



JUDGMENT DAY

Marine Fighter Attack Squadron 121 (VMFA-121) 'Green Knights' at MCAS Yuma is set to become America's first operational F-35 squadron in July. *Combat Aircraft* editor Jamie Hunter meets the unit that carries a considerable weight of expectation on its shoulders.

report and photos:
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MARINE CORPS AIR Station Yuma swelters for most of the year under the unforgiving Arizona sun. The temperature here is rising by the day, and it's not just the climate, as VMFA-121 'Green Knights' — the Marine Corps' first front-line F-35B Lightning II unit — prepares to declare initial operating capability (IOC) with its new fighter on July 1.

Led by Lt Col Steve 'Glibby' Gillette and currently forming part of Yuma's Marine Air Group (MAG) 13, all eyes are currently on the 'Green Knights'.

No-one at the squadron is under any illusion — challenges still lie ahead in order to make that milestone. Deputy Commandant for Marine Aviation Lt Gen Jon 'Dog' Davis isn't about to accept compromise and says that IOC



This photo: A 'Green Knights' F-35B taxis out at Yuma in late April as the pilot heads to the new Auxiliary Landing Field (ALF) for field carrier landing practice.

Inset: Lt Col Steve Gillette, commanding officer of VMFA-121 'Green Knights'.

won't be declared 'unless they're ready and they can do all the things that they've said they can do.'

The Marine Corps has been focused for two years on the July 2015 milestone, as Lt Col Gillette explained to *Combat Aircraft* in his Yuma office in late April. 'In June 2013, the then Deputy Commandant for Marine Aviation Lt Gen Robert Schmidle put out a requirements letter that outlined what the Marine Corps needed to be able to do [in order to make] IOC. It talked not only about the equipment but also about the configuration of the airplane; the Block 2B capabilities and pilot training. [This includes] the number of pilots we need to have trained and the mission sets we need to be able to do. That letter has been the driver for the Marine Corps and also for industry to meet the requirements. For us, the end user,

at VMFA-121 there are things that the program must deliver — primarily, 10 aircraft in IOC configuration, of which we are set to receive our first in the next few days.'

While all of Lt Col Gillette's aircraft are in Block 2B software configuration, the IOC-configured aircraft are further modified to so-called Group 1 standard. 'They took all the modifications and lumped them into an over-arching configuration, which is the Group 1 modification. So, we have sent 10 aircraft off starting from last October.'

For Gillette, the Group 1 upgrade has not affected training, the remaining jets on the flight line at '121' being broadly configured in the IOC standard. 'All the jets we currently have on the flight line are not IOC-standard; they are 2B software-configured with the expanded training envelope. So, from a training and readiness perspective they are

99.9 per cent of what these IOC jets will be as they come back.'

The first Group 1 aircraft started returning to Yuma in early May. 'Most of the things they are doing in Group 1 are life-limit structural modifications to the airplane', said Gillette. These include the 496 bulkhead, a primary wing carry-through bulkhead that has been found to be prone to cracking in fatigue testing, plus the Auxiliary Air Inlet Door (AAID), and lightning protection.

Lt Col Gillette commented that the major elements still needed in order for his squadron to make IOC 'aren't really in our sphere of influence or control — these are big programmatic things'. The F-35's Automated Logistics Information System (ALIS) is still giving cause for concern, not so much from a software standpoint, but more from a deployment perspective. Gillette said: 'The

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Lt Col Steve 'Glibby' Gillette

configuration it's in right now, if you were to look at it, it's really just a server rack. Can I deploy with that server rack? I'd say probably not. So, ALIS version two needs to be delivered. It is in modular cases that we can pack up and take with us.

'The enhancements from the Block 2A software to 2B are phenomenal. The information that's shared F-35-to-F-35 over MADL [the Multi-function Advanced Data Link] or the amount of information that we're primarily pushing out over the Link 16 network to other users is very good.'

Lt Col Gillette also commented on recent reports of pilots within a formation 'seeing' the same targets multiple times. 'I've heard, but not seen, that if something out there [an air target] is radiating and your radar is seeing it and your ESM [electronic support measures] are seeing it and you put a bunch of different jets on the MADL network, instead of seeing one [target], you might see two or three. This is because the jet is so good at measuring angles that those point degree differences mean it sees two things'. He added: 'We haven't seen that here.'

USS Wasp trials

Although not tied to the IOC declaration, one of the most significant events on the horizon for VMFA-121 is the planned operational test (OT-1) embarkation on the amphibious assault ship USS *Wasp* (LHD 1) in late May. 'We are in full work-ups in support of VMX-22, which is the lead organization for OT-1', Gillette said. 'We've been doing day and night FCLPs (field carrier landing practice).'

OT-1 is the first operational test period for any of the F-35 family, with two previous embarks on the *Wasp* having been completed under the development test program. 'We've been to the boat twice with the F-35B in DT-1 and DT-2, where they cleared the envelope and made sure everything was safe', said

Gillette. 'For OT-1, this is the first chance to take out a fleet-representative airplane and fleet maintainers, and really the goal is to take a hard look at interoperability and sustainability of the F-35 at sea'. As well as verifying the standard of the LHA and LHD amphibious assault ships to host the F-35B, OT-1 will encompass a whole host of demonstrations, such as proving the ability to change an engine and lift fan at sea, ferrying power modules to the ship, supply chain management in the logistics structure, and ordnance loading. Gillette added: 'We want to make sure we have all the things we need for a six-month deployment before they slap the table and say 'Okay, we've looked at everything now'.'

Both VMFA-121 and Marine Fighter Attack Training Squadron 501 (VMFAT-501) 'Warlords' will embark with the jet's current standard of Block 2B software. The final configuration of Block 2B software isn't scheduled to come online until October, so the Marine Corps will deploy with an interim standard.

Maintaining the F-35's low-observable (LO) characteristics on board the ship is likely to be an area of interest. Gillette explained: 'Just like anything else in the maintenance department, the learning curve has been steep in terms of the procedures we use to maintain the LO characteristics of the airplane. When they designed the F-35 they worked out predictions for component mean-time between failures. Some were spot on, and some were way off. Some panels weren't intended to regularly come off [but] we have found ourselves having to go into those panels to replace components at a higher rate than the predictions. The good news is that these high-rate-failure parts have been retrofitted and re-designed, so the requirements to go into these what we call 'LO intrusive' panels has decreased. Is it perfect right now? Certainly not, but we've seen less of



This photo: **F-35B pilots are still flying with the Gen2 VSI helmet, which is expected to receive full night capability shortly.**

Left: **The forthcoming OT-1 trials aboard the USS Wasp are not tied to the IOC declaration but will be an important milestone for the Marine Corps.** Lockheed Martin

Above: **Pilots and maintainers at '121' are clearly noticing a constant upward curve in capability and maintainability of the F-35B.**

Top: **The weight of recent flying at VMFA-121 related to the USS Wasp embark planned for late May.**





a requirement to go into those panels. The materials that we're using and the procedures we employ to restore the LO have seen a vast improvement.'

Vital for the future

Things have clearly advanced at an impressive rate at VMFA-121, right from forming the squadron and its team, through to the capabilities of the F-35B and its software. Lt Col Gillette commented: 'When we started flying the very first versions of the Block 2A software, not even the final version, we were happy to start the airplane up and go fly. The missions were somewhat hamstrung [by] airspeed and aerodynamic envelope. It was intensive in terms of process, procedures and with non-dynamic flying — not so much focused on tactics.'

Talking about the spotlight placed on the close air support (CAS) mission, Gillette provided a fascinating insight. 'We train day and night for the CAS mission. There are things the F-35 can do that others can't, including the ability for the air-to-surface modes of the radar to very keenly see tactical-size targets on the ground'. He added: 'The argument that the F-35 can't do CAS and that it's going to be high and fast and not down in the weeds is a little bit of a misnomer'. However, many senior officers are being vocal about the proliferation of highly capable 'double-digit' surface-to-air missile systems and argue that what may be seen as a 'permissive' environment could well be

peppered with unknown threats. 'The only time I foresee we would be down in that low-altitude regime would be if we are employing the gun', Gillette told CA.

With the flight envelope restrictions now eased and the Block 2B training software now online, VMFA-121 pilots are flying as fast as 550kt or Mach 1.2, up to 40,000ft at as much as 5.5g, and with an AoA (angle of attack) of 20 degrees, soon expected to increase to 50 degrees. As the squadron awaits final support from industry, the aircraft and the men and women who fly and maintain the F-35Bs here at Yuma are ready and raring to go into IOC. Said Gillette: 'If you look at our tactical operations and mission complexity compared with 18 months ago it's vastly different now, but there's still a lot of work to do.'

Looking ahead to the IOC declaration specifically, VMFA-121 will report through MAG-13 up to the 3rd Marine Air Wing when they are ready to be checked out. 'Once we hit all the IOC wickets — all our airplanes, gear, etc — I'll make the recommendation to MAG-13 that we are ready for IOC', said Gillette. That will be passed up the chain to Lt Gen Davis, who will send an Operational Readiness Inspection (ORI) team to Yuma to verify the status. 'They'll go down the list. They'll say, 'show me you can brief, execute and debrief a CAS mission'. And we'll do it.'

As the Marine Corps looks towards establishing VMFA-211 as its second front-line F-35B unit, the pace of development in the program underscores just how important this IOC milestone is. The 'Green Knights' are determined and focused as they prepare to give the F-35B a real and meaningful endorsement of its future in Marine aviation. 