

# F-35B

## COMPLETES

### AT-SEA DEVELOPMENTAL

# TESTING



The fifth-generation F-35B Lightning II strike fighter wrapped up its third and final shipboard developmental test phase Nov. 17 aboard amphibious assault ship USS America (LHA 6) off the coast of California.

**S**even F-35Bs assigned to Air Test and Evaluation Squadron (VX) 23, Marine Operations Test and Evaluation Squadron (VMX) 1 and Marine Fighter Attack Squadron (VMFA) 211 took part in three weeks of testing, which began Oct. 28.

The third developmental test phase, known as DT-III, evaluated the fighter's short takeoff/vertical landing (STOVL) performance during high sea states. Operations included vertical takeoffs and landings, short takeoffs, night operations, symmetric and asymmetric internal and external weapons loads, and the first engine and lift-fan removal and replacement at sea.

A cadre of test pilots, engineers, maintainers and support personnel with the Patuxent River Integrated Test Force (ITF), assigned to VX-23 at Naval Air Station Patuxent River, Maryland, conducted the developmental testing and established the boundaries of safe and effective operations for F-35Bs outfitted with new Block 3F software, which provides 100

percent of the software needed for full war-fighting capability.

"F-35B brings a first-day, low-observable stealth aircraft strike capability to the amphibious fleet, and that is unique and new," said Maj. John "IKE" Dirk, a Marine Corps test pilot and the F-35B DT-III officer-in-charge from the ITF. "Now we have a stealth capability off a relatively moderately-sized ship—less than 50,000 tons—that can be anywhere in the world, which means there's nowhere an enemy can hide. If we have the ability to send an amphibious ship there with the F-35 aboard, then we can prosecute targets."

During the three-week detachment, the test team logged 53.55 flight hours across 60 flights, conducting 126 short takeoffs, 128 vertical landings and two vertical takeoffs—an operational volume equivalent to at least four months of operations during a routine deployment at sea. Testing featured solid Sea State 4 conditions with high sea states featuring plus/minus 5.5 degrees of roll, plus/minus 2 degrees of pitch, up to 40 knots of headwind, and up to 18 knots of starboard crosswinds.

During the three weeks, 19 Marine Corps pilots qualified with the F-35B. Eight had qualified in the previous four years.

America welcomed the three squadrons aboard with her fully trained flight deck crew. Earlier in October, a group of flight deck aircraft directors and a crash and salvage team spent three days with Marine Fighter Attack Squadron (VMFA) 211 at Marine Corps Air Station (MCAS) Yuma, Arizona, becoming familiar with the F-35B.

Although the team has tested the aircraft on various installations throughout the U.S. and aboard different Navy platforms, training on how to handle the F-35B is not yet available fleet-wide. The amphibious Navy's only exposure to the aircraft came in 2012 and 2013 aboard USS Wasp (LHD 1). After completing the familiarization training, America's crew passed on its newfound knowledge to eight Sailors from USS Essex (LHD 2), who boarded America for their first opportunity to work with the F-35B.

"It was the first time we were able to have eyes on launch, recovery and taxiing of the aircraft," said Chief Petty Officer Phillip Posada, V-1 Division's crash and salvage leading chief petty officer. "We were able to get familiarized with the aircraft's tie down points, as well as ordnance and cockpit familiarization, to ensure that we are able to take care of it safely and without causing unnecessary damage to the aircraft."

The world's first supersonic STOVL stealth aircraft has subtle

*"Now we have a stealth capability off a relatively moderately-sized ship—less than 50,000 tons—that can be anywhere in the world, which means there's nowhere an enemy can hide."*

differences in its handling from aircraft the crew is accustomed to handling.

"There is a slight difference in handling the AV-8B Harrier and the F-35B," Posada said. "The Lightning II packs more of a punch when it takes off. Because of that, our handlers know to plant themselves firmly and grab a pad eye, if necessary, to steady themselves. Another attribute is that it has a sharper turning radius, so we are able to taxi the aircraft easier."

The plane also handles much differently while landing vertically.

"I think the best adjective to describe it is that it's awesome," Dirk said. "You could parallel park this thing, it is so accurate. You've got a 40,000-pound aircraft that you have control over within a foot."

"It is awesome. Taking the system and the sensors away from it, just from a real pilot's perspective, the aircraft is effortless. It is so easy to fly," agreed Royal Air Force Squadron Leader Andy "Gary" Edgell, an F-35 test pilot embedded with the ITF. "I'm a Harrier pilot, and she was a great aircraft, but she was a handful, and this is on the other end of the spectrum. The sheer level of effort required while stabilizing alongside the ship—it's so low—that what happens is you can come back to the aircraft carrier and enjoy it, as opposed to being petrified of it."



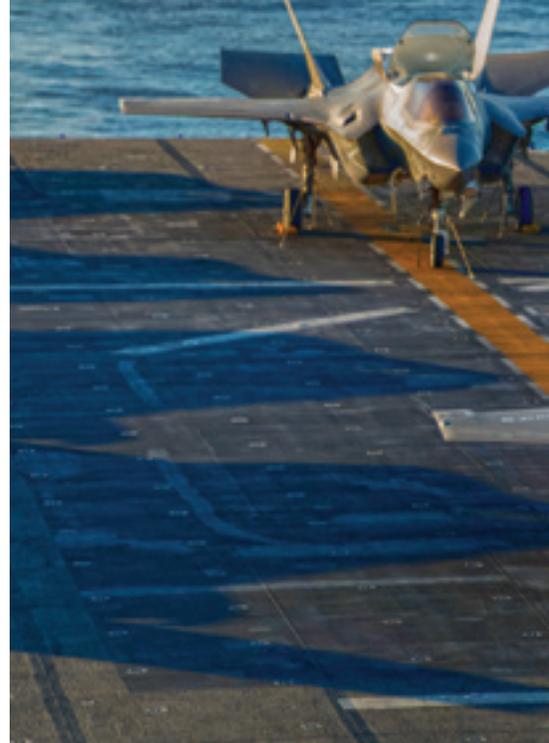
U.S. Navy photo by Darin Russell

*An F-35B Lightning II prepares to perform a vertical landing onto the flight deck of amphibious assault ship USS America (LHA 6).*



U.S. Navy photo by Lt. j.g. Maideline Sanchez

*Royal Air Force Squadron Leader Andy "Gary" Edgell, U.K. test pilot, meticulously inspects his F-35B Lightning II aircraft during preflight.*



*Two F-35B Lightning IIs sit on the flight deck aboard USS America (LHA 6) for the Lightning Carrier Proof of Concept Demonstration.*



U.S. Navy photo by Darin Russell

*An F-35B Lightning II from Air Test & Evaluation Squadron (VX) 23 launches from the flight deck of amphibious assault ship USS America (LHA 6).*

Meanwhile, VMX-1 performed operational testing focused on preparing maintenance crews and pilots for the F-35B's first deployment aboard Wasp in 2018. As a part of operational testing, one of the VMX-1 jets was placed in the hangar bay, taken apart—engine, driveshaft, lift fan and all—and put back together.

The Patuxent River ITF and VMX-1 embarked on America with an aggressive test plan featuring a broad array of milestones, including shipboard launch and recovery expansion test points focused on evaluating flying qualities at various aircraft weights, particularly with regard to crosswinds, sink rates and high sea states.

Pilots intentionally conducted test flights under unfavorable environmental conditions to test the aircraft's limitations and capabilities.

"As we all know, we can't choose the location of the battle, so sometimes we have to go into rough seas with heavy swells, heave, roll, pitch and crosswinds," Edgell said. "The last couple of days, we went and purposely found those nasty conditions and put the jets through those places, and the jet handled fantastically well. So now the external weapons testing should be able to give the fleet a clearance to carry weapons with the rough seas and rough conditions. We know the jet can handle it. A fleet clearance will come—then they can go forth and conduct battle in whatever environment."

Additionally, the DT-III weapons team evaluated ordnance separation and live-fire tests. With bombs built by America's Sailors, VMX-1 test pilots conducted successful live-weapons tests for two days, dropping six GBU-12s on a live-weapons range at MCAS Yuma.

The weapons team conducted load tests on land before embarking on America, testing all the takeoff and landing worst-case scenarios and endpoints.

"The only way to increase the endpoints is to test on board a ship for sink rates and high sea states, which is the next phase of testing after land-based testing is complete," said Gabriella Spehn, an F-35



U.S. Marine Corps photo by Cpl. Thor Larson

weapons engineer with the ITF. “There is no way to recreate the conditions that come with being out to sea.”

In preparation, America’s Weapons Department assembled two types of smart bombs—72 laser-guided Guide Bomb Unit (GBU) 12s and 40 satellite-guided GBU-32s—for the first time in the ship’s short two-year history.

The VMX-1 maintenance team completed the first at-sea swap of an F-35B engine and power module in America’s hangar bay successfully. The team spent two years learning and testing maintenance procedures for the F-35B and developed a process to remove and replace the jet’s engine.

They spent a week on the initial swap aboard America, making

sure to account for and track each step of the process within the Automatic Logistic Information System (ALIS), which gives the F-35 team the ability to plan, maintain and sustain the aircraft.

“We are a test squadron. That’s what we are and what we do,” said Marine Staff Sgt. Mark Veliz, an F-35B power line mechanic. “Taking a week to test an engine swap is how we find obstacles and fix them.”

“Testing the ability to swap entire engines or engine components at sea is vital, as this is the last opportunity for the Marine Corps to perform these shipboard maintenance actions in a sterile test environment before they deploy with the F-35B in 2018,” said Lt. Col. Richard Rusnok, officer-in-charge of VMX-1’s F-35B detachment.

The squadrons followed DT-III with a three-day proof-of-concept demonstration Nov. 18-20. The 12 F-35s aboard America during the demo were the most on a single ship—the previous high had been six.

The Lightning IIs flew alongside two MV-22B Ospreys, a UH-1Y Venom and an AH-1Z Viper, solidifying procedures between the Navy and Marine Corps.

The first of three variants to reach the fleet, the Marine Corps declared initial operating capability (IOC) for the F-35B in July 2015 and, this January, stationed VMFA-121, Marine Aircraft Group 12, at Marine Corps Air Station Iwakuni, Japan, marking the first forward deployment of an F-35B squadron (see sidebar). The U.S. Air Force declared IOC for its F-35A variant in August 2016, while the Navy projects the F-35C will reach IOC in 2018.

The first ship of its class, America is an aviation-centric platform that incorporates key design elements to accommodate the F-35B, along with MV-22B Osprey tiltrotor aircraft and various Navy and Marine Corps helicopters.

*Compiled from information provided by Patuxent River ITF PAO Sylvia Pierson and news releases by USS America Public Affairs.* ✈

## First F-35B Squadron Deploys Overseas

IWAKUNI, Japan—Marine Fighter Attack Squadron (VMFA) 121 arrived at Marine Corps Air Station (MCAS) Iwakuni, Japan, Jan. 18, marking the first deployment of the fifth-generation F-35B strike fighter outside of the United States.

VMFA-121 conducted a permanent change of station to MCAS Iwakuni from MCAS Yuma, Arizona, and now belongs to Marine Aircraft Group 12, 1st Marine Aircraft Wing, III Marine Expeditionary Force.



U.S. Marine Corps photo by Sgt. Lillian Stephens

“There’s definitely been a lot of challenges . . . moving our aircraft here, the logistics, and we have a lot of people to move,” said U.S. Marine Corps Gunnery Sgt. Vincent Koscielniak, an avionics technician with VMFA-121.

VMFA-121 consists of the F-35B Lightning II aircraft, which is planned to replace the F/A-18 Hornet and AV-8B Harrier II aircraft currently based at the air station.

“The F-35B represents the future of Marine Corps tactical aviation, and bringing it to Japan makes MCAS Iwakuni only the second operational F-35B base,” said U.S. Marine Corps Maj. Jimmy Braudt, a quality assurance officer and pilot with VMFA-121.

*Written by Cpl. Aaron Henson, Marine Corps Air Station Iwakuni, Japan.* ✈

*Two Marine Corps F-35B Lightning II aircraft, assigned to Marine Fighter Attack Squadron (VMFA) 121, transit the Pacific Ocean on their way to Marine Corps Air Station Iwakuni, Japan.*