Last-minute passengers board an Air National Guard C-130J Super Hercules in Iraq. The aircraft is from the 175th Wing at Martin State Airport, Maryland. The crew is from the 115th Airlift Squadron, Channel Islands, California.
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Distribution information: 888-883-3780

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ISSN 1071-3816 A06-19538

ABOUT THE COVER
Front: US Navy F-16s break formation over the ranges at NA5 Fallon in northern Nevada. The Navy operates F-16s as adversary aircraft for training missions at Fallon. Photo by Ted Carlson
Back: An F-117 Nighthawk from Palmdale, California, and an F-22 Raptor from Edwards AFB are silhouetted against a setting sun in late October. The aircraft are flying northwest of Edwards AFB near the southern end of the Sierra Nevadas. Photo by Andy Wolfe
NSAWC FLIES F-16
Lt. Winston Scott, an experienced Naval aviator with more than 900 hours in the F/A-18C, smiles as he climbs down from his F-16 Fighting Falcon. Scott has just completed his first solo flight in a Navy F-16. “That was fantastic,” he says. “The agility is outstanding, but I am most impressed with the airplane’s thrust-to-weight ratio.” 

Scott’s first solo flight was his fourth sortie in an F-16. He flew his first three sorties in the front seat of a two-seat F-16B with a Navy instructor pilot in the back seat. He will complete several more flights, about ten hours total flying time, before he is officially certified by the Navy as an F-16 pilot. The training is the first step in turning Scott and several other pilots into adversary pilots for the Naval Strike and Air Warfare Center at NAS Fallon, Nevada.


The US Navy has been flying F-16s at NAS Fallon since early 2002 when the first of fourteen F-16s arrived (ten single-seat and four two-seat versions). The aircraft, with distinctive paint schemes, are low-hour Block 15 F-16s taken from desert storage at Davis-Monthan AFB, Arizona, and restored to flying condition at the Aerospace Maintenance and Regeneration Center at Davis-Monthan. These F-16s are often confused with the Block 30 F-16Ns the US Navy
operated at several locations beginning in 1987. Those F-16Ns were retired in 1995. Between 1995 and 2002, F/A-18s and F-5s flew the adversary role. They are still flown today as adversaries at NAS Fallon.

Initially, Navy pilots received their F-16 conversion training in Tucson from the 162nd Fighter Wing, the Arizona Air National Guard unit. About two years ago, several of the NSAWC pilots took the initiative to move most of the conversion training to Fallon. The move saved time and money for the Navy and allowed the 162nd to concentrate on its primary mission of training international F-16 pilots.

“We base our program on the Air Force syllabus,” notes Weber, who was...
instrumental in bringing the conversion training to Fallon. “We still send pilots to Tucson to train in the F-16 simulators there, but we do all the actual flying and the other ground instruction here. The Navy did its own conversion training when it operated the F-16N.”

About thirty Navy pilots are qualified to fly the adversary role in the F-16, an assignment that lasts two years at Fallon. The Navy replenishes pilots for the role by conducting four F-16 conversion classes with four students per class every year. Once the Navy pilots are qualified in the F-16, they go through another seven weeks of training to learn to fly the Fighting Falcon in the adversary role. After that, they are ready to function as adversary pilots at NSAWC.

NSAWC Advantage

“NSAWC is widely recognized as the premier aviation center of excellence and the primary authority on training and tactics development for the US Navy,” explains Capt. Eamon Matthew Storrs, deputy commander of NSAWC.

This designation as the center of excellence carries an assortment of responsibilities. NSAWC personnel train pilots and ground personnel, assess the results of that training, and recommend requirements for future training programs. They research and develop priorities for integrated strike warfare, maritime and land air superiority, strike fighter employment, airborne battle management, combat search and rescue, close air support, and associated planning and support systems. They also develop, implement, and administer several courses of instruction. In addition, NSAWC personnel function as the Navy point of contact for all issues relating to the Navy’s air combat training curriculum.

NSAWC is split into several divisions, including personnel resources; intelligence; operations; maintenance; plans and programs; command control, communications, computers, and intelligence; training and standardization; and ranges. The training and standardization division includes carrier air wing training and strike fighter tactics instructor (SFTI) training, better known as Top Gun.

“We also began training special operations forces in the last three or four years,” adds Storrs. “Navy SEALs have a four-week course that coincides with the carrier air wing training. The special operations forces trained here will become terminal attack controllers. Most of them head to Afghanistan or Iraq two weeks after they graduate from the course.”

Range Space

The huge ranges near Fallon are perfect for training on a large scale. The area has more than 300 clear flying days per year. The operating area encompasses 10,200 square miles east of Fallon and features a 14,000-foot runway (the longest in the Navy), four bombing ranges, and an electronic warfare range.

“The range alone distinguishes us as the crown jewel of aviation training for the Navy,” Storrs says. “It is vast enough to conduct a full-scale air wing rehearsal. We can launch a full-up strike package of forty aircraft and put up as many as twenty of our own aircraft at the same time.”

The Fallon range training complex includes an array of electronic systems that support the various types of training. The heart of this system, called the advanced digital display system, allows each training event to be displayed and recorded as it occurs on the ranges. Information transmits instantaneously from each aircraft to large-screen displays at NSAWC and records for playback for post-flight analysis of procedures and tactics. This system also allows controllers and aircrews to view an event in three dimensions from different perspectives.

“We can review frame by frame what went on in every encounter and ask everyone what was going on in the cockpit,” notes Storrs. “Aircrews learn more during these detailed reviews than from the actual missions.”
A carrier air wing comes to Fallon four or more times a year for carrier air wing training, a four-week course to prepare the wing for its first deployment as a fighting unit. These visits bring as many as eighty aircraft and approximately 2,000 people to the base.

The training starts with a strike leader advanced training course with strike leads nominated by the squadrons. These strike leads are put through academics on evaluating threats, putting together strike packages, and using reconnaissance and other assets. At the same time, other members of the squadron become familiar with the area, the local targets, and the range boundaries.

As the training progresses, aircrews are introduced to various potential threats. They fly prescribed missions against basic threats and then thoroughly debrief the missions. The number of threats and the size of the strike packages increase during the training. In the final week, the advanced training phase, the aircrews essentially conduct a two-day simulated war.

“They start the week with a given number of aircraft and personnel,” Storrs notes. “If they lose an aircraft in an engagement, they can’t use that aircraft for the remainder of the war."

“Air Wing Fallon is the best operational training that a squadron ever receives,” Storrs continues. “Once the squadrons leave here, they go back to typical operations from a ship. Twenty-five to fifty percent of their time is spent concentrating on taking off and landing on the ship. Here, they can drop all that extra operational baggage and concentrate thoroughly on tactics.”

Ground crews benefit from the training as well. “They become more skilled at getting the aircraft prepared for combat and tweaking the electronic warning systems,” Storrs says. “They work on the turnaround times here they will experience on the ship in combat. The whole team comes together at Fallon. The team becomes proficient here.”

STRIKE FIGHTER TACTICS INSTRUCTOR TRAINING

SFTI, or Top Gun, training is still widely perceived as addressing air-to-air tactics only. The curriculum changed in the early 1990s to include air-to-ground tactics. The ten-week course graduates strike fighter tactics instructors who return to fighter squadrons to train fellow aircrews in air-to-air and air-to-ground tactics. An SFTI graduate is roughly equivalent to a US Air Force weapon system officer.

Students selected for the course come from the most highly rated aircrews who have completed their first fleet tour and have accumulated 1,000 or so hours of flight time. Top Gun instructors at NSAWC conduct about five of these courses every year. The coursework begins with a week of academics and builds from one-vs-one air combat, to small strike packages against unknown threats, to large strike packages involving all students and all instructors.

“Top Gun also helps standardize tactics so that every squadron is working from the same sheet of music,” explains Storrs. “For example, we recently gave two months’ notice...
to an F/A-18 squadron from Beaufort, South Carolina, on the East coast to deploy to a carrier air wing based on the West coast. We made the substitution without a hiccup. We couldn’t do that back in the 1980s because tactics varied from squadron to squadron. The tactics were similar, but not nearly as standardized as they are now.”

VIKER EUPHORIA

Fighting Falcons at Fallon are playing a critical role in ensuring the continued success of NSAWC. "The F-16 has been very reliable for us," says Storrs, who has accumulated some F-16 time himself. "We can generate a lot of sorties with this aircraft. Briefing times and manpower are the limiting factors, not aircraft availability. We could fly these airplanes all day if we didn’t have to brief and debrief. Most of all, the F-16 gives us the fourth-generation threat we need in our training."

"We employ realistic threat tactics with our F-16s," adds Cdr. Brad Blackwelder, assistant operations officer who is also in charge of the F-16 program at NSAWC. "That means we are handcuffed by limits we place on our radar and by the types of shots we take as Red Air. But at a merge, we fight our best fight."

"Performing as adversaries, our job, as Red Air, is to die. And we do that often," continues Blackwelder, who, with just over 300 F-16 hours, is the high-hour Viper pilot at Fallon. "Every Blue platform should beat us. They have bigger sticks in terms of radar ranges and weapons. But we fight as hard as we can within the limits they give us."

Getting to fly the F-16 is considered a bonus for Navy instructors at NSAWC. "An aviator in the regular Navy pipeline would never get that experience," says Storrs. "It is one of the few rewards instructors get for coming here and working their tails off."

NSAWC adversary pilots explain the rewards in various terms. "Pilots experience Viper euphoria when they get qualified in this jet," says Blackwelder. "The aircraft is so different from what they have been flying their previous 1,000 to 2,000 hours. For a guy who enjoys flying jets, the F-16 offers a unique experience."

"We fly in the best possible configuration for the F-16—completely slick," adds Weber. "No drop tanks. No pods. No bombs. Just AIM-9s on the wingtips. Pilots are like King Kong in this airplane. Most Air Force F-16 pilots would envy the way we get to fly these airplanes."

The rewards, however, carry some real-world benefits for the pilots going through training at NSAWC. "An F-18 pilot can get away with things against another F-18 that he cannot get away with flying against an F-16," Blackwelder says. "I ran a guy down in two or three minutes when he was twenty miles away. The top-end speed on the F-16 allows me to make an intercept."

One of the more exciting intercept missions the NSAWC adversary pilots perform is airfield protection. "We call it a DLI, for deck-launched interceptor mission," Blackwelder explains. "We act as if we are on alert. When we get notice of an attack, we head down a supersonic corridor to intercept Blue forces. Things happen fast. We are supersonic almost from the moment the wheels are in the well. Students look at their radar displays and see a threat aircraft closing in on them. That’s an invaluable experience. Students leave here and do business differently."

Weber looks over at Scott, who is still recovering from his first F-16 solo. "You’re going to love those missions," he laughs. "They are retention sorties."

Eric Hehs is the editor of Code One.
AMP replaces the 1960s- and 1970s-era analog avionics system in the C-5 Galaxy strategic transport fleet with a commercially available digital avionics suite along with an integrated architecture that allows for system upgrades. It incorporates a digital, all-weather flight control system and autopilot, color liquid crystal flat panel displays, an advanced embedded global positioning/inertial navigation system, and a new communications suite that features satellite communications and a high-frequency datalink.

The entire system is designed to increase safety, ease crew workload, and enhance situational awareness, particularly in the coming global communications, navigation, surveillance/air traffic management, or GCNS/ATM, controlled airspace. GCNS/ATM, formerly called Global Air Traffic Management, will essentially put eight aircraft in the space now filled by two aircraft of any type. Noncompliant aircraft will be forced to take longer routes over the ocean, which means a C-5 without AMP would be carrying more fuel and less cargo.

“Navigationally, the system allows us to do a lot more,” says Capt. Doug Jackson, an AMP instructor pilot at Dover. “The technology in AMP allows us to meet the GATM standards. Now in the airspace, we have to report at a waypoint within plus or minus three minutes. Under the new rules, we will have to report within seconds. Many more aircraft will be in the same airspace, and we have to be where we are supposed to be. Those rules are down the road, but they are coming.”

The flight line at Dover is nearly filled with Galaxys that
have undergone the AMP upgrade. By the end of 2006, the last two of eighteen aircraft assigned to the active duty 436th Airlift Wing and the Air Force Reserve Associate unit, the 512th AW, will have been modified with the new cockpit avionics. The aircraft will join the other modified C-5s already in service at the base.

“There is a lot of capability in AMP,” notes Hebel, who has fourteen years’ experience in the C-5 cockpit and was instrumental in the beddown of the AMP aircraft at Dover. “I don’t want to go back to the legacy cockpit. With AMP, I’ve got autothrottles; I’ve got a dedicated navigation display with a map of the world and information about every airport in it. I can also program my own custom navigational waypoints with special attributes to make particular tasks much easier to perform. We are flying C-5 AMP into Iraq today with no restrictions.”

Sharing the nearly mile-long flight line at Dover is the AMP modification line, where two C-5s at a time, parked side by side, are going through the upgrade process. This scene is repeated at Travis AFB, California, where a second AMP modification line is up and running. Approximately one-third of the forty-nine C-5B fleet has now been modified. The first C-5C modification is nearing completion. The remaining C-5C and the sixty C-5As are scheduled to follow in turn.

When a C-5 comes in for modification, the aircraft is essentially gutted, at least electrically. “We remove 12,000 wires and put 9,000 wires back in,” says Stephen Rall, the Lockheed Martin AMP manager at Dover. “We install wiring all the way up the tail.”

The C-5’s size actually works to the install team’s advantage in one respect. They turn the aircraft to be modified into a workshop—desks, tool chests, and work stands are all set up in the cargo compartment—which keeps the technicians from having to go back and forth to the hangar for tools and parts. The team built several large, specialized platforms for access to particular areas of the aircraft, such as underneath the flight deck floor.

The technicians tend to stay in one area when they work, such as at the flight deck avionics rack. They get accustomed to the one area and can even remember where the individual wires are and where they go. “You can tell a tech who is overly particular about how his wiring looks—the physical appearance of the bundle, how neatly it is tied off, and where it is placed—is a good electrician,” Rall observes.

Modifying a Galaxy is an all-day, five-day-a-week operation. “We hire mostly local technicians with previous Air Force experience,” notes Rall. “Nearly all of them worked on C-5s in the military. We have a good system in place, and we have a familiarity with the aircraft.”

The first aircraft through the modification line took 23,000 hours to complete. The span has been reduced by close to 10,000 hours and considerably fewer days. The reductions have come from experience and the way the work is sequenced.

The finished AMP cockpit has seven six-inch by eight-inch flat panel liquid crystal displays, with six for the pilot and co-pilot and one on the engineer’s panel. These displays produce little heat, are fully readable in sunlight, and have proved reliable in years of use on commercial airliners.

Functional tests begin on the aircraft at about Day 65 of the mod process. Near the end, the Air Force starts its inspections. “It takes up to two weeks to go through all the checks and sign off on the aircraft,” notes Hebel. At Dover, a modified aircraft is returned to the Air Force approximately 115 days after it was started on the modification line.
“WE REMOVE 12,000 WIRES AND PUT 9,000 WIRES BACK IN. WE INSTALL WIRING ALL THE WAY UP THE TAIL.”

— Stephen Rall

Stephen Rall, Lockheed Martin AMP manager
“The AMP hardware is very reliable,” notes Rall. “Any future changes in these cockpits will be a sustainment software upgrade, not a hardware change. But anytime we make a major system change, it takes a lot of work.”

Indeed, putting digital avionics on analog aircraft proved to be a challenge. “AMP development went from two planned software blocks to four,” notes Blair Marks, the Lockheed Martin C-5 AMP program manager. The program moved rapidly and paused when some of the aircraft were needed for operational missions in the Middle East. This allowed more time for the fault isolation manuals for AMP to be refined. “The Air Force and contractor team have worked together to address every challenge along the way,” Marks says.

“When we started, it was all on-the-job training,” recalls TSgt. Michael Matthews, one of the Air Force maintenance supervisors at Dover. “Since OT&E, formal training has gotten a lot better. We still have a lot of on-aircraft work, but the support behind the work is better.”

SSgt. Carlos Manriquez adds, “We now have better quality technical orders to work from. Early on, we kind of had the cart in front of the horse in some areas. The technical orders are getting better. We were using the preliminary tech order data, and now we are getting updated information.”

OT&E was then restarted and completed in the summer of 2006. The test aircraft recorded an eighty-five percent sortie reliability rate during OT&E, and AMP systems performed very well during the 350 hours of testing. No sorties were lost due to AMP component issues. “The system still has some warts,” Hebel notes. “Going through a learning curve is not always fun. But most of the issues are fixed now. Bottom line: we’re getting the job done.”

The transition to an all-AMP, active duty fleet is well under way. All AMP aircrew training is done at Dover. Instructor pilots from Travis are at Dover for initial cadre training. To assist in the transition, the legacy simulator at Dover has been replaced with an AMP simulator.

“Going to AMP from the legacy cockpit is a big transition,” says Maj. Bob Shelton, a C-5 AMP aircraft commander at Dover. “It requires some intensive training. We still have the throttle and yoke, but pilots must remember that this is mostly a new aircraft and they have to fly it that way. We have to learn some new terminology and new visuals. We have to train our eyes to do a proper cross-check. Learning to fly this aircraft is like learning to drive a new car. We intuitively know the basics: turn the key, put it in gear, and put a foot on the gas to make it go. We still use the basic skills to fly a C-5. However, the C-5 AMP cockpit provides more information. Learning to use it all is more of a human factors’ issue.”

“Only a small number of people will fly both the AMP and legacy aircraft,” Hebel adds. “AMP has enough differences that pilots have to focus their full attention on the new procedures and equipment. We tried to go both ways, but it essentially became ‘once you go AMP, you stay AMP.’ None of the new pilots coming to the Dover flight line will fly the legacy cockpit.

“We worked with Air Mobility Command Standardization/Evaluation and had lots of conference calls when we started,” recalls Hebel. “We knew that nobody knew everything about AMP. We had a lot of work to do to reconcile our legacy C-5 procedures with the new AMP equipment. For example, when we needed to check our navigation equipment, an AMC procedure requires that we operate specific equipment. Since that equipment was removed and upgraded with AMP, we had to figure out how to perform the old procedures with the new equipment. This involved a lot of rewriting of regulations. We have progressed far enough, though, that training issues are now handled in AMC training, and standardization/evaluation issues are being handled by AMC Stan/Eval. That’s the way it should be.”

Aircrews have accumulated more than 4,000 flight hours in the reconfigured Galaxys. “We get AMP and get it fully automated, and it is a thing of beauty,” says Hebel. “We have better planning tools with this system. A good example is fuel planning. Before, we looked at the gauges to decide how much fuel we had. Then we had to calculate how much we needed to get where we wanted to go. Now, we press a single button, and it tells us when we will land with an accurate estimate of how much fuel will be left. Additionally, when we fly an oceanic crossing, we have a datalink with air traffic control. We check in with ATC and verify that the HF radio works. From that point, we don’t need voice communication over a radio. Communication is all done via a datalink. To change air traffic control sectors, we only have to check in to make sure we can communicate in an emergency, but that’s it. Overall, AMP works well.”

Jeff Rhodes is the associate editor of Code One.
Nose On
The first F-35 carries no radar. Space in the nose of the aircraft normally allocated to the radar contains flight test instrumentation. The seam around the front circumference of the nose, unique to the first aircraft, allows easy access to this equipment and easy installation of an air data instrumentation boom. The hexagonal panel on the left is a closeout panel for the upper forward antenna for a datalink. The hexagonal panel on the right is the upper forward window for the distributed aperture system, an array of infrared sensors that work with the helmet-mounted display to provide the pilot with a 360-degree field of view around and through the aircraft.
Main Gear And Tires
The F-35 landing gear varies in capability from variant to variant. The carrier and short takeoff/vertical landing versions have beefier gear and structure to handle higher sink rates and harder landings. Goodrich Corporation manufactures the main landing gear as well as the associated downlock and retract actuators and the wiring harnesses. The tires are manufactured by Goodyear, which is supplying prototype intelligent tires with sensors and transponders embedded in the rubber. These tires sense and transmit tire inflation pressure and temperature. The information is associated with a unique serial number that assists maintenance personnel to monitor tire life from cradle to grave. This monitoring ability supports the F-35 autonomic logistics system that uses advanced technology to prescribe maintenance actions.
Front Landing Gear Bay And Electro-Optical Targeting System

The single door on the front landing gear bay is unique to the first F-35. Subsequent versions of the aircraft will feature split doors to reduce weight and increase control during landings in crosswinds, as a single large door requires larger tail surfaces to control the aircraft in crosswinds. The faceted object just below the nose represents the window for the electro-optical targeting system. Although not every production F-35 will possess this system, every F-35 will feature this shape for aerodynamic consistency. This consistency reduces costs associated with flight testing the aerodynamic effects of aircraft not equipped with the system.
Diverterless Intake

The unassuming bump at the opening of the F-35 inlet works with the forward-swept inlet cowl to redirect unwanted boundary layer airflow away from the inlet. The diverterless inlet, as it is called, is a technology advancement introduced on the JSF. It meets aerodynamic and observables requirements in a less complex manner than previous designs. The geometry of the cowl itself changed from X-35 to F-35. The new geometry provides better airflow into the engine at higher angles of attack. The inlet itself was moved back several inches to reduce weight and cost. White paint on the internal surfaces is unique to the first aircraft. Internal surfaces of subsequent inlets will be painted gray.
Panel Seams And Air Data Probe
New seam technology used on the F-35 makes the aircraft easier to maintain. The technology allows removable panels to meet low-observable requirements. Unlike larger panels of the past, the seams of these smaller panels do not themselves require maintenance. Also unlike the larger panels, these smaller panels require less time to remove and reinstall. Smaller panels can now be associated with specific pieces of equipment. The mechanical air data probe, made by Avionics Specialties, Inc., swivels and is unique to the first F-35. Subsequent aircraft will have fixed probes, made by Goodrich Corporation, similar to those on the F-22.
The F-35 is powered by a single Pratt & Whitney F135 engine that produces approximately 40,000 pounds of thrust in afterburner. The thrust makes the Lightning II the most powerful single-engine fighter ever built. To reduce cost, the nozzles of engines flown on the first aircraft do not have the low-observable characteristics that will be found on engines for subsequent aircraft. The geometry of the swiveling nozzle associated with the short takeoff/vertical landing version requires slightly shortened tail feathers.

**Engine Nozzle**
The Royal Air Force Hercules detachment at Kandahar, Afghanistan, is tasked to support British forces in the turbulent southern provinces of Afghanistan as well as the coalition forces throughout the country.

The Hercules force is led by 70 Squadron, the Hercules C. Mk. 3 unit based at RAF Lyneham, England. The unit is supported by ground personnel, which includes engineers, armourers, and logistics technicians, all based around what is called a deployable operations cell. In addition to the Hercules air and ground crews, 47 Air Dispatch Squadron, a High Readiness Army unit based at RAF Lyneham, remains on standby at Kandahar in case weapons are needed.

The principal task of the Hercules force is to airlift troops and supplies into and around Helmand province and into the force’s main troop base, Camp Bastion, in the middle of Afghanistan’s volatile poppy-growing region. Hercules crews also support the UK 16 Air Assault Brigade by helping to provide airdrops, if required, for the thirty-five nation, NATO-led International Security Assistance Force, or ISAF, and the US-led Operation Enduring Freedom coalition effort throughout Afghanistan.
TriStar Arrival

British troops arrive at Kabul International Airport, Afghanistan, on a Royal Air Force TriStar based at RAF Brize Norton. The passengers all don helmets and body armor as the wide-body jet begins its descent to Kabul, which is enclosed by snow-capped mountains, 6,000 feet above sea level. In good weather, the approach to Kabul is spectacular. In bad weather, the approach can be treacherous.

Kandahar Operations

RAF assets at Kandahar include two Hercules C. Mk. 3 (C-130K) and two C. Mk. 4 (C-130J) tactical transports, six Chinook C.2 support helicopters, and six Harrier GR.7A attack jets. These aircraft are supplemented by eight British Army Air Corps Apache AH Mk. 1 attack helicopters and four Lynx AH Mk. 9 support helicopters. The assets are part of the UK 904th Expeditionary Air Wing.
Kabul Crossroads

A variety of Hercules transports, like this Safair L-100-30, appear often on the ramp at Kabul. Some of the 4,500-strong UK force will be based at Camp Souter, the RAF headquarters on the outskirts of Kabul, but most will be deployed to Helmand Task Force headquarters at Kandahar Airfield, some 200 miles to the southeast. Kabul is considered a crossroads in Afghanistan.

One Day At Work

The RAF aircraft, aircrews, and ground crews in Afghanistan are heavily tasked, as this photo attests to one recent day’s operations. The workday began when an RAF Hercules C.4 (C-130J) took off from Kandahar in support of an ISAF mission. The aircraft carried a pallet of stores and a Swedish general and his staff. The first destination for the Super Hercules was Maimana, to support an ISAF Provincial Reconstruction Team based in the northern Faryab province close to the Afghanistan border with Turkmenistan. After a one-hour transit, flying over snow-covered peaks and deep sandstone canyons, the C-130J crew swerved to approach the short dirt airstrip at Maimana, 2,800 feet above sea level.
The pallet was offloaded with aircraft engines running. Norwegian medics came on board with a late request for the two loadmasters to rig a stretcher in the cabin. A five-year-old Afghan boy accompanied by his father and a Norwegian doctor was then carefully carried on board. The boy, suffering from a serious head injury, had been in a coma for several days before the doctor found the child in a remote village. After a full power takeoff from the short strip, the Hercules crew took off for Mazar-e-Sharif in the northern Balkh province near the Uzbekistan border.

Lt. Gen. Marco Del Vecchio, then commander of ISAF, boarded the aircraft in Mazar-e-Sharif. Accompanying him was the German ambassador to Afghanistan who was on his way to a meeting with Afghan’s President Hamid Karzai in Kabul. The ambassador was traveling with a squad of heavily armed German Special Forces.

The Super Hercules’ next scheduled destination was Konduz, 100 miles to the east. However, Vecchio requested that he and his troops be flown directly to Herat, more than one flight hour to the west. As air traffic control communications are unreliable in many parts of Afghanistan, the Hercules captain used his satellite mobile phone to call the UK Ministry of Defence for permission to change the flight plan. Permission was immediately granted.

Having delivered the Italian troop to Herat, fifty miles from the Afghanistan border with Iran, the crew took off for the last leg to Kabul. The C-130J dropped below the cloud cover to touch down after this ninety-minute transit flight. The two-man crew had been in the cockpit for almost six hours flying through weather ranging from heat and high winds to heavy rain and limited visibility. At no time did the crew shut down the C-130J engines. The RAF loadmasters accommodated troops from six different nations as well as one Afghan casualty... all in a day’s work for the RAF C-130J and its experienced aircrew.

David Oliver is the editor of Jane’s Helicopter Markets and Systems and was the founding editor of AirForces Monthly. This is his first article for Code One.
With a twinkle in his eye and a smile on his face, the man perched at the workshop bench selects a tool from the dozens strewn about and puts the final touches on a small F-35 model. Geppetto? Santa Claus? He may feel that way some days, but make no mistake—this workshop is all about the airplanes.

Located in Fort Worth, Texas, the workshop is home to the Lockheed Martin Engineering Concept Models and Exhibits team. An interesting bunch, the models and exhibits team members have backgrounds in engineering, industrial design, electronics, and fine arts, among other disciplines. Despite their varied areas of expertise, they all share a passion for aviation and modeling.

“Most of the people who work in this shop have said at one point or another, 'I can't believe I get paid to build models,'” says design engineer Tom Blakeney. “What we do here is kind of like what the Imagineers do at Disney...though I think we're a little more engineer than Imagineer.”

Blakeney’s colleagues agree. “There’s something in the atmosphere here,” explains Richard Adams, senior technical lead for the group and self-proclaimed sole nonmodeler. “And it’s not just the smell of modeling cement!

“These guys wake up in the morning and start reading about models. Then they come here and work on models. When they take their coffee break, they’re researching models. When they’re eating lunch, they catch up on the latest news about models. And then they go home and build models for fun. While none of them would make this claim, I think many would consider them the best in the world.”

Blakeney grins at this description. “Yes, I guess you could say some of us are fanatics.”

BEYOND THE LITTLE ROOM

The model shop began as a one-man show in the late 1950s, when an engineer in the Advanced Design group was asked to build wooden concept models so that his teammates could see their aircraft designs in three dimensions. His models became so popular that by the 1970s, the company began using the models in air shows as marketing tools. Today the team is thirty-three people strong, consisting of three subteams: presentation models, engineering concept models, and air shows and exhibits models.

Only a few people still work in what they affectionately call “the little room,” the place where it all began. Many of them have moved to a larger shop above the factory floor, while the air shows and exhibits team, which includes Adams, work at an off-site location about two miles from the...
factory. The scattered locations are a testament to the team’s literally ever-growing success.

“The air shows and exhibits part of the team oversees all domestic and international trade shows for Lockheed Martin Corporation, so their work takes up quite a bit of space,” explains Fred Samudio, head of the models and exhibits group. “Many of these team members travel around the world to construct interactive displays that tell the story of these aircraft and that show off their teammates’ models.”

That’s not to say the engineering concept model and presentation model groups don’t have a good time, too. The engineering concept model team members design, create, and manage three-dimensional real-time studies and assessments. They assist engineers in finding economical solutions to aircraft design issues, from low-speed wind-tunnel test aids to representations of advanced concept designs. The group claims these aids represent the dirty work.

“In other words, we help engineers figure out, ‘Is my wild-hair idea nuts, or is this something we can pursue?’” explains design engineer Doug Thompson.

Members of the presentation models group, meanwhile, design, create, and manage aircraft scale models for mechanical, structural, and concept studies as well as for displays. These models are often used by business development representatives in presentations across the globe. When the model is complex, like the full-scale F-35 model, or a moving, working STOVL F-35 transitional model, a model team member often travels with it to ensure all goes according to plan.

LIGHTNING II: A MODEL SUCCESS STORY

In fact, the full-scale and transitional models are just two examples of how the F-35 Lightning II has been a model success story. From as early as the conceptual stages, the model and exhibits group has been actively involved in the F-35 program.

With rapid advances in technology plus a wealth of lessons learned from legacy programs, the Lockheed Martin team relied on computers to design and test the F-35. Still, a computer cannot always provide all the answers—especially when it comes to living and working in a three-dimensional world.

Throughout the design phases of the program, the F-35 design engineers consulted the concept models team on issues related to the spatial depth of the aircraft. The model team responded with a variety of creative, low-cost design aids, including a full-scale cockpit replica with an actual Martin-Baker ejection seat.

“The F-35 Pilot Vehicle Interface team routinely requires pilot and cockpit ergonomic design studies, sometimes within a day,” explains Samudio. “To help them with those studies, the model team created a design aid composed of three-dimensional cockpit components representing the size, shapes, and materials of the actual cockpit.”

The model can be modified easily and quickly for tests. It has been used for a variety of studies, including fit check, pilot visibility, instrument orientation, controls and panels accessibility, seat ergonomics, and cooling air flow. Since it was built in 2002, Jon Beesley, the F-35 chief test pilot has used the design aid to assess ergonomics numerous times.
The running joke among the model team is that the full-scale model is routinely mistaken for the real thing. That’s why Adams calls it the “ambassador to the world.”

So far, the full-scale model has gone to more than fifty shows and events, including the commissioning of the USS Ronald Reagan and several Paris and Farnborough International Airshows. “Until the first real airplane takes off, this model is the F-35 that the world knows,” says Adams. “It’s as close to reality as it can get.”

In fact, the demand for such an ambassador was so high that the model team created a second full-scale model. Aptly nicknamed Number 2, this model is more complex than the first because it can be broken down for easy shipping overseas. The first full-scale model, Number 1, now serves primarily as a domestic ambassador. Regardless of which model people see, their reaction is usually one of awe.

The models that come out of this shop aren’t just full scale, however. The group makes about seven different scales of models, ranging from full scale to 1/72nd scale, where one inch on the model equals six feet on the real thing.

“Right now, we build models for all LM Aeronautics programs,” says Blakeney. “We also build models for other Lockheed Martin programs, such as advanced concept designs, submarines, and the new presidential helicopter.”

Dozens of models are on display throughout the Fort Worth factory, beginning with the 1/5th-scale models of the F-16, F-22, and F-35 at the entranceway to the countless models displayed proudly in offices and conference rooms throughout the company. Still, not all of the models are for show. The company has an entire room filled with 1/72nd-scale models that allow customers to see how aircraft fit and function on aircraft carriers.

While the designs for all of the models originate in house, production for many of the 1/72nd-scale models is completed by partner organizations. Samudio explains that the model and exhibits group approaches its work as an independent business would and practices lean work initiatives whenever possible. He estimates that the group produces 4,000 to 6,000 1/72nd-scale models a year, but says those are just one small element of their work.
WORTH TEN THOUSAND WORDS

Show models fall somewhere between the full-scale models and the 1/72nd-scale models. One of the most impressive show models the team has built to date is the F-35B short takeoff/vertical landing, or STOVL, transitional model. A 1/10th-scale model, this work of art contains more than three dozen moving parts and performs a two-minute flight demonstration.

“The process this aircraft has to go through to land vertically is difficult to explain in words,” says Adams. “So the group devised a way to explain it with a moving model.”

Although the task was daunting at first glance, the team relished the challenge.

“We first built a model that had no moving parts,” explains Blakeney. “Then, we worked from the tooling to build a model with moving parts, and we developed proprietary software that allows us to control the model movements through a laptop computer.”

“The challenge with the STOVL model, like many of our projects, is that it’s not intuitive,” adds Thompson. “We were working from a concept. All of this work was done before we won the contract. I think the moving model played a role in Lockheed Martin’s win.”

The final product, which moves vertically along a pole, replicates all the motions that the real aircraft performs. During the two-minute demonstration, it performs hundreds of functions, including opening doors, deploying flaps and lift fans, and retracting landing gear. The pilot moves, too. This display even has its own soundtrack.

“Before the X-35B performed these functions in real life, people didn’t have a clear concept of how our STOVL version of the JSF was going to look or work,” says Samudio. “The model, which was completed several years before the X-35B flew vertically, gave customers an excellent preview.”

Or as Blakeney likes to put it, “Hey, if a picture is worth a thousand words, a model is worth ten thousand.”

Kimberly Jaindl is in the communications leadership development program at Lockheed Martin.

“BEFORE THE X-35B PERFORMED THESE FUNCTIONS IN REAL LIFE, PEOPLE DIDN’T HAVE A CLEAR CONCEPT OF HOW OUR STOVL VERSION OF THE JSF WAS GOING TO LOOK OR WORK. THE MODEL, WHICH WAS COMPLETED SEVERAL YEARS BEFORE THE X-35B FLEW VERTICALLY, GAVE CUSTOMERS AN EXCELLENT PREVIEW.”

– Fred Samudio
The F-16 added a battering ram to its quiver in August when the 55th Fighter Squadron from Shaw AFB, South Carolina, launched the AGM-158 Joint Air-to-Surface Standoff Missile. These missiles, better known as JASSMs, were launched from two Fighting Falcons from the 55th at Combat Hammer exercises at Hill AFB, Utah.

“This is a first for the F-16 community,” noted Lt. Col. David Lujan, commander of the 86th Fighter Weapons Squadron in charge of the exercise. “The F-16 now has a cruise missile capability.”

“Having the JASSM in the F-16 arsenal is key to the flexibility for combined force commanders,” added Lt. Col. David Hathaway, commander of the 55th FS and one of the two F-16 pilots to drop a JASSM in the exercise. “The JASSM gives us the ability to conduct suppression of enemy air defense missions at standoff distances or, better yet, negates the need for these missions during surgical strikes to take down high-value targets.”

The JASSM, built by Lockheed Martin in Troy, Alabama, is the world’s stealthiest conventional cruise missile. The 2,000-pound class weapon has deployable wings and is powered by a small Teledyne Continental Motors jet engine that allows it to cruise autonomously. It uses a state-of-the-art infrared seeker in addition to the enhanced digital anti-jam global positioning system receiver to find specific aimpoints on targets in adverse weather, day or night. A stealthy airframe makes it extremely difficult for air defense systems to engage.

The JASSMs launched at Hill have a range of more than 200 nautical miles. An extended-range version under development, called JASSM-ER, has a range exceeding 500 nautical miles. The launches at Combat Hammer are the first time an operational F-16 unit has ever employed JASSM. Likewise, JASSM is the first cruise missile ever released from an F-16.

Eight JASSMs were launched during the exercise. One JASSM was delivered from each of the two F-16s from the 55th FS. The other six missiles were delivered from B-52s from the 23rd Bomber Squadron, Minot AFB, North Dakota; B-1Bs from the 37th Bomber Squadron, Ellsworth AFB, South Dakota; and B-2s from the 393rd Bomber Squadron, Whiteman AFB, Missouri. Each unit sent two aircraft, each aircraft launching one JASSM. While the F-16s took off from and returned to Hill AFB during the exercise, the bombers flew
to the Utah range from their home bases, released their missiles, then returned to their home bases.

The JASSM launches capped the last week of a busy three-week Combat Hammer exercise. This session included A-10 Warthogs from the 103rd Fighter Squadron at NAS JRB Willow Grove, Pennsylvania; F-15E Strike Eagles from the 336th Fighter Squadron from Seymour Johnson AFB, North Carolina; F-22 Raptors from the 422nd Test and Evaluation Squadron from Nellis AFB, Nevada; MQ-1 Predators from the 15th Reconnaissance Squadron from Creech AFB, Nevada; and additional F-16s from the 510th Fighter Squadron from Aviano AB, Italy.

Combat Hammer is the US Air Force formal program for evaluating the operational effectiveness of precision-guided munitions. These highly scrutinized bomb dropping and missile firing sessions, also known as air-to-ground Weapon System Evaluation Programs, or WSEPs, are conducted at two locations: the Utah Test and Training Range near Hill AFB and the range complex surrounding Eglin AFB, Florida.

Responsibility for Combat Hammer falls under the 86th Fighter Weapons Squadron at Eglin. The unit provides a cradle-to-grave assessment of all of the precision-guided weapons in the Air Force. Members assess the effectiveness and suitability of these weapons through realistic and tactical scenarios—from the time the bomb is built through the moment the bomb impacts.

The latest exercise involved more than 100 total weapons, which included AGM-65 Maverick missiles, Wind-Corrected Munitions Dispensers, GBU-31 Joint Direct Attack Munitions, GBU-10 2,000-pound laser-guided bombs, GBU-12 500-pound laser-guided bombs, AGM-114 Hellfire missiles, and AGM-88 High-Speed Anti-Radiation Missiles.

Aside from dropping two JASSMs, F-16 pilots from the 55th also dropped JDAMs and WCMDs and launched HARMs. “Combat Hammer is part of an evaluation program to validate our squadron training, weapons loaders, maintainers, aircraft systems, and weapons,” explained Hathaway, 55th FS commander. “We employed more than $8.5 million in air-to-ground weapons, including JASSMs, HARMs, JDAMs, Sensor-Fused Weapons, and Combined Effects Munitions. All the weapons were employed in combat scenarios with both air-to-air and surface-to-air threats.”

“This is also the first time for one-third of the pilots in the 55th Fighter Squadron to drop these bombs,” added Lt. Col. Tom Littleton, director of operations for the 55th. “It is a rare operation. Pilots may get only two of these types of deployments in their entire career.”

“Employing JASSMs from four different weapons systems was the culmination of bringing the JASSM into the operational world,” added Lujan. “The capability our combatant commanders now have with the JASSM is immense. The Air Force now is fully operational with a ‘knock the door down’ standoff weapon. We bring such newly fielded weapons to Combat Hammer to polish and perfect our concepts of operations. While we demonstrated the capability of the JASSM to destroy difficult targets, we also proved the entire concept of the weapon system—from mission planning to target impact. This exercise proved that crews in the B-52, F-16, B-1, and B-2 are ready for the challenge of employing JASSMs if called to do so.”

Eric Hehs is the editor of Code One.
F-35 Basing
The US Air Force announced four initial operational locations for the F-35 Lightning II on 4 October: Hill AFB, Utah; Kadena AB, Japan; Shaw AFB, South Carolina; and McEntire ANGS, South Carolina. The Air Force will now begin the environmental study analysis process, which could take up to two years. These bases join the previously announced locations for the F-35 at Edwards AFB, California, and NAS Patuxent River, Maryland, for flight test; Nellis AFB, Nevada, for tactics development; and Eglin AFB, Florida, for maintenance and flight training. The Air Force is expected to start taking delivery of the F-35A in 2009.

2,300th Hercules Rolls Out
The 2,300th production Hercules came off the assembly line at Lockheed Martin in Marietta, Georgia, on 4 October. The milestone aircraft, a KC-130J Super Hercules tanker, was delivered to VMGR-352 at MCAS Miramar, California, in late November. This delivery marks the second time the Marine Corps received a milestone Hercules—the 1,800th aircraft, a KC-130R tanker. The Hercules is flown by sixty-four countries. More than seventy variants have been developed. The C-130J combat delivery and KC-130J tanker models of the Super Hercules are the latest variants to come off the longest continuously operating military aircraft assembly line in history.

Second C-5M Flown
The second fully modernized C-5M Super Galaxy test aircraft was flown for the first time 17 November from Dobbins ARB in Marietta, Georgia. The C-5M is the second of three aircraft that will comprise the C-5M test fleet. The aircraft will be used mostly for utilities and subsystem tests, airfield performance, and diagnostics testing. The C-5M upgrade includes avionics modernization along with reliability enhancement and re-engining. The first test aircraft has logged more than fifty flight hours since first flight in June 2006. Both of these test aircraft were originally C-5B models. A third test aircraft, a C-5A, is currently in the final stages of modernization.

F-16s Arrive In Poland
The first four Advanced Block 52 F-16 Fighting Falcons acquired by the Polish Air Force arrived at their new home at Poznan-Krzesiny Air Base on 9 November. Dignitaries at the arrival included the president of Poland, the minister of national defense, the commander of the Polish Air Force, the US ambassador to Poland, and the commander of US Air Forces in Europe. The arrival event included a blessing of the aircraft and a consecration ceremony. To prepare for the arrival of their new aircraft, Polish pilots and maintainers trained with the 162nd Fighter Wing of the Arizona Air National Guard in Tucson. Forty-eight F-16s will be delivered to Poland under the Peace Sky foreign military sales program.
**Raptor 5K Hours**

The 43rd Fighter Squadron at Tyndall AFB, Florida—the F-22 Raptor schoolhouse—reached the 5,000-flying-hour mark collectively on 20 September. Tyndall is the second base to achieve the 5,000-hour milestone with the Raptor. The Air Force Flight Test Center at Edwards AFB, California, was the first. The first local sortie for the Raptor at Tyndall took place 31 October 2003. The 43rd has increased its annual flying hours every year since. In fiscal year 2006, the 43rd F-22s spent 2,770 hours airborne for a fifty percent increase over FY05. Since standing up as the only F-22 flying training squadron, the 43rd FS has produced seventy-four F-22 pilots.

**Associate Unit In Reverse**

The 30th Airlift Squadron became the first active duty associate squadron earlier this year, marking a groundbreaking partnership between Air Mobility Command and the Wyoming Air National Guard. Under the active duty associate concept, the 30th AS will be the first active duty air mobility squadron to report operationally to an Air National Guard unit. The 153rd Airlift Wing, the Guard unit at Cheyenne Municipal Airport, provides operational support to the 30th AS. The two units share C-130H aircraft. Administratively, the 30th AS reports to the 463rd Airlift Group at Little Rock AFB, Arkansas, which provides funding, equipment, and personnel. The active duty associate concept at Cheyenne resulted from a Base Realignment and Closure Commission recommendation.

**Reserve Associate Expansion At Shaw**

Air Force Reserve Command will expand its associate presence at the 20th Fighter Wing at Shaw AFB, South Carolina, by adding additional F-16 pilots in FY08. The development of such associate units began in March 1997, when a dozen reservists worked with the 20th FW as a detachment. The success of that program led to the signing of an agreement in April 2003 by the commanders of ACC and AFRC to establish associate units at ACC F-16 and F-15 bases, including establishing a second unit at Shaw. Under the classic associate concept, the active duty unit will retain principal responsibility for its equipment. The Reserve unit will share in operating and maintaining the equipment.

**First Graduates**

The new C-5 Galaxy schoolhouse at Kelly Field, Lackland AFB, Texas, graduated its first class on 20 October. The first to complete their practical flight training at the new C-5 Galaxy Formal Training Unit Complex are 1st Lt. Paul Sloan, Air National Guard; 2nd Lt. Blair Preston, Air Force Reserve; and SrA Raymond Montanino, active duty. They completed their initial classroom training at the old C-5 schoolhouse at Altus AFB, Oklahoma. Students are transferring from Altus to Lackland for Galaxy training in twenty-five percent increments each quarter. By the end of FY07, all C-5 aircrew students will receive their ground and air training from the 433rd Airlift Wing of the Air Force Reserve Command at Lackland.
RATTLRS Tests
Penetrator warhead sled tests of the Revolutionary Approach To Time-critical Long Range Strike, or RATTLRS, were successfully completed at Holloman AFB, New Mexico, in mid October. During the tests, a simulated nose and inlet structure of an air-breathing cruise missile was tested against hardened bunkers. The airframe was accelerated to supersonic speeds greater than Mach 2. The warhead penetrated cleanly and completely through concrete barriers. Recovered hardware showed that the warhead remained structurally intact. This testing validates that lightweight penetrator warheads, when coupled with high-speed vehicles, provide the same depth of significantly heavier penetrators. Lockheed Martin and Allison are developing RATTLRS, a supersonic missile flight demonstrator. The sled tests are part of the development effort.

Netherlands Continues F-35 Participation
Netherlands became the first of the partner nations on 15 November to extend its participation into the production and support phase of the F-35 Lightning II fighter program. The agreement, called the Production, Sustainment, and Follow-On Development Memorandum of Understanding, extends cooperation in the program beyond the program’s current system development and demonstration phase. Netherlands has been involved in the JSF program since 1997. Several other F-35 partner nations are expected to sign the MOU by the end of the year.

Super Hercules Upgrades
Lockheed Martin signed a contract in October to upgrade and enhance the capabilities of the C-130J transports flown by the four international Super Hercules operators: United Kingdom, Australia, Italy, and Denmark. This contract will allow those countries to benefit from a joint program that represents a significant milestone in international cooperation on a major weapon system. The program, known as Block 6.1, will include seven major upgrades to the C-130J aircraft and its avionics systems. This block upgrade program allows multiple nations to acquire enhanced capabilities while sharing costs and collaborating on development, design, test, and integration. The program also allows the operators to set the time frame to field the increased capabilities.

Air Force Memorial Dedicated
The US Air Force Memorial was dedicated on 14 October in ceremonies at Arlington, Virginia, near the Pentagon. Attendees included President George W. Bush, military leaders, medal-of-honor recipients, political and business representatives, and thousands of airmen and ordinary citizens. Aircraft ranging from World War I biplanes to current stealth bombers and fighters, including the F-22, flew over the memorial in chronological order. The ceremony ended with a demonstration from the Air Force Thunderbirds, who flew F-16s over the crowd before ending with the bomb-burst formation. That aerobatic formation inspired the design of the three aluminum spires of the memorial.
**Fifty Years On Ice**

An LC-130 Ski-Herk crew from the 109th Airlift Wing, the New York Air National Guard unit based at Stratton ANGB near Schenectady, touched down at the South Pole on 30 October to commemorate the first plane landing at the bottom of the world fifty years ago. The pilot of that historic flight to the South Pole on 31 October 1956, Navy Lt. Cmdr. Gus Shinn, landed a ski-equipped R4D-5 nicknamed Que Sera Sera. To commemorate the half-century anniversary, Maj. Carlyle Norman landed an LC-130H with radio callsign Skier 00 on an Operation Deep Freeze mission in support of the National Science Foundation at the South Pole. The 109th Airlift Wing is the only unit in the world to have the ski-equipped LC-130 aircraft.

**Combat Shadow Rescue**

Air National Guard from the 129th Rescue Wing at Moffett Federal Airfield, California, conducted a successful medical evacuation of a critically injured US citizen in La Paz, Mexico, on 24 October. The rescue team flew on an MC-130P Combat Shadow to provide assistance to the injured twenty-eight-year-old male who had been involved in an automobile accident in Mexico. The aircrew had to fly around tropical storm Paul as the medical crew provided life-saving medical aid during the 2,000-mile flight to Moffett. After the aircraft landed, the patient was transferred by ambulance to a hospital in Sunnyvale, California. This rescue brings the total number of people saved by the 129th RQW to 558.

**USAF C-130J IOC**

Air Mobility Command officials declared Initial Operational Capability for the C-130J Super Hercules on 14 October. IOC came after specific criteria were met, which included successfully completing qualification operational test and evaluation; fully equipping the first combat delivery squadron and successfully performing operational airland missions; and manning one squadron of trained aircrews and maintenance members to support the mission. AMC first deployed two Air National Guard C-130Js to Southwest Asia in December 2004. The deployment lasted until March 2005. The aircraft flew more than 1,380 hours, and its mission capable rate was more than ninety-three percent. Subsequently, four US Guard C-130Js have been continuously deployed to the AOR since June 2005, flying more than 7,800 hours and achieving an 84.2 percent mission capable rate.

**Nighthawk Anniversary**

Members of the F-117 community, past and present, were on hand at Holloman AFB, New Mexico, on 29 October to pay homage to the first operational stealth fighter as the twenty-fifth anniversary of the US Air Force Nighthawk was recognized. The F-117 has played a vital role in the Air Force since being introduced. It has seen service in Panama, Iraq, Afghanistan, and Bosnia. The last class of pilots graduated from the F-117 schoolhouse on 13 October. The F-117 is being phased out, and the 7th Fighter Squadron, which oversaw the school, was deactivated in December 2006.
Rich Crupi, a longtime aviation enthusiast from Hopkinsville, Kentucky, built this one-third scale F-117 Nighthawk model as a hobby. The aircraft is powered by a golf cart engine and has working lights and battery-operated canopy lift. Top speed is six mph. The cart is steered using the rudder pedals, while the stick functions as the accelerator. Crupi takes his replica to county fairs and local air shows. He has been invited to show it next year at the home of the full-scale Nighthawks, Holloman AFB, New Mexico, during the base air show. The cockpit is cramped, so the height limit for pilots is four feet ten inches, about the size of the average ten-year-old.

A Chapter Closed
The remains of 1st Lt. Shannon Estill, a P-38J pilot missing in action from World War II, were buried with full honors at Arlington National Cemetery on 10 October. Estill’s aircraft was struck by anti-aircraft fire 13 April 1945 over eastern Germany. Because the location of the crash was within the Russian-controlled sector of occupied Germany, the remains could not be recovered immediately after the war. A team from the Department of Defense’s Joint POW/MIA Accounting Command investigated a crash site near Elsnig in eastern Germany in 2003. Two years later, another JPAC team excavated the crash site and recovered the remains. The Armed Forces DNA Identification Laboratory used site evidence and mitochondrial DNA to identify the remains.

Mini-Stealth

Rich Crupi, a longtime aviation enthusiast from Hopkinsville, Kentucky, built this one-third scale F-117 Nighthawk model as a hobby. The aircraft is powered by a golf cart engine and has working lights and battery-operated canopy lift. Top speed is six mph. The cart is steered using the rudder pedals, while the stick functions as the accelerator. Crupi takes his replica to county fairs and local air shows. He has been invited to show it next year at the home of the full-scale Nighthawks, Holloman AFB, New Mexico, during the base air show. The cockpit is cramped, so the height limit for pilots is four feet ten inches, about the size of the average ten-year-old.

Minute Men
The 140th Fighter Wing at Buckley ANGB, Colorado, marked the fiftieth anniversary of the National Guard’s first and only federally recognized aerial demonstration team, the Minute Men, by repainting one of its F-16s in the scheme of the original F-86 Sabres flown by the team. The Minute Men began performing in 1947 with a solo pilot, Lt. Col. Walt Williams. Within a few years, that solo act grew to a four-aircraft precision team. Although the federal recognition lasted only three years, the Minute Men logged more than 1,135,000 flying miles during their brief official life while performing before more than three million people in eight countries. The F-16 will be repainted in standard colors in January 2007.

Jammin’
Aircrews in the 41st Expeditionary Electronic Combat Squadron have flown 5,000 combat hours in two years in support of the war on terrorism. The EC-130H Compass Call squadron has flown more than 940 sorties to support ground troops in Afghanistan. This milestone reflects the longest deployment in the squadron’s history. Compass Call, a modified version of the C-130 Hercules, provides electronic warfare protection to ground troops. The aircraft and its crew employ offensive counter-information and electronic attack capabilities in support of US and coalition tactical air, surface, and special operations forces. The 41st EECS has sustained a better than ninety-five percent mission capable rate.
**PACAF Raptor Rolled Out**

The first F-22 to be assigned to Pacific Air Forces was rolled out of the Lockheed Martin factory in Marietta, Georgia, on 16 October. The aircraft, the eighty-seventh F-22 to come off the assembly line, will be delivered to 90th Fighter Squadron at Elmendorf AFB, Alaska, in early 2007. The US Air Force will also stand up F-22 squadrons at Holloman AFB, New Mexico, and Hickam AFB, Hawaii, over the next two years.

**Viking Trap**

An S-3B Viking from the Topcats of Sea Control Squadron 31 (VS-31) lands on the flight deck of the nuclear-powered aircraft carrier USS John C. Stennis (CVN-74). Stennis and embarked Carrier Air Wing 9 (CVW-9) were participating in a Composite Training Unit Exercise, or COMPTUEX, off the coast of Southern California in early October.

**50k For Italy**

The Italian Air Force fleet of twenty-two C-130Js reached the 50,000-flight-hour milestone on 4 October. The accumulated time is equivalent to 2,083 consecutive flight days or 562 times around the world. Two million pounds of equipment and 100,000 passengers were moved over that span. The first Italian C-130J was delivered in August 2000, with the final aircraft delivered in December 2004. Italy was the first country to deploy the C-130J into combat.

**Parking P-3**

Aviation Machinist’s Mate Airman Mark Ruddy watches as his shipmate signals the pilot of a Patrol Squadron 16 (VP-16) P-3C Orion prior to takeoff in early October. Ruddy is training for the signaling duty. VP-16, homeported at NAS Jacksonville, Florida, is forward deployed at NAS Sigonella, Sicily.

**On Their Way**

Sailors from Mobile Inshore Undersea Warfare Unit 105 (MIUWU-105) board a C-5A from the 105th Airlift Wing at Stewart ANGB, New York, to deploy to the 5th Fleet area of responsibility in support of the global war on terrorism. The undersea warfare unit, based at Naval Weapon Station Seal Beach, California, spent several weeks in San Diego for training. MIUWU’s mission involves defending harbors and protecting high value assets.

**Crew Reunion**

The crew of a Coast Guard HC-130H Hercules that rescued ten members of a Navy P-3 crew that crashed twenty-eight years ago in the Pacific was honored 26 October for its heroic rescue. The crew was honored in ceremonies at CGAS Elizabeth City, North Carolina, the current home of Coast Guard 1500, the aircraft the crew was flying during that rescue.

**Coin Toss Flyby**

Four F-22 Raptor pilots from the 1st Fighter Wing at Langley AFB, Virginia, flew over FedEx Field in Landover, Maryland, on 5 November as Secretary of the US Air Force Michael W. Wynne officiated the coin toss for the NFL game between the Washington Redskins and the Dallas Cowboys. The flyover was just one of several activities that took place during US Air Force Appreciation Day at the game.

**Trailblazer Retires**

Lt. Col. Sharon Preszler, first female active duty F-16 pilot in the US Air Force, retired 13 October after a twenty-year career. She retired as the staff director for the 20th Fighter Wing at Shaw AFB, South Carolina. Preszler was commissioned in 1986 and became a navigator before learning to pilot C-21s. She was tapped to fly the Fighting Falcon in 1993. She later served as an F-16 instructor and then enforced no-fly zones as part of Operation Northern Watch over Iraq. She plans a second career as an airline pilot.

**Atlantic Strike**

Two F-16 Fighting Falcons take off from MacDill Air Force Base, Florida, on 24 October for a mission in the Atlantic Strike exercise. The fighters, from the 20th Fighter Wing at Shaw AFB, South Carolina, were at MacDill for the US Central Command bi-annual Atlantic Strike training event. Through realistic close-air support training, Atlantic Strike is designed to better prepare aircrews and Air Force joint tactical air controllers for deployments.