

Pilot reaction to flying the F-35B

Aviation Week blog

Posted by Guy Norris

Ever since the F-35B short take-off and vertical landing (STOVL) version of the Joint Strike Fighter first flew in the hands of BAE Systems' test pilot Graham Tomlinson in June 2008 we have heard plenty about the easy and precise nature of the jet's controllability. Commenting about STOVL operations in particular, pilots tend to focus on the 'push button' ease of vertical landings compared to the Harrier and the unusual (until you get used to it) 'walnuts in a blender' sound that comes from the lift fan.

However virtually everything we have heard so far has been from seasoned military or industry test pilots who were involved in the development and evaluation of the F-35B, or leading instructor pilots assigned to initial training. But now that an increasing number of regular U.S. Marine Corps squadron pilots are flying the F-35B at MCAS Yuma, Arizona, with VMFA-121, what do they think? Their view is bound to be of wider interest as the JSF is prepared for its first overseas visit to the U.K's Royal International Air Tattoo and the Farnborough airshow later this summer.

Lockheed Martin's Code One magazine has produced an interesting piece on F-35B operations at Yuma which includes interviews with some of the squadron's first cadre of qualified pilots. Numbering 16 by the time of Code One's visit in March, the roster is still growing to match the number of aircraft now operating from the base. Following the delivery of the first F-35B in late 2012 VMFA-121 now has its full complement of 17 aircraft, the last three of which were delivered in December 2013.



Preparing for a sortie at Yuma (Code One)

Here are a few snippets from the story:

Transitioning from Harrier/AV-8B and F/A-18 to F-35B:

Capt. Brian Miller, who came from the F/A-18D, explained the transition in simple terms: "In a Hornet, we had a center stick. In the F-35, we have a sidestick. I don't even think about the difference now. Once I landed and took off in the simulator a couple of times, I was comfortable the stick location."

Learning the F-35B's short takeoff/vertical landing procedures:

"You would think former Harrier pilots would have an advantage with the F-35B STOVL modes since they have experienced those modes before," continued Miller. "They may be more versed in the engineering dynamics and physics of STOVL operations. But in terms of cockpit controls, STOVL mode in the F-35 is almost completely backwards from the Harrier. So F-18 pilots may have an advantage since they don't have to unlearn STOVL habits."

...and from another pilot Capt. Jonathan Thompson, a former Harrier pilot now with the VFMA-121: "The F-35B is designed to be very intuitive in hover mode," he explained. "To a pilot coming from a conventional fighter, hover mode is intuitive. Push down on the stick and the aircraft goes down. Pull back on the stick and the aircraft goes up." Hover mode control in a Harrier, however, is a little different. Up and down movement is controlled with the throttle. Left and right movement is controlled with the stick.

"Whereas I used to pull back on the stick to point the thrust down to land the Harrier in hover mode, I push forward on the stick to land the F-35 in hover mode," Thompson continued. "That said, the F-35B hover technique is just as easy to learn and just as easy to

become second nature. Former AV-8 pilots just have to be more deliberate until STOVL mode operations become more routine. Short takeoffs and vertical landings are some of skills and habit patterns we develop in the simulator.”



(Code One)

Increased situational awareness:

“The biggest situational awareness enhancer in the F-35 is the radar,” Thompson continued. “The way the F-35 presents the radar picture in the cockpit is most impressive. The ease of use is an eye opener though. The Harrier has the APG-65 radar, which is very old. Still it provided a lot of situational awareness we would not have had otherwise. But I can’t tell you how many times I flew the AV-8 without a working radar. We performed the mission anyway, but without as much situational awareness.”

The F-35’s helmet mounted display adds to situational awareness. “Hornet pilots may have experience with a JHMCS [Joint Helmet-Mounted Cueing System] before coming to the F-35,” Thompson added. “But the ability to have a contact on the radar and then be able to look out the cockpit and have that contact appear on my visor is as different as night and day from Harrier operations.”



Old and new - Harrier and F-35B fly by the Salton Sea. (Code One)

Developing future capabilities:

The pilots and planners at VMFA-121 are part of a larger team developing tactics and procedures that capitalize on these new capabilities. "As the radar gets more stable, as the electro-optical targeting system, or EOTS, gets more reliable, as pilots become more proficient, as the flight envelope opens up, we can look at the tactics, techniques, and procedures we can bring forward from legacy aircraft," explained Miller. "We can consider performing those procedures differently in the F-35 because of all the new capabilities it brings to the fight. We are just starting to break the surface on tactics development.

Similarly pilots are looking forward to a larger part of the flight envelope being cleared. "Flying at 400 knots and pulling 4.5 g's in this fighter is difficult because it wants to do so much more," Miller said. "Tactically we are rarely going to be flying the aircraft at less than 400 knots."

The upcoming Block 2B software provides weapon capability and expands the flight envelope to Mach 1.2, 5.5 g's, and fifty degrees AOA. The F-35Bs will eventually be cleared to operate at Mach 1.6 and seven g's.