

United Kingdom F-35B Testing

Code One Magazine

Jamie Hunter



The United Kingdom watched with enthusiasm as the US Marine Corps declared initial operating capability with the F-35B on 31 July 2015. As the only non-US Tier 1 partner in the F-35 program, the UK has nurtured strong participation from both an industry and operational standpoint.



The UK's joint Lightning Force has worked hard to stay at the leading edge of F-35 development from the start, notably with the advance of STOVL technology. Photo by Jamie Hunter



The RAF's Air Officer Commanding 1 Group, Air Vice Marshal Gary Waterfall is the senior officer presiding over the UK's combat air.



No 17(R) Test and Evaluation Squadron, called the Black Knights, has been re-established as the UK's premier unit for developing and realizing the potential of the Lightning II. Photo by Jamie Hunter



Now based in the California desert at Edwards, handpicked personnel of Black Knights are already engaged in the operational evaluation of the F-35 — learning about, flying, and maintaining this advanced fighter. Photo by Jamie Hunter



Wing. Cmdr. Jim Beck, the first officer to command a UK F-35 squadron, leads the Black Knights.



Beck's squadron is embedded as part of the F-35 Joint Operational Test Team, or JOTT. The team's mission is to build confidence in the aircraft towards helping clear the F-35 to make the legally mandated advance from Low Rate Initial Production to Full Rate Production. Photo by Jamie Hunter



The RAF's No 17(Reserve) Test and Evaluation Squadron comprises ten percent of the test program in the JOTT. Photo by Darin Russell



The British squadron will remain in the United States to maximize its partnership in the F-35 program. This will continue past the JOTT production decision, with the squadron set to ensure the British F-35s are kept at the leading edge of their capabilities. Photo by Jamie Hunter

The UK's joint Lightning Force has worked hard to stay at the leading edge of F-35 development from the start, notably with the advance of STOVL technology.

UK test pilots Simon Hargreaves and Justin Paines both flew the X-35 during the competitive fly-off against the rival Boeing X-32 in 2000 BAE Systems test pilot Graham Tomlinson later became the fourth pilot to fly the F-35 on 28 May 2008, when he piloted F-35 test aircraft AA-1. Tomlinson went on to be at the controls for the first flight of the first F-35B on 11 June 2008.

Today, the RAF's Air Officer Commanding 1 Group, Air Vice Marshal Gary Waterfall is the senior officer presiding over the UK's combat air. No one is better placed to provide a clear overview of British plans for the Lightning II.

"We are in a really good place now in the F-35 community in terms of relative priority because we were in right from the beginning," he explained. "We have 25,000 jobs in the UK

directly related to the Joint Strike Fighter, and we have a fifteen percent stake in every airplane through BAE Systems' workshare.

"We want the F-35 to be a core part of the UK's sovereign air defense and air power projection," Waterfall continued. "To do that, we have to do our own test and evaluation, which we are doing with our No 17(Reserve) Test and Evaluation Squadron at Edwards [AFB, California]. We have to understand how the aircraft works and how we are going to operate it. We would not have been able to do that if we just bought it off the shelf as an FMS customer and just used it without any in-depth knowledge.

"So only by being embedded now in the program are we able to manipulate our sovereign rights in terms of what we want to do with the aircraft — that's why it's so important for us now," Waterfall added.

No 17(R) Test and Evaluation Squadron, called the Black Knights, has been re-established as the UK's premier unit for developing and realizing the potential of the Lightning II. Now based in the California desert at Edwards, handpicked personnel of this famous squadron are already engaged in the operational evaluation of the F-35 — learning about, flying, and maintaining this advanced fighter.

Wing. Cmdr. Jim Beck, the first officer to command a UK F-35 squadron, leads the Black Knights. "The past year has been about being able to safely fly the F-35B under UK jurisdiction," he explained. "The big thing for us has been to train pilots and engineers. We are using UK engineering documents and we generate our own training packages."

Beck's squadron is embedded as part of the F-35 Joint Operational Test Team, or JOTT. The team's mission is to build confidence in the aircraft towards helping clear the F-35 to make the legally mandated advance from Low Rate Initial Production to Full Rate Production. "We are getting good value for money in terms of influence and access, and we've got it from a very early phase," Beck added.

"This squadron comprises ten percent of the test program in the JOTT, but we also have specific UK test items and areas of interest such as interoperability with the Eurofighter Typhoon," Beck explained. "We have been conducting ad hoc trials, however we started the core phase of the operational test work last May."

At Edwards, No 17(R) TES operates alongside the US Air Force's 31st TES plus the Marine Corps test unit, VMX-22, which completes the overall construct of the JOTT. The squadron also maintains a close relationship with the 422nd TES at Nellis AFB.

The UK contingent plays a role in the decision to move to full rate production, and they are writing the UK tactics manual for the F-35B. "By being in the position that we are within the JOTT," said Beck, "we have access to the full-up operational evaluation across the board."

"If we were to simply go and buy F-15s or F/A-18s, we'd just buy them off the shelf," Beck continued. "We couldn't influence those programs. Whereas with the F-35 we can steer the program. So, we are forward thinking about what the adversary might be doing in 2020 and beyond."

Beck and his team are focused on mission capabilities and tactics. "We are involved in some really exciting test work," he said. "For example, we are evaluating how the aircraft can be used against surface-to-air missiles and simulated enemy fighters. We are flying close air support missions. We are doing this early enough to inform any reprogramming we might need. In these operational evaluations we try to stress the system."

The system is clearly impressing Beck, who is a former Tornado pilot. "I simply cannot explain to you how good this sensor suite is," he said. "It is mind-blowing. We don't actually even need to carry a weapon, albeit we can. I can track targets, identify them all, after having turned [nose] cold [away from the targets], then datalink that information to my Typhoons. The Typhoon pilots can then carry their ordnance to bear against the targets.

"So, I've identified everything at distances that no one thought previously possible," Beck continued. "I've shared that data with other assets. I can lead them all into the fight. We are very focused on getting value for money and we can do a lot more by blending our assets.

"This jet isn't just about the weapons — it's a game-changing capability. The Tornado GR.4 can't just stroll into a double digit SAM MEZ [Missile Engagement Zone]. In the F-35 I can generate a wormhole in the airspace and lead everyone through it. There isn't another platform around that can do that. This isn't all about height and supercruise speed — it's the ability to not be seen," added Beck.

Waterfall added: "The F-35 is providing the pilot with all the needed information; it is largely irrelevant where that information has come from because the aircraft is manipulating all of the sensors available and taking the best of those sensors, correlating the information and presenting it to the pilot."

Beck noted: "We can never be explicit about the true capabilities of this jet, we've got to hold our cards close because otherwise people will try to reverse engineer it. This aircraft is so sophisticated that no pilot who has actually flown it says a bad thing about it. That tells you a lot about what this can do."

With the US Marine Corps having now declared Initial Operational Capability, Beck says that British IOC is "what makes me tick every day." His squadron currently has two aircraft assigned: F-35Bs ZM135 and ZM136. A third aircraft, ZM137 is attached to Marine Fighter Attack Training Squadron 501 (VMFAT-501) at MCAS Beaufort, South Carolina. "We are soon upgrading to Block 2B software. When I collect our fourth aircraft at the end of 2015, it will be in Block 3I software configuration. This aircraft will have a genuine fieldable capability — pretty much what we would take to war."

The clock is ticking towards establishment of the UK's first front line unit at RAF Marham, 617 Squadron, the famous "Dambusters" from World War II. IOC in a land-based capacity is scheduled for 2018 and then from the UK's new Queen Elizabeth Class aircraft carriers in 2020. Beck commented: "My driver is not the day 617 Squadron declares IOC, I need the squadron to be able to spin up, so we need to be ahead of the game. We've got to have the tactics manual ready and check that this jet is fit for purpose. We must generate sufficient evidence

to meet UK public procurement legislation through the Integrated Test and Evaluation Acceptance Plan.”

Looking ahead to 2016, Beck and his team have a series of significant milestones. Fourth-fifth generation integration trials with the Typhoons of 41(R) TES are planned, initially to hammer out communications procedures from the F-35’s intra-flight Multifunction Advanced Datalink and Link-16.

The squadron will remain in the US to maximize its partnership in the F-35 program. This will continue past the JOTT production decision, with the squadron set to ensure the British F-35s are kept at the leading edge of their capabilities.