Cross Training With South Carolina’s ANG
This Lockheed M-21, piggy-backing a D-21 reconnaissance drone, prepares to take on fuel. Both aircraft were projects of the famed Skunk Works. See page 18 for more.
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Turkish Air Force F-16s fly over the former Yugoslavia. See page 8 for more.
It's takeoff time. I'm settling in with my photo gear in the back seat of an F-16 from the South Carolina Air National Guard's 169th Fighter Group. The pilot is Lt. Col. Dick Noble. Capt. Jeff Smiley is our wingman. We are part of a four-ship F-16 force going against one of the toughest adversaries this ANG unit may ever face—the US Navy. Talk about interservice rivalry!

From McEntire ANG Base near Columbia, we head straight east to the Atlantic then south. Not ten minutes after takeoff, without warning, the engagement begins. The aircraft makes several seemingly random high-G turns to evade the beyond-visual-range radar missiles of the four F-18s that are, well, beyond visual range. It's another three minutes before we see our Navy adversaries from Jacksonville, Florida. Once they are within sight, we endure about a minute more of what feels like hour-long hard turns before the first engagement ends. We have time and fuel for one more round. So we exit the area and wait for the signal "Fight's on!"
This time it's a “heaters only” affair, that is, guns and AIM-9 Sidewinder missiles only for both sides. We chase an F-18 out of the area. Before I have a chance to ask if we nailed the Hornet, Noble angles back into a swarm of six jets for more action. The second engagement lasts two minutes according to my watch, which has slowed down considerably according to my senses. The two groups reunite, but this time like old friends.

Now it’s my turn to do some shooting. Unfortunately, the Navy jets have time for only a few aerial poses before heading south and home. Afterwards, we head back to South Carolina for a smooth landing and a thorough debrief.

This was my first exposure to something that many units do all the time—dissimilar aircraft combat training, or DACT as it is more commonly called. This training has some distinct advantages.

“It is beneficial to fly with units that train differently, have different personnel, and use different tactics,” explains Noble, who is the operations officer at the 169th. “Also, every airplane has some things it can do better than other airplanes. If you fly against the same people and the
same airplanes
all the time, and it doesn’t matter
if it is F-16s against F-15s or F-16s against
F-18s, you can become rigid in your tactics. You
can become predictable. We do our best to mix it up.”

Lt. Cdr. Robert Field (that double f is no mistake) of the
Navy’s VFA-105 Gunslingers from Naval Air Station
Jacksonville, one of our adversaries from the previous day,
echoes Noble’s appreciation for dissimilar training. “If you
train against similar aircraft all the time,” says Field, “it’s
real easy to develop a sense of that aircraft’s energy status,
to become too comfortable with how that particular air-
craft performs. When you fly against aircraft that you don’t
see very often, you learn to retrain your eye. You learn
how to understand what its capabilities are during an
engagement. For this reason, it is a big advantage to fly
against dissimilar airplanes.”

And flying against dissimilar aircraft from dissimilar
branches of the armed services gives pilots a much
greater variety of not only the aircraft but also their
weapons, tactics, and training. Such cross-service training
is nothing new for the Swamp Foxes of the 169th. In 1986,
the unit’s F-16 pilots faced Navy F-14s and F-18s from the
USS Forrestal before the ship left for the Mediterranean
from Mayport Naval Station in Northern Florida. The F-16s
attacked the carrier group, simulating Libyan MIG tactics,
as the Forrestal steamed up the East Coast before cross-
ing the Atlantic. In late 1990, Marine F-18s from Beaufort
Marine Corps Air Station in South Carolina returned the
favor by simulating Iraqi MIGs for the 169th before the
unit deployed to Saudi Arabia for the Gulf War.
“On the first day of the war, we took twenty F-16s into Kuwait and had between thirty and forty SAMs launched at us within a four-minute period,” explains Lt. Col. Jet Jernigan. “I went in as an experienced pilot. Even given that, when SAMs were streaming up, I had to rely on instinct more than on thinking. And the effectiveness of my reactions depended on the quality of my training.”

Jernigan believes that the quality of that training goes a long way in accounting for 1,750 combat missions flown by the 169th during the war without one aircraft lost. The unit also had one of the highest mission-capable rates.

“When we train against dissimilar fighter adversaries, we’re usually training to the worst possible scenario,” says Jernigan. “The worst case being a full-up four-ship of F-18s with a bunch of highly trained Navy or Marine pilots hitting the merge trying to kill us. If we can go up against them and do a good job, then anything an enemy air force can throw at us we should be able to handle just fine.”

Surprisingly, these cross-service exercises are organized at the unit level. Usually a phone call between the units’ flight schedulers gets things rolling. “Our leaders recommend that about half of our missions be flown against dissimilar aircraft,” explains Capt. Smiley. “But the impetus comes from the unit level. And that’s the way it
Desert Shield.
(Smiley is the one who set up the fight that began this
time.) “The biggest benefit from an ex-
change officer tour is the friends you make,”
says Smiley, who now flies against some of his former
shipmates.

The 169th’s proximity to a variety of fighter units also
helps it maintain a high level of dissimilar training. “We’ve
always flown against Marine F-18s out of nearby
Beaufort,” says Noble. The 169th also regularly flies
against USAF F-15s from Dobbins AFB in Georgia and
F-15Es from Seymour Johnson AFB.

VFA-105 Commander Rob Nelson says the interservice
training also makes monetary sense. “The services have
to work more closely, especially as our budget and forces
shrink,” he says. “One of the hardest parts of our training
is finding dissimilar aircraft. Our cross-training with the
F-16s from Florida, Georgia, and South Carolina is a great
resource. And the F-16 is a great adversary.” Nelson’s
squadron has flown against ANG/ADF F-16s from
Jacksonville’s 125th Fighter Group and active-duty USAF
F-16s from Moody AFB in Georgia as well as the Navy’s
own F-16N dedicated adversary squadron from VF-45 in
Key West.

Not long after our aerial encounter, I visit my former
adversaries at Cecil Field in Jacksonville and ask, Who
won the battle? Lt. Cdr. Ffield’s answer: “There were
goods and others on both sides. I wouldn’t narrow it down
to who won. There were definitely lessons learned on our
side and I’m sure on their side as well.”

And this backseater learns another advanced lesson in
fighter-pilot diplomacy.

From the ANG perspective, Capt. Smiley’s answer is
basically the same: “When you go out to fly, it is not to
have a good time. It is to win. We have some of the best
fighter pilots in the world and the best aircraft. If we want
a good fight, why not fight another US squadron? These
can be the toughest fights. The bottom line—everyone
wins.”

Lans Stout is a Florida-based photographer
and regularly contributes to Code One.
Within minutes, the F-16s are back over war-torn Bosnia to enforce the United Nation’s no-fly zone.
We're our country's first and best F-16 squadron.

High above the Croatian port of Split, a pair of Turkish Fighting Falcons climb to catch the boom of a US Air Force KC-135 tanker. The lead pilot comes up on the radio to report that his combat air patrol "Ceylan One" is ready to take on the vital fuel. (Ceylan is Turkish for young dear.) Within minutes, the F-16s are back over war-torn Bosnia to enforce the United Nations' no-fly zone.

This routine has been repeated hundreds of times since the Turkish Air Force's 142nd Squadron arrived at Ghedi Air Base in Italy last April to take part in Operation Deny Flight. The squadron is under the command of NATO's 5th Tactical Air Force.

For the Turkish F-16 pilots, Deny Flight has been a demanding test of their airmanship. The operation has involved new mission profiles, intensive use of inflight refueling, and close cooperation and coordination with six allied air forces.

However, being chosen to lead their country's participation in the operation came as no surprise to members of the 142nd. The unit was the first to field the F-16 in Turkish service and, in 1992, placed first in the Turkish air force's annual bombing competition. "We're our country's first and best F-16 squadron," says Capt. Ali Akman Saruhan. Nicknamed "Master of the F-16," Saruhan has accumulated over 700 hours in the fighter. He first flew the F-16 in 1989, when he entered F-16 flight training in Turkey. (Only eight instructor pilots were educated on the aircraft in America.)

The squadron's fifteen F-16Cs and three F-16Ds flew to Italy on 20 April after NATO's Supreme Allied Commander Europe, Gen. John Shalikashvili, requested additional fighter aircraft to enforce the no-fly zone. Almost immediately, the Turkish deployment, led by Lt. Col. Semih Birdogay, headed for Ghedi near the northern Italian city of Brescia.

The Turks are being hosted at Ghedi by the Italian Air Force's 6th Stomo (wing), which flies Tornado strike aircraft. The Turkish contingent taking part in Deny Flight, totaling some 250 support personnel and twenty-five pilots, has made itself home at Ghedi. A satellite television dish even allows the unit's personnel to watch Turkish stations.

"We have many reporters from Turkey visiting us here," says Saruhan. "We often see ourselves on Turkish news shows on our satellite television."

After arriving, the Turkish pilots began preparing for their first mission over Bosnia. The 5th Air Force's concept of operations to enforce the no-fly zone has pairs of fighters maintaining two combat air patrol stations over Bosnia around the clock. To allow for four hours on station and one hour of transit time, the fighters must be refueled in flight.

This type of mission was new to the pilots of the 142nd, according to Saruhan, even though the pilots had regularly practiced inflight refueling with USAF tankers based at Incirlik Air Base in Turkey.

"Our first missions here were flown without taking on fuel to get used to working with the tankers," says...
The Turkish F-16s usually fly loaded with four AIM-9 Sidewinders, an electronic countermeasure pod, and two 600-gallon fuel tanks.

Sarihan. “We were accustomed to flying missions of one and a half hours. About ten days after everyone arrived, we were flying full Deny Flight missions.”

When the work-up period was complete, the Turks were fully integrated with the cycle of the 5th Allied Tactical Air Force, working an around-the-clock shift with US Air Force F-16s and F-15 Eagles, US Navy F-14 Tomcats and F/A-18 Hornets, British Tornado F-3s and Sea Harriers, and French Mirage 2000s are also seeing duty in the operation.

Our F-16s are better than the MIGs. The Russian technology is old.
Usually the Turks fly four days followed by two down days. By the beginning of July, the F-16s of the 142nd had flown more than 500 operational sorties over Bosnia. At the same time, the unit’s ground crews were working a blistering routine on the Ghedi flight line to maintain a 100 percent availability rate. Their operation has been extremely successful: not one mission has been aborted.

For the pilots of the 142nd, Deny Flight missions begin when an air-tasking order arrives from the 5th Allied Tactical Air Force’s headquarters at Vicenza. A squadron plan is developed. Following intelligence and weather briefings, pilots start planning their sorties with a computerized mission support system. The system loads radio frequency and weapons data for the aircraft.

To transit to their operational area, the Turks work under the direction of Italy’s civilian air traffic control until they reach a special zone that is free of civilian traffic well out over the Adriatic Sea. Once there, the aircraft refuel and work with NATO ships enforcing the UN economic blockade against Serbia.

“Deny Flight missions tend to be long and boring,” admits Sarihan. “If someone enters the zone without authorization, you have something to do. But that rarely happens.” To date, the no-fly zone over Bosnia has been relatively quiet, with no one openly challenging NATO aircraft. Scores of helicopters and light aircraft have made unauthorized flights. But as soon as NATO fighters appear, they land or flee the zone.

The 142nd maintained a flying schedule of eight to twelve sorties per day. The squadron completed 100 percent of its 533 planned missions, which totaled over 2,400 flying hours.
"We've seen no sign of the Serbian Air Force's MIG-29s," continues Sarihan. "Our F-16s are better than the MIGs. The Russian technology is old. From the day Deny Flight began, the Serbian Air Force has had less time flying. So their flying skills must also be degraded."

While on patrol over Bosnia, the Turkish F-16s are always under NATO control, usually through links with British or French E-3 Sentry AWACS aircraft. The AWACS radar aircraft operate two orbits—one over Hungary and another over the Adriatic. Most of the time, the radar picture over the area is clear. Sometimes UN aid aircraft can be seen far below, flying into Sarajevo and the Croatian-controlled airport at Split. The Turkish crews say that the summer weather over Bosnia produces some spectacular views of the country's high mountain ranges. During daylight hours, little activity can be seen on the ground. At night, however, Deny Flight pilots get a grandstand view of artillery flashes and tracer streaks from machine guns.

By July, the 142nd and its NATO allies were still enforcing the no-fly zone over Bosnia. No peaceful solution seemed in sight for the civil war that has devastated the country for over a year. Capt. Sarihan speaks for many of the NATO pilots taking part in the operation: "This is a very beautiful country. I can't understand why they are fighting." —

Tim Ripley, a military author based in England, visited the Turkish operation in Italy this summer. Pilots and other personnel of the 142nd Squadron completed their NATO mission in late July and returned safely to their home base in Akinci, Turkey.

The 142nd Squadron of the 4th Main Base in Akinci, Turkey, deployed to Italy on 19 April to support Operation Deny Flight.
Lockheed artist Price Randel wanted the fourth installment of the fin flash series to be a little different. So here it is—a collection of one-of-a-kind F-16 tail markings. Since most of these fins were painted to identify test programs and commemorate technical milestones, there’s plenty of history among them.

Tracing the lineage of the stabilizers involved a lot of research. Astute history buffs and those who have “lived” the F-16 program will notice that two of the fins go with a common airframe. Lockheed’s work-
horse technology demonstrator, F-16B No. 2, appears in this group twice: as the F-16/79 and as the “GD” airplane with green markings for close air support tests. In fact, several of the planes have been used in many more projects than these fins indicate.

We hope you enjoy this catalog of unique Fighting Falcon tails. Since it's far from complete, we're open to suggestions concerning fins to be covered in future installments. And you can look forward to fin flashes denoting future technologies and milestones, as the F-16 continues to evolve.

— Joe Stout

YF-16 No. 2
The original blue and white paint scheme was used on the No. 2 prototype. The aircraft was later painted red, white, and blue and also sported experimental gray markings. First flight was in May 1974.

F-16 CCV
The Control Configured Vehicle was a modification of YF-16 No. 1 and was used to test inlet-mounted canards and new flight control modes following the completion of the prototype tests. First CCV flight was in March 1996.

AFTI/F-16
The Advanced Fighter Technology Integration/F-16 is an Air Force, NASA, and Lockheed testbed for various advanced technologies. First flight was in July 1992.

Salty Falcon
This fin belongs to an attrited F-16 recovered from the Gulf of Mexico after the pilot successfully ejected. The aircraft was later used in test programs by Texas Instruments, General Dynamics, and Lockheed. It arrived at TI in Dallas in 1984.

DFLCS F-16D
The Digital Flight Control System test aircraft, F-16D No. 3, with conventional analog controls replaced, led to the incorporation of the digital system in production aircraft at Block 40. First flight was in July 1986.

Auto TF
This F-16B was modified for a 101-flight automatic terrain-following test program. First auto TF flight was in October 1987.

ADF/AIM-7
This fin appeared on the test aircraft for the F-16 Air Defense Fighter configuration, which included the first integrated F-16A AIM-7 Sparrow capability. First guided AIM-7 launch was in February 1989.

Farnborough 90
This F-16A was leased from the Royal Netherlands Air Force’s 323 Squadron for Farnborough Air Show aerial demonstrations. It was flown by General Dynamics test pilots at the show in September 1990.
F-16/79
The J79 engine powered this F-16, which was developed as a prototype under the Carter administration’s intermediate or “export fighter” policy. First flight was October 1980. It was evaluated as a potential adversary aircraft for the Navy in 1981.

F-16/101
This F-16 demonstrator was powered by a General Electric F101 engine (derived from the B-1 bomber powerplant). The program led to the introduction of the F110 engine in F-16C/D aircraft. First flight was in December 1980.

DEEC F-16
This test airplane was equipped with a Pratt & Whitney F100 powerplant and developmental Digital Electronic Engine Controls. First flight was in March 1983.

F-16 Recce
F-16D equipped with a General Dynamics-developed reconnaissance pod, demonstrated near-realtime reconnaissance. First flight was in December 1985.

"GD" Tail, CAS Colors
F-16B No. 2, Fort Worth’s venerable technology demonstrator, was painted camouflage green for close-air-support-related tests. A major USAF evaluation of F-16 CAS potential occurred in September 1988.

Night Falcon
This fin flash was used with the first Block 40/LANTIRN F-16C and with a static display aircraft at the 1990 Farnborough Air Show. First Block 40 delivery was in December 1988.

F-16XL No. 2

VISTA/F-16
The Variable-Stability Inflight Simulator Test Aircraft is a testbed with programmable computers that simulate flight control properties of other aircraft. First flight was in April 1992.
LOGO
The origin of the name Skunk Works is generally attributed to Lockheed engineer Irv Culver, a serious follower of Al Capp's Lil' Abner comic strip. In the strip, "Skonk Works" referred to an illegal still where "kikapoo joy juice" was brewed. Culver answered the phone one day with, "Skonk Works. Inside man Culver speaking." The name stuck. After some litigation, Lockheed changed the spelling from Skonk to Skunk and copyrighted it. The famous skunk logo—also copyrighted by Lockheed—soon followed.
The first XP-80, nicknamed Lulu Belle, was built in the first Skunk Works facility—a quasi-lean-to constructed of canvas and wood from old crates attached to the side of the company's Burbank wind tunnel facility. Only one other US jet aircraft, the Bell XP-59 Airacomet, had flown by the date of the XP-80's first flight on 8 January 1944.

During early 1943, as a result of prescient jet engine design work by chief engineer Hall Hibbard and conducted by Lockheed's Nate Price and the then little-known Clarence L. "Kelly" Johnson, the Army Air Force's H. H. "Hap" Arnold drafted Lockheed to design and build a jet fighter to counter the rapid technology advances then taking place in Nazi Germany. On 17 June 1943, the Air Force formally approved what was to become Lockheed's first jet aircraft—the US Air Force's XP-80. That day is considered the birth date of the Skunk Works.

The security surrounding the project and the expeditious manner in which the aircraft was to be designed and built meant that most of the bureaucratic norms for new aircraft design and manufacture could be circumvented. Hibbard, Johnson, Willis Hawkins, Art Viereck, Donald Palmer, and a team that eventually totaled 128 went to work immediately constructing a jet fighter. The schedule was severe. The jet-powered aircraft was to make its first flight within 180 days after the project started.

The deadline was met. On 8 January 1944, Lockheed's Milo Burcham piloted the XP-80 (nicknamed Lulu Belle) into the air for the first time at Muroc Army Air Field (now Edwards AFB) about seventy miles northeast of Los Angeles.

Lulu Belle's flight testing took place at Muroc Army Air Field. Two flights were made on 8 January 1944. The first was prematurely terminated when the pilot, Milo Burcham, ran into minor problems with the flap and control system. The problems were hurriedly corrected and a second successful flight was undertaken less than thirty minutes later. Both flights were observed by a majority of the engineers—including Kelly Johnson—and construction personnel who had participated in the XP-80's creation.
This year, the Skunk Works looks back proudly on fifty years of the most innovative accomplishments in aerospace engineering ever recorded. To celebrate the milestone, the company has pulled the wraps off some of its lesser-known historically significant projects.

Skunk Works aircraft, though relatively few in number, have heralded exceptional advances in technology and performance. Some of these aircraft set world speed and altitude records nearly twenty-five years ago—records unassailable by any known conventional winged aircraft in the world today.

Aircraft built or designed directly under the Skunk Works umbrella include the XP-80, the family of U-2 aircraft, the JetStar, the little-known CL-400, the A-12, the YF-12, the D-21, the SR-71, Have Blue, the F-117, and the YF-22. Peripheral programs conceived, manufactured, or influenced by the Skunk Works philosophy include the Model 75 Saturn, the Model 89 Constitution, the T-33 and T2V family, the F-94 Starfire family, the XF-90, the XFV-1, the R7V-2/YC-121F, the X-7, the RB-69, the YC-130 Hercules, and the XF-104 Starfighter. Many other aircraft were modified or upgraded as part of normal Skunk Works subcontract business, including RB-57s, P2V/P-2 Neptunes, and a variety of types for foreign air forces.

Picking a selection of photos that adequately summarizes the best work of an organization as long-lived and innovative as the Skunk Works is a tough task. Any list would have to con-

Perhaps the least known of the so-called Blackbird family of Mach 3-capable reconnaissance aircraft is the A-12. Fielded before the SR-71 and accommodating only a pilot, it was developed to fulfill a Central Intelligence Agency requirement calling for a U-2 replacement. At the time of its first flight in 1962, this was by far the most advanced aircraft in the world. Only fifteen were built. The last A-12 flight took place in 1971.
The latest U-2 iteration to enter the US Air Force inventory is code named *Senior Span*. The large dorsal fairing contains a satellite communications antenna to relay tactical intelligence data anywhere in the world—including data gathered by the airplane's nose-mounted advanced synthetic aperture radar. Such unmatched versatility is one of the many attributes that has kept the U-2 in constant operational service for nearly four decades.

Even less known than their A-12 stablemates were the two M-21 carrier aircraft. The M-21 carriers were A-12s built specifically for transporting and launching the highly classified D-21 drones. Powered by a single Marquardt ramjet engine, the inertially navigated D-21 could fly at speeds up to Mach 3.35 and ranges exceeding 3,000 nautical miles. During an attempted launch in July 1966, a D-21 collided with its M-21 carrier. Both aircraft crashed. This ended the M-21's career and forced Kelly Johnson and other Skunk Works engineers to come up with another approach to launching the D-21.
One of the few unsuccessful Skunk Works ventures was the company's foray into the highly competitive lightweight fighter competition, which eventually was won by the General Dynamics YF-16. Lockheed's entry, generically referred to as the Lancer, gestated through a series of design studies from the CL-1200 through the CL-1600 and the X-27. The aircraft can trace its roots to the company's highly successful F-104 (which also started life as a Skunk Works aircraft).

Thirty-eight D-21s were built and twenty-one were flown, including four on operational missions. These missions were undertaken from two modified Boeing B-52Hs as carrier aircraft. A single solid-fuel booster rocket attached ventrally to the drone accelerated it to ramjet ignition speed. The booster, equipped with a folding ventral fin, ignited after the drone was released. The booster, before it was jettisoned, had enough fuel to propel the D-21 for about 90 seconds.

The SR-71, appropriately code named Senior Crown, is perhaps the best-known of all Skunk Works projects. Holder of the world's absolute speed and altitude records for its class for nearly twenty-five years, the aircraft is no longer in operational service. Three aircraft, however, are flown by NASA for high-speed research. Several additional aircraft are in long-term storage for the Air Force. Three trainers, including two SR-71Bs and a single SR-71C, were built with elevated rear seats for an instructor.
tain what has become known unofficially as the Blackbird family, which includes the world-renowned SR-71 and its A-12 and YF-12 predecessors. The forty-eight Blackbirds represent the only production jet-propelled aircraft in history capable of routinely cruising at speeds in excess of Mach 3 (over 2,000 mph) and at altitudes above 80,000 feet. They hold numerous world records, including that for absolute speed of 2,193 mph and the absolute sustained altitude of 85,069 feet.

The list also would have to contain the U-2 that, in its U-2R variant, remains in front-line operational service nearly four decades after the original U-2 first flew in 1955. Capable of cruising at altitudes above 75,000 feet, the aircraft remains the highest flying subsonic aircraft in the world. It is probably the world’s best manned reconnaissance platform.

Lesser known, but equally innovative, are the two Have Blue prototypes, the world’s first dedicated testbeds for low-observables technologies and the archetypes for the F-117 stealth fighter—another product of the Skunk Works. These and the long list of other Skunk Works aircraft represent a proud legacy. This fifty years of aerospace leadership merits acknowledgment and applause.

The faceting, a design hallmark of the F-117, is a key ingredient in its ability to counter radar. Its fly-by-wire flight control system was adapted from the F-16. Sixty-four aircraft were built (the first five were pre-production aircraft for flight testing). The last F-117 was delivered to the Air Force in 1990.

This article was adapted from Jay Miller’s just-released book, Lockheed’s Skunk Works, The First Fifty Years. Initiated and endorsed by the Lockheed Corporation, it is the first authoritative and complete history published on the Lockheed Advanced Development Company (the Skunk Works). It is available from Aerofax, Inc., in Arlington, Texas. For information, call (800) 733-2329.

Photos courtesy of Lockheed Advanced Development Company.
F-16 Team Wins Turkish Bombing Competition

Every year, eight teams of Turkey’s top fighter pilots compete to see who’s best. This year, top honors went to an F-16 team from the 141st Squadron from the 4th Main Jet Base at Murted (now Akinci). Lt. Col. Akin Ozturk, the squadron’s commander, received the Top Gun trophy by finishing first in overall scoring. Each team consists of four aircrews and five aircraft (one is a spare). Team members reach the national competition after placing highest in their own squadron-level competition. Teams are judged on bomb, rocket, and gun accuracy as well as on mission profiles in both tactical and classic modes. A variety of aircraft compete, including the F-16, NF-5, RF-5, F-4, and F-104. To level the playing field, aircraft with less sophisticated avionics are assigned handicaps.

Winners from the 141st Squadron
Lt. Col. Akin Ozturk (top) poses with the rest of his team (left to right): Capt. Ergun Sarac, 1st Lt. Erhan Pamuk, and 1st Lt. Mehmet Ozlu.
F-111s and F-16s Excel In Excalibur IX Competition

F-111Es of the 77th Fighter Squadron of Upper Heyford's 20th Fighter Wing captured the two highest awards in the Excalibur IX Competition. The 77th's B Flight was awarded overall best flight/best wing in the competition. Capts. John Begley and Ken Byrd of the 77th won Top Gun honors. Excalibur is an annual USAFE weapons and tactics gunnery competition. F-16 crews from the 52nd Fighter Wing from Spangdahlem Air Base in Germany also had an outstanding performance by capturing the top honors in four of the six weapons and tactics gunnery events. A total of forty-six Air Force aircraft (including F-16s, F-111s, F-15s, and A-10s) and fifty-nine crewmembers participated in the competition.

First Indonesian Hits 1,000 Hours

Maj. Rusamsi Dede (with the callsign “Viper”) is the first Indonesian pilot to clock 1,000 hours in the F-16 Fighting Falcon. Dede is the director of operations for Squadron 3 at Iswahyudi Air Base. As one of the first Indonesian pilots to convert to the F-16, he first flew the F-16 in 1990 in the United States. He has previously accumulated over 1,100 hours in the F-5E/F.

Australia Increases Its Aardvark Population

The Royal Australian Air Force began taking delivery of fifteen F-111Gs from USAF inventories in September. The aircraft, which are an inexpensive way to extend the life of the RAAF's two squadrons of F-111s, will enter service in late 1994 at Amberley in Queensland. The RAAF currently operates twenty-two F-111Cs as reconnaissance and bomber aircraft.
Thrust-Vectoring F-16 Sets Record Stabilized Angle Of Attack

The VISTA/F-16 with the Multi-Axis Thrust-Vectoring achieved a stabilized angle of attack record of eighty-three degrees on 3 September during envelope expansion testing at Edwards AFB in California. On the same flight, Lockheed’s Joe Sweeney and Air Force Maj. Mike Gerzanics performed the dynamic “J-turn” maneuver in which the aircraft is quickly decelerated in pitch and then reversed in direction in yaw to minimize the time and radius of a turn. Five days later, the aircraft performed a “hammerhead” maneuver—similar to a standard loop, but performed as a quick back flip. (These maneuvers were depicted in the July issue of Code One.) The General Electric F110-powered F-16 has routinely flown the famed “cobra maneuver” since early August to angles of attack up to 110 degrees. This maneuver was first demonstrated by the Russian Su-27 a few years ago. “Engine performance has been outstanding throughout the test flights,” reported Maj. Gerzanics. “Pitch-control authority is eye-watering, with pitch rates of fifty degrees per second.” Gerzanics is looking forward to working with the 422nd Test and Evaluation Squadron on the tactical evaluations scheduled to begin in October.

First USAF F-16 Pilot Surpasses 3,000-hour Mark

Maj. Mike Brill of the USAF Reserve’s 419th Fighter Wing at Hill AFB in Utah became the first USAF pilot to accumulate 3,000 hours of flying time in the F-16. Brill, who first flew the F-16 in October 1980, says he was in the right place at the right time. The AF Reserve pilot accumulated 2,300 hours during his ten-year active-duty career in the Air Force. As the top student in his flight school, he was allowed to choose the aircraft he wanted to fly. “I chose the F-16 because it’s like a sports car—nimble, sleek, and in a small package,” explains Brill. “I’ve loved flying it over the years because I keep learning things about it. There are always new experiences with this airplane.” Brill joins Belgian Air Force pilot Cmdt. Jean-Marie Toussaint, who was the first F-16 pilot to reach the 3,000-hour mark in October 1992.
AFA Honors Arizona’s 944th

The Air Force Reserve’s 944th Fighter Group at Luke AFB, Arizona, receives the Air Force Association’s outstanding USAF Reserve unit award. The award was accepted by Col. Richard Hall, 944th commander, at the AFA’s national convention in September. The 944th was the first Reserve fighter unit to fly operational missions over Iraq in operation Provide Comfort II and subsequently flew over 300 combat sorties during the deployment. The 944th is also the first Reserve unit to fly operationally with the AIM-120A advanced medium-range air-to-air missile.

600th Flight For Edwards’ AFTI/F-16

The Advanced Fighter Technology Integration/F-16 completed its 600th flight test mission in August. The flight supported the upcoming AFTI/F-16 Full Envelope Ground Collision Avoidance System effort. The total flights date from July 1982. Since that time, the program has led to many significant firsts in fighter technology, including a triplex digital flight control system, an automated maneuvering attack system, and, most recently, various integrated technologies for low-level night attack.

Hillaker Inducted Into Hall Of Fame

Harry Hillaker, known by many as “the Father of the F-16,” was inducted into the Michigan Aviation Hall of Fame in August. The aircraft designer attended the University of Michigan before joining in 1941 Consolidated Aircraft, a predecessor to General Dynamics and Lockheed Fort Worth Company. Lockheed’s Clarence “Kelly” Johnson, founder of the Skunk Works, and Robert Fuhrman, retired vice chairman and chief operating officer, are also members of the Michigan Aviation Hall of Fame.
128th Fighter Wing Flies F-16s

The 128th Fighter Wing of the Wisconsin Air National Guard officially converted to the F-16 Fighting Falcon earlier this year. The wing's 176th Fighter Squadron is the flying unit. The squadron is based at the Dane County Regional Airport in Madison, Wisconsin. The F-16s replace the unit's A-10 Thunderbolts.

138th Fighter Group Converts

The 125th Fighter Squadron of the 138th Fighter Group of the Oklahoma Air National Guard officially began flying their F-16C aircraft in June. The unit, based at Tulsa International Airport, previously flew the A-7D Corsair.
178th FG Flies F-16s

The 178th Fighter Group of the Ohio Air National Guard in Springfield officially began flying F-16s in July. The unit, based at Springfield-Beckley Municipal Airport, is the last ANG unit to fly the A-7D. The 162nd Fighter Squadron is the group’s flying unit.

74th FS Gets F-16s

The Flying Tigers of the 74th Fighter Squadron at Pope AFB in North Carolina are now flying F-16 Block 40 aircraft. The 74th FS is part of the newly created battlefield attack composite wing—the 23rd Wing. The 23rd Wing also has OA-10 (the 76th FS) and C-130 aircraft.

F-16s Go To Des Moines

The 124th Fighter Squadron of the 132nd Fighter Wing of the Iowa Air National Guard is now flying the F-16. The Fighting Falcons replaced the unit’s A-7D Corsairs, which it had been flying since 1977. The unit was formed in 1941 and originally flew P-51D Mustangs.
The Origins Of Semper Viper

Rereading Joe Bill Dryden’s collected wit and wisdom in the new *Semper Viper* edition and seeing the photo of him in his Lockheed flight suit reminded me of how his series of articles came about. I met Joe Bill when he first came to work for General Dynamics in 1984 and worked with him on the early studies that led to the ATF/F-22 program.

He told me that before the “Electric Jet” was invented, the most fun he ever had flying an airplane was with the Lockheed F-104 (a minimum size airframe with the maximum engine of its day). He also said that in the early 1960s, the famous Lockheed test pilot Herman “Fish” Salmon had written a series of articles for the operational community on how to get the most out of the Starfighter. These articles had greatly influenced the young Capt. Dryden. Joe Bill declared that he wanted to do the same thing for the F-16. He then wrote several white papers on aspects of the care and feeding of the F-16 long before there was a *Code One* Magazine to publish them.

Joe Bill always worked closely with the Advanced Design engineers, particularly the younger ones. He wanted to make sure the next generation of fighters met his high standards for performance and safety. His presence and style will be greatly missed.

Kevin Renshaw
Advanced Programs
Lockheed
Fort Worth, Texas

F-16XL Ramp Tramp Remembers

All of us who knew Joe Bill Dryden mourn the loss of our friend. He was much more than a fighter test pilot; he was also a military leader. From 1982 through 1984, Lt. Col. Dryden was the commander of forty-four Air Force maintenance troops assigned as suitability evaluators on the F-16XL test program. Before our arrival at Edwards AFB, he was the sole TAC resident within the F-16 Combined Test Force.

Col. Dryden accepted his new responsibility of managing these “ramp tramps” and gave us his genuine concern for our well-being. With all of the problems associated with supervising such a diverse group, he was the driving force in ensuring the welfare of his troops and the success of our unique mission. This “fighter pilot” became an administrator, liaison between three major commands, and the best friend we had at Edwards. He fought our battles and supported us when we needed him.

We all knew he was a great pilot. That’s why he was there. But more than that, he was the best friend and advocate of the enlisted force he commanded.

Joe Bill, we salute you. We honor you. But most of all, we will never forget you.

SMSgt. Vance Willsey (Ret)
and the F-16XL Test Team

Straight And Well Written

I am sorry to hear about Joe Bill Dryden flying to “the other side.” We all do eventually.

I enjoyed his pilot articles. They were straight and written so even those of us who have never held an F-16 sidestick in our hands while breathing aviator’s oxygen appreciated and understood. We’ve all lost a good one; he won’t be forgotten.

John Andrews
The Testor Corporation
San Diego, California

Supreme Dedication

What a splendid issue—July ’93. I’m sure our Joe Bill Dryden would be proud of this one as he gave so much of himself for F-16 aviators.

Joe Bill will certainly be missed by members of his Fighting Falcon family who have tested the thrust and heights of the F-16 ever so confidently. Joe Bill became a legend that lives on, like our naval aviator and instructor, John “Bug” Roach, his life of supreme dedication to the A-4 Skyhawk, the special plane that he loved so much and the one that was with him in his last cut.

All the best and Semper Fi Joe Bill. You made the F-16’s grand flight so much smoother.

Arthur J. Radige
Geiger US Marine Aviation Sq.
Pensacola, Florida

Lessons In Writing

I came to know Joe Bill while preparing an article for distribution to the field through Product Support Engineering. I recall some interesting “one v. one” encounters as Joe Bill debated his cockpit perspective with engineering on various technical issues. We were attempting to iron out differences concerning the article. He hung in there until he gained the six
A Pilot's Writer

I met Joe Bill Dryden just once. I did take the opportunity to tell him that I enjoyed and appreciated his writings. A lesson for all of us: never pass up such an opportunity, because we cannot know if it is our last.

Joe Bill Dryden's passing is a loss to the community of aviation writers as well as to the community of fighter pilots. His voice was unique—lucid, stylish, and authoritative with a trace of arrogance.

I'm certain that—somewhere, someday—a hotdog pilot will think about some of Joe Bill's advice and decide not to push the limits or bend the rules. And he'll make it home that evening.

All of us who write about this fascinating, frustrating, perilous business can only hope that our words do half as much good.

Bill Sweetman
Communications for Aerospace
Oakdale, Minnesota

Felt All Over The World

The Royal Thai Air Force and Wing One would like to express our sincerest regrets over the loss of Mr. Joe Bill Dryden. Our pilots recently had the pleasure of flying with him, and everyone gained the greatest respect and admiration for him. We will always remember his contribution to our F-16 squadron.

We are very sorry that we did not get a chance to say good-bye to him, and so, in his memory, we flew a missing-man formation over our airfield in Korat on 28 May. The loss of Mr. Dryden was felt all over the world and especially by Wing One.

Sailaud Santakul
Wing One Commander
Korat, Thailand

Giving Honor

All of the pilots of the 103rd Squadron are thankful for the recent opportunity we had to fly with Joe Bill Dryden. We are determined to continue on in his memory. We will never stop striving to reach the pinnacle of proficiency and professionalism in the F-16, as we know this is the best way we can give honor to Joe Bill. We will always hold him in the highest regards, and he will always be with us in our memories.

Signed by the Commander and Pilots of the 103rd Squadron
Royal Thai Air Force

Note From A Friend

I met Joe Bill on my tenth day at General Dynamics, in December 1984. He wasn't teaching a class or greeting new hires at a barbecue dinner. Rather, I smiled at him in the hall. He spoke to me. From that day on, we were friends.

He told me on a number of occasions that he wanted to bundle up all the Code One magazines with his articles and send them to those English professors at the Air Force Academy who told him he couldn't write worth a squat. He said he would attach a simple note: "So there, Joe Bill," I'm certain that if he were still with us, those professors would be in possession of Semper Viper at this very moment. If I knew who they are, I'd send the copies myself. He wrote just like he talked. His love for what he did was contagious.

Your words on the inside front cover of the collection awakened many memories. And though I cried while I read them, they were in many ways tears of joy for being one of the lucky few who knew him. I know that somewhere up among the clouds, he's probably wondering, "Why all the fuss?"

Lisa Gafford
Lockheed
Fort Worth, Texas

In Spanish

This letter will acknowledge, with thanks, receipt of Code One. I read it from beginning to end as soon as it arrives. Congratulations for maintaining the superb quality. I also congratulate your staff on Code One's recent well-deserved award from the Aviation/Space Writers Association.

I was shocked with the news of the death of test pilot and writer Joe Bill Dryden. His articles were my favorites. I would like to express my deepest sympathy to his family and to the Lockheed Corporation for this great loss. I would be proud to translate his Semper Viper book into Spanish.

Jose Bryan
Alice, Texas

In French

Je fus heureux d'être impliqué avec Joe Bill Dryden à un vol de test program en Europe l'année dernière. Le programme a été effectué dans des sites de test en Belgique, les Pays-Bas, et la France. Ce, ainsi que des excursions de week-end, ont permis de rendre l'amour de la langue étrangère des fonctionnaires de Joe Bill.
I had always marveled at his flying ability and love for the open sky, but not until last summer did I truly get to know the man behind the visor. Joe Bill was a gentleman’s gentleman. Regardless of the situation, whether work-related or not, he always insisted on speaking the language of his host, never expecting the host to return the favor. He managed to make his foreign speaking appear as effortless as his maneuvering of the F-16. Joe Bill had the ability to make everyone he met feel important. He earned great respect from all.

I will always remember that summer. It was a time when Joe Bill and I became friends. As I continue to interact with other nationalities, the memory of him will live on with each French word I massacre.

David M. Clark
Flight Test Engineering
Lockheed
Fort Worth, Texas

Sorely Missed

I am very sorry to hear of Joe Bill Dryden’s accident. As an F-16 pilot since 1980, I have enjoyed his articles and the many things he taught all of us. He will be sorely missed in the F-16 community. He was the best.

Maj. Kevin J. Kelly
Arizona ANG
Tucson, Arizona

Never Forget

It was a year and a half ago when I met Joe Bill Dryden, and I’ll never forget the experience. A darkened hangar on the General Dynamics flight line revealed one of the latest additions to the F-16 family. As a ground crew hustled around the airplane, Joe Bill showed me the nuts and bolts. This was a special treat for me—a guided tour of the world’s most sophisticated fighters by the man who quite probably knew it best.

My half-hour inspection revealed not only the Fighting Falcon but also a man whose technical knowledge of the ship was equalled by his respect for it. He was articulate and, as you mentioned in your memorial, intense. He also had a sense of humor and the consideration to take time out from his heavy schedule to show me the F-16 as a favor to a mutual friend. I consider myself lucky to have received such a gift, and I never thanked him enough. I guess, like so many of us, I thought there would be time later on.

I hope F-16 pilots everywhere will take advantage of the wealth of information	

Joe Bill left behind in his Code One contributions. I’m sure his concern for their well-being was a driving force in his role as both test pilot and writer.

I feel honored to have met Joe Bill. Whenever I see an F-16, I am reminded of how much he contributed to the aircraft’s success.

William T. Heald
Aviation Writer
Washington, DC

Joe Bill’s Legacy

Joe Bill Dryden’s untimely passing has left a void that may never be filled. But his articles and views on the Viper remain a timeless legacy to him and his dedication to the F-16 community.

Lt. Col. Nelson Beard
Editor, The Combat Edge
HQC ACC
Langley AFB, Virginia

No-Cow Painting

The preliminary sketch for the artwork that accompanied Joe Bill Dryden’s article, “Out of the Dark, Through the Glass,” had a cow in the background, looking up at a low-flying piston-engine airplane. The airplane’s blindfolded pilot is hanging out the side window feeling for the ground with his cane. Joe Bill, who always looked over my illustrations for his articles before we went to press, asked me if I could get rid of the cow. I was a little surprised because he had never asked me to alter a painting before. When I asked why, he said he thought it just looked better without the cow. So I took the cow out.

As it turned out, the final illustration won a national award for art. I never questioned his judgment again. Joe Bill, I miss you.

Ben Juarez
Lockheed
Fort Worth, Texas

Unique Abilities

Joe Bill Dryden was a man for whom I had a great respect. This came from working side by side with him since 1985. I saw his passion for the F-16 and his desire to do whatever it took to make it better for the line fighter pilot. It was just this desire that was the catalyst for the soon-to-be-fielded (in the Reserve fleet) TERPROM navigation and ground collision avoidance system. Without his tireless efforts, this life-saving system would still be in the talking stages.

He was a man of unique abilities, and it was my privilege to see this on a daily basis. He could brief American pilots on the engine one week and train Venezuelan pilots (in Spanish) in high-angle-of-attack flying the next. When we tested night systems, Joe Bill was always ready to give the engineers his opinion. He never lost sight of the goal of making things better for the F-16 fighter pilot.

Many weekends you could find him at work writing articles for Code One. He wanted everyone to understand and know the F-16 machine as well as he did. These writings were one of his ways of giving of himself to help others.

Joe Bill’s death has had a profound effect on many of us at Lockheed. He was involved in so many areas within the company that it was difficult for me to keep up with all of them. His expertise spanned from advanced design to foreign fighter weapons instructor courses. Replacing his wealth of knowledge and experience will be impossible. Above all, he was a man of honesty and principle. These traits were visible in his daily activities. Although work continues here, it will never be the same without Joe Bill. He is sorely missed.

Stephen W. Barter
Chief Test Pilot
Lockheed
Fort Worth, Texas

From One To Another

I have long visualized premier test pilot Joe Bill Dryden as a crusading knight ranging the skies in an everlasting quest for perfection of pilot and machine. But with the shock of a sudden thunderbolt, the July issue of Code One revealed his untimely death.

In reading the memorial by Eric Hehs, I found some comfort in the face of tragedy—but a strong feeling of disbelief lingered.

I had believed that Dryden was destined to be always successful in outwitting difficult flight situations and would fly unscathed into aviation’s far-reaching future. But a devilish hand of fate must have intervened and dealt him unplayable cards from a ruthlessly stacked deck.

Joe Bill’s illustrious flying career was unexpectedly and inexplicably ended. Replacing him will be extremely difficult. He was thoroughly a gentleman, and he possessed the creative and analytic talents of a well-polished scholar. For him, no task was too involved or menial. He performed all with focused skill and enthusiasm.
Top Credit For Top Gun

Great work on the July 1993 issue featuring Top Gun. Eric Heh's article was clear, concise, well written, and very informative. It brought back great memories of my few weeks flying and working at Top Gun last year with "Puke," "Hack," "Goose," "Trim," "Clete," "Action," "Milt," "Rooster," "Flea," etc. The article complements my book, TOPGUN Miramar, which offers a slightly different slant. I am especially proud to have contributed some of the photography for the article.

Unfortunately, I cannot take credit for the opening two-page silhouette of the Viper and Tom.

It's easy to see why the Code One staff has received the Aviation/Space Writers Association's awards. Even my bumbas at Duke University, a motley crew of gregarious geeks and nonchalant nerds, look forward to seeing Code One on the conference table in the Hamburger Lounge. Yours is a much-welcomed treat in a high-tech atmosphere, filled with wall-to-wall electronics devoted to single brain cells.

Dean Garner
Duke University Medical Center
Durham, North Carolina

Peace Dividend Pie

As a recent new subscriber, I received my first issue of Code One in April. Congratulations on your penetrating interview with the former Mikoyan Design Bureau engineer, Alexander Velovich. Hearing from him about life inside the MiG place and Russia after the USSR's collapse is a delicious slice of the peace dividend. Jay Miller's authoritative overview of the MiG-29 made a perfect companion piece.

Likewise, Joe Bill Dryden's advice to F-16 pilots tempted to exceed their airplane's established operating limits forcefully brings home the reasons those rules exist.

I learned a lot. Keep up the good work.

Stuart F. Brown
West Coast Editor
Popular Science Magazine
Hollywood, California

Airplanes In Mothballs

We would like to welcome you aboard and know you will enjoy being part of the Lockheed family. [Calcomp is a subsidiary of Lockheed.] We appreciate receiving your outstanding Code One Magazine and enjoy the fine articles in both the current and back issues.

I was happy to see the B-36 restoration article. As a child growing up in Arizona, I well remember all those big airplanes in mothballs. It's a shame that most of them are gone now.

Nancy Lubanovich
Calcomp
San Jose, California

Semper Viper Edition Available

A collection of Joe Bill's articles was published as a ninety-six-page special edition of Code One this summer and distributed to F-16 units worldwide. We've received many calls for personal copies. Unfortunately, there are not enough of the magazines to satisfy the demand for complimentary copies. We have, however, set aside some of the remaining copies for those willing to pay for it.

They are available at cost ($5/copy plus $2.50 for first-class postage) until they run out. Our mailing address:

Code One Magazine
Lockheed Fort Worth Company
PO Box 748, Mail Zone 1793
Fort Worth, Texas 76101

Beryl Arthur Erickson
Former Test Pilot
Aspen, Colorado

Regards From DWIC

I would like to thank you and all the members of the Lockheed team that have supported the Dutch Weapons Instructor Course so well over the years. The company involvement in this program since the beginning has been a key factor in the tremendous success of the school.

The article in the July's Code One was superbly written and brings much deserved recognition to the Royal Netherlands Air Force and its efforts to establish and maintain a world-class weapons school. It is impossible for me to thank everyone at Lockheed in one letter, but I would like to point out the efforts of Mr. Dick "Ski" Pawloski from Fighter Operations Training Services. His support of this program has always been instrumental in helping us improve the school to the level it now enjoys.

It is with great sadness that we must share our pride in the DWIC articles in the same edition with a memorial to Mr. Joe Bill Dryden. There are no words that can adequately describe the loss of this outstanding individual. He was not only a superb pilot, but also a tremendous human being. The contributions he made to the nation and to aviation cannot be measured. It is clearly a national loss. I will never forget what he meant to me and to my fellow F-16 drivers. He will be truly missed.

Maj. Mike R. Cook
USAF Exchange Officer
HQ RNLAF, The Hague