By John A. Tirpak, Editorial Director

Fifth gen vacuum cleaners; Two vs. two yawners; F-35s in Oz; ALIS in wonderland ....

FIFTH GEN: NOW WHAT?

The Air Force should declare the multirole F-35 operational this month, making it the second "fifth generation" fighter—jets with stealth, high situational awareness, integrated avionics, and sensors—in the service's arsenal. The F-22 was declared war-ready 11 years ago and has been flying combat missions in Syria for nearly two years.

The Air Force has long anticipated the day when it would have the dynamic duo in service and has spent countless simulator and computer modeling hours figuring out how best to employ it in real-world conflicts.

So now what?

Answer: "We have a lot of work to do."

That was the summary from Maj. Gen. Jeffrey L. Harrigian, director of the Air Force F-35 Integration Office at the Pentagon, presenting a paper about the advanced fighters for AFA's Mitchell Institute in early July. Harrigian, who was about to pin on a third star and take command of US Air Forces Central Command forces battling ISIS, said all the wargaming, exercises, and real-world combat have shown conclusively that fifth gen aircraft "make everyone better." Moreover, fourth gen fighters—like the F-15, F-16, and F/A-18—can't survive the modern and anticipated battlefield of lethal anti-access, area-denial defensive systems.

"You put a fourth [gen] in there, they're going to die," Harrigian said flatly.

Modern air defenses are powerful and highly mobile, he said, and the capabilities of fifth gen aircraft are essential to finding and destroying the elements of an enemy's air defenses so the rest of the force can then get in the fight.

"It comes down to the ability to survive," he said.

The paper, "Fifth Generation Air Combat: Maintaining the Joint Force Advantage," was cowritten with Col. Max M. Marosko III, deputy director of air and space operations at Pacific Air Forces headquarters in Hawaii. Both authors are veteran F-22 pilots.

Harrigian said the center of the integration effort acknowledges that the fifth gen force is simply not going to be as numerous as USAF planned when it began developing the fighters 30 years ago. A lot of tactics, techniques, and procedures must be developed to exploit the capabilities of fifth gen, especially to help the fourth gen fighters USAF has to keep in service useful and relevant. It also means developing ways that the fifth gen jets, which are essentially vacuum cleaners that suck up vast amounts of information about an enemy's forces, can stealthily communicate with each other and share data with the rest of the joint and coalition force.

In the near future, "we'll use Link 16," the generic data link that now connects USAF aircraft, but something more advanced and hack-proof is needed, Harrigian said.

In addition, USAF is going to have to figure out a way that it can, with extreme fidelity, create simulated air battles that pit the F-22 and F-35 against vastly superior numbers of enemy aircraft working in concert with super-lethal enemy air defense systems.

Right now, simulated air combat between fifth gen aircraft and small numbers of fourth gen foes are ho-hum, Harrigian said. A two vs. two battle, he said, is a "yawner" and almost useless training. Meanwhile, USAF can't regularly afford to launch enough aircraft to make a scenario authentic. The F-22's great speed also causes it to rapidly run out of restricted practice-area airspace.

Not only that; live-fly battles can be observed by adversaries, who could deduce tactics and capabilities from what they see.

All this means USAF will "have to invest" in extremely good live, virtual and constructive (LVC) simulations that look completely authentic to the pilots, whether they are flying a real jet or a simulator. Simulators will have to be able to simulate G forces, and virtual constructs piped into real cockpits will have to be convincing in their depiction of enemies fighting and things blowing up.

Harrigian said a fifth gen pilot "has to be sweating when he comes out" of the simulator. If the training isn't authentic, the pilots will reject it, he said.

"We have to figure out how you'll train like you fight" and not give anything away about fifth gen's unique capabilities, he added.

PACIFIC OVERTURES

Harrigian and Marosko's paper posited a 2026 war with a vaguely described Pacific enemy. The scenarios showed USAF dispersing fighters widely around the Pacific, shifting them around so no one base made too tempting of a target—and so USAF could stay in the fight even if a number of bases were knocked out by an enemy's tactical ballistic missiles.

Marosko, participating in the presentation by telecon, acknowledged to one questioner from the audience that aerial tankers will be key to traversing the great distances of the region. "We will protect the tankers," Harrigian said.

He also said the F-35 will be a force multiplier because of the great interoperability available with US allies who also field the F-35. In the scenario, he said an F-35 could land at an Australian air base and could be rearmed, refueled, and relaunched back into battle because the ground handling procedures will be identical to those of the US services. This will be accomplished with a minimal ground footprint, as well, which will sharply expand the number of potential operating locations for US fighters.

Australia, Japan, South Korea, and likely Singapore are Pacific nations that will have F-35s in 10 years.

The fifth gen fighters will carve out "pockets of safe airspace" for fourth gen fighters and the rest of the fleet—ranging from cargo aircraft to intelligence, surveillance, and reconnaissance craft—to move in and strike targets, Harrigian explained. The fifth gen jets will be able to take off "with a minimum of information" about where to find, say, a mobile target, and be updated en route.

The ISR fleet "needs fifth gen" aircraft to relay information about what's going on deep in enemy airspace, beyond the sensor range of the rest of the ISR enterprise, Marosko said. But this requires fifth gen pilots to be on hand in air operations centers to help explain the new fighters' capabilities. That could be difficult, Marosko noted, because at present USAF has a growing fighter pilot shortage.

"One of the things we need to do … is educate people about what these aircraft can do," Harrigian said, so realistic rules of engagement can be developed, fully exploiting fifth gen capabilities.

One trouble spot Harrigian mentioned is that for the concept of employment to work, all F-35 pilots have to see the same overall view of the battlespace, and in testing so far, that has proved to not always be the case.

"We've got to see the same picture," Harrigian said. "The mission data files have to agree."

The mission data files are a database of all the potential threats in a geographic area—ranging from fixed surface-to-air missile sites to mobile radars to air bases and the unique signatures of particular threat aircraft. Harrigian allowed that there are four such geographic areas worldwide, but the computer systems of the F-35 can only be loaded with two at a time. For now, only a lab at Eglin AFB, Fla., is developing the mission data files, and this is slowing things down. Other countries will soon develop their own data files, and that will complicate things, Harrigian said, because many countries cannot accept intelligence that they can't independently verify by source, and the US cannot share all its intel sources.

"Sovereign sources" are another area where "we have a lot of work to do," he said. Marosko said it will require establishing a "new level of trust" with allies and coalition partners. This must happen, because the databases "must be synchronized." Harrigian worried, though, that this goal may be unobtainable.

MOUNTAIN HOME COMPANION

The F-35A performed "phenomenally" during an 11-day deployment from Hill AFB, Utah—the jet's first operational base—to Mountain Home AFB, Idaho, checking off a major last test before the jet can be declared war-ready, 388th Fighter Wing Commander Col. David B. Lyons reported.

Air Combat Command chief Gen. Herbert J. "Hawk" Carlisle is expected to announce initial operational capability for the F-35 this month.

Speaking in a telecon with defense reporters in late June, Lyons said, "We flew 88 of 88 scheduled sorties" during the June 6-17 deployment, which saw the seven F-35As flying both alongside and against F-15Es and F-16s, in a simulated "dense" air defense environment. The jets performed air-to-air missions, ground attack missions, suppression of enemy air defenses, and destruction of enemy air defenses, scoring hits with 39 of 40 GBU-12 and GBU-31 inert bombs released on training ranges. The bomb that missed failed due to a problem with the bomb, not the F-35A, Lyons said. The F-35As defeated all comers in air-to-air combat, and missions were flown both day and night.

At the same time, the F-35As demonstrated a 92.3 percent mission capable rate—well above the standard even for mature Air Force aircraft. Only two ground aborts were recorded, and one was merely precautionary.

Lyons said he would be able to recommend to Carlisle that the F-35A is ready for IOC "very soon," but that he still needed to get a full complement of jets at Hill. Twelve, all configured with the 3i software, are required to meet the operational standard. Before recommending IOC, Lyons also needed to check off some other prerequisites, such as an eight-ship generation and making sure the initial cadre of operational pilots has all their certifications in the many missions the F-35A will perform. Asked, though, if he thought the F-35A is ready for real-world combat, he answered, "Yes."

Two items that were expected to be problematic proved to be non-issues. The F-35A software, which has had a history of needing to be rebooted, was stable, and the deployed jets suffered "zero" problems with the software, Lyons said. Also, the Autonomic Logistics Information System, or ALIS, "performed the way it was supposed to," he said.

The F-35 program director, Lt. Gen. Christopher C. Bogdan, has said that the "full" capability with ALIS is the only roadblock to declaring IOC this month, suggesting that milestone might not happen until October or November, but Lyons said he sees no hindrance to declaring IOC "on time." The declaration was predicted for this month several years ago.

The deployment included pilots from both the 388th and the 419th Reserve fighter wings. One hundred and eighty-one flying and support personnel deployed as if they were going to an overseas location equipped with basic amenities to host the contingent. A small number of tech reps from Lockheed Martin, maker of the F-35, deployed with the group, as they would in a real-world situation.

Pilots in the deployment reported no issues with the F-35A's helmet, which displays flight data and targeting information.

Hill will eventually field three F-35 squadrons totaling 78 aircraft. Receiving new aircraft at the rate of about two per month, the base should be fully equipped with the fighters by December 2019. The all-up 3F version of the F-35's software is to be operational in 2018.

"This was really the capstone event in our preparations to reach IOC and it was a resounding success," Lyons asserted.

Separately, the Air Force deployed three F-35As from Luke AFB, Ariz., to the United Kingdom in early July to participate in the Royal International Air Tattoo. Pilots on that flight reported no difficulties in making the journey from JB Langley-Eustis, Va., during which the jets made seven aerial tankings from a KC-10 and KC-135 tanker.

The high number of tankings was required because the aircraft are new to trans-Atlantic deployments, and for safety the jets were to maintain fuel levels permitting an emergency divert, which proved unnecessary. A software issue that has previously prevented F-35As from rapidly taking on a full complement of fuel from a tanker did not manifest during the mission, participating pilots said. ✪