

To support the F-35C program, several facilities have been added or remodeled to accommodate maintenance and training, including a pilot fit facility, centralized engine repair facility, pilot training center and an upgraded hangar.

“All F-35C fleet operations are currently single-sited at NAS Lemoore, making it the focal point for Navy’s newest strike fighter capability. Lemoore is the only naval air station where both fourth- and fifth-generation squadrons will be co-located," said Capt. Max McCoy, commodore, CJSFW. “The addition of the F-35C to existing carrier air wing capability here ensures that we can operate and win in contested battlespace now and well into the future.”

The base is separated into two sides—an operations section that includes the aircraft hangars and two offset parallel 13,500-foot runways—and an administrative side that includes family housing, medical, exchange, commissary, and morale, welfare and recreation facilities.

Fleet Readiness Center West, Center for Naval Aviation Technical Training Unit and Strike Fighter Weapons School Pacific are also located here.

Background
In the mid-1950s, the Chief of Naval Operations conducted a survey to find the best location for the next master jet base. The master jet base at the time, Moffett Federal Airfield in northern California, was deemed unsuitable for expansion because of the nearby increase in urban growth. The survey concluded Lemoore’s rural location in a rich agricultural area made it ideal for unimpeded flight training.

“Lemoore is in very close proximity to some of the best training ranges available in the Navy,” said Cmdr. Chris Fisher, NAS Lemoore executive officer. “As technology has evolved, the amount of airspace needed to develop tactics and train our aircrew has increased, and Lemoore can accommodate that.”

The military operating area directly over the airfield allows aircrew to execute flight carrier practice landings without having to modify flight patterns, which other squadrons at air stations in more urban areas must do.

Over the years, the squadrons and aircraft based at NAS Lemoore have changed, but their mission has remained the same—provide infrastructure, support and services that enable CSFWP, and now CJSFW, to conduct operations in support of national tasking.

— Andrea Watters

In some cases, exceptional second-class petty officers have also been considered for crew lead, including Aviation Electrician’s Mate 2nd Class Michaela Zadra, a member of VFA-22’s quality assurance division. Having crew leads that can focus on individual jets—and communicate with the various maintenance shops—relieves maintenance control from having to keep near-constant track of as many as a dozen aircraft at a time, Zadra said.

“Crew leads have cut down on empty communication, so now I, as a maintainer who is not stuck behind a maintenance control desk, can walk around to each shop and talk to them personally,” she said. “There’s a lot more communication one-on-one, instead of one-to-one-to-one and then to maintenance control. It’s definitely helped with communication and productivity with the jets.”

In tandem with the crew lead concept has been the utilization of a whiteboard alongside each aircraft that informs anyone passing by as to the jet’s status. Information on the boards includes the names of the crew chief and additional personnel assigned to the aircraft, what maintenance is needed, and the expected completion date.

“If you physically walk through one of our hangars today, you can tell which ones have been reformed and which ones haven’t,” said Vice Adm. DeWolfe H. Miller, III, CNAF. “You know the exact status of that airplane, you know who’s working on that airplane and when they expect that airplane to be up. There’s going to be a crew lead who has that ownership.”

In addition, the two squadrons have begun treating the spaces around each Super Hornet in their hangars as dedicated workspaces, with all necessary tools and parts kept beside the aircraft rather than back in one of the various maintenance shops.

“We’re now treating the airplane a little more, as an analogy, like a patient getting surgery,” Miller said. “I am the doctor as the maintainer, and I said, ‘scalpel,’ and my tool is right there. What we’re seeing with that sort of approach, having our tools next to
the airplane, having our status board next to the airplane, everything is going to the point of action being around that airframe, and we’re seeing a really significant improvement in our mission capable rates.”

Both squadrons have also begun keeping larger parts in a centralized “parts cage” in the hangar, dramatically reducing the amount of time Sailors spend traversing the hangar in search of equipment rather than with their hands on an aircraft.

“It may be five minutes here or five minutes there, but over the course of a day across all those technicians, that’s a lot of time saved by having those parts close to where the job is being done,” Michaelis said.

The 84-day Corrosion Inspection
Together, the changes have helped the squadrons achieve one of the first goals of O-level reform—reducing the turnaround time for routine 84-day corrosion inspections down from 10 to 14 days to three days.

The 84-day inspection, so called because Super Hornets receive one every 84 days, is one of the most common checks conducted on the jet and is officially supposed to take three days.

“Our average is about 10 to 14 days,” Miller said. “It’s really important for us to put some discipline into achieving these checks on a predictable three-day pattern.”

After meeting with consultants, VFA-22 was the first squadron to pilot reforms aimed at reducing the 84-day inspection time.

“They were able to do it in two-and-a-half shifts, and as we’ve been going through the process with other squadrons, we realize that yes, three days in itself is sufficient, once we weed out the inefficiencies,” said Lt. Hasely Clarke, assistant maintenance officer for Strike Fighter Wing Pacific (SFWP).

Clarke said many of those inefficiencies arose from work centers waiting on one another to be finished with an aircraft before beginning their own tasks. “There was a lot of waiting time in between,” he said.

Time management, communication and multitasking between shops have all improved following the O-level reform, Zadra said, noting shops were encouraged to identify which of their tasks could be performed alongside another’s simultaneously. For instance, Zadra said she can check the lights in the cockpit from the side of the jet while someone from the avionics shop inspects instrumentation inside the cockpit.

“It cuts down a lot on worker hours, so we can minimize the time on the inspection,” she said.

Initial Skepticism
A former MMCO, Michaelis said he was skeptical of the O-level reforms when they were initially proposed, but has come around after seeing how VFA-22 and VFA-122 have put the reforms into practice.

“It’s been a tough pill to swallow, to see how inefficient [it was] even when I was in that position, even though I thought we were on point every single time,” he said.

“To now look back and go, ‘Wow, there were a lot of places where I could have improved.’ So, that’s what’s made me a believer, is being able to look in hindsight and realize there’s tons of this stuff that I wish I had when I was an MMCO.”

Michaelis said the plan is to take the reforms to VFA squadrons at NAS Oceana, Virginia, before rolling them out across the Super Hornet community and, ultimately, to other platforms.

“As we migrate this and expand it across all type-model-series, I’m excited about what this is going to do for our future,” Miller said.

Further evidence of the reform’s efficacy will come when squadrons can keep their Sailors on normal work schedules while preparing for deployments, Michaelis said.

“Before we go on detachments or on deployment, we often work Sailors 12 [hours] on, 12 [hours] off, sometimes seven days a week,” he said. “The proof is when, on a Thursday, we can let our people out for a three-day weekend because our jets are up and ready to go, and we saw that recently in one of our transformed squadrons.”

Jeff Newman is a staff writer for Naval Aviation News.
By Jeff Newman

The Sailors of Strike Fighter Squadron (VFA) 22 initially were skeptical when commercial aviation consultants arrived last fall to help improve maintenance procedures as part of the Naval Sustainment System’s (NSS) overall reform efforts.

Unsure whether such consultation would take the form of strict directives or fluid suggestions, the “Fighting Redcocks” soon realized the outsiders were merely there to unlock their own intuition.

“What they really did is facilitate change,” VFA-22 Commanding Officer Cmdr. Bill Frank said. “They were a catalyst for us. They ingrained themselves in our daily practices, asked a lot of questions and we garnered a lot of great information from them.”

Before long, the squadron had begun instituting changes as the first Navy squadron to undergo operational-level, or O-level, maintenance reform.

“A lot of these changes, these ideas, were already inherent in the people that have been in the business for years and years, and even some of our most junior Sailors,” Frank said. “A lot of good conversations happened just from asking, why? Why do we do things this way? What would you do differently? Why don’t you do it that way?”

**Special Changes**

When considering where to first apply its reforms, the squadron zeroed in on maintenance inspections known as “specials,” which occur at various intervals and have different focuses. The most frequent occurs every 84-days and is largely a corrosion inspection, while the 728-day special includes inspection of complex systems such as ejection seats, VFA-22 Maintenance Officer Lt. Cmdr. Billy Mohr said.

“It’s like taking your car in for an oil change,” he said. “They are scheduled, regular inspections on the preventative side versus the reactive side, where we can plan for it ahead of time, and bring jets into the hangar and hopefully get them out within the week and back in the flight schedule.”

Mohr said the squadron initially emphasized the 84-day inspection simply because it occurs most often.

“If we have a full complement of 12 jets, ideally we would be doing one of those every week,” he added.

An 84-day special is essentially a “look” inspection, where Sailors are searching the aircraft for corrosion, and is supposed to take three days. Prior to the reform effort, the inspections were taking as many as 10 days to complete.

“We want to get that look phase done, because then it gives us more time to turn it back over to the corrosion specialists and give them more time to work on the corrosion,” Frank said.

The squadron made changes and proved that the three-day timeline was realistic, leadership said. Frank noted that the decreased inspection times all stem from efficiency—the actual process for conducting the inspection remains unchanged.

“We’re not skipping anything. We didn’t cut out anything. We didn’t develop some new train of thought,” he said. “We just found ways to get back to the basics and be efficient—having the right people at the right time, having the right part there at the right time, having your tools and materials available and close to you to execute, so you don’t have to go back and forth.”

Frank likened the reform to organizing your tools and planning a materials list before beginning work on a home improvement project. Without such preparation, you could end up wasting time searching for tools or making multiple trips to the hardware store, ultimately adding days to your project timeline, he said.

**The Reform ‘Jewel’**

Of the changes made, squadron leadership identified the most significant as the assignment of crew leads to each F/A-18E-F Super Hornet that is down for maintenance. Previously, the maintenance desk chief oversaw all 10-to-12 aircraft in the squadron’s hangar.
Culled from the ranks of first- and second-class petty officers, the crew leads are the “jewel” of the entire reform effort, Frank said. “It has empowered those first and second classes to start acting like chiefs or officers,” he said. “We’re short on those people, so we need those junior personnel, who I believe are capable of it, to now start to feel empowered to act like those supervisors.”

“Being a crew lead and being a second class, when they originally wanted it as a first-class billet, it means a lot,” said Aviation Electrician’s Mate 2nd Class Michaela Zadra, a member of VFA-22’s quality assurance division. “And other second classes, besides myself, have had this opportunity as well, and that really shows how our leadership has entrusted us to do that.”

The sense of ownership that comes with being a crew lead has “changed the culture dramatically,” said Aviation Structural Mechanic Safety Equipment 1st Class Preston Clary, VFA-22’s quality assurance leading petty officer. “First of all, they don’t just pick someone; we volunteer to take on that responsibility, and we want to make sure it succeeds because it’s our name on it. If this fails, it’s on me.”

**Parts Cage, Overhauled Spaces**  
To Lt. Michael Loomis, VFA-22’s maintenance material control officer, after the crew leads, the most significant change has been the establishment of a centralized parts cage for systems and components, especially those that are repairable but awaiting parts. Previously those components, known as AWPs, would often end up back in the various repair shops, where they had a tendency to be pillaged for parts or lost altogether, Loomis said.

“Maintenance guys are not logisticians. We don’t count and control very well. We fix, destroy and fix again, right? My logistics specialists are the experts of understanding what we’ve got, what we need, how to replenish it, how to keep it stocked, how to control it, all that stuff,” he said. “So we took everything out of the shops and we have it in a centrally located AWP locker in the cage. That, in my opinion, needs to be a policy change.”

Though not as significant a change as the crew leads or parts cage, an overhaul and general beautification of the squadron’s maintenance control room has also contributed to overall squadron morale, Loomis said.

In addition to giving the room a new, bright paint job, the maintenance desk was moved back to open up the space and make it feel less cramped. Status boards went up for each crew lead to provide updates on their aircraft.

“There has always been pride from within, but now outside people walk in and they see evident pride in this squadron, starting with maintenance control,” Loomis said, emphasizing renovations would not have been possible without support from

Frank, who signed off pulling a handful of maintainers off the flight line to paint, even though it meant a brief slowdown in maintenance.

“We’ve always wanted to make our buildings better and our spaces better, but we’ve always prioritized planes, planes over the shops because we just lack the manpower to do both,” Loomis said. “However, we had a good opportunity where we’re able to slow down maintenance, and I had full support from the skipper to prioritize the transformation process.”

**‘Go for It’**

Elsewhere at Naval Air Station (NAS) Lemoore, VFA-122 followed the lead set by the Fighting Redcocks and began instituting similar changes in January (see page 40). As of March, reform was rolling out to VFA-94 and 113, with squadrons stationed at NAS Oceana, Virginia, set to be next.

For other squadrons interested in implementing some reforms of their own, Frank has a simple recommendation: “Don’t wait.”

“You have the ideas, you have the people. You’ve got the experts inherent in your commands. It’s just fostering an environment that allows them to execute and do that,” he said. “What [the consultants] did is open our eyes to ideas that a lot of our guys already had, and that’s terrific, but as for other squadrons—you don’t need to wait for them. You can do it today.”

*Jeff Newman is a staff writer for Naval Aviation News.*

‘FIGHTING REDCOCKS’

![VFA-22 Sailors prepare to reinstall a pylon.](image-url)
Process improvements coupled with hangar reorganization are the focus of operational-level (O-level) reform at Strike Fighter Squadron (VFA) 122, assigned to Commander, Strike Fighter Wing Pacific.

Based at Naval Air Station (NAS) Lemoore, California, the “Flying Eagles” are the wing’s F/A-18E/F Super Hornet fleet replacement squadron (FRS) and the second squadron to undergo O-level reform.

During an April 2 tour of VFA-122, Maintenance Officer Cmdr. Kelly Borden described both the improvements initiated by industry partner, the Boston Consulting Group, and the squadron’s own initiatives.

“Here in the hanger we’ve changed our processes regarding how we go about fixing an airplane. We’re in tune with supply, expected completion dates, and those are driving our expected fly dates. We’re working diligently to clear obstacles and barriers to production,” Borden said.

In addition, communication throughout the squadron and with the supply chain has improved and VFA-122 is making more accurate predictions of expected flight dates, he said.

Like VFA-22 (see story on page 36), VFA-122 has adopted the one crew-team concept to return aircraft to the flight line. Historically, the squadron assigned maintenance priorities and worked them by rate.

Today, whether it’s a scheduled maintenance event, special inspection, phase inspection or unscheduled maintenance, such as an engine change, the crew lead sets the priorities and sees the maintenance through from start to finish one jet at a time, Borden said.

“While the crew leads still answer to a senior chief, crew leads tell us when they expect to complete the aircraft, which parts are holding them up or any other barriers to their production,” Borden said.

Master Chief Joseph Coleman, maintenance control supervisor at VFA-122, has seen a positive change and noticed a sense of pride in how his Sailors approach their work.

“They are taking ownership and have gotten to the point where they’re starting to identify and realize where they could do better or which processes they can improve,” Coleman said. His Sailors are also more proactive when it comes to requesting parts or equipment to meet their deadlines.

“They know they can affect change and they’re getting cross trained at the same time,” he added.

Another tool is the use of white boards that provide squadron leaders with a visual status and help the crew lead focus on what it takes to make their aircraft mission capable.

“We established those early in this process to help standardize each hanger-spot. Some of that same information is on display in our Production Control Center. So that any given time, you know whether
the aircraft is on track to meet its expected flight date or not,” Borden said.

**Hangar Reorganization**

Borden took advantage of the Navy’s focus on O-level reform to incorporate changes of his own such as reorganizing the layout of his 14-space hangar by consolidating all the contractor work at the south end of the hangar and creating dedicated lines of production.

Unlike the fleet squadrons, VFA-122 has contractor maintenance people responsible for flight line support and scheduled maintenance requirements.

He reduced the clutter, and instead of labeling hangar spots by rate, each spot is now numbered and assigned a crew. Borden is also designing a model hangar to eliminate wasted time spent walking back and forth to check out tools or update paperwork.

“If we’re not on the aircraft taking care of business, we’re wasting time,” he said.

Ideally, each hangar spot will have a roll-around tool cart outfitted with common tools, a worktable and cages to store parts and panels without spreading them on the deck, he said. Each spot would also have fall protection in the form of a platform that surrounds the aircraft.

When funding is available, he wants to purchase electronic visual status displays and set up centrally located Portable Electronic Maintenance Aid (PEMA) stations where Sailors can access manuals and update their paperwork on site and avoid returning to the shop.

**Long-term Down Aircraft**

One of the benefits of NSS reform for VFA-122 was the reassignment of about half, approximately 60, of their long-term down aircraft and associated parts to the Naval Aviation Maintenance Center for Excellence (NAMCE). NAMCE’s mission is to rebuild the long-term down aircraft onboard NAS Lemoore and make them mission capable. (See NAMCE story on page 40.)

While the squadron’s planned authorized aircraft (PAA) was at 60, and is now at 48, the number crept up over the years, Borden said. “As an FRS, it’s our job to serve as a shock absorber for fleet squadrons. We give them trained air crew and maintainers as well as mission-capable aircraft.”

In return, fleet squadrons were giving VFA-122 the aircraft that needed major work. “Obviously, the fleet needs aircraft to win when they go to sea and deploy,” Borden said.

NAMCE was also able to help VFA-122 reconcile the thousands of parts associated with the long-term down aircraft.

“We turned excess parts into supply and eliminated the bulk of distractions that were cluttering up our hangar and flight line. It also freed up those Sailors reconciling parts to return to their shops and work in their rate,” Borden said.

Borden is proud of his relatively empty parts cage. “There are 28 parts in the cage, all accounted for and all belonging to one jet currently undergoing a planned maintenance interval.”

Like many squadron maintenance officers, Borden said he was open to discussing changes to his hangar for two reasons.

“One, it makes sense to follow commercial industry best practices since they are successful, proven methods. As the Navy integrates those concepts into our practices, it only increases our readiness,” Borden said. “Two, in order for us to continue to evolve, we have to change.”

“We eliminated and reduced all that clutter and distractions which allows us to focus on the effort at hand.”

**Andrea Watters is editor of Naval Aviation News.**
The team at Naval Aviation Maintenance Center for Excellence (NAMCE) Lemoore assesses, preserves and builds long-term down aircraft—playing a major role in giving fleet squadrons the mission-capable aircraft they need.

A Naval Aviation Enterprise initiative, NAMCE was established in July 2018 as a formal detachment under Strike Fighter Wing Pacific to improve F/A-18E/F Super Hornet material readiness and the knowledge, skills and experience of junior enlisted Sailors conducting maintenance on the flight line.

While the initial focus was on training, maintenance became the No. 1 priority last fall in response to initiatives under the Naval Sustainment System.

“NAMCE’s mission is to take all the long-term down aircraft on board NAS Lemoore and reconstitute them into flyable assets,” said Capt. Jim Bates, commodore, Strike Fighter Wing Pacific.

Designed to reduce squadrons’ excess planned authorized aircraft (PAA) inventory, NAMCE removes the administrative burden of long-term down aircraft and serves as a clearinghouse, Bates explained.

Fighter squadrons are assigned a PAA of 10-12. Before NAMCE stood up, some squadrons had 15 aircraft, said Chief Warrant Officer 4 Beko Rivera, maintenance material control officer for NAMCE.

“Transferring the long-term down aircraft to NAMCE makes a lot of sense and allows the squadron to manage their 10-12 aircraft,” Rivera said.

A depot-level event required every four years, a planned maintenance interval (PMI) includes a full inspection of the aircraft, particularly the airframe, and modifications to keep it current. Often, artisans find more corrosion than expected, and an engineer must assess the aircraft before work can proceed.

As squadron maintainers and depot artisans have discovered, each aircraft is unique based on its environment. Factors affecting
corrosion include whether a squadron’s aircraft sits on the bow or fantail of the carrier deck, how often it has been to sea between PMI events, and how many cats, traps and hard landings it has experienced at sea, Rivera said.

As of May 1, NAMCE owns 22 administrative aircraft and 44 long-term down aircraft physically at Lemoore, many of which were reassigned from Strike Fighter Squadron (VFA) 122, the wing’s fleet replacement squadron.

Rivera compared the transfer of all those aircraft to a poker game when the chips are all in. “What did we win? Yup, a lot of aircraft and parts,” he said.

An ongoing assessment team evaluates the jets and parts, giving Rivera the data he needs to determine how much depot-level maintenance an aircraft needs, which parts need to be ordered and which aircraft can be preserved. Once parts arrive, the NAMCE contractor field team repairs and returns the aircraft to the squadrons.

Currently, NAMCE is capable of level-two preservation with the recent delivery of NAS Lemoore’s first 1010 oil preservation truck to preserve aircraft fuel cells. The goal, however, is to be able to preserve aircraft at level three, which requires a new facility with a controlled environment of less than 40-percent humidity, Rivera said.

In the future, if a fleet aircraft is unable to deploy, for example, NAMCE will induct the aircraft and give the squadron a mission capable aircraft that is sitting in preservation.

Built on the tarmac, NAMCE occupies a 73,800-square foot air-conditioned tension fabric structure that accommodates 12 maintenance stations, each equipped with all the tools required to perform aircraft maintenance and full-wrap fall protection for the maintainers.

NAMCE Lemoore has achieved several milestones in the last 15 months:
- Built a temporary hangar capable of supporting aircraft maintenance
- Established a 371-person contract field team
- Oversaw the development and implementation of the Naval Aviation Maintenance Program Indoctrination Program
- Achieved safe-for-flight designation
- Passed the Conventional Weapons Technical Proficiency Inspection
- Accepted 66 aircraft and built and transferred four aircraft
- Removed the PAA aircraft from fleet squadrons and VFA-122, allowing all NAS Lemoore commands to focus on the mission

To date, NAMCE has returned four of its initial six jets to the fleet with four more due out before July and has developed a process to help NAMCE and the Navy prioritize recovery of these long-term down aircraft.

Rivera has also developed a business model and strategy based on data collected during the assessment phase of an aircraft’s induction into NAMCE.

He is working on creating a database that will use assessment information, outstanding technical directives, special inspections, existing discrepancies and depot-level work to determine how long it will take to repair and how much it will cost. This will give the Navy the information it needs to make calculated decisions in the recovery effort, he said.

Andrea Watters is editor in chief of Naval Aviation News.

From left are NAMCE’s first recovered aircraft LOT 33 and LOT 24 F/A-18E Super Hornets. They are parked under maintenance awnings that provide sun and rain coverage during flight line maintenance.

An F/A-18 Super Hornet is covered in protective barrier paper to prevent corrosion and environmental damage until it undergoes level-two preservation treatment at NAMCE.
Naval Aviation’s New Aircraft-on-Ground Cell Expedites Readiness

By Commander, Fleet Readiness Center Public Affairs

The day starts early for Cmdr. Jeff Brown and his team at the Aircraft-on-Ground (AOG) cell as they prepare for their teleconference with squadrons from Strike Fighter Wing Atlantic. They will check the status of short-term down Navy and Marine Corps aircraft, determine what is required to get them flying again and connect with Strike Fighter Wing Pacific later in the morning.

Located at Commander, Naval Air Forces Atlantic Fleet in Norfolk, Virginia, the newly formed AOG, part of the Naval Sustainment System initiative, builds long-term collaboration among Naval Aviation stakeholders and experts from all lines of support to quickly resolve the constraints of short-term down aircraft.

The concept has proven successful in the commercial airline industry, and Naval Aviation has already started to see results.

“By bringing needed parts from Boeing and Northrop Grumman, as well as those organically manufactured by the FRCs, the AOG returned 133 unique aircraft [by May 1] to mission-capable status since its inception in October,” said Brown, from Commander, Fleet Readiness Center (COMFRC). “This not only increases readiness immediately, it will also have positive ramifications for years to come.”
Typically, there are 40 aircraft in-scope at AOG at any given time. To gain the attention of the AOG, the aircraft must have flown in the last 160 days and must have fewer than 10 issues. There are exceptions for aircraft at risk of becoming long-term down without AOG intervention or if the down aircraft limits the wing’s ability to conduct operations or meet readiness standards.

“This is what’s needed to quickly address the reason for the aircraft not flying,” said David Ferreira, director, Maintenance Operations Center and deputy director for Aviation Material Readiness. “AOG gets to the root of the problem and quickly solves it.”

Brown sits before a large screen that lists each AOG aircraft by bureau number (BuNo). At the table with him are representatives from Naval Supply Systems Command, Weapon Systems Support and Defense Logistics Agency, along with Navy type commanders, engineers, data analysts and industry partners.

Maintenance material control officers and master chiefs from each squadron are on the phone while Brown leads the teleconference through the list of aircraft, BuNo by BuNo, addressing each constraint and getting answers on the spot, in real time.

“This problem-solving process occurs every day, several times a day, at the AOG,” Brown said.

For example, during a recent spike in Door 68 discrepancies, the AOG was able to spread multiple doors across four repair sites and resolve the issue in a matter of weeks, Brown said. “Otherwise, they would have taken maybe six months to repair all at one site.”

Located on the underbelly of the aircraft, Door 68 includes both the left and right panels that encase the engine. Because of their size and weight, they must be opened using proper technique.

The rise in discrepancies, particularly on the right door, prompted the development of a training video that reduced the number of discrepancies.

The AOG’s collaborative environment enables the fleet to not only expedite parts delivery but also address maintenance quality and training issues as they arise.

Andrea Watters, editor, Naval Aviation News, contributed to this article.
In October 2018, while on assignment shooting footage for an aerial special, a helicopter news crew from the Eastern Shore spotted an old crashed aircraft on Wroten Island.

“We were flying over, going out to another island, when I saw the airplane,” said Taylor Rogers, a producer with WBOC-TV out of Salisbury, Maryland. “We went on to do what we had to do, and then I asked the pilot to go back so I could record it. We circled the island, and I got as many shots as I could with the HD [high-definition] helicopter camera.”

Rogers described the plane as sitting in shallow water in the middle of the island, surrounded by trees, and not visible to passing boats.

“I zoomed in on the tail to try to get any identifying markings so we could find out where the plane had come from,” he said. “We found three different pieces of it in the vicinity.”

Back at the station, the crew began reviewing...
A TV-2 Shooting Star that crashed out of Naval Air Station Patuxent River in the early 1950s sits in shallow water on Wroten Island in the Chesapeake Bay.

the footage and were told by an older helicopter pilot it looked like a military airplane. WBOC reporter Brooke Reese called area military installations and learned from Dover Air Force Base’s military museum it was a training/testing type of aircraft.

Eventually, Reese spoke with the public affairs officer at NAS Patuxent River, Maryland, who advised her to contact George Schwarz, an underwater archaeologist with Naval History and Heritage Command, whose team has been compiling a list of the potential locations of aircraft that crashed out of Pax River in the 1940s and 1950s.

Schwarz's research indicated a TV-2 Shooting Star had crashed off the installation in the early '50s, and based on information garnered from archival records, pinpointed Wroten Island as one of its possible crash sites. Reese met with Schwarz in Washington, D.C., armed with Rogers’ overhead video footage.

The video showed the letters NATC—Naval Air Test Center—painted clearly on the aircraft’s tail, indicating it was a Navy wreck. But, before Schwarz could comment definitively on which aircraft it was, he explained he would need to physically visit the site, take measurements, look for features that are diagnostic of the TV-2 and attempt to find the Bureau Number, the ultimate piece of evidence. However, with other higher priorities, that likely wouldn’t happen any time soon.

Reese went on to question longtime business owners and watermen in the Wroten Island area, but found no one who knew anything about the plane. Channel 16 aired the story as it was—what they called their “mysterious discovery”—and shortly after it was televised, Reese received an email from Philip Iglehart telling her he and his friend, Michael Keyser, both later owners of the island, knew exactly what the aircraft was and the story behind how it got there.

The Aircraft and Pilot Revealed
Michael Keyser is Fenwick Keyser’s son, and he and Iglehart have been friends for years, ever since Philip moved from New York to Baltimore.

“One day Michael asked me if I’d like to learn to shoot, and the rest is history,” Iglehart noted.

Michael Keyser—who was only six at the time the incident occurred—shared his memories of the event.

“[My father and others] went running through the marsh with their hip boots on, and when they got there, the pilot was sitting there, making sure he was still alive,” he recalled.

In his newspaper article, Fenwick described the scene.
“The pilot explained his $50,000 jet motor had cut out seven minutes after he took off from the Patuxent base and that gravity had done the rest of the job, despite his frantic efforts to get the engine started again as he hurtled toward the earth.”

Parts of the jet were strewn over a wide area along the glide path through the trees, and both the nose and tail had been twisted and partially torn away from the fuselage.

“But the cockpit was intact and there, crawling out of it, was a coverall-clad figure in a brilliant Mae West life jacket,” he wrote.

That pilot was Lt. Cmdr. Kenneth S. Smith with Service Test Division, Patuxent River. As reported in the Dec. 4, 1953, issue of Tester, Pax River’s base newspaper, the accident occurred at noon when Smith’s TV-2 jet trainer suffered a flame-out.

Keyser wrote the pilot explained his “$50,000 jet motor had cut out seven minutes after he took off from the Patuxent base and that gravity had done the rest of the job, despite his frantic efforts to get the engine started again as he hurtled toward the earth.”

Not long after the crash, a Navy helicopter circled the trees a few times, hovered 40 feet above them, and lowered a long steel cable dangling a yellow sling, which hauled Smith quickly up into its belly before returning to Pax River.

“The pilot had told us his plane was a special conversion job designed for the testing of new instruments, and two large panels bristling with gauges, switches and dials bore out his words,” Keyser wrote. “The commander, just before leaving, also intimated that the Navy would be extremely grateful if nobody pinched a large gadget, which was an experimental gyro-driven artificial horizon and the only one of its kind in existence.”

Approximately an hour later, two more helicopters deposited members of a salvage team on the ground.

“Equipped with the proper tools, skilled mechanics made short work of removing vital equipment,” Keyser wrote. “Both instrument panels and a variety of other mysterious gadgets were hauled up and stowed in the waiting helicopters, and by dark, the cockpit of the plane had been reduced to a few knobs, switches, and lengths of wire and tubing.”

Iglehart and Keyser no longer own Wroten Island but remember the crash site well, located near an area that has come to be known as Airplane Pond.

“We used to take a boat through the cove or go around on the south shore and walk in, but there was clearly nowhere near as much water on that end of the island as there is now,” Iglehart noted. “Adventurous members and guests [of the hunting lodge] would often go over there because it was excellent shooting, but in the most recent years, it
got to be too treacherous, because you didn’t know if you’d step in a hole or not.”

A document signed by Fenwick Keyser on Dec. 1, 1953, gave the Navy permission to remove the plane from the island, but they never did.

“I remember the Navy building a wooden platform in the marsh, which served as a landing pad for a helicopter,” Michael said. “I’m not sure how they got the engine out of there, but I guess they took what they wanted and decided the rest was too much trouble [to remove].”

And so the aircraft remained, largely forgotten for six decades, until Chopper 16 and WBOC revealed its history once again.

“I was very pleased to get that email from Mr. Iglehart,” Reese said. “The information [he and Keyser] had was beyond any expectation. To them, it was just something that happened, but to us, it was an interesting story to be retold.”

**Benefits to the Navy**
The Keyser family’s information, photos and documents have proven valuable to the Navy, and especially to Schwarz and his team, who now have a final resolution for another one of the unrecovered Pax River crashes they’re investigating.

Typically, when Schwarz hears about possible discoveries of naval aircraft wrecks from the public, he conducts archival research and combines that with field research or site documentation to determine whether the wrecks belong to the Navy.

“Sometimes, but rarely, we receive additional information, such as photographs or official contemporary correspondence from the public that confirms the identity of a site,” Schwarz said. “Often, the Navy doesn’t have complete copies of these records for each crash, and in this case, it was very helpful for us to have received this information, which helped confirm our determination that this was the aircraft we suspected it was. Since only abbreviated accident history reports were archived, the documents and photos provided contributed to our understanding of the crash event and final disposition of the aircraft.”

Schwarz also reiterated military aircraft wreck sites are protected under the Sunken Military Craft Act of 2004, which makes disturbing such sites without permission of the U.S. Navy a crime. The Underwater Archaeology Branch manages, researches, conserves and interprets Navy shipwrecks and aircraft wrecks worldwide.

Donna Cipolloni is editor of the Tester and a communications specialist supporting Naval Air Station Patuxent River Public Affairs.
At one point in our lives, we had a favorite car. The hunk of metal that was our go-to. Our ol’ reliable. In the MV-22B Osprey program, that moniker goes to Aircraft No. 8—affectionately known as the “Eight-ball.”

After serving 20 years in test and evaluation, Eight is retired to the Patuxent River Naval Air Museum in Lexington Park, Maryland, in June.

Her humble beginnings started at the Boeing hangars in Philadelphia and Arlington, Texas. Eight was one of four engineering manufacturing development (EMD) aircraft built and heavily instrumented for the EMD flight test program at Naval Air Station Patuxent River, Maryland.

The MV-22 instrumentation package included 1,300 analog sensors, such as strain gauges, accelerometers, pressures and temperatures that helped engineers analyze and understand aircraft and propulsion system loads, stresses and strains, and how the aircraft performs in all types of conditions. It is also capable of onboard data recording and real-time data telemetry to the ground station.

Eight’s first chance to spread her wings came Aug. 23, 1997, in Arlington. After a series of shakedowns and envelope expansion flights, the aircraft was transferred to Patuxent River.

There, Eight was directly responsible for helping the MV-22 transcend from an ordinary vertical takeoff and landing to an exceptional aircraft. During the EMD and follow-on test and evaluation flight test programs, expanding the envelope or taking an aircraft to, or even beyond, its altitude and speed limits was Eight’s objective. Whether it was a hover to the never-exceed-speed, light-to-heavy gross weight or from forward-to-extreme aft center of gravity, Eight stood her ground and gave engineers vital information on the MV-22.

She demonstrated a maximum airspeed of 354 knots, along with other envelope expansion and flying qualities testing, including the high angle of attack, buffet, aerial refueling, external loads and structural landings. Eight was also instrumental in defining the height-velocity diagram for the aircraft. While in formation flight with another MV-22, Eight examined the change in flight characteristics caused by the wake interaction with the rotor’s super vortex.

She still has fans: Mark Hollady, the MV-22B flight test engineer lead, remembers his first time flying in the Eight-ball fondly.

“It was like half an hour, but what I remember the most was the short takeoff—we call it a STO. The blades come over, and then they give it the power. I was amazed at the acceleration—I almost got thrown
out of the seat,” he recalled. “You’re talking 12,000 horsepower and two 38-foot rotors. I didn’t think it would move that fast. You know, looking at it, she looks a little big and slow, but she’s very maneuverable. She’s fast.”

After the loss of two MV-22s in 2000, Eight was the lead aircraft for the high-rate-of-decent testing as part of the Osprey’s return to flight. Eight later became part of a comprehensive study on rotorcraft descent into its rotor wake. Ground tests also showed Eight could hold her own when faced with extreme crosswinds, takeoffs and landings on slopes, as well as taxing and braking.

Over the years, many operational test pilots had their first training flight on board the Eight-ball. She has also flown many influential VIPs.

There were times when she showed off her skills in the skies, performing such risky maneuvers as a 360-degree aileron roll as part of her many defensive combat maneuvers. When she encountered an unexpected bird-strike in 1998, she gave engineers the opportunity to assess the structural integrity of the Osprey’s nose cone and forward fuselage bulkhead.

Eight also helped pave the way for the development and evaluation of many versions of flight controls, avionics software, engine control and inertial navigation software.

She participated in so many offsite tours, both in and outside the U.S., she was almost like a rock star. She demonstrated her prowess in the cold temperatures of Nova Scotia, Canada, in 2000, and did a couple of stints in Gunnison, Colorado,

“OVER THE LAST 20 YEARS OF TEST AND EVALUATION, THE EIGHT-BALL HAS BEEN PUSHED, YANKED, STRETCHED AND BENT IN EVERY DIRECTION IMAGINABLE AND HAS PERSEVERED.”
and Amarillo, Texas, for heavy gross weight and crosswind STO/run-on-landing testing. Eight’s last offsite test was conducted in 2016 in Logan, Utah, where she evaluated bonded blade tab rotor hover performance at medium altitude.

Former project officer, Lt. Col. John Ennis, now Commanding Officer, Air Test and Evaluation Squadron (HX) 21, experienced firsthand the importance of checking your gear while in Yuma, Arizona, with Eight. The aircraft underwent a field repair in the Yuma desert in 2009 after rough-field STO testing.

“It was Maj. Craig Merriman and me at the time, operating aircraft Eight from the desert floor in Yuma, and the test point was taxing 10 knots over an unprepared desert floor,” Ennis said. “We’re taxiing probably 8 knots, and we’re almost done with the test point, when all of a sudden, the gear hits a really soft spot in the desert, then a pop, and the nose is sitting on the ground.”

Yuma Test Command built a tent around the aircraft and repaired the landing gear. After a month in the sweltering sun, Eight was fully functional.

Over the last 20 years of test and evaluation, the Eight Ball has been pushed, yanked, stretched and bent in every direction imaginable, persevering and providing key test data supporting the development of the aircraft. The other 350 MV-22B aircraft operated by the Marine Corps and Air Force have the Eight-ball to thank for their capability.

Peter Fitzpatrick is a writer and photographer with Naval Air Systems Command Public Affairs.
This new book caught my eye, and after getting into it, I was quite taken by the general design and presentation of the narrative and how the author found a new approach to what has, admittedly, become a rather worn subject. After all, how many more ways are there to describe “how we beat them at Midway?” The book does have several flaws of omission, which I will describe through this review. But as the review flyer says, the book, “focuses on the HOW [sic], not the what, when, or the by-the-whom.”

After a few pages, it is obviously a much different and well-considered treatment by an author who wants to give us a unique view of what went into designing, building and outfitting the new capital ship, replacing battleships as the centerpiece of the fleet during the pivotal years before World War II.

Using sidebar boxes within the main text, the author—a systems engineer, private pilot and avid yacht racer—has some general knowledge and understanding of how aircraft operate and focuses on various specific aspects of 1940s carriers and how individual countries approached their design. He also interjects occasional humor in describing the work and resulting designs, which is not always included in other histories of carriers.

He delves into various types of aerial attacks, e.g., using bombs or torpedoes, high- and low-level strikes as well as the various types of aircraft, noting that often bomber types could be maneuverable though slow, giving good accounts of themselves against opposition fighters.

After detailed dissection of many specific aspects of carriers and what it took to operate and fight them, Celander gets into several well-known World War II carrier engagements—Coral Sea, Midway and Leyte. All of these accounts are almost clinical in nature, especially Midway. I have never seen such a dissection of action. Surprisingly, there is no mention of the diversionary sortie by two—and eventually four—Japanese carriers to the Aleutians to move attention away from the major Midway operation in June 1942, perhaps because that campaign played little part in affecting what happened at Midway, apart from presenting the U.S. with a complete, flyable example of the Japanese Zero fighter.

Although the presentations in this book are different—some might even call them refreshing compared to the more traditional histories and accounts of the actions involved—there are times when the narrative is cold and lifeless, devoid of the human aspect that, after all, was the cause of these battles and, more often than not, their outcomes.

With the arrival of the Zero in August 1940 over China as a land-based fighter, and new variants quickly taking their place on all the Imperial carriers, the Japanese owned the world’s premier naval carrier fighter until mid-1943 when the Grumman F6F Hellcat arrived. The biplane fighters and torpedo bombers of the late 1930s with which Japan attacked China from its carriers were quickly replaced by more modern monoplane designs that placed Japan’s carrier forces at the head of the world’s fleets.

The attack on Pearl Harbor certainly opened the world’s eyes to just how dangerous the Japanese had become. This awakening posed several threats and concerns that took two years to overcome. In the meantime, the Allies fought with what they had, all of which is described in unusual form by this author.

Although this book has several good, even unusual points, I have to say the number and selection of photographs is disappointing, and not well presented within the text.

In addition, the reader won’t find much mention of the names and personalities on both sides—Allied and Axis—that we have come to expect in traditional accounts of carrier operations in the Pacific and in the ETO. But that’s all part of this author’s different approach to the same history.

And finally, while 75 percent of the narrative gives readers a very unusual look at a familiar story, namely World War II carrier operations, the last 25 percent is very difficult to read, almost too esoteric as the author tries applying an engineer’s analysis to the subject and supposed lesson for today’s carrier community. Perhaps he should have stopped while he was ahead. Still, “How Carriers Fought” deserves attention in today’s highly overpopulated market.
**Famous Russian Aircraft: Mikoyan MiG-19**

By Yefim Gordon and Dmitriy Komissarov


The April 29, 1957, edition of Newsweek magazine carried an artist’s rendering of a simplified MiG-19 in a full afterburner climb across the page while bold red type below declared, “Closing the Gap in the Air.” Then in black type underneath, “Reds Are Coming Up Fast—What They’ve Got.” In those early, intense days of the Cold War, any new Soviet equipment, and especially aircraft, was cause for great concern in the West.

The solid, not-too-graceful MiG-19, with its NATO code-name Farmer, was the latest design to come from the MiG design bureau. Memories of the Korean War’s MiG-15 and the later MiG-17 were still very much on everyone’s mind. Now, some 60 years from those troubling times, this huge volume follows a similar book on the MiG-17 in the Famous Russian Aircraft series, and is probably the ultimate biography of the Farmer in all its myriad prototype and production forms.

Coupled with an amazing collection of color and black-and-white photos, authoritative text, line drawings, well-done profiles, as well as various tables, this book should be the last word on the MiG-19. The text discusses all the aircraft that led up to the Farmer’s service variants and includes an end section that describes the aircraft that served with many of the USSR’s client states and any combat they may have seen during the latter period of the Vietnam War or in the Middle East against Israel. The Farmer also saw lengthy service with the Pakistani Air Force and the Chinese beginning in the late 1950s, flying against the aircraft of the U.S.-supported Chiang Kai-Shek government in Taiwan.

The MiG-19 was never a real player, but certainly put in its appearance from time to time and could hold its own against other adversaries with its heavy cannon armament.

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**Green Ink, Memoirs of a Fighter Pilot**

Maritime Patrol (VP) Squadron 46
“Grey Knights”
Established: July 1, 1931
Based: Naval Air Station Whidbey Island, Washington
Commanding Officer: Cmdr. Michael D. Bishop
Mission(s): To expertly fulfill the Navy’s maritime patrol and reconnaissance needs by developing and maintaining the highest standards of aircrew professional competency and aircraft readiness.

Brief History: The “Grey Knights” of VP-46 are the Navy’s ‘oldest and the best’ maritime patrol squadron. The squadron traces its history back through 87 years of continuous operations to the establishment of Patrol Squadron (VP) 5S on July 1, 1931. In the 17 years following its establishment, the squadron was redesignated eight times until finally becoming VP-46 on Sept. 1, 1948. Since its establishment, VP-46 has flown seven aircraft variants; the PM-2, P2Y, PBY Catalina, PBM-3 Mariner, P5M Marlin, P-2 Neptune, and since Jan. 6, 1965, the venerable P-3 Orion. The squadron has had 10 different home stations. A few notable air stations include NAS Coco Solo Canal Zone, in Panama during the 1930s and 40s, NAS North Island and NAS Moffett Field, in California, and since Nov. 14, 1993, NAS Whidbey Island.

Throughout its extensive history, VP-46 has participated in a number of engagements and exercises. During World War II, VP-46 was responsible for finding and sinking three German U-boats operating in the Caribbean Sea in summer 1943. During both the Korean and Vietnam wars, VP-46 participated in anti-submarine operations, surveillance and coastal search and rescue flights. Throughout the Cold War, VP-46 operated from deployment and detachment sites all around the world to monitor Soviet surface and sub-surface fleet activities.

Since the close of the Cold War, VP-46 has continued to maintain its primacy in anti-submarine warfare (ASW) and answered a new call to perform overland intelligence, surveillance and reconnaissance (ISR) missions. During Operation Desert Storm, VP-46 conducted strike support missions.

VP-46 again returned to the Middle East during Operation Iraqi Freedom and provided valuable intelligence to troops on the ground while performing ISR operations. In the following years, the Grey Knights continued to provide ISR capabilities and expertise during Operations Enduring Freedom, Restoring Hope and Inherent Resolve.

When VP-46 returns from its current deployment in spring 2019, the squadron will transition to the P-8A Poseidon, the Navy’s newest maritime patrol and reconnaissance aircraft. The transition will mark the end of a storied era for VP-46, but the dedication and professionalism of the men and women who have called themselves Grey Knights ensures that VP-46’s future will be as remarkable as its past.

Aircraft Assigned: Nine P-3C Orions
Number of People in Unit: 69 officers, 271 enlisted Sailors
Significant Accomplishments:
- 2012, 2016, 2017 Battle Efficiency (Battle ‘E’) Award for Maritime Patrol Excellence
- 2012 CNO Safety Award
- 2017 CNAP Retention Excellence Award
- More than 52 years and 345,000 Class-A mishap-free flight hours
I AM NAVAL AVIATION

Aviation Structural Mechanic Airman Javier Perez, CVN-74