

Col Albert De Smit flies RNLAf F-35A serial F-001 at low level as he evaluates its low-altitude handling characteristics.

EDWARDS AFB, CALIFORNIA, was chosen as the primary location for conducting formal operational evaluation of the F-35 Lightning II program. The infrastructure here as part of the JOTT (Joint Operational Test Team) includes a significant contingent from the Netherlands, which is dedicated to ensuring that the F-35A enters the Royal Netherlands Air Force (RNLAf) inventory as smoothly as possible.

The US, Australian, British and Dutch teams at Edwards have, in fact, worked together over the last few years exploring the F-35. They have been investigating its limitations and advantages, pounding the local flying areas on a daily basis, building hours and shining lights into dark corners.

Col Albert 'Vidal' De Smit, commander of the Dutch detachment at Edwards, told *Combat Aircraft*, 'We have been generating sorties to get the maintenance system flowing and to give our maintainers extra experience. Flying means maintenance and when there's something to fix our people gain important expertise. This is also true for our IT personnel that work with ALIS [the F-35's autonomous logistics information system]. These experts also got to the next level of expertise with ALIS, which will be beneficial for the IOT&E.'

New jet, new missions

While technicians have gained valuable experience of turning spanners on the F-35, the four Dutch Lightning II pilots have striven to understand the aircraft from a tactical perspective. 'We worked on getting a better understanding of how we can execute the D-SEAD [destructive suppression of enemy air defenses] mission — it's a new mission set the F-35 brings to the RNLAf,' adds De Smit. 'Additionally, we have been looking at how we can execute mission concepts that are very familiar to us like close air

support [CAS]. The new variable message format [VMF] is the new datalink protocol that we use to talk to ground forces. VMF is fully digital and enables us to send, in addition to voice commands, imagery back and forth to the JTACs [joint terminal attack controllers]. In addition, the synthetic aperture radar can make images from a long distance through the weather. This is a whole new aspect in the CAS mission and will be a game-changer in the dialogue between JTAC and pilot because it offers a new way of finding and verifying targets.'

Within the detachment, the 323rd Test and Evaluation Squadron (TES) commander Lt Col Ian 'Gladys' Knight is leading the way when it comes to Dutch experience with the F-35. 'In CAS,' he says, 'VMF gives us options for supporting ground forces in a way we never had in the F-16. Instead of using voice radios and getting eyes on the target using a targeting pod close-in, we're able to use the SAR to make images of the target area and generate very accurate target co-ordinates. We pass these to the ground forces and confirm a target location using VMF from beyond visual range, assuring that enemy forces are not alerted to our air presence. All the while we can be flying in pretty bad weather with long on-station times. This would have been impossible to do with our F-16s.'

While a lot of missions are conducted with the JOTT partners, the Dutch F-35s periodically fly with the 148th Fighter Squadron 'Kickin' Ass,' the RNLAf's F-16 training unit in Tucson, Arizona, to evaluate and validate new tactics. 'The first time we got to test all these advanced capabilities to their fullest potential was about a year ago, with and against our F-16s in Tucson,' says Knight. 'The initial scenario was that our two F-35s would escort a four-ship of F-16s

The Royal Netherlands Air Force has been flying a pair of F-35As from Edwards AFB since January 2015 in the build-up towards initial operational test and evaluation. *Combat Aircraft* finds out how the journey has gone to date.

REPORT AND PHOTOS

Frank Crébas/Bluelife Aviation



OUT OF THE SHADOWS





across a notional border and protect them against another eight-ship of F-16s simulating a modern adversary. A relatively inexperienced flight leader was in charge of the F-16s on our side and Lt Col Joost 'Niki' Luijsterburg, the Tucson detachment commander, was responsible for the adversaries. Up to this point we had only practised these scenarios in the simulators and while we had a decent game-plan, we were all anxious to see how the F-35 would perform in real life. We figured that the F-35's stealth would keep us out of harm's way for most of the fight, but that we also need to protect the friendly F-16s, maximize the lethality of their missiles and get them to the target. To make this happen, we planned to initially use electronic attack against the adversary F-16s, see if we could avoid having them detect friendly fighters and datalink the location of the hostile aircraft to our F-16s. This way we could use the F-16s on our side to shoot down the initial wave of enemy fighters and keep our own missiles available once the 'Blue Air' F-16s had to focus on their target attack. The plan worked flawlessly.

'In the debrief 'Niki' told us it was one of the most memorable sorties he had ever flown. Having previously worked in

Above: The Dutch F-35A evaluation team has flown alongside the RNLA F-16 training unit in Tucson.

Above right: Col Albert 'Vidal' De Smit in the cockpit of an F-35. He praises the type's new approach to traditional missions.



the F-35 program office he was elated to find out how effective the F-35 was, but at the same time he was frustrated by not getting a single shot off the rail against us, while getting killed multiple times. After that sortie it really hit us that the F-35 was going to make a big difference in how we operate fighters and other assets in the Royal Netherlands Air Force.'

Dogfighting in the F-35

While there appears to be little discussion regarding the beyond visual range (BVR) prowess of the F-35, close-in dogfighting

has always been an area that's attracted detractors when it comes to the F-35, with reports of poor performance when it came to turning and burning.

Knight offers a very different perspective based on his experiences flying the jet, as opposed to online speculation. 'The first thing to realize when comparing modern fighter aircraft is that every type has compromises and it's up to the pilot to get the best performance out of the jet. The F-16 is a relatively small and lightweight fighter; this meant we had great sustained high-speed turning performance and



simple handling characteristics. The flight control laws were designed in such a way that the pilot can simply pull back on the stick as hard as he or she wants and the aircraft will give its maximum performance. On the flip side, we've always had to make do with limited fuel, limited payload and sluggish slow-speed maneuverability due to flight control limitations.

'The F-35 is a very different aircraft, and it took pilots a while to adjust and figure out how to max-perform it. What didn't help is that until about 18 months ago we were restricted in envelope, which meant we couldn't pull as much g as we wanted to, nor fly with high-alpha. It was an eye-opener for all of us when those restrictions were lifted and we finally got to see the full potential. Actually, it was an eye-opener for a lot of adversary pilots as well.'

The F-35 is far larger than the F-16, and it carries twice as much fuel and three times the payload. 'Consequently, the F-35 loses energy a bit faster than the F-16 at higher speeds,' continues Knight. 'But the slow-speed handling is amazing. The F-35 pilot has the option to continuously point the nose at the adversary, even at ridiculously slow speeds, which is a great capability to have in combination with high off-boresight missiles and a helmet-mounted sight. You need to be careful maneuvering the aircraft at higher speeds, because if you keep pulling back on the stick the aircraft will give you as much alpha as it can, but it will bleed a lot of energy in the process. It's up to the pilot to recognize when to try to maintain airspeed and energy and when to give

“The F-35 pilot has the option to continuously point the nose at the adversary, even at ridiculously slow speeds, which is a great capability to have in combination with high off-boresight missiles and a helmet-mounted sight

Lt Col Ian Knight

Above: Dutch F-35 pilots appreciate the F-35's low-speed agility, even at higher all-up gross weights.

Right: Close air support may call for the F-35 to get down low, so this kind of testing ensures there will be zero surprises when it comes to operational flying.

that away to prosecute with missiles or guns. I typically tell new pilots that the F-35 sits somewhere in between the F-16 and F/A-18 when it comes to within visual range maneuvering.'

Knight divulged a little more information about flying basic fighter maneuvers (BFM) in an F-35. 'When our envelope was cleared to practise BFM we got the opportunity to fight some fourth-generation fighters. Remember, back then the rumors were that the F-35 was a pig. The first time the opponents showed up [in the training area] they had wing tanks along with a bunch of missiles. I guess they figured that being in a dirty configuration wouldn't really matter and that they would still easily outmaneuver us. By the end of the week, though, they had dropped their wing tanks, transitioned to a single centerline fuel tank and were still doing everything they could not to get gunned by us. A week later they stripped the jets clean of all external stores, which made the BFM fights interesting, to say the least...

'High-g maneuvering is fun, but having high fuel capacity and the ability to carry lots of stores is great too. During the weeks when we were flying BFM we also needed to drop a GBU-12 [laser-guided bomb] on the China Lake weapons range. Back in our F-16 days we'd have had to choose, since there is no way you can BFM with a bomb on your wing, let alone having the fuel to fly both missions in a single sortie. With the F-35, however, this isn't much of an issue. On one of the sorties, my colleague, Maj Pascal 'Smiley' Smaal, decided he would fly BFM and still have enough fuel to go to the range afterwards and drop his weapon. During the debrief, the adversary pilot told us he was confused as to why we went to the range after the fight. When 'Smiley' told him that he was carrying an





The current and future faces of the RNLAf's fast jet force – an F-16AM from the 148th FS leads an F-35A over the spectacular scenery of Sedona, Arizona.



inert GBU-12 the entire time and that he then dropped it afterwards during a test event, the silence on the other end of the line was golden.'

Formal IOT&E

Having built a wealth of experience on the F-35 and with two jets in Block 3F software configuration, the Dutch contingent is poised for formal initial operational test and evaluation (IOT&E). 'We need the right instrumentation and airspace to do our tests,' explains De Smit. 'Not all of these assets are currently in place. Therefore, the decision was made to commence the OT [operational test] in a phased approach.'

De Smit's comments echo the words of the director of operational test and evaluation's recently released annual report for 2017, which details how validation of the F-22 Raptor's latest upgrade requires the ability to conduct 'mission-level, open-air flight-testing against specific adversary air capabilities.' It goes on to state that the US Air Force 'was not able to provide the means to conduct open-air testing on the Nevada Test and Training Range (NTTR) using all of the appropriate air assets required by the IOT&E test plan.' Crucially, it says that this 'places pending FY18 F-35 IOT&E open-air NTTR testing in jeopardy since a fully functional AARI [Air-to-Air Range Infrastructure] is required for F-35 IOT&E.'

To get things moving the JOTT has already sent all three F-35 variants to Alaska for cold-weather tests. This deployment marked the first official OT

event fully organized and supported by the JOTT. 'The next thing the JOTT will do is test the relatively simple missions,' says De Smit. 'These won't need a large number of F-35s to validate the system and will include CAS, FAC-A [forward air controller — airborne] and CSAR [combat search and rescue] events. Lastly, the complex scenarios will be flown and validated, so there is a lot of work to do.'

Meanwhile, F-35 integration within the RNLAf is ramping up, with the first aircraft due to arrive in the Netherlands in 2019. This summer, the initial cadre of F-35 instructor pilots will move to Luke AFB, Arizona, to begin training embedded within the 308th FS 'Emerald Knights,' which will shortly form as an F-35 training unit. At the outset the RNLAf will have up to eight aircraft at Luke to supplement the local pool of F-35s. The first Dutch aircraft for the detachment, AN-3/F-003, will be delivered from the Fort Worth, Texas, production line during the first quarter of 2019. The initial aircraft to arrive at Leeuwarden will be AN-9/F-009. This will be the first RNLAf F-35 to emerge from the new final assembly and check-out (FACO) facility in Cameri, Italy, which will then assemble the remaining Dutch examples.

Like many F-35 operators, the RNLAf is at a crucial phase of the project. No doubt any skeptics will be pleasantly surprised by the findings of the operational test team at Edwards, tasked with getting the most from the Lightning II. 