F-16 MATV: A New Era For Thrust Vectoring
The F-16/MATV angles its afterburner.

For more on this unique F-16, see page 2.
IN THIS ISSUE—JULY 1994

2
BEYOND THE LIMITER
A Test Pilot Perspective On The F-16/MATV

6
THRUST VECTORING IN THE REAL WORLD
An Operational Perspective On The F-16/MATV

11
THE BEST OF BOTH WORLDS
RSAF Trains In The Arizona Desert

16
AARDVARKS, CONSOLIDATED
F-111s Converge In New Mexico

24
ACTIVATION AVIANO
F-16s Find A New Home In Italy

28
EVENTS

32
LETTERS

PHOTO: ERIC HEHS

All USAF operational F-111s now fly from Cannon AFB in New Mexico. See page 16 for more on the F-111 consolidation.
Take a fighter aircraft with a low-drag design and a superb thrust-to-weight ratio. Add lots of airspeed-independent control power. Then throw in a propulsion system that is near stall-free under any dynamic condition. What you have is the recipe for a fighter pilot's dream machine. From July 1993 to last March, a fortunate few of us feasted on just such an aircraft—the multi-axis thrust-vectoring F-16, better known as the F-16/MATV.

USAF test pilot Maj. Mike Gerzanics and I were the aircrew for the airplane's first flight on 2 July 1993 in Fort Worth. We accomplished a lot in a short time. During the first two and one-half months of thirty flights, for example, we expanded the flight envelope to a stabilized angle of attack of eighty-three degrees and saw transient AOA values of well over 100 degrees. What follows are my impressions of the airplane during the envelope expansion phase of the program. The operational phase—in which the aircraft was flown in a variety of tactical engagements—is the subject of James Sergeant's accompanying article.
Maneuvering the F-16/MATV above the normal AOA limit of twenty-five degrees is effortless. The pilot simply points the nose where he wants it to point. Below 300 knots, a pitch stick input from the pilot is a pitch rate command. As the AOA gets above twenty degrees, a slight AOA signal is fed back to the tail and nozzle commands, making the airplane feel “stable,” or as if the nose wants to come down. Effectively, the pilot has pitch rate reserve, or the ability to point the nose from any AOA, of up to eighty-five degrees.

If the pilot commands full aft stick in a hurry, the airplane can easily achieve AOA values over 100 degrees. The F-16/MATV demonstrated this capability near the end of our initial envelope expansion flying. After stabilizing the airplane at sixty degrees AOA, which takes only a small amount of aft stick force, I snapped the stick full aft and was able to command over thirty degrees of pitch change and near 100 degrees AOA. With a slight push forward, I could easily recapture sixty degrees or any desired pitch reference within a degree or two.

Your standard F-16 does not exhibit much buffet when operating within the flight envelope of the normal AOA limiter, except at higher transonic Mach numbers. At specific places beyond the limiter, we encountered a noticeable and meaningful buffet. Moderate buffet begins at about forty degrees AOA and continues until fifty degrees, at which point it diminishes to near zero. The pilot should be able to use the buffet as a cue to make stick or pedal input decisions and to keep the airplane from extremely high AOA, if these angles are not desirable. Other forms of cueing, possibly presented on the head-up display, are needed for the pilot to optimize the use of thrust-vectoring. Maj. Billie Flynn, an exchange test pilot who flew F-18s in Canada, noted this requirement after his first flight. He stressed the importance of the pilot’s being able to assess the AOA and energy state quickly.

Refining the flying qualities in the roll and yaw axes proved trickier for F-16/MATV test pilots and for the control system engineers. Roll takes on a different character above about thirty degrees AOA. If the airplane were to roll solely about its own longitudinal axis, as at low AOA, the nose would not appear to move in yaw throughout the roll. However, at higher angles, what started out as AOA would become sideslip (the yaw angle from the relative wind), then negative AOA, and so on as the roll progressed. Besides causing some pilot discomfort, this AOA/sideslip interchange produces erratic roll-rate response. So at the higher AOA, the control system tries to force the airplane to roll about the velocity vector in response to the pilot’s roll stick input and attempts to keep sideslip at zero or very small. In other words, the F-16’s flight control computer attempts to coordinate a turn automatically.

Rolls at high AOA require a couple of tradeoffs. The first involves whether to roll with the stick or pedals. As the AOA increases, the roll about the velocity vector looks more like yaw; therefore, some pilots feel that the pedal is a more intuitive controller. Above sixty degrees, a roll looks like a flat spin. The second tradeoff involves directional stability. If the system attempts to zero the sideslip too strongly, the nose appears to be yawing. If sideslip is allowed to be a little looser, the response to a roll command is not always predictable.

The F-16 loses most of its directional stability (the natural ability to keep the nose pointing into the relative wind) between thirty and fifty degrees AOA because most of the vertical tail is blanked by the fuselage at these angles. Before thrust vectoring came along, we had no very impressive. The combined ability to expand the usable flight envelope to $C_{L_{max}}$ [maximum lift] and to reduce any departure tendency for both air-to-air and air-to-ground loadings could increase military utility and safety.


We’ve taken the airplane into the pure vertical without regard for how low the speed decayed and convinced ourselves that we can predictably point the nose in pitch at any airspeed. Even while falling flat on our back (at negative ninety degrees AOA), we could accurately command nose position with forward or aft stick commands. If you want lots of pitch rate, pitch attitude change, or pointing capability, the F-16/MATV can deliver.

Maj. Gerzanics demonstrated early on in our flight test program that the Russians no longer have a monopoly on the dynamic “Cobra” maneuver. The F-16/MATV is ideally suited to perform the Cobra effortlessly. The MATV will go from 200 knots level flight to beyond the vertical in about two seconds. While little airspeed is left when the airplane reaches the vertical position, its thrust keeps the flight path from falling right away. Plus, we can easily push the nose back to the horizon and start accelerating in a hurry without losing altitude.
way to compensate for this lack of stability since the rudder also lost effectiveness above thirty-five degrees AOA for the same reason. This situation changes with vectored thrust. We can now produce a yawing moment with the nozzle at any AOA or airspeed. So the directional stability can be augmented if the flight control system can correctly determine the amount of sideslip.

Our first attempts to maintain stabilized AOA values from about thirty-five degrees through fifty degrees, though simple in the pitch axis, were complicated by the airplane’s tendency to develop random nose wandering. The resulting sidleip would then cause roll oscillations, which looked in some ways like the classical wing rock seen in many jets at higher AOAs. When we tried to counter the roll oscillations, the roll stick inputs deflected the flaperons, which are also powerful yaw devices at these AOAs. If a rapid pitch input was made, the nose would slice noticeably as the AOA went through this region. The nozzle power was always strong enough to counter this slice before it became uncontrollably large. However, the slice would still cause the plane of the pitch motion to deviate from where we wanted it. Since the nozzle had to be borrowed somewhat by the yaw axis to counter the slice, the pitch rate would decrease. While none of these motions and reactions presented a loss-of-control problem, they would likely complicate tactical tasks.

These tradeoffs, however, do not overshadow the remarkable capability of the airplane in roll and yaw axes at AOAs above the normal limiter. At forty-five degrees and below, the airplane could be rolled—with full stick or full pedal—through 360 degrees of bank angle change with no hint of departure. Above fifty degrees, that same full stick or pedal input would cause the airplane to rotate around the horizon at up to fifty degrees per second. Controllably, I would add. I performed these maneuvers many times in Lockheed’s MATV simulator before flying the real thing. Even though I had great confidence in our engineering team, I didn’t expect to perform these maneuvers so easily in the real thing.

We had time to make one flight control change last September to improve the flying qualities in the roll and

In the pitch axis, the aircraft exhibits truly impressive performance and generates pitch rates that are on the order of fifty degrees per second with excellent controllability. Excellent pitch response, pitch rate control, and ability to arrest the pitch rate on command are outstanding qualities of this aircraft and flight control system. The roll/yaw response is crisp and well behaved during lateral stick reversals and aggressive pedal rolls.

Engine response was quick, precise, and carefree throughout the envelope. The thrust-vectoring system was transparent in function to the pilot and smoothly blended into the conventional aerodynamic controls. The combination of usable displays, cockpit switchology, a high thrust-to-weight ratio stagnation-free engine, low inertias, and the tremendous pitch and yaw control power increases provided by the MATV system transform the F-16 into a carefree handling airplane with low-speed/post-stall performance that qualitatively matches or exceeds the aircraft’s large conventional envelope. The addition of the MATV system remarkably improves the agility of the aircraft at a relatively small cost in weight and complexity.

—Ed Schneider, NASA F-18 HARV pilot. (Flight 14)
The HARV is one of NASA’s thrust-vectoring research aircraft.

The performance of the MATV aircraft was very impressive. Handling qualities were good. I found it valuable to see the MATV utilize many of the maneuvers and control schemes conceived in the YF-22 and planned for the F-22.

—Jon Beesley, Lockheed F-16, YF-22, and F-22 test pilot (Flight 91)

yaw axes and to address those tradeoffs I mentioned earlier. With comments provided from all six of the test pilots who had flown the airplane, Lockheed’s flight control system engineering team identified some key options to be compared in flight. We started flying the new control laws in October and settled on a combination of options that eliminated the nose slice during aggressive pulls except at higher speeds. The change improved the directional stability considerably from thirty to fifty degrees AOA. Yaw pedals became the favored controller for maneuvering above forty-five degrees AOA.

With the improved flight controls, we got to work on tactical maneuvers. We refined techniques for performing a J-Turn, which is a rapid pitch maneuver to establish AOA beyond sixty degrees followed immediately by a roll input that yaws the airplane through the desired turn angle. With pitch rates up to fifty degrees per second and yaw rates of the same magnitude, anyone can appreciate the turn rates this maneuver can achieve. We also refined a technique for the hammerhead, or buttonhook, turn. This maneuver allows the airplane to rotate nearly 270 degrees in pitch while remaining in the same spot in the sky. Most of these maneuvers and a few others were incorporated into the demonstration flights for the VIPs quoted in this article.

The MATV airplane could do what I’ve described here because of the incredible performance and operability of the GE F110 engine. We were prepared to encounter occasional pop stalls as the AOA surpassed sixty degrees, particularly if sideslip was present. We experienced only one pop stall throughout the program (at an aggravated sideslip and high AOA condition). And we didn’t achieve this level of performance by pampering the engine. To determine whether we needed throttle movement restrictions, for example, we explored throttle transients at some extreme conditions. At seventy degrees AOA in full afterburner, we canceled the throttle to military power, waited three seconds, and reselected afterburner. No problem. The afterburner lit smoothly. So we tried it again at seventy degrees, only this time holding full pedal to generate fifty degrees per second of yaw rate. Same result.

We also didn’t experience any transient airplane responses due to different thrust levels. The flight control system made throttle transients invisible to the pilot. When we started the program, we had no idea how reliable the engine would operate in afterburner with minimum airspeed and distorted inlet flows. But we understood that, for thrust vectoring to be accepted in a single-engine aircraft, engine operability had to be unquestioned. Not only has the engine met those requirements, but the wear and tear on the new nozzle has also been less than expected. The team from General Electric deserves a lot of credit for making this fighter pilot’s dream machine come true.

Joe Sweeney is a Lockheed test pilot and manager of flight operations in Fort Worth.
THRUST VECTURING
In The Real World
By James Sergeant
This series of radio calls became a familiar prelude to some unique aerial combat encounters last November as some of the US Air Force’s best fighter pilots flew no-holds-barred fights in and against an F-16 like no other in the world—one with a thrust-vectoring engine nozzle. Their purpose: to test the tactical utility of thrust vectoring and post-stall maneuvering.

The multi-axis thrust-vectoring F-16 had already impressed a small group of Lockheed and USAF test pilots during its initial envelope expansion and development flight testing. In only four months, the airplane, previously limited to twenty-five degrees angle of attack, was cleared to perform such maneuvers as the Cobra, J-turn, and helicopter to unlimited AOAs. But whether this capability would have real tactical utility was left for the operational phase of the test program.

Critics of post-stall maneuvering argue that fighters should never get slow. They equate low speed, regardless of agility, with presenting an easy target. Proponents argue that vectoring offers a decided agility advantage as aerial encounters progress and combatants become slower. The debate has been mostly theoretical.

That’s why the pilots from the 422nd Test and Evaluation Squadron at Nellis AFB were called in to fly the F-16/MATV. The 422nd Squadron tests and develops tactics for new equipment and systems for operational F-16, F-15, A-10, and F-4G squadrons. Typically, the squadron performs this operational testing after the folks at Edwards AFB (and a few other test sites) complete developmental testing.

The 422nd chose two of its top F-16 pilots, Maj. Jay Pearsall and Capt. Jim Henderson, to fly in and against the F-16/MATV. Pearsall has over 2,400 hours in the F-16. He has completed F-16 tours at Kunsan, Luke, and Spangdahlem. Besides completing several operational tours in the F-16, Henderson, who has 1,900 hours in the F-16, also served as an F-16 instructor pilot. Both pilots are graduates of the USAF's rigorous Fighter Weapons School.

Pearsall and Henderson participated in the early planning stages of the program and then flew the F-16/MATV soon after the envelope was cleared by the F-16 Combined Test Force at Edwards. The CTF consists of Lockheed, General Electric, and USAF test pilots, engineers, mechanics, and technicians. Thanks to these people and a great design team, the envelope expansion phase was so successful that no restrictions were placed on the aircraft for the operational phase. However, the 422nd pilots were asked to keep the throttle at military power or higher when flying above the Category I limiter (above twenty-five degrees AOA). Doing so would keep the thrust and the resulting vectoring force high. (Throttle chops to idle were tested earlier in the flight test program and showed no
High-Aspect Single-Circle Maneuver

After energy has been depleted through several turns, the bandit (red) and the F-16/MATV (blue) pass nose-to-nose at Position 1. The F-16/MATV goes post-stall (Position 3) to execute a modified J-turn to reverse inside the bandit’s turn circle by Position 6 and gun track for the kill.

8 JULY 1994

Pitch rate during vertical pursuit and split-S maneuvers clearly demonstrated a unique capability to position the fighter inside the bogey’s turn radius, and stay there! Overall, clearly a unique capability during BFM [basic fighter maneuvers]. Controllability was excellent.

—Lt. Hal Murdock, US Navy F-14 Test Pilot (Flight 82)

MATV’s ability to fight an angle fight will require typical F-16 pilots to rethink their BFM techniques.

—Maj. Vince Caterina, USAF F-16 test

The bandits were leery about pointing at MATV since my post-stall “bat turn” and rudder gun attack generally killed them. As the bandits got tired of getting gunned, they attempted to run me out of energy, so they could gang up on me. This tactic was hard for them to execute without one of them still getting shot.

—Maj. Jay Pearsall, USAF’s 422nd Test & Evaluation Squadron

MATV opens up a new era of fighter tactics. Let’s hope we see it in the operational fleet soon.

—Gen. Ron Yates, Head of USAF Materiel Command, Wright-Patterson AFB, Ohio (Flight 62)
The 422nd Squadron flew 175 tactical engagements mostly against their own F-16s. They also flew nine engagements against an F-18 from NASA.

problems other than reducing the vectoring force.) The altitude floor for the air-to-air engagements was raised from the normal 10,000 feet to 20,000 feet as an added safety precaution for an aircraft with a prototype system.

The 422nd pilots rotated between MATV and the bandit or aggressor aircraft, which were F-16 Block 32 aircraft from the 422nd Squadron. The pilots flew one-vs-one engagements first. The weapons simulated during the evaluation were the F-16's standard gun with increased range PGU-28 bullets, AIM-9Ms, and AIM-120s.

Throughout their evaluation, the 422nd pilots were encouraged to fight their best BFM (basic fighter maneuvers). The engagements were no duck shoot. The goal was to get a no-kidding reality check on the usefulness of thrust vectoring.

The one-vs-one engagements started from offensive and defensive perches (positions in trail or in lead of the bandit) as well as from neutral or head-on passes. Initial speeds ranged from 435 knots down to 250 knots. The lower speeds were used to represent a fight that had already progressed through several turns.

The F-16 already possesses awesome maneuvering characteristics. But vectoring allowed the offensive pilot to get a quicker kill, and it helped eliminate some of the common mistakes of overshooting or getting stuck in lag (a situation in which the aircraft can't quite get its nose onto the bandit because of the AOA limiter).

From a defensive position, thrust vectoring allowed the F-16/MATV to survive longer. The bandit was still able to shoot at the airplane, but the shots had a lower probability of kill because the F-16/MATV was more elusive than a standard F-16. In addition, the known ability of the F-16/MATV to use post-stall maneuvering caused the attacking pilot to feel somewhat defensive and thereby modify his tactics to guard against any real, or perceived, threat from the thrust-vectoring jet.

The high-speed neutral one-vs-one engagements displayed the benefits of the F-16 limiter. The limiter allows the pilot to maintain the aircraft's energy in the turns by keeping the airplane out of the post-stall region, where drag is dramatically higher. If the MATV pilot employed post-stall maneuvering too early or at the wrong time, he would indeed slow down too fast and the bandit could gain an advantage. However, thrust vectoring allowed the F-16 to employ that portion of the flight envelope between the normal AOA limiter and the AOA for maximum lift (around thirty-five degrees AOA). As a result, the MATV pilot could take advantage of the F-16's maximum turn capability.

Thrust vectoring and post-stall maneuvering did improve the F-16's air-to-air capability as airspeeds decreased and as the one-vs-one neutral setups progressed to offensive or defensive positions. Of course, the neutral setups were against another F-16 with good vertical capability. Against a dissimilar aircraft without such a high thrust-to-weight ratio, the F-16/MATV would have a distinct advantage because it could exploit post-stall maneuvering earlier in the fight.

For the one-vs-two engagements, the 422nd sent Capt. Dave Dodson as a dedicated bandit. Dodson, with over
Capt. Dave Dodson, Capt. Jim Henderson, and Maj. Jay Pearsall (left to right) of the 422nd Tactical Evaluation Squadron performed the operational assessment of the F-16/MATV for the US Air Force.

1,000 hours of F-16 flying time, has a background that makes him a most formidable adversary. It includes a tour flying nothing but air-to-air engagements in the F-15C and a tour as a dedicated F-5 and F-16 aggressor. Like Pearsall and Henderson, Dodson is also a graduate of the USAF Fighter Weapons School.

In the one-vs-two engagements, Dodson flew exclusively as an adversary against the F-16/MATV while

This jet is much more lethal than a normal F-16. In a one-vs-two engagement, it allows you to actually be offensive instead of defensive, as in a normal jet. The limiter-off capabilities give you the opportunity to quickly kill one bandit and then engage the other—one on one. The bottom line: you have a greatly increased capability to survive and kill with this system.

—Capt. Jim Henderson, USAF's 422nd Test & Evaluation Squadron

Pearsall and Henderson switched between the adversary and the front seat of the F-16/MATV. The three pilots flew a total of sixty-two one-vs-two aerial engagements.

In these encounters, the bandits tried to send the wingman high to gain an advantage in the fight—along with trying everything else in the fighter tactics handbook. Their strategy was to attack the F-16/MATV from above while it countered an aggressive lead bandit. Employing this strategy successfully would support the critics' main argument against post-stall maneuvering.

That is, any advantage offered by post-stall capability could be easily overcome by multiple bandits.

The actual results, however, may surprise these critics. The MATV aircraft was able to hold its own in these lopsided contests, and it was often impressively offensive. Post-stall maneuvering forced the bandits to modify their tactics and to reduce their mutual support to counter the thrust-vectoring opponent. Although the bandit wingman tried going high, the F-16/MATV would use its post-stall capability to get a shot at or, at least, threaten the high wingman before continuing to fight the lead bandit.

The evaluation also showed that the gun (with the increased-range PGU-28 bullets) was the weapon used most of the time because of the close ranges and short reaction times associated with the dogfights. Missiles were used only a portion of the time. And most of the missile shots were fired within the standard AOA envelopes for the missiles. (High-FOA missiles are in development. In fact, a specially instrumented AIM-9M was carried on the F-16/MATV's wingtip during several flights to gather vibration and loads data on the impact of the high-FOA environment on the missile itself.)

The pilots of the 422nd commented that while thrust vectoring would never be a substitute for a good understanding of basic air-to-air fighting skills, the capability significantly improves the airplane's lethality.

The F-16 would also benefit from the ability to carry air-to-air missile loadings presently limited to around fifteen degrees AOA (asymmetric missiles, for example) out to the maximum lift AOA of thirty-five degrees and beyond. This advantage, however, was not specifically addressed in the flight test program.

So it appears that the debate over thrust vectoring has moved from the chalkboard to the cockpit. Whether this capability, which is designed into the F-22 Air Superiority Fighter, will find its way into future versions of the F-16 remains to be seen. Those who have witnessed what this capability can do in the air, however, have been favorably impressed.

James Sergeant was the flight test engineer for the MATV program.
Luke Air Force Base baked under a cloudless blue sky. It was the kind of Arizona day that the crewchiefs could step into their jet’s exhaust to cool off. Second Warrant Officer Tan Yeow Heng was a long way from his home in the Republic of Singapore. But the efficient whine of jet engines was the same here as it was at Tengah Air Base, some 11,000 miles away. Holding a radio to his ear, Tan scanned the shimmering tarmac as the first wave of six F-16 Fighting Falcons cranked their engines. The production superintendent knew things looked good. His crewchiefs in their blue coveralls scrambled around their F-16s with confident, well-practiced professionalism. The pilots bobbed and twisted under Plexiglas canopies; each one checking knobs and throwing various switches. Soon Tan’s pilots, both American and Singaporean, would engage some US Marine F/A-18s in simulated dogfights somewhere over the sprawling Barry Goldwater Range.
All their technicians arrive here fully qualified on the F-16. Their proficiency is definitely world-class. And they are a pleasure to work with.

To say that Tan is a member of a unique international fighter squadron is something of an understatement. His unit, the 425th Fighter Squadron, is an integral part of Luke's 56th Fighter Wing. Ninety percent of its members, however, are foreign nationals—members of the Republic of Singapore Air Force. Commanded by a US Air Force officer and assisted by a small group of US supply, administration, and maintenance specialists, the unit is more than just another foreign military sales training effort. It is a stand-alone US fighter squadron that has held its own against Luke's other eight fighter outfits in the short time that it's been operational.

MSgt. Paul Enfield has been with the program from day one. "These guys know their stuff when it comes to aircraft maintenance," says the eighteen-year veteran of maintenance and advisor to the Singapore personnel. "All their technicians arrive here fully qualified on the F-16. Their proficiency is definitely world-class. And they are a pleasure to work with." Enfield's glowing observations are backed up by plenty of supporting numbers. Since becoming operational in May 1993, for example, the squadron has posted a mission-capable rate of eighty-five percent. Likewise, its cumulative ground-abort rate is less than

PHOTO A1C HOLLY CASTANO / USAF
three percent. These performance indicators are particularly impressive when you consider the aircraft are not exactly factory fresh. In fact, the average airframe age is thirteen years with airframe times averaging around 3,100 hours. To make things even more entertaining for the 425th's maintenance troops, the unit's nine F-16A/B aircraft have been modified with Singapore-specific software and line-replaceable units. These differences provide more than their share of maintenance and supply challenges. "A lot of logistics issues must be massaged," Enfield continues. "Although we're part of the 56th Fighter Wing, our unique configuration often means we have to arrange our own support outside the normal maintenance system."

Operating under the project name Peace Carvin II, the primary mission of the 425th Squadron is to provide follow-on training for fighter pilots of the Republic of Singapore Air Force. Upon arriving at Luke, the average RSAF pilot has 500 hours in the F-16. Not surprisingly, many of them also have considerable time in other RSAF aircraft, such as the A-4S, F-5, and the now-retired Hawker Hunter. At any given time, ten to twelve Singapore pilots are assigned to the squadron. They will stay an average of eighteen months. Upon returning home, an RSAF pilot might be assigned to Singapore's F-16 unit, the 140th Squadron at Tengah Air Base, or to a staff tour.

A former commanding officer of the 140th Squadron, Lt. Col. Richard Lim is the 425th's senior RSAF officer. "One of the reasons we're here is for the superb training facilities Luke Air Force Base has to offer. Our country occupies only 244 square miles. There simply isn't the airspace for fighter training," Lim, who has 1,000 hours in the F-16, finds much of his time occupied with non-flying chores. By the time pilots, maintenance, and support staff and their families are factored in, Lim heads up a Singapore community of approximately 105 servicemen and women and 150 dependents. "Living and working in the United States is a great experience for our people," Lim says with a smile. "We encourage them to get out and travel, to see as much of your vast country as possible. Last August, we deployed to Eielson AFB in Alaska. Several families took advantage of the opportunity to see that unique corner of the world."

Some things, like Alaskan weather, take getting used to for citizens from tropical Singapore. Other things, like practicing top-notch fighter maintenance, comes as easily as falling off the proverbial log for the members of the 425th. Maj. Tan Hoo
Our initial expectations regarding mission-capable rates have been greatly exceeded despite the age and unique configuration of our aircraft.
Min is the squadron’s senior maintenance officer. “Our initial expectations regarding mission-capable rates have been greatly exceeded despite the age and unique configuration of our aircraft,” says Min. “Our aircraft were formerly operated by the USAF Thunderbirds. They’re leased to the Singapore government. We maintain them to US Air Force standards.”

Some veteran maintainers might wonder if they are maintained above the usual standards. For example, the 425th managed to launch 100 percent of its fleet to Miramar Naval Air Station in southern California. Soon after, the squadron repeated this performance when it deployed to Tyndall AFB in Florida. This was no mean feat, considering the age of the aircraft and the potential of a unique LRU giving up the ghost.

Tan’s maintainers can be equally proud of their collection of Fighter Squadron Maintenance of the Month Awards. Every squadron of the 56th Fighter Wing at Luke competes for the trophy. “The award takes into account all maintenance factors and statistics as well as things like weapons loading and quality assurance reports,” explains Tan. “It’s quite an honor to receive it because it reflects on our performance for an entire month. It is based on the big picture.”

As the 425th’s commander, Lt. Col. Wayne Hughes has been with the outfit from the very beginning. Designing a fighter squadron that includes 105 foreign nationals and sixteen Americans is quite a challenge. Designing one that excels at its task is even tougher. “The objective was to establish a US fighter squadron, taking into account national and cultural sensitivities, our relatively small size, and some complex bureaucratic arrangements,” Hughes explains. “Lim and I work hand in glove, as does everyone at every level, to make this place run smoothly. What we lack in size we make up with style.”

Hughes, who himself has over 700 hours in the F-16, recognized there was little need to adopt US management programs blindly if the RSAF had something better to offer. “Sure we’re a US fighter squadron,” the native from Lime Springs, Iowa, says. “But I’m convinced the RSAF can teach us about things like program management, preventative maintenance, and risk management. If they’ve broken the code on stuff like that, I won’t ignore it. I’ll adopt it.”

Small wonder that, when time came to pick a squadron motto, Lim and Hughes put their heads together and came up with “The Best of Both Worlds.”

Cole Morris is a public affairs writer from Luke AFB in Arizona.
AARDVARKS
CONSOLIDATED

Code One Visits Cannon AFB, New Mexico
Jackrabbits can’t hide on the flat, featureless plains of northeastern New Mexico. The furry creatures rely on their speed and keen sense of hearing to avoid predators. The assembly of F-111s parked on the ramp at Cannon AFB appears similarly vulnerable. Like the jackrabbit, the EF-111s, F-111Es, and F-111Fs at Cannon must count on their own unique capabilities to survive—as defense budgets shrink.
The airplane is still around because the leadership understands and appreciates its capability.

If Brig. Gen. William Guth, the wing commander at Cannon, ever needs proof of the F-111's capability, he can turn around and point to the 1994 Fairchild Trophy polished and parked behind his desk. F-111E and F-111F aircraft from Guth's 27th Fighter Wing competed against two B-1B units, four B-52 units, and an F-15E unit to win the top honor in the 1994 Proud Shield Bombing Competition last May. The 27th Fighter Wing is the first fighter unit to win the Fairchild Trophy. The wing also took the Russell E. Dougherty Trophy as the top fighter unit at Proud Shield and the Koritz-Holland Trophy as the competition's best electronic countermeasures unit.

"I sometimes feel that the F-111 is a misunderstood airplane," says Guth, who has over 3,000 hours in a variety of aircraft, including 1,500 hours in the F-15 and 250 hours in the A-10. "Now I'm not talking about our leadership. It is the folks out there flying other weapon systems that may not fully understand the F-111. But the airplane is still around because the leadership understands and appreciates its capability."

Guth credits performance at competitions like Proud Shield, a busy deployment schedule, and the F-111's frequent participation in military exercises for improving the Aardvark's image. "Whenever we go places with other aircraft, it helps our reputation," Guth explains. "At the last Green Flag exercise at Nellis this Spring, we were the main strike force. The F-16s and F-15s performed air-to-air tasks before dropping their bombs. We are not an air-to-air platform. We are heart and soul of the long-range air interdiction mission in the US Air Force. It's our forte. And we perform the mission as well as or better than anyone else. The airplane is good at carrying a lot of weapons a long distance. It can carry them fast and deliver them precisely."

All remaining US Air Force F-111s were consolidated at Cannon by last year. As wing commander, Guth is in charge of the entire USAF F-111 force—about 120 airplanes. The wing is composed of five squadrons: the 428th Fighter Squadron (a training and combat squadron that flies F-111Es); the 429th Electronic Combat Squadron (which flies the EF-111A radar-jamming Ravens); and the 522nd, 523rd, and 524th Fighter Squadrons (combat squadrons that fly the F-111F).

The F-111Es came to Cannon from RAF Upper Heyford in England and replaced the 429th's F-111G models, some of which were subsequently retired or acquired by the Australian air force. The F-111Fs came from RAF Lakenheath in England and replaced Cannon's F-111Ds, which were retired. The EF-111s came from Mountain Home AFB in Idaho.

According to Col. Thomas Runge, the operations group commander at Cannon, the consolidation of F-111s at Cannon was relatively smooth. "The F-111F spin up and the drawdown of the F-111D went extremely well," says Runge, who was at Cannon for the transition period. "In the beginning, though, we were hurting for F-111F support equipment and parts because Lakenheath still had an operational commitment to patrol northern Iraq in Operation Provide Comfort."

As F-111Fs deactivated from Lakenheath and headed stateside to be reassigned, Lakenheath's commitment to Provide Comfort was assumed by the new F-111F pilots.
and personnel of the 524th Fighter Squadron at Cannon. The Air Force gave the 524th six months to get rid of its F-111Ds and get everyone checked out in the F-111F. The unit showed up in Incirlik Turkey ahead of schedule in October 1992 and was patrolling the skies over northern Iraq the next day. The performance earned the squadron an Outstanding Unit Award for 1992.

The workload at Cannon didn’t become any less demanding or routine after the 1992 deployment to Turkey, however. “Replacing our F-111Gs with F-111Es from Upper Heyford was too simple,” explains Runge. “So we took engines from the retiring F-111Ds and put them in the new F-111Es.” The units at Cannon are busy with a variety of other modifications as well. “We’re installing digital flight controls on some of our airplanes,” says Runge. “So we have F models with and without digital flight controls. We are about to begin flying Pacer Strike-equipped aircraft. Pacer Strike will take several years to get on all of our airplanes, so we will have Pacer Strike and non-Pacer Strike aircraft. We’re also halfway through an avionics modernization program on the EF-111. When you consider all this is happening at the same time, the fact that we sit in good shape today is pretty impressive.”

(Pacer Strike is an avionics upgrade for the F-111F. The modification includes an improved inertial navigation system, a global positioning system, integrated digital communications and navigation equipment, and multifunction displays. The upgrade will replace the F-111F’s analog avionics with digital equipment and make it more compatible with the F-111E’s avionics, which were updated in an earlier program.)

If deployment activity is any indicator of health for a squadron, all the units at Cannon are in top shape. “I like to have the guys on the road,” says Runge. “If you train locally too much, you get in a rut. Being on the road is good because it gives us a chance to work together as a team and practice as we would fight. We’re always going to Turkey for Operation Provide Comfort and to Saudi Arabia for Southern Watch. Three weeks ago we had EF-111s deployed to Spain. Right now we have F-111Fs deployed to Eglin in Florida. In another week, we’ll be deployed to Lakenheath in England.”

F-111Es and F-111Fs from Cannon dropped BDU-33 practice bombs in the Proud Shield Competition.
“I’ve done more in this last year and a half than I’ve done in a similar period in any other fighter squadron during my twenty-five years in the Air Force,” says Lt. Col. Stuart Ehrlich, the commander of the 524th Fighter Squadron at Cannon. “Usually a squadron will have two or three deployments a year. In the last year, this squadron alone has had seven deployments. We had a back-to-back deployment to Nellis last summer to do a Red Flag and then a JADO JAZE (joint air defense operation joint engagement zone exercise). We’re always involved in different exercises—Roving Sands, Pecos Thunder, Agile Provider, and Crested Cap. We support the operations, test, and evaluation here for F-111 modifications and updates. Something is always going on.”

Cannon’s radar-jamming EF-111 squadron is no less active. “We are the busiest squadron of the 27th Fighter Wing,” says Lt. Col. Mark Nichols, the operations officer for the 429th Electronic Combat Squadron. “We are one of the busiest squadrons in the entire Air Force. “We deploy every ninety days to Operations Provide Comfort and Southern Watch. Every three months, I’m sending three or four airplanes from this squadron to these operations. We swap out roughly 120 to 140 people on an airlift every three months. We recently deployed six airplanes and 120 people to Spain.”

The EF-111’s numbers and unique capability account for the 429th’s busy schedule. “We are a limited force. The Air Force has only forty EF-111s. And they are all stationed at Cannon. The F-4 Wild Weasels and the EF-111s are continually tasked for numerous deployments to support the strikers. We turn down more exercises than we go on.”

Nichols is looking forward to the latest electronic upgrade for the squadron’s Ravens. “The Air Force started flying the EF-111 in 1981,” recounts Nichols. “Since that time, we’ve completed five block cycle changes.

“Right now we’re waiting on Grumman’s system improvement program,” Nichols continues. Much of the aircraft’s electronic jamming equipment and computers will be modernized as part of the program. “We will be able to work against a newer threat base,” says Nichols. “The SIP is a good indicator that the airplane will be here for a while. The aircraft they are building now will still need electronic combat support. A strike plane just can’t carry everything it needs to defeat a particular radar.”

While the EF-111’s staying power in the Air Force’s arsenal can be attributed to its unique and necessary ability to jam enemy radars effectively, the longevity of bomb-dropping F-111s is partly a function of the airplane’s uncanny ability to accommodate the latest in precision-guided munitions. The F-111F has been at the leading edge of developing and successfully employing these weapons for years.

The GBU-15 and the AGM-130 represent the latest in precision-guided munitions. The GBU-15 is a 2,500-pound bomb that carries an infrared or electro-optical camera in its nose. The camera transmits a signal back to a small television or infrared screen in front of the airplane’s weapon systems officer (the right-seater), who uses the picture to send control signals back to the bomb to guide it. The GBU-15 can be launched eight or nine miles away from a target. The AGM-130, basically a rocket-assisted GBU-15, can be launched up to fifty miles away. It
Throughout its history, the airplane has been able to adapt to and adopt changing weapons.
weighs 3,000 pounds. Where previous precision-guided munitions had accuracies of ten to twenty feet, these latest weapons reduce the miss distances to the size of a small window.

"About a year ago, we finished the weapons test and evaluation on the GBU-15 in which we actually dropped the weapon on some targets," explains Ehrlich. "That was about a $4 million operation. The folks that came down for the evaluation said it was the best weapons employment exercise they've ever participated in. We achieved operational capability for the GBU-15 in December last year, a couple of weeks ahead of schedule." The 524th will operationally evaluate the AGM-130 in July 1994.

The F-111F was also the first and only aircraft to employ the devastating GBU-28 Paveway III "bunker buster" during the Gulf War. The GBU-28 is a 5,000-pound pene-

tration bomb that explodes after going through 100 feet of earth or twenty feet of concrete. The bomb's casing is machined from spare howitzer barrels.

Ehrlich, who first flew F-111s at Nellis AFB in the mid-1970s and has flown the A, D, E, F, and G models, keeps a summary of other F-111 Gulf War accomplishments under the glass cover of his desk. From the looks of the paper, he has removed it many times before. "The F-111 had 14,000 combat hours, 33,000 sorties," reads Ehrlich. "We didn't lose one airplane over there. F-111s destroyed 1,200 tanks, 252 artillery pieces, 113 bunkers, 245 hardened aircraft shelters. That's forty percent of the total aircraft shelters destroyed. These were second- and third-generation shelters that probably cost the Iraqis one million dollars each. Part of winning a war is economics. If we continually destroy million-dollar facilities with single hits from $20,000 weapons, we are eventually going to win a war."

Ehrlich credits the F-111's maturity as one reason the airplane tends to be ahead of the curve on incorporating these new weapons. "Throughout its history, the airplane has been able to adapt to and adopt changing weapons," Ehrlich explains. "It's a very stable platform with a high wing loading." No doubt the aircraft's ability to carry payloads a long distance, very fast, and in any weather adds to its successful record in incorporating new weapons.

Lt. Col. Howard Beuhler, the maintenance officer for the 524th, has worked on F-16s, F-15s, A-10s, T-38s, and F-4s. With about 250 maintainers working under him,
Beuhler is responsible for keeping the unit's F-111s in flying condition. “The F-111 is an old airframe,” Beuhler readily admits. “You don’t see the same level of line-replaceable units, the same level of design for maintenance, that you see in newer aircraft.”

Beuhler, however, believes the upgrades slated for the F-111F will make his job easier. “We’re looking forward to the Pacer Strike upgrade because of the new inertial navigation system,” Beuhler says. “The old INS is notoriously unreliable. Digital flight controls also give us an advantage. We will be able to download faults and make good troubleshooting determinations quickly. The system should become more reliable, so it won’t break as often. And when it does break, it will be easier to fix.”

Consolidation of all the F-111s at Cannon will also make fixing the airplanes a little easier. “The wing commander has every F-111 and all the parts and supplies available at Cannon,” explains Nichols. “And that is a big plus. He doesn’t have to worry about getting parts from Lakenheath. I’d much rather call the 524th Fighter Squadron down the road here for a spare tire than negotiate with Mountain Home AFB for it.”

“There are two trends in Air Force organization,” explains Runge. “On one hand, the Air Force is moving towards composite wings. For example, Mountain Home has a variety of aircraft—F-16s, F-15Es, F-15Cs, plus other assets—that can deploy to project power. On the other hand, the Air Force is consolidating aircraft operations at places like Cannon, Barksdale AFB, and Fairchild AFB. Consolidation is good from a supportability standpoint because of parts commonality on the line. And, in this age of scarce resources, that is a big advantage. The upgrades on the F-111 will give us even more avionics commonality.”

“The F-111 consolidation, in some respect, is its own composite wing,” explains Guth. “We have F models and the EF jammers—two different and complementary capabilities. We have part of both worlds. On one side, we are consolidating all of the same type of aircraft to help solve the logistics problem. On the other side, we have an innate capability within the organization to go someplace, provide our own jamming, and strike targets. We had a mission recently that went into Canada from Cannon. Our 523rd Squadron flew with a package of four EF-111 aircraft from the 429th. It makes sense in both ways to have all the aircraft here.”

And everyone at Cannon seems to agree that the high plains of New Mexico is the best place for the F-111s to be. “The weather is great,” says Guth. “The sparse population over most of our routes allows us to train the way we plan to fight. We have great public support from the local communities of Clovis and Portales. F-111s have been here for a long time and the people like them. They were happy when more came.”

And how long these aircraft remain on the high plains will depend, in large part, on their contribution to military might. “In today’s age of forced structure drawdown, of renewed effort of the federal government to balance the budget, nothing is for certain,” says Col. Runge. “You can look at F-16s parked in the desert at Davis-Monthan and understand that these are tough times for military budgets. We think we have an extremely important role in serving the national interests, whatever those interests might be, when it comes to using military power. We hope we’re around a long time.”
For the first time since World War II, US Air Force fighters have been permanently assigned to an Italian air base. USAF Secretary Sheila Widnall and senior USAF Europe marked the occasion formally in northeastern Italy last April when the 31st Fighter Wing at Aviano Air Base was activated. The day before the ceremony, F-16 pilots from the 31st Wing were making some history of their own as they carried out the first bombing mission in the history of the NATO alliance.

Their mission was to protect British Special Air Service Regiment commandos under Serbian tank fire in the eastern Bosnian enclave of Gorazde. Only a month earlier, F-16Cs based at Aviano shot down four Serbian Jastreb attack aircraft that had breached the United Nation’s no-fly zone over the war-torn former Yugoslav republic. The engagement represented NATO’s first combat action in its forty-five-year history.

Two weeks after the activation ceremony, the commander of the 31st Fighter Wing, Col. John Campbell, flew the first mission from the base in an F-16C. His aircraft sported the wing’s new AV tail code. The first of the wing’s two new squadrons, the 555th “triple nickel,” was formed with personnel from the old 526th Fighter Squadron formerly based at Ramstein Air Base in Germany. The squadron will be fully operational by 1 July. The 510th Fighter Squadron (formerly the 512th) will follow from Ramstein and begin its own three-month work-up phase to full operational status. To complete the new wing, the 603rd Air Control Squadron will transfer to Aviano from Sembach Air Base in Germany. The 603rd will provide theater-level command and control.

The transfer of NATO military power to the south makes sense. Since the collapse of the Berlin Wall and the 1991 Gulf War, NATO’s southern region, which encompasses all of the Mediterranean Sea littoral, has become one of the world’s new crisis zones. Potential flash points throughout the region could call upon the services of the 31st Fighter Wing’s F-16s.
“In this changing world, we no longer have a central European focus,” said Col. Mike Scott, commander of the operations group at Aviano. “The likelihood of a major crisis is probably stronger in NATO’s southern region than it is in central Europe. The 31st Wing gives the United States a flexible presence in this region. We are here to deal with any contingencies that may arise.”

Scott’s new wing will be equipped with thirty-six Block 40 F-16s. “We anticipate achieving LANTIRN capability in the near future,” said Scott. “We will be the first F-16 unit in USAFE to have the capability.”

F-16s operating from Aviano already use the AIM-120 advanced medium range air-to-air missile during patrols over Bosnia. Scott said the AMRAAM gives tremendous increase in range, tactical options, and firepower.

According to Scott, the base has enough shelters to accommodate the aircraft. However, some facilities for personnel and operations will be needed. The majority of pilots will come from Ramstein with the aircraft. Some of the maintenance and administrative personnel will come from USAF units around the world.

In addition to being closer to potential flash points, the redeployment of the Ramstein F-16 squadrons to Italy provides pilots with enhanced training opportunities. Italian low-flying regulations are less stringent than their German counterparts. A number of large air-to-ground bombing ranges are within easy striking distance from Aviano. And the weather is superb. “For a pilot, Aviano is a great place to be assigned,” said Scott.

At the same time that Aviano is standing up a new wing, it is also at the center of NATO air operations over the former Yugoslavia. Around the clock, alliance aircraft deployed to the base launch to patrol the no-fly zone and to fly close air support missions to protect UN troops on the ground in Bosnia.

The base hosts several flying units and a variety of aircraft participating in Operation Deny Flight. A-10 Warthog tank-busting aircraft from Spangdahlem AB in Germany provide close air support for UN troops. F-15E Strike Eagles from RAF Lakenheath in the United Kingdom provide precision night strike capability. F/A-18 Hornets fly close air support, strike, and offensive counter air missions. E-3D Sentry aircraft from Britain monitor the no-fly zone over Bosnia and provide airborne warning and control. EC-130E aircraft integrate UN ground operations with NATO air combat patrols.

The 31st Wing’s successor, the 401st Fighter Wing, launched more than 7,000 F-16 sorties during the first year of NATO’s involvement in the Bosnian crisis. For its work, the unit won the Air Force Outstanding Unit Award.
F-16s from Spangdahlem AB in Germany provided fighter cover when NATO first started to fly close air support for the UN in July 1993. The 526th Fighter Squadron from Ramstein deployed to Aviano next. The squadron was relieved in late 1993 by Air Force Reserve F-16 units from Carswell AFB in Texas and Luke AFB in Arizona.

As events began to heat up in Bosnia in February 1994, the 526th Fighter Squadron went back on duty at Aviano. They flew air-superiority missions over Bosnia during the Sarajevo ultimatum crisis.

On 28 February, the squadron fired NATO’s first ever shots in anger when its aircraft downed four Serbian aircraft in the no-fly zone. A pair of F-16s from the 526th were on patrol over central Bosnia when a NATO airborne early-warning E-3A Sentry reported unauthorized aircraft in the no-fly zone and vectored the F-16s to intercept. When the Serbian attack aircraft bombèd a Muslim town, NATO commanders ordered the fighters to engage the JASTREB attack aircraft. One fell quickly to an AMRAAM (the third operational F-16 kill with the weapon). Two more of the Serbian aircraft were dispatched with AIM-9M Sidewinder missiles. The flight leader of another pair of 526th F-16s downed a fourth JASTREB with a Sidewinder.

According to Col. Scott, who was previously the 401st Fighter Wing’s operations group commander, the shoot down added substance to what the unit had been doing for the previous ten months. “Up until that time, we had not run into any fixed-wing aircraft in the no-fly zone. The encounter showed that our folks were well prepared to do the job.”

A month after the JASTREBS were shot down, a crisis around the besieged Muslim enclave of Gorazde erupted. Aviano F-16s were on patrol over Bosnia in the afternoon of 10 April when a call for help came from British UN troops under fire in the eastern Bosnia town. Two F-16s swept down over the town, but bad weather prevented them from locating their primary target—a Serbian T-55 tank. The British forward air controllers diverted the aircraft to a secondary target, an artillery command post. The aircraft successfully attacked the post with unguided bombs in marginal weather. The following day, US Marine Corps F/A-18 Hornets based at Aviano made a similar attack on the town.

“Our F-16s and F-18s were in the air when the request came in,” said Scott. “Timing is everything.”

The 526th returned to Ramstein by late April to prepare to move back to Aviano permanently as the 555th Squadron. In the meantime, the 512th returned to Aviano for a second time. The 512th will return permanently as the 510th Fighter Squadron in July.

Capt. Pete Graves, plans officer with the 512th, described a typical Deny Flight sortie. “We take off over the Adriatic. We hit the corridor through Croatian air space. We perform close air support, offensive counter air, and visual reconnaissance.

“Offensive counter air was the initial Deny Flight mission,” Graves continued. “Offensive counter air is our primary mission. We use roving combat air patrols and we monitor air space to deny any side use of airplanes and bombing. Close air support is our secondary mission. We support UN troops on the ground. We can combine these two missions as well. If we are called upon to do close air support, we let the primary CAS guys drop the bombs first.

“Our operations now are very similar to last year, only things have heated up. We're flying around the clock,” said Graves. “This is a real war-time mission. Soldiers on the ground are shooting at us.”

Tim Ripley is a military reporter based in England.
Events Around The World

F-16s Activated In Italy

The Air Force celebrated the redesignation of the 401st Fighter Wing to the 31st Fighter Wing on 11 April at Aviano Air Base in Italy. The new wing is the home of two new F-16 squadrons, the 555th and the 510th. The 555th was formed from the 526th from Ramstein AB, Germany. The 510 was formed from the 512th, also formerly at Ramstein. Aviano has been the main NATO base for fighter pilots deployed in Operation Deny Flight to enforce the UN no-fly sanctions over Bosnia. The operational F-16 wing will add 1,400 people and double the base’s population.

Kunsan Wins Its Own Invitational

Twenty F-16 pilots from South Korea’s Kunsan and Osan Air Bases and from Japan’s Misawa Air Base competed in the first Kunsan Invitational Bomb Competition last February. Five four-aircraft teams participated. Teams were from the 35th and 80th Fighter Squadrons at Kunsan, the 25th and 36th Fighter Squadrons at Osan, and the 14th Fighter Squadron at Misawa. The teams earned points by dropping BDU-33 practice bombs at targets on the Kooni Range, west of Osan. The 80th Fighter Squadron from Kunsan won the top team award.
Joe Bill Dryden Honored
By Venezuelan Air Force

The Venezuelan Air Force presented its Carlos Meyer Baldo Medal to Diane Dryden, wife of the late Joe Bill Dryden, in a ceremony in Fort Worth in May. Joe Bill, who spoke Spanish and as well as several other languages, had a close relationship with the Venezuelan Air Force. “He was held in the highest regard by our pilots, said Lt. Col. Régulo Anselmi, group commander of Venezuela’s F-16 unit. “I flew with Joe Bill a couple of times myself and am very proud to have done so.” The Carlos Meyer Baldo Medal is named for a Venezuelan combat pilot who flew in World War I. Baldo was one of the country’s first aviators. The Baldo Medal is the nation’s highest military honor given to civilian personnel.

First FS-X Wing
Box Completed

The first co-cured FS-X aircraft wing box was recently completed in Fort Worth. The structure is the first of eight left-hand wing boxes that Lockheed will fabricate during the development of FS-X prototype aircraft. Transfer of Japan’s co-cured composite wing technology began in 1990 with material testing. Six prototype aircraft will be manufactured during development. The first flight for the first prototype is scheduled for the summer of 1995.
A-12 Mock-up Donated To Museum

The mock-up for the Navy's canceled A-12 aircraft was donated to the Heritage Aviation Association in Fort Worth. The association plans to display the full-scale mock-up in the Aviation Heritage Museum to be located at Alliance Airport in north Fort Worth.

VF-43 and VF-126 Disestablished

Naval Air Station Miramar's VF-126 Squadron in San Diego and the VF-43 Squadron at NAS Oceana in Virginia were formally disbanded in May and June. The F-16Ns from NAS Oceana will initially go to the VF-45 in Key West, Florida. The Navy's Top Gun School, at NAS Miramar, will inherit the F-16Ns from the VF-126. The Navy has been flying F-16Ns since 1987.
Female Firsts

Maj. Jackie Parker became the first American female qualified in the F-16 and the first female combat pilot in the Air National Guard in April when she graduated from F-16C training at McConnell AFB in Kansas. Parker has been assigned to the ANG’s 174th Fighter Group at Hancock Field near Syracuse, New York.

Lt. Leslie DeAnn Crosby became the first female Air Force Reserve F-16 fighter pilot in May when she graduated from F-16 training at the 162nd Fighter Group (ANG) in Tucson, Arizona. Crosby has been assigned to the 704th Fighter Squadron at Bergstrom Air Reserve Station in Austin, Texas.

191st Fighter Group Loses Its F-16s

The 191st Fighter Group of Michigan’s Air National Guard completed its last official F-16 flight on 26 March. The unit, which has flown the F-16 Air Defense Fighter since 1990, is converting to the Lockheed C-130E.
Boundary Layer Wrestling

Thank you for the Code One Magazine. I find it to be informative and enjoyable. The interview with Marta Bohn-Meyer and her work with the F-16XL and wing gloves was particularly interesting since it touches on the fringe of a boundary layer control issue we are wrestling with in the ARPA [Advanced Research Projects Agency] Wingship Investigation. Please consider me a satisfied reader.

Richard T. Jones
SRS Technologies
Arlington, Virginia

No Florida Vacation

On behalf of the 17th Training Squadron, better known as the “Water Survival School,” I want to express my appreciation to Doug Ritter and Lanes Stout for their outstanding work in researching, preparing, editing, photographing, and publishing the Water Survival article in the April 1994 issue of Code One Magazine. This article may be the last time the water survival school will be recognized as a total Air Force operation since we are in the midst of a transition to co-locate training with the Navy.

My staff and I thank you very much for all the time and effort these two professionals put in to make this article possible. I know they at least enjoyed a short Florida vacation. Thanks again for a super job.

LT Col. Lance Bachran, Cdr.
17th Training Squadron
Tyndall AFB, Florida

Lockheed Aircraft In Uruguay

Last March, while participating in the Fourth International Fighter Pilots Symposium in Santiago, Chile, I had the opportunity to get a copy of your publication. Back in my country, everyone in the squadron became delighted with its usefulness.

While we are not customers of your newest fighters, we are still flying the Lockheed AT-33A in the air-to-surface arena after forty years of their receipt. In one of them, we have accumulated 10,000 flying hours. So we are big fans of Lockheed and your great airplanes. We are also very happy with your continued success in the fighter business. We look forward to more news and publications.

TTE Jose Visconti
Operations Officer
Grupo de Aviación No. 2 (Caza)
Durazno, Uruguay

Still The Best

When I was a teenager (an unspecified number of years ago), the F-16 was undergoing initial development testing. At that time, I thought it was the best-looking aircraft ever built. Later on in life, I was fortunate enough to spend almost five years at the F-16 Combined Test Force at Edwards AFB, California, taking part in the development of the Block 40 digital flight controls and LANTIRN terrain-following system. At the end of that time, I not only felt that the F-16 was the best-looking aircraft, but also believed (and still believe) it was the best aircraft ever built.

Having moved on to another job here at Edwards, I have kept in touch with the F-16 world through your magazine, which is obviously not just another corporate newsletter, but a labor of love by people who have been affected by the F-16 in the same way I have been affected. The Semper Viper special issue is a fitting tribute to a pilot similarly touched by your airplane. Moreover, many of the lessons Joe Bill Dryden taught through your magazine apply not only to the F-16 but to the next generations of aircraft for the US military.

Thanks for all the great work.

Tim Cacanindin
Branch Chief, B-2 Program
Lancaster, California

Good Ol’ Days

I am a crewchief on the F-16C Fighting Falcon with the Kansas ANG 184th Fighter Group at McConnell AFB, Kansas. Over the past six years, we have been the “schoolhouse in the sky” for many active, reserve, and ANG pilots who have come to train with us in the F-16. Many of these pilots, I am sure, are avid readers of Code One. Recently, because of changes throughout the world and a reduced need for pilot training, my unit was slated by Congress for conversion to the Rockwell B-1B bomber. I am writing to thank your company on behalf of my unit for the six short years of enjoyable, reliable service the F-16 has provided for us. It is sad to see them go. They will be sorely missed when they are gone, but they will never be forgotten. Please keep up the good work because Code One will be one of our only reminders of the good ol’ days.

SSgt. Chad Brown
184th Fighter Group
McConnell AFB, Kansas

The Aledo Dilemma

You have to help me. Several months ago, a friend introduced me to your excellent publication. I showed it to a coworker (who is also an F-16 fan) and we both agreed it was one of the best magazines we had laid eyes on.

I decided to subscribe immediately. My coworker asked if he could have the magazines after I had finished them. I said sure.

Here’s the dilemma. Each issue I’ve received is so good I can’t bring myself to part with it. Like National Geographic, Code One is going to start piling up at my
house so I can show it off to visitors and have it for future reference.

So, I’m enclosing a check so my coworker can have his own subscription. I feel bad for not passing on the last two issues as I had promised, so please send them as well if they are available.

Brad Potter
Aledo, Texas

Closer To Fine

I would be most pleased to be on the mailing list for Code One Magazine. It is, indeed, one of the finest, probably the finest, magazine in the aerospace industry. I used to read it when I was a senior editor of Air Force Magazine. I am now freelancing, writing about military aviation for civilian audiences. Your magazine should prove most useful to me, and I look forward to receiving it.

Col. James P. Coyne (USAF, ret.)
Berlin, Maryland

In The Navy

I have finally quit bugging my former squadron mates to send me their old copies of Code One. Instead, I’m asking you for a subscription so I can share it with my current shipmates. As a former Viper driver from Eielson AFB, Alaska, I have a one-of-a-kind job with the Navy’s Tactical Training Group Pacific. TTGP is the West Coast schoolhouse for battle group operational commanders and their staffs as they conduct work-up training prior to deployment. While I enjoy the job, it certainly isn’t flying. Of course, driving past NAS Miramar each night and watching Top Gun’s F-16N models in the pattern doesn’t help much either.

In any case, a subscription for the school would be very much appreciated, especially by the aviators. (The ship drivers will just look at the pictures.) Your publication is first-rate, for a first-rate aircraft.

Lt. Col. Brian L. McDonald
Joint (USAF) Warfare Instructor
Tactical Training Group Pacific
San Diego, California

Air Defense

Our unit is responsible for the air defense of the southwestern United States and all our air-defense units fly the F-16 Fighting Falcon for the air defense mission. Your magazine is an invaluable source of information for our air weapons controllers and pilots.

Lt. Col. J. Brian Lihani
March AFB, California

Oklahoma Kudos

I would like to give kudos to Code One Magazine. As a member of the 507th Fighter Group at Tinker AFB, Oklahoma, it’s been a real pleasure to read your magazine since 1988 and our conversion to the F-16A. It is unfortunate that we are converting from the F-16 to the KC-135R tanker. Meeting and working with your company’s representatives, and occasionally seeing our unit mentioned in your magazine these past few years, have been most joyful experiences. Thanks for the support and for a fine airplane, to boot.

SSgt. John D. Kobun
507th Fighter Group
Oklahoma City, Oklahoma

Being There, Again

Thank you for sending this excellent magazine to all of us at Hughes Training, Inc. Many of us came from General Dynamics/Lockheed and we all agree that one of the things we miss most is watching the F-16s, not only in the air but on the factory floor being built. Reading Code One helps us to be there again. Although Joe Bill Dryden and his great Code One articles are dearly missed, the magazine has not suffered from a lack of excellent articles and illustrations. Keep up the good work.

Sherry Nathan
Hughes Training, Inc.
Arlington, Texas

Corps Readers

Thank you for including us in your distribution of Code One Magazine. We find it informative and entertaining. I’m sure the cadets in the corps will find it the same. As we’re always looking for new sources of information about the aviation industry, your magazine comes to us as a welcome addition to our library. We look forward to receiving future issues of Code One.

SMSgt. Ken Roundtree (USAF, ret.)
Aerospace Science Instructor
Henry J. Kaiser High School
Honolulu, Hawaii

More Corps Readers

I was very excited to receive two issues of Code One in the mail and to learn that your company wishes to share this excellent magazine with my cadets. As a former Viper driver myself from 1980 to 1992, I’m particularly pleased to see an old friend like Code One again. The magazine will provide me with even more material to present on the F-16 and on the US Air Force. My cadets will quickly tell you that I am a die-hard believer that the F-16 is the greatest fighter aircraft ever built.

Lt. Col. Andy Denny (USAF, ret.)
Aerospace Science Instructor
Maiden High School
Maiden, North Carolina

Even More Corps Readers

Thanks for sending us Code One. It was an instant hit with our cadets. They were particularly pleased with the terrific photography and easy-to-read articles. The blend of US and international military articles was also of interest to them. We’ve already posted the finflash poster in a prominent location in our classroom.

Steven Price
Aerospace Science Instructor
Temecula Valley School District
Rancho Vista, California

One More From The Corps

On behalf of our cadets and the instructor staff, I want to thank you for the January and April issues of Code One. The magazine was an instant hit, and the finflash poster was outstanding. Your magazine will go a long way in helping us educate our young cadets on the developments, training, and the latest advancements of air power.

Lt. Col. Stephen Wulf (USAF, ret.)
Aerospace Science Instructor
Madison County High School
Madison, Florida

A Swedish Request

I am an instructor in the Swedish air force youth organization. When I teach my students about foreign military aircraft, I have a hard time finding good information. I recently borrowed a copy of Code One from a Dutch colleague and would like a subscription for my air force unit. Sadly, we have no F-16s or F-111s in Sweden. But I’d like a subscription anyway.

Samuel Sandén
Vaggeryd, Sweden

We’d like to hear from you. Send letters to Editor, Code One Magazine, Lockheed Fort Worth Company, PO Box 748, Mail Zone 1783, Fort Worth, Texas 76101
CODE ONE
LOOKING OUT FOR AMERICA