Grim Reapers

BACK ON DECK

In March 2005, VF-101 carrier-qualified the last F-14 Tomcat pilots. This August, the famous unit — now VFA-101 — returned to the carrier deck to qualify the first cadre of F-35C pilots aboard the USS *George Washington* (CVN 73) as a major milestone on the road to US Navy initial operating capability in 2018.

report: **Gert Kromhout**

AMONG THE US Department of Defense's Lockheed Martin F-35 customers, the US Navy has been the most tentative in its approach to the Lightning II's path to initial operating capability (IOC). To date, it has only formed one F-35C unit: Strike Fighter

Squadron (VFA) 101 'Grim Reapers', currently home-stationed at Eglin Air Force Base, Florida, and the first Fleet Replacement Squadron (FRS) to train new pilots on the type.

August's carrier qualifications ('carquals') were a major milestone for the squadron and the new F-35C as the US Navy builds toward IOC somewhere in the second half of 2018.

According to CAPT James D. Christie, commanding officer of VFA-101, the first US Navy fleet squadron — which will be the unit to declare IOC — will begin conversion to the F-35C in January 2018. 'Based on our experience, it's our task to write up the syllabus for carquals for pilots that have never landed a tactical jet on a boat', he says. The initial VFA-101 'embark' was dovetailed with the third and final period of developmental test (DT-III) conducted by Air Test and Evaluation Squadron (VX) 23 'Salty Dogs' on the USS *George Washington* (CVN 73; see *Combat Aircraft* October 2016).

While the deployment was deemed successful, there are still some significant challenges ahead, not least due to the fact that the VFA-101 pilots were unable to qualify at night this time around because testing of the Gen III helmet for night flying was incomplete. CAPT Christie says that the squadron will need a second period at sea once his pilots are all equipped with the new helmet. 'Only a few of us have them now but we will all have them by the fall. VX-23 will test [some] software modifications later this month [and] we expect they will be released shortly. We should go back to the ship in spring next year.'

Working up

Preparations to take jets to sea with any squadron are well structured and follow a carefully planned path. When it's a new type, that process becomes all the more important.

With the right qualifications lined up, the pilots begin 'bouncing' — flying field carrier landing practices (FCLPs), basically a simulated carrier pattern and touch-and-go, or landing, but at a land base. VFA-101's preferred Choctaw Naval Outlying Field, situated just

VFA-101 worked alongside the test community during August's DT-III phase to complete its first carrier qualifications with the F-35C. Here, Maj Eric Northham is seen launching from the USS *George Washington* on August 14.
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west of Eglin, was unavailable because of maintenance, so the squadron headed to Naval Air Station Meridian, Mississippi, in the weeks preceding the carrier embarkation to 'bounce'.

The squadron's landing signal officers (LSOs) carefully scrutinized the FCLPs to determine readiness and any tweaks that might be required ahead of going to sea. The requirements for the daytime carquals are two touch-and-goes and 10 full-stop 'traps'. VFA-101 reserved two full days for this once they arrived aboard the USS *George Washington* on Sunday, August 14, with four F-35Cs arriving directly from Eglin. They immediately went into carquals mode to make full use of the excellent weather and sea conditions.

Left: **CAPT James D. Christie, commanding officer of VFA-101.** Gert Kromhout

Below: **A pair of VFA-101 F-35Cs is marshaled into position ready for launch.** Gert Kromhout

Of the 15 pilots on squadron strength, 12 deployed to the carrier. They were all experienced crossover instructor pilots, with years of carrier 'traps' under their belts. But, for many, it was the first time they had come aboard the carrier in an F-35C. They were joined by five pilots from VX-23, with two Integrated Test Fleet (ITF) jets from NAS Patuxent River, Maryland. The FRS pilots and test pilots completed carquals alongside each other before the VX-23 team got into the meat of DT-III, which culminated on August 26.

LT Graham Cleveland is the lead LSO at the 'Grim Reapers'. He told *Combat Aircraft*: 'It's awesome to see that everybody performs so well. We are on the boat less than 24 hours and almost everybody is qualified without a single 'bolter' [when

the tailhook misses all of the arresting wires]. We've not heard any screaming calls from the LSOs and not a single pilot has caught the one-wire, which is less safe than a two- or the preferred three-wire. We also haven't seen any wave-offs due to unsafe approaches.'

Cleveland has gradually built up his experience of the F-35C on deck, having worked as an LSO during the previous DT-I and II test embarkations. 'I've been working on this for quite some time. It is my job to qualify the pilots and ensure that everything [is] safe. You know, when the weather is this good, it cannot get any better than landing on a carrier.'

Both Christie and Cleveland agreed that the favorable weather and sea conditions contributed to the success of these first qualifications. However, they also pointed out that new technology had a large part to play. The Delta Flight Path (DFP) has been developed by the US Navy in close co-operation with Lockheed Martin. It partly automates the precise flying phase in the final seconds before touchdown. Without DFP, an average pilot makes 200 to 300 minor corrections with the throttle, stick and rudder in the last 18 seconds prior to landing. DFP, along with the simultaneously developed Magic Carpet software for the F/A-18 Hornet, dramatically decreases these corrections to just 20 for an average pilot. It is expected that this number could even drop below 10 inputs!

Until now an experienced pilot has needed between 16 and 18 days of FCLPs. Apart from the daylight requirements mentioned above, the pilot must complete six night traps. 'With DFP we have reduced FCLPs to between four and six days', says Cleveland. 'I expect the Navy to reduce day requirements to six traps'. Undeniably, the new technology will also affect night qualification requirements.

The huge advantages of both DFP and Magic Carpet have significant implications for the Navy. The reduction in the training requirement means a lower usage rate, helping extend airframe life. Less time will be required to spin up for deployment, while the overall landing phase is set to become far safer. Furthermore, because the time spent recovering aircraft to the ship is reduced, the vulnerability of the carrier decreases, as it will spend less

Top: **The carrier qualifications helped to underscore the accuracy and simplicity of the flight control system in the final phase of the carrier approach.** Gert Kromhout

Above: **Marshaling out for another launch and recovery sequence.** US Navy/MCS2C Kris R. Lindstrom

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LT GRAHAM CLEVELAND, LSO

time sailing a predictable course in the launch and recovery phase. Last but not least, the pilot is able to spend more time focused on the mission, as opposed to the challenges of getting back on deck.

Taking a complex new fighter to sea is fraught with potential pitfalls. Even some of the rudimentary elements of the operation can throw up problems. Changing the F-35's F135 engine at sea was one such issue, mainly because the engine in its carriage container does not fit inside the C-2 Greyhound carrier on-board delivery (COD) aircraft. This was part of the assessment that went into selection of the CMV-22 Osprey as the future COD platform.

A fifth F-35C arrived on the carrier on August 15 for an embarked engine change with a spare unit that was loaded before the carrier sailed from Norfolk. 'There was nothing wrong with the engine, but we wanted to evaluate how a fleet squadron changes an engine', says CAPT Christie. 'We remove one engine and put another in, and then we launch it from the ship. It would give us a better understanding of how we have to do that on board. It is not really a test but more an evaluation of how it works'. In all, the 'Grim Reapers' brought along 70 maintenance personnel, some of them civilians from contractors such as Lockheed Martin and Pratt & Whitney.

Moving ahead

Looking ahead, VFA-101 has established a detachment at NAS Lemoore in California and VFA-125 'Rough Raiders' will be formed

Above: **A sharp four-ship of 'Grim Reapers' enters the pattern over the carrier.** Todd R. McQueen

Right page top to bottom: **VFA-101 deployed to NAS Meridian to 'bounce' prior to embarking the ship.** Gert Kromhout

The new Delta Flight Path (DFP) in the F-35C has dramatically reduced pilot workload on the final phases of the approach to the boat. US Navy

here as an FRS in January 2017. VFA-147 'Argonauts', currently equipped with the F/A-18E Super Hornet, will become the first operational squadron in 2018. The VX-9 'Vampires' detachment at Edwards AFB, California, has started to receive jets and in the near future the US Navy will assign F-35Cs to the Naval Aviation Warfighting Development Center (NAWDC) at NAS Fallon, Nevada, to develop tactics and bring the F-35C into the TOPGUN program.

With IOC rapidly approaching, the US Navy has also established a new Joint Strike Fighter Fleet Integration Office (FIO), with RADM Roy 'Trigger' Kelley at the helm. Kelley is a former F-14 pilot, and he will now co-ordinate with the F-35 Joint Program Office (JPO) to help bring the F-35C into operational service.

'Our goal is IOC', says Kelley. 'But in order to reach that we have important dates ahead of us, and milestones to pass. We just have to ensure that everything goes as planned. A good example is the ALIS [Autonomic Logistics Information System], which needs to be integrated in time at air stations and aircraft carriers. Plus, of course, we must have Block 3F software operational. At operational levels, the Navy has a lot of work to do.'

Kelley is also keen to stress the importance he places on the F-35C: 'Currently, the Carrier Strike Group doesn't have a stealth fighter in the inventory. As commander of a CSG, it is very difficult to get access in heavily defended territories with integrated air defenses. Seventy per cent of the world is covered with water, so typically the first response is from the CSG. Stealth, sensors and the network-centric capabilities of the F-35C allow us access from the first day of a conflict.'