F-22 Deploys To Guam
F-35 Hover Pit Testing
C-130J To Norway And Ramstein
S-3 Viking Sunset
The Royal Netherlands Air Force F-16 demonstration team began the 2009 air show season in style with one of the most brilliant paint schemes ever sported by a Fighting Falcon. The team, based at Volkel AB near the town of Uden, includes personnel from 313 and 311 Squadrons. “One Team, One Task” is the motto of the RNLAF. The aircraft will appear in approximately thirty shows in 2009. For more information and photos, visit: www.f16demoteam.nl.
WHERE THE RAPTOR STARTS ITS DAY
Deployed F-22s Bolster US Presence On Guam

LIGHTNING SIGHT
F-35 Pilot’s Helmet Isn’t Science Fiction

THE NORSE GODDESSES
Norway Begins Operations With The C-130J

GOING VERTICAL
Hover Pit Testing Prepares F-35B For Ups And Downs

ON THE FAST TRACK
Ramstein AB Converts To The C-130J…Quickly

DOVER DELIVERY
C-5M Begins Operations

VIKING DEPARTURE
S-3 Retires From Navy Fleet Service

EVENTS
Where The Raptor Starts Its Day

BY ERIC HEHS

“Where America Starts Its Day.” This slogan, appearing on T-shirts sold in tourist shops all over Guam, highlights the island’s distinction as the westernmost US territory and, hence, where day first breaks on America. Guam’s proximity to Japan, about a two-hour flight south from Tokyo, makes it a popular destination for Japanese tourists, who can be seen wearing the aforementioned T-shirts at local beach resorts and outlet malls, where they take advantage of warm weather and favorable yen-to-dollar exchange rates. Location explains Guam’s attraction to Japanese tourists. Location also explains the reason military officials view the island as a strategic asset for the United States.

LOCATION, LOCATION, LOCATION

“Location and sovereignty,” stresses Brig. Gen. Philip Ruhlman, commander of the 36th Wing that operates from Andersen AFB, Missouri, sends B-2s. Approximately 300 personnel accompany each rotation. “This deployment is historic,” says Lt. Col. Orlando Sanchez, 90th FS commander. Sanchez flew one of the dozen Raptors in the initial group deployed from Andersen to Guam. “This is the first time the United States has deployed the B-2 and the F-22 to a forward base location together. The B-2 has been here before many times. F-22s came to Andersen from Elmendorf for the first time last July for about a week. But this is the first time both aircraft have operated together.”

The previous deployment of F-22s was to ensure that the 80th could fulfill obligations related to its initial operational capability, or IOC, status. The fighter squadron had to show that it could deploy and function as a fighter squadron. In the latest deployment, a four-month stint, the 90th is fulfilling a real world role as part of a theater security package. The F-22s were flown nonstop from Anchorage to Guam in a ten-hour flight. “Flying 4,000 miles from Anchorage to Guam made me appreciate the scope of the Pacific theater,” says Lt. Col. Chris Niemi, director of operations for the 90th. “The F-22s flew along the Kamchatka peninsula and then along the coast of Japan, our home, and on to Guam. “We kept busy during the flight refueling and keeping track of the nearest divert runways,” Niemi continues. “We came with three four-ship formations, and then we brought two more Raptors about a month later to maximize our sortie rates.” The pilots exercised as much as they could during the extended flight. “We can’t go up and wait down the side in an F-22, so we run the seat up and down several times during the long flight to stretch the legs,” explains Niemi.

“Deterrence didn’t go away with the Cold War,” Ruhlman says. “The bomber presence sends a strong message. It deters adversaries. It assures our allies.”

In addition to the bombers, the 36th Wing hosts a year-round expeditionary air refueling force provided by the Air National Guard or Air Force Reserve Command. “We have a substantial flying operation at Andersen,” Ruhlman explains. “This is not Sleepy Hollow.”

The continuous bomber and tanker presence on Guam has been supplemented more recently by regular fighter deployments called theater security packages. “The theater security package is a Pacific Command initiative,” Ruhlman continues. “Up to nine months out of the year, we are going to have US Air Force or US Navy fighters here to augment our continuous bomber presence on the island.”

RAPTORS DEPLOY

The fighter role was elevated from non-steady fourth generation to stealthy fifth generation in January 2009 when twelve Raptors from the 90th Fighter Squadron at Elmendorf AFB, Alaska, landed at Andersen. Initially, the F-22s from the 90th were deployed with B-52s from Minot AFB. With the arrival of B-2s in April, the Air Force’s premier stealth assets were working together for the first time at a forward deployed operating base.

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GROUND PHOTOS BY KATSUHIKO TOKUNAGA
AIR-TO-AIR PHOTOS BY MSGT. KEVIN GRUENWALD
"All of the jets have held up quite well," explains Capt. Mary Lent, maintenance chief for the 90th. "We have had a few flight control issues. But other than that, maintenance has been fairly routine." Aircraft take about one week to acclimate to a new environment. The F-22 is no different from any other fighter going between climate extremes of cold Alaska to warm tropics. "The low-observable coatings require a little more maintenance because of the tropical environment," Lent adds. "So we rinse the F-22 with clear water daily to prevent corrosion.

"The operational tempo here is about the same as Alaska," Lent continues. "The nice weather is conducive to hot pit refueling." Hot pit refueling involves flying a mission and then refueling the aircraft on the ground without shutting down the engine. Because pilots don’t exit the aircraft during hot pit refueling, the technique allows them to fly two missions in rapid succession. Maintenance crews can hot pit refuel eight F-22s in less than one hour. "Cold temperatures at Elmendorf make hot pit refueling difficult between November and March," explains Lent.

The 90th brought its entire maintenance team to Guam. Many are fairly new to the squadron and to the F-22. "They are getting a lot of hands-on experience here," says Lent. "I am immensely proud of their performance. These are some of the best maintainers I’ve worked with. Further, they are generating some excellent sortie rates."

"We have done phenomenally," adds Sanchez. "We have lost no flights to weather. Flying can be such a struggle in Alaska regardless of the airplane."

The 90th brought about 250 personnel, including twenty pilots, four of whom are Reservists. About a dozen Reservists are supporting the maintenance side as well.

"The airfield at Andersen is not quite as busy as the airfield at Elmendorf," Sanchez explains. "We have more competition for resources at home. We face the other F-22 squadron, an F-15 squadron, C-17s, and AWACS—all competing for the runway and airspace." Flight schedules at Andersen can be more flexible allowing the pilots to fly day and night missions. "We typically fly seven or eight jets, hot pit refuel, and fly seven or eight again," continues Sanchez. "Then we fly once again in the afternoon. With that process, we get twenty or more sorties some days."

The difference between two stealth platforms working together and one stealth platform working with non-stealth platforms is significant, according to Sanchez. "We have a much greater ability to project power into denied access environments," he says. "We magnify the B-2’s capabilities, and it magnifies ours. The B-2 carries a lot of ordnance to the fight. The F-22 offers speed, sensors, and agility. These two platforms will likely work together in future contingencies, so this experience may prove invaluable."
**MIXING IT UP**

The 90th also got the chance to work with the B-52 Stratofortresses before those bombers redeployed to Minot. “In a higher-threat scenario, the B-52 can be a real challenge to defend,” says Sanchez. “They are much larger and have less ability to defend themselves. The tactics we use for the B-2 and the B-52 bombers are not the same.”

Raptor pilots are also getting exposed to other assets in the theater. “We flew with F/A-18Es from VFA-27 last week,” says Capt. Patrick Williams, a pilot with the 90th. “That was my first time to fly with Super Hornets. The experience was a great opportunity to share tactics and capabilities. It was also a great opportunity to share techniques for working together.”

“Some Navy pilots have had some experience with the Raptor,” adds Niemi. “One pilot with VFA-27 flew with the F-22 at China Lake. But this deployment is the first time I escorted Super Hornets. We focused on joint integration. We also acted as Red air for the Navy Hornets or they played Red air for us. The Navy is starting to understand what we can do.”

“The Navy rolls through Guam with an entire carrier group,” Niemi continues. “We don’t get carrier groups at Elmendorf. The experience working with a carrier group is worth its weight in gold. We may deploy somewhere and fight in the future with a unit that has never flown with us. So this experience exposes us to the questions we may face when we have to bring another fighter unit up to speed on our capabilities and the best way to coordinate missions with them.”

**JUST VISITING**

Bringing units up to speed is the name of the game at Andersen as the base has no permanently assigned Air Force flying units. “My biggest challenge is to learn all the missions of the various aircraft as they come through Andersen,” explains Col. Tod Fingal, commander of the 36th Operations Group at Andersen AFB. Fingal, who took over the operations group three weeks before the Code One visit, deployed to Andersen in 2007 as part of a theater security package. At the time, he was with the 522nd Fighter Squadron from Cannon AFB, New Mexico. “We brought eighteen F-16s and stayed four and one-half months,” he recalls. “Now I am here for the long term as the operations group commander. Seeing the base from the deployed commander’s perspective certainly helps.”

The infrastructure at Andersen is growing to keep up with the base’s accelerating operational tempo. That tempo may never reach the levels seen during World War II, when twenty-four squadrons of B-29s were stationed at Andersen. Or reach the activity during the Vietnam War, when more than 100 B-52s filled the ramps for Operations Linebacker and Arc Light.

“We are receiving funding to build facilities to meet our latest warfighting needs,” Fingal says. “We have several major projects under way. The south runway is under construction. The north runway was completed in 2007.”

Guam is all about those two huge 10,000-foot runways,” adds Ruhlman. “All we have is Hangar 1, a thoroughly modern hangar built to withstand typhoon season. In fact, everything built on the base has to withstand 170 mph winds and Category 4 earthquakes. Because of those requirements, construction that costs $1 in the United States costs $2.64 here.”

The base is also completing work on two new hangars to support the RQ-4 Global Hawk high-altitude UAVs that will be stationed at Andersen in early 2010. A lot of the improvements are designed to meet the needs of emerging technologies in the US Air Force. The deployment of stealth assets, as well as the investment in infrastructure, amplifies the island’s strategic significance.

“Andersen is a jewel in the Pacific,” says Col. Damian McCarthy, deputy commander of the 36th Wing. “We are strategically located. Our base structure is very flexible. Our prevailing winds allow pilots to take off over the water and immediately climb to the altitudes they need to train. We have great and patriotic hosts and excellent community support. Guam is a great place to host a lot of people and partners in the Pacific.”

Eric Hens is the editor of Code One.
The F-35 pilot’s helmet—with its glowing green eyes, bulbous shape, and carbon fiber construction—looks like something out of a sci-fi movie. And, in this case, the look actually fits.

"We have eliminated the need for a head-up display. Instead, the helmet connects the pilot to the airplane," says Jon Beesley, F-35 chief test pilot. "We’ve taken pieces that are essential for combat operations, such as targeting information, crucial flight measurements, and night vision capability, and merged them into the helmet to give the pilots more complete situational awareness."

The helmet-mounted display system, or HMDS, displays head-sterrollable symbology, meaning the pilot’s line of sight dictates the content that appears on the visor. As soon as, or even before, a pilot sees another aircraft in the distance, the system projects a marker on the visor to locate, identify, and track the aircraft. If the designated aircraft is determined to be hostile, the pilot can use the targeting info to cue weapons—without even displaying all the information needed should something go wrong. For example, it provides an alert and directs the pilot’s attention if there’s something nasty coming from the nose of the airplane while the pilot is looking somewhere else."

These HMDS capabilities apply to F-35 air-to-ground missions as well. Pilots can mark new target locations by simply looking, pointing, and clicking a designator on the sidestick as they fly by. Then the aircraft’s datalink system allows pilots to send the marked precise target coordinates quickly and easily to bombers and other combat aircraft in the same mission.

The F-35 helmet provides pilots a unique ability to see through their aircraft. Even though the helmet doesn’t come equipped with x-ray vision, the HMDS correlates images from a set of cameras, called the distributed aperture system, mounted on the outer surfaces of the jet. These cameras provide a constant 360-degree view of the aircraft’s surroundings. When a pilot looks down, the image of what is below the aircraft shows up on the HMDS. This feature is helpful not only in combat, but also during carrier and vertical night landings with the Navy and Marine variants, respectively.

Through a night vision camera built into the front of the helmet, the F-35 HMDS visor can also display flight and targeting information on top of night vision images. "No helmet provided the combination of night vision and symbology at the same time until now," explains Beesley. "With legacy systems, pilots have to choose between the two capabilities." This combination is a huge advantage for F-35 pilots because all night vision devices limit peripheral vision. The symbols help pilots interpret more of the environment than night vision capability alone.

For the display to correlate with what the pilot is looking, a magnetic field in the cockpit senses the direction the helmet is pointing. A transmitter on the helmet sends the magnetic flux as it moves in that field. "Most HMDS systems require pilots to go through an alignment process before each flight," explains Beesley. "They may have to realign the system several times during a flight because the systems can drift. This magnetic tracking system makes all the corrections itself, so that we pilots never have to adjust the alignment."

Additionally, the night vision camera and a day camera right next to it ensure that the images and symbology correctly represent the direction the pilot is looking. "The helmet cameras look out at all times, take a picture of the outside scene, and relate that image to other images from the fixed camera on the glareshield to make sure the line of sight is correct," says Perkins. "If the two images are even a little bit off, the system self-correction."

**EVOLUTION**

Flight display systems have evolved from the head-down displays of every fighter through Vietnam to the head-up system now used in the F-16 and many other modern fighters. However, no flight display system has achieved functioning HMDS capability to the level of the F-35 helmet. In the 1980s, engineers developed the Falcon Eye system for F-16—a project for which Beesley flew test flights. Falcon Eye was also head-sterrollable, with targeting and flight information symbology projected on the helmet display. However, imagery was analog with high latency, or lag times, in information transfer. Current F-16 pilots fly with digital imagery on the Joint Helmet-Mounted Cueing System, or JHMCS, but this system provides only targeting information and not the head-up display information pilots use for flying. "Providing that content was never a design goal for JHMCS," notes Beesley. "If we tried to put all the F-35 information we need on the JHMCS, the potential latency would be too great for it to be effective."

Advances in computer technology have significantly reduced latency of the content displayed on the F-35 HMDS. The HMDS currently exists in two forms. The first is a binocular system with optics that display images and symbology so that the right optic shines to the left eye and the left optic shines to the right eye. This bifurcated helmet is characterized by sharp, distinct edges down the center and around the perim-eter of the visor where curved surfaces come together. While the bifurcations...
The HMD connects two ways to the F-35 cockpit to provide power, symbols, images, oxygen, and communications to the pilot. The F-35 pilot must be able to understand all incoming communications, and friendly forces on the ground and in the air need to understand the HMD. The F-35 pilot’s head is used to position the optics to get the optimum image size.

To fit the visor, the pilot puts on the oxygen mask so that the visor can be hand-trimmed around it. “We have to hand-trim the visor because we don’t want to be leaving anything apart from its own fixings,” says Perkins. “Otherwise it will distort the image the pilot sees.” The gap between the visor and the oxygen mask should be small to allow a little bit of movement while pulling g’s. However, it also needs to fit closely enough to protect the pilot’s eyes from debris during ejections. “We are looking at a method to profile the face to quickly trim the visor to fit,” Perkins adds, “but right now the fit is done by hand.”

To test the fitting process, a group of four F-35 test pilots went to the United Kingdom and flew RAF Hawk T.1 Mk. 1A trainers with the displays in front of their eyes (not with the whole system). They flew at nine g’s to determine whether they would lose their exit pupils. “The results were very good,” Breesley says. “The pilots all had genuine success with keeping the display in the right position. We learned that the basic helmet capability and fit system is on the right track.”

As the Gen II system progresses alongside the F-35, more and more pilots will learn to fly with advanced HMD Capability. Beesley, a veteran pilot who has flown with HMD prototypes for more than twenty years, foresees no adaptation problems for new pilots, whether they’re fresh out of flight school or they’re transitioning from another fighter.

“At first we keep things easy because the helmet is new,” he says of the training process. “Pilots train some with the HMD in the simulator, but it falls short of what it’s like to really fly. One of the most challenging things I’ve heard is that, after they’ve flown for a while, pilots forget they’re flying with the symbols on their heads.”

Sydney Carroll is in the Communications Leadership Development program at Lockheed Martin.
It took a couple of tries, but Norwegian Defence Minister Anne-Grethe Strøm-Erichsen followed tradition and shattered a bottle of champagne on the forward fuselage jack pad of the Royal Norwegian Air Force’s first Super Hercules. The naming was the highlight of Norway’s official welcoming ceremony for the C-130J held 25 November 2008 at Gardermoen Air Station outside Oslo.

The sages tell us Frigg was beautiful and the most powerful of the goddesses. What better attributes can one wish for in a transport aircraft? I am convinced she will serve her country in an outstanding way. It is with honor and respect I christen our first C-130J transport, Frigg. I wish you and your crews a smooth and safe flight.”

A crowd of more than 300 people attended the ceremony, including US Ambassador to Norway Benson K. Whitney; Royal Norwegian Air Force Chief of Staff Maj. Gen. Stein Nodeland; and ranking officials from the Norwegian Ministry of Defence, the Norwegian Air Force, and the US government. Aircrew, maintainers, and family members from the air station were also in the audience.

Frigg— which is pronounced Freeg—is the first of four C-130Js that will be flown by 335 Squadron, whose lineage dates back to 1946. Initially equipped with Lockheed C-60 Lodestar transports, the squadron mostly flew logistics flights within Norway. The introduction of the C-119 Flying Boxcar in 1956 allowed Norwegian Air Force crews to assist in international relief operations in Europe, Asia, and Africa.

Since 1969, the squadron has flown six C-130 Super Es—basically late-model C-130Es equipped with the C-130H model’s upgraded T56-A-15 turbo-prop engines—logging more than 132,000 hours of flight time. Impressively, this operational legacy has come without a single mishap or major incident.

Over the past four decades, 335 Squadron has supported countless Norwegian, NATO, European Union, Open Skies Treaty, Arctic and Antarctic, aeromedical airlift, and humanitarian relief missions around the world. The aircraft have also been used to support search and rescue operations as well as Norwegian Special Operations missions. But despite meticulous maintenance, the Norwegian C-130Es had reached the end of their useful service lives.

“At the end of the day, we were forced to ground the aircraft,” says Oberst (Col.) Diederik Willem Kolff, commander of 135 Air Wing, the parent unit of 335 Squadron. “We couldn’t fly tactical missions. We did fly some transport missions, but eventually we even had to suspend those missions, as well.” The last operational mission for Norway’s C-130Es came in July 2008.

“We were extremely lucky to get the opportunity we did to get our C-130Js,” Kolff notes. “The US Air Force essentially allowed us to jump the queue to get new aircraft. It was a tremendous help to us. Otherwise, we would not have had a transport fleet.”

Delivery of the first C-130J to Gardermoen came only eighteen months after the US and Norwegian government representatives signed the contract. “My government’s decisive guidelines and quick political action paved the way for this speedy and efficient procurement,” Strom-Erichsen said. “It is, in fact, quite rare that a defense minister gives the go-ahead for a project of this magnitude and gets to be in position when the order is delivered.”

“The original six C-130s were named after the male gods, Odin, Tor (Thor), Balder, Frøy, Tyr, and Ægir,” Kolff notes. “The C-130Js will be named after the wives of four of them. Frigg is the wife of Odin, according to Norwegian mythology. She’s the first lady.”
a former Dutch F-16 exchange pilot who flew square kilometers in area," says Kolff, C-130 operations. "The base is only a AFB, Arizona, in early 2009. Regeneration Group at Davis-Monthan the 309th Aerospace Maintenance and last of Norway's E-models was retired to been donated to a local museum. The other squadrons had already been retired, and one had Norwegian F-16s. One of the squadron's Nanna, wife Haukås, chief of aircraft maintenance tenant to work," says Maj. Vida r harsh winters. of which allow the common hall, all necessary back shops, one for checks and necessary maintenance, such as aircraft engine changes; and one for washing or painting aircraft— with the supply section and all necessary back shops, such as avionics, propulsion, and systems conveniently located across a common hall, all of which allow the maintainers to stay indoors during the harsh winters.

"We wanted to make it easy for main- tenance to work," says Maj. Vidar Haukås, chief of aircraft maintenance at Gardermoen. "One of our main goals is efficiency. Manpower is expensive. We need low manpower and high efficiency."

The fourth hangar, which is glazed in at both ends, is for operational air- craft. "The Air Movements [aerial port] section is located right next to that hangar to make it convenient to load the cargo," notes Haukås. "An aircraft leaving on a mission will be parked and loaded in there. We don't use chemicals to deice the aircraft. Instead, the pro- pane heaters in the hangar melt the ice and snow. There is a drain system in the floor. In two hours, the aircraft is ready to go."

GETTING READY Preparations for the new aircraft began in earnest in 2008. "We sent our first pilots and loadmasters to the US Air Force's

"The unit will have an initial transport capability in the summer of 2009," Kolff says. "Then we'll start aircrew training in complex situations. We'll go to Red Flag. We'll fly a lot at night in the winter when it actually gets dark here. We'll start flying with night vision goggles, which is something completely new for us. We'll have an initial tactical capability with two aircraft and four crews by January 2010. We'll have full tactical capability in 2011." "We haven't done heavy equipment drops before, but we will do that in the J-model. That's a new capability for us," Solna observes. "With only four aircraft, what I think we'll see when we are in full operation is one aircraft in main- tenance, one in training, one for tasking, and one that's flexible for any tasking."

"With the J, we'll be doing more night flying and more special operations work," adds Haukås. "Maintenance will have to go to two shifts. The technicians are used to working day shift only. The crew chief would call in specialists if there was something he couldn't handle when an aircraft came in late. That will have to change." "These aircraft are not only essential for our air force— they are, in fact, essential for all the Norwegian armed forces," said Størmen-Erichsen. "Transport aircraft are of paramount importance for our military to have the neces- sary flexibility and deployability, especially for our troops on the ground. These new aircraft will play an even more vital role in supporting the complex operations of our spe- cial forces than the old ones did. It is my expectation that as soon as these aircraft are fully mission capable, they will be deployed to international operations."

"We plan to do the job we did with six aircraft with the four new aircraft," Kolff concludes. "We have seen what other nations have done with the J. We have large expectations for the goddesses."
HOVER PIT TESTING Prepares F-35B for First STOVL Mode Landing

BY MONICA KEEN

The F-35 hover pit may resemble an Olympic-size swimming pool, but this specially instrumented test structure at the F-35 factory in Fort Worth, Texas, holds no water and is covered with interlocking metal grates that span its surface. B-1, the Lockheed Martin designation for the first F-35B short takeoff/vertical landing, or STOVL, variant of the Lightning II, is attached to the top of a restraint system that supports the aircraft on the work surface of the aircraft. The instrumentation will be removed after testing is completed.

Design, development, manufacture, build, pretest, and testing of both the hover pit and the force and moment restraint system began five years ago. F-35 team partner BAE Systems developed the design of the actual pit using subscale wind tunnel models at its facility in Warton, UK, about 250 miles northwest of London.

“Hover pit testing is the only time engineers can measure and confirm the aircraft/engine interaction and the total system performance in a completely controlled setting,” says Richard Hoggarth, lead STOVL aerodynamics engineer for BAE Systems.

A significant portion of the latest round of hover pit testing consisted of force and moment testing. During the test, forces generated by the propulsion system are precisely sensed by three load cells that substitute for the aircraft’s landing gear tires. These cells measure forces in three axes. These force measurements are then resolved into forces that act along the thrust axes of the aircraft. Resulting pitch, roll, and yaw moments are then derived from this data.

The testing is recorded and required some adjustments to BF-1 before testing began. To prepare for the test, the aircraft was first taken to the hover pit where it was jacked up in the air to remove the wheels and brakes and to de-service and lock the landing gear. It was lifted by crane into the force and moment system. Special instrumentation added to the aircraft for the hover pit test collects environmental data created by the impact of the propulsion system exhaust on the work surface of the aircraft. Testing will be removed later this year.

“Restraining the aircraft over the hover pit allows us to conduct specific testing that couldn’t be conducted in flight,” Hoggarth says. “This testing also enables us to validate various aircraft/STOVL models that have been developed over years of work, both powered and unpowered aerodynamics, propulsion, performance, and in-flight thrust.”

“Before we do STOVL mode in flight, we have to make sure we have the performance out of the engine to support the airplane,” notes Doug Pearson, F-35 Integrated Test Force vice president. “But more importantly, we have to make sure that we can control the aircraft precisely.”

During testing, the aircraft simulates actual operational maneuvers, such as short takeoffs and vertical takeoffs, while being locked to the ground. The pilot in the cockpit inputs all commands either by directly using the normal cockpit inceptors or by selecting the built-in software routines to execute more complex maneuvers that are difficult to repeat to a high degree of fidelity. During these maneuvers, engineers take measurements to confirm the control authority needed for the pilot to fly the aircraft successfully.

“Everything has been tested with software models,” adds Mark Smith, Lockheed Martin F-35 Air Vehicle Lead for STOVL hover pit testing. “Pit testing is really a validation exercise for the modeling we’ve done.”
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For the F-35B pilot, converting from conventional to STOVL mode will be no more complicated than pushing a STOVL conversion button. The same button on a conventional takeoff and landing F-35 (an F-35A or F-35C) lowers the tail hook. “The button initiates a magical transformation,” says J.D. McFarlan, who leads the F-35 air vehicle development team.

This transformation, as McFarlan describes, includes the opening of all STOVL blast doors, and the propulsion system preparing to engage the clutch. Once all doors are open, the clutch is engaged when sets of carbon plates are pressed together to spin the lift fan up from a complete stop to engine speed. Once the speeds between lift fan and engine are matched, a mechanical lock is engaged to remove the torque load from the clutch and permit the electrical connection to be made. After the lock engages, the propulsion system completes conversion to STOVL mode. All doors and nozzles were deflected out of the exhaust section. Most other changes are automated, is a smooth transition for the pilot.

TESTING TYPES

Hover pit testing began in May 2008, during which time the aircraft operated at thirty percent power and converted to STOVL mode. All doors and nozzles were engaged during testing. The 2009 testing was more intense, focusing on force and moment testing, environmental testing, as well as on other types of tests. The most recent testing encompassed three segments of pit testing: open, partially plated, and fully plated testing.

In open pit testing, a ground plane was placed directly beneath the aircraft’s three-bearing swivel exhaust doors. The plane, which is instrumented with temperature sensors, measures heating characteristics where the main engine exhaust impinges on the surface beneath the aircraft. These data are used to characterize the heating effects of the engine’s exhaust on whatever surface the aircraft is sitting on, be it runway, taxiway, or ship deck.

In fully plated testing, the entire pit is covered with steel plates to simulate a solid surface. In this configuration, external instrumentation is mounted to the aircraft to measure surface heating from plumes rebounding off the solid surface and hitting the aircraft in the same manner that would occur during a vertical landing.

Arrays of acoustic and pressure sensors are arranged around the aircraft to measure sound levels and outwash from the jets. These data are used to characterize the environment around the aircraft during operation producing noise characteristics for ship-based operations. Testing is conducted for short periods at full power to simulate aircraft heating during a vertical landing or vertical takeoff, or VTO. During a typical VTO, the aircraft is twenty feet off the ground within five seconds of nominal thrust.

In open pit testing, the aircraft acts as if it were hovering fifty to one hundred feet above the ground surface.” says Smith. “By directing the exhaust away from the aircraft, the aircraft is able to endure long periods at full power with no exhaust effects to its surfaces. Deflecting the exhaust during hover mode is the primary reason we built the pit.”

“Open pit testing also allows us to conduct high-power propulsion runs with the lift fan engaged,” adds McFarlan. “The open pit will be used to conduct propulsion system checkouts, or functional checkouts, for every production STOVL airplane. These functional checkouts will verify the hover pit test on BF-1. It will be more like an engine run on the flight line.”

FULLY AND PARTIALLY PLATED PIT TESTING IS ASSOCIATED WITH ENVIRONMENTAL TESTING, WHICH HAS TWO PRIMARY OBJECTIVES. THE FIRST OBJECTIVE IS TO DEFINE THE WORKING ENVIRONMENT FOR THE PILOT.”

“Hover pit tests have since revealed that the aircraft is meeting all thrust requirements, demonstrating more than 41,000 pounds of vertical thrust, an amount more than necessary for robust STOVL operations. Additionally, hover pit testing has demonstrated low-power and high-power engagements of the clutch that transfers power from the engine to the vertical lift fan. The testing has also captured critical performance data, such as inlet pressure recovery, pitching moment, rolling and yawing moments, and the forces on six degrees of the exhaust, and control input response time.

We have demonstrated with tremendous confidence that we will meet the hover requirements with the installed thrust capability,” McFarlan continues. “We are confident we will meet our key performance parameter requirements for STOVL performance, and we will demonstrate those parameters this summer during the flight test program.”

The hover pit force and moment tests are used to demonstrate installed thrust capability, no more pit testing is required except for functional testing.

Hover pit testing is a key component for STOVL flight clearance,” says McFarlan. “All of this work eventually leads to a major program milestone—the first vertical landing.”

PHOTOS BY JOHN WILSON

PHOTOS BY TOM HARVEY

PHOTOS BY TOM HARRIS
The unit’s operational tempo is very high, as it has been for years. Among many 2008 high-fights, squadron crews flew 211 hours, and local community leaders, USAFE, host 86th Airlift Wing officials, and US Army bases where they will be used as ground trainers for paratroopers. A few aircraft, including the last E-model to come off the assembly line in 1972, will be transferred to the C-130 schoolhouse at Little Rock AFB, Arkansas, and continue in service. “Even as the E-models draw down, we will still obviously need to keep qualified crews to continue to fly missions and deploy,” says August. “But with the reduced crew requirement on the J-model, we will also need to work on finding good assignments for the E-model navigators and flight engineers. Our maintainers will also have to keep the E-models flying while facilitating the changeover to the C-130J.”

“The hard part of the transition is that we are getting a lot of C-130Js quickly, but the crew pipeline is only so big,” says Lt. Col. Craig Williams, director of operations for the 37th. “We sent an initial cadre of aircrew and loadmasters to Little Rock for transition training last fall. With the delivery of our first new aircraft, we now have fourteen loadmasters and eight pilots qualified to fly the J-model. We wanted to be in a position that, when we get a new aircraft, we’re able to use it.”

The 37th Airlift Squadron carried out its first C-130 training mission only two days after the first aircraft was delivered. “The squadron’s first J-model paratroop drop came on 7 May. To help the Blue Tail Flies convert to the new aircraft, the 143rd Airlift Wing, the Rhode Island Air National Guard unit at Quonset Point, deployed aircrew and one of its C-130Js to Germany. For the six weeks prior to the arrival of Ramstein’s first Super Hercules, J-qualified members of the 37th flew with the 143rd crews on missions, including flights to Bulgaria and Italy. “The Rhode Island Guard has really helped us,” notes August. “We got experience in operations, and our maintainers received hands-on experience with the C-130J as well.”

“We originally thought it would take eighteen months to complete this transition,” says Williams. “But we have all the pieces in place that we need to pull the squadron together and make this switch happen. And it will happen in thirteen months.”

Jeff Rhodes is the associate editor of Code One.
WITH GEN. ART LICHTHE, COMMANDER OF AIR MOBILITY COMMAND, AT THE CONTROLS, THE FIRST C-5M SUPER GALAXY TOUCHED DOWN AT DOVER AFB, DELAWARE, ON 9 FEBRUARY TO BEGIN A NEW CHAPTER IN C-5 OPERATIONS.

Lichte was joined on the delivery flight by John Young, Undersecretary of Defense for Acquisition, Technology, and Logistics, and by Sue Payton, Assistant Secretary of the Air Force for Acquisition. A flight crew consisting of Team Dover members from both the active duty 436th Airlift Wing and Air Force Reserve Command’s 512th Airlift Wing flew the aircraft from Lockheed Martin in Marietta, Georgia, to Dover. A host of dignitaries, including Lt. Gen. Charles Stenner, Chief of the Air Force Reserve; the entire Delaware Congressional delegation; and local civic leaders looked on as the fully modernized C-5M, nicknamed Spirit of Global Reach, was taxied in. Greeting the aircraft were four members of the now-retired crew that had delivered the first C-5A to Dover nearly thirty-eight years ago.

In his remarks, Col. Manson Morris, commander of the 512th AW, noted, “Today we see the fruits of a long-term effort by thousands of personnel to develop an airlifter with greater strategic capability than any of its predecessors.” The Super Galaxy is the result of the two-phase C-5 modernization effort. The first phase is the ongoing Avionics Modernization Program, or AMP, that is more than forty percent completed. All 111 aircraft in the C-5 fleet are scheduled to receive the AMP modifications, with deliveries completed in 2014. AMP provides new glass cockpit displays and a digital backbone to support the second phase of the C-5 upgrade, the Reliability Enhancement and Re-engineing Program, or RERP. Once a C-5 receives both the AMP and RERP upgrades, the aircraft is redesignated C-5M.

AMP reached initial operational capability with the Air Force in February 2007. As of February 2009, the AMP-modified C-5s have logged more than 50,000 operational flight hours on missions around the world. AMP installations are being completed on two separate modification lines, one at Dover and one at Travis AFB, California. The last AMP-modified C-5B is scheduled to be delivered in September 2009.

Developmental flight testing on the three C-5M test aircraft was completed on 16 August 2008 after a two-year flight test program. The 403-flight, 1,037-flight-hour test program included verification of the more than seventy performance and reliability enhancements to the aircraft’s new utilities and subsystems, flight controls, airframe, and propulsion system. Flight testing took place in Marietta; at the Air Force Flight Test Center at Edwards AFB, California; in Yuma, Arizona; and at other sites. All of the flight test equipment and associated wiring was removed from the C-5s once testing was complete.

The major RERP upgrade is the installation of the GE Aviation Aircraft Engines CF6-80C2 commercial engines. These 60,000-pound thrust engines, given the military designation of F118-GE-100, are de-rated to 50,000 pounds thrust on the C-5M. During the system design and development phase of the program, the Super Galaxy propulsion system averaged more than seven times better than the legacy engines in terms of both mean time between maintenance actions and mean time between individual part failures. The C-5M also meets Federal Aviation Administration Stage 3 noise requirements—more than ten decibels quieter than the requirement—and emissions standards as well.

During her remarks at the ceremony, Payton highlighted one of the two international missions the C-5M test team carried out earlier this year. Taking off from Travis at a gross weight of 865,000 pounds, the C-5M crew lifted off in 5,000 feet, climbed to 30,000 feet in less than twenty-five minutes, and then flew eleven hours nonstop and unre-fueled over the North Pole to RAF Mildenhall, England. She concluded by noting that, “The delivery of the C-5M is a huge, significant step forward bringing increased capability to the warfighter.”

The first C-5 to be inducted into the production M-model modification line will be flown to Marietta in August. That aircraft will be re-delivered in mid 2010. Low-rate production will continue through 2013, with three aircraft delivered in 2011, five in 2012, and seven in 2013. A total of fifty-two of the 111 aircraft in the C-5 fleet are currently scheduled to be brought up to C-5M standard. The final thirty-three aircraft will be re-delivered at a rate of eleven per year from 2014 to 2016.

A second C-5M, nicknamed Spirit of Normandy, was delivered to Dover on 27 February. Aircrews and maintainers from both the 436th and 512th Airlift Wings will spend the next several months familiarizing themselves with their new aircraft and flying operational missions. Seven aircrews and close to 100 maintainers have already been trained on the C-5M. “We are going to fly the aircraft and see exactly what its capabilities are,” said CMSgt. Don Cunningham, one of the C-5M initial aircrew cadre.

Both of the C-5Ms now at Dover are former C-5B aircraft. The third Super Galaxy, a former C-5A aircraft, is currently in depot maintenance at Robins AFB, Georgia. It will be flown to Dover later this year. All three C-5Ms will be flown during Air Force Operational Test and Evaluation, a critical evaluation of the C-5M’s ability to carry out its mission, which is scheduled to begin in October 2009 and run through the first quarter of 2010.

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The keynote speaker at the ceremony, Vice Adm. David Architzel, principal military deputy to the Assistant Secretary of the Navy for Research, Development, and Acquisition and a former S-3 pilot with more than 3,400 hours in the aircraft, succinctly summed up the Viking's career: "The S-3 stayed in the fight for almost four decades."

The Navy began what became the S-3 Viking program in 1964 to replace the piston-powered S-2 Tracker. Known originally as VSX—for “carrier-based antisubmarine warfare aircraft-X”—a formal request for proposal was issued in April 1968. A joint General Dynamics-Grumman team and the then-Lockheed Aircraft Corp. were chosen from among the competitors to refine their proposals. Although Lockheed had four decades of land-based antisubmarine warfare experience dating back to the World War II-era Hudson, the company had only built one carrier-based aircraft to that point, the T2V-1 SeaStar trainer. To build a strong Navy-oriented team, Lockheed first brought on LTV Aerospace, formerly Vought, with its long history in carrier aviation, as a partner. Then the Federal Systems Division of Sperry Rand was added to develop the aircraft’s computerized acoustic detection system, a first for an airborne antisubmarine warfare platform.

The Lockheed team was declared the winner of the VSX competition on 4 August 1969. One of several speakers at the 2009 retirement ceremony was current Lockheed Martin F-35 Executive Vice President Tom Burbage, who flew the Viking as a Navy test pilot and later ran the S-3 program for the company. He noted that “the S-3 was a unique program. We went from first contract to first contact over a submarine in just three years.”

VSX to Viking

Rollout of the first aircraft came at Lockheed’s plant in Burbank, California, on 8 November 1971, a specific date that had been agreed to when the development contract was signed. Jane McClellan, wife of Navy Bureau of Aeronautics head Rear Adm. T. R. McClellan, christened the aircraft with champagne and bestowed the aircraft’s official nickname—Viking, the winning entry in a Navy and contractor name-the-plane contest. But because the aircraft’s GE TF34 turbofan engines sound much like a very large vacuum cleaner, crews were very soon calling the S-3 by its unofficial and more widely used nickname—Hoover.

After the rollout, the first of eight YS-3A flight test aircraft was trucked from Burbank to the company’s facility in Palmdale, California, for first flight. Company pilots John Christiansen and Lyle Schaefer made the ninety-minute maiden sortie on 21 January 1972.

On 23 August 1972, a test crew tracked a submerged US submarine for the first time in an exercise off the California coast near San Diego. The first S-3 trap, or carrier landing, came aboard the USS Forrestal (CV-59) on 26 November 1973.

After the twenty-six month test program, Sea Control Squadron 41 (VS-41), the S-3 training unit, received its first aircraft on 20 February 1974, another contract-specific date. The Shamrocks, based at NAS North Island, San Diego, California, would serve as the Viking Replacement Air Group until the unit was decommissioned in July 2006, completing 347,000 flight hours with more than 48,000 traps and training more than 55,000 personnel.

Sea Control Squadron 29 (VS-29), known as the Dragonfires, made the first S-3 deployment aboard the USS John F. Kennedy (CVN-67) in July 1975. The S-3 fleet surpassed 100,000 flight hours less than two years after that first deployment.

A total of 187 S-3As—eight test and 179 operational aircraft—were built between 1971 and 1978. Over its career, the Viking would serve with eighteen Navy squadrons. Operational aircraft were homeported at North Island on the West Coast and first at NAS Cecil Field and then later at NAS Jacksonville, Florida, on the East Coast. All total, the Viking fleet accumulated approximately 1.7 million flight hours.
The S-3 went to war a second time during Operation Iraqi Freedom, again performing a variety of missions and joining the fight from the beginning. At the top of the mission list was refueling. During major combat operations in 2003, Viking crews transferred nearly nine million pounds of fuel to Coalition aircraft.

Two other OIF highlights stand out. A VS-29 aircraft was equipped with the Surveillance System Upgrade, or SSU, a one-of-a-kind, computerized, carrier-based intelligence gathering asset. The SSU had the capability to stream real-time video from a camera or from the aircraft’s synthetic aperture radar to the ship or to a unique mobile ground station. With a range of more than 150 miles, SSU quickly became the primary choice for aerial surveillance in theater.

The Viking had toiled in relative anonymity for most of its career. That changed on 19 March 2003, when an S-3B crew from VS-38, the world famous ‘Hoover’ squadron, launched in the Arabian Gulf to harpoon the Iraqi ocean-going yacht with a laser-guided AGM-65E Maverick missile. For a brief period, the Viking became a media darling. As one pilot put it, “Nobody had ever heard of an S-3 before that.”

On 1 May 2003, the S-3 made world headlines as President George W. Bush flew out to the USS Abraham Lincoln (CVN-72) in a VS-30 Viking to make a televised address. This marked the first time any Navy aircraft had carried the Navy One radio call sign, and the first time a sitting president had trapped aboard a carrier at sea.

Several variants of the S-3 were developed. Seven aircraft were modified as US-3A Carrior Onboard Delivery aircraft, capable of carrying 4,250 pounds of cargo. The US-3 was first flown in 1976, and the type served until the early 1990s. Development of a dedicated antisubmarine warfare, antisurface warfare, carrier onboard delivery, electronic surveillance, tanking, or aerial refueling using a wing-mounted pod, a task which most S-3s later performed.

The significantly improved S-3B was developed in the early 1980s to better detect quiet Soviet submarines, identify targets, and carry standoff weapons. The S-3B prototype was flown for the first time in September 1984. A total of 119 S-3As were upgraded to the S-3B configuration between 1987 and 1994. The modification work took place at Cecil Field and at North Island.

After a series of fatal accidents, the Navy’s obsolete carrier-based EA-3B electronic warfare aircraft was withdrawn from service in 1987. The Viking was chosen to be its replacement. Fitted with a ventral facing, three radomes and more than fifty antennas, an aerodynamic prototype of the ES-3A Shadow was first flown in 1989. The first operational aircraft was flown in 1991. Fifteen more aircraft would be modified at Cecil Field by 1994. Despite outstanding results, high maintenance costs and the prospect of a major avionics upgrade led the Navy to withdraw the Shadow from service in 1999.

The Navy went to war in 1990. During Operation Desert Shield/Desert Storm, Viking crews flew many hundreds of armed surface reconnaissance, electronic surveillance, and overland support missions. The Hoovers were also used to bring the massive daily Air Tasking Orders in printed form to the fleet from US command in Riyadh, Saudi Arabia. Using buddy tanking, S-3s from seven squadrons transferred more than fifteen million gallons of fuel to Coalition aircraft over seven months.

HEADING FOR VALHALLA
Under the S-3 Integrated Maintenance Program, or IMP, Lockheed Martin and Navy personnel worked side-by-side to perform scheduled depot maintenance and repairs to return the Vikings rapidly to the operational fleet. This highly successful program ran from 2001 until 2007. A total of 149 aircraft were cycled through the program.

IMP began in 2001 primarily as a means of reducing the backlog at the Naval Aviation Depots. Instead of a Viking bringing out of service for nine months while it went through a full depot-level teardown and reassembly, IMP broke the required inspections and maintenance tasks into three forty-eight day periods spread over five years. IMP increased S-3 aircraft availability by eighty percent, reduced maintenance tasking by forty-seven percent over the previous depot-level maintenance plan, and resulted in significantly reduced costs to the Navy. In 2004, the Navy made the decision to draw down the number of aircraft types on its carrier decks to save costs and to increase the efficiency of the carrier air wings. The F-14 Tomcat fleet air defense fighter was already being retired, and the determination was made that the S-3 would be retired as well.

Under the drawdown plan, the S-3 squadrons at NAS North Island were decommissioned first, starting with VS-29 in 2004. Sea Control Wing, US Pacific Fleet was disestablished in August 2005, closing out West Coast Viking operations.

The last S-3 carrier deployment was completed on 15 December 2007. Although it was an Atlantic Fleet squadron, VS-32, known as the Maulers, completed the deployment in the Western Pacific on the USS Enterprise (CVN-65). On 28 May 2008, a crew from VS-22 made the last S-3 catapault launch, taking off from the USS George Washington (CVN-73). VS-22 was aboard the Washington to assist with carrier qualifications and flight deck certification in preparation for the ship’s homeport change to Yokosuka, Japan. The very last Viking at-sea deployment ended the next day when the aircraft returned to NAS Jacksonville. VS-22 also completed the last-ever S-3 deployment when the squadron was sent to Iraq later that summer. The squadron’s return to NAS Jacksonville came in December 2008. The Checkmates were disestablished the day before the Viking itself was retired in January.

Although the S-3 airframes have considerable useful service life left, most of the Vikings have been retired to the 309th Aerospace Maintenance and Regeneration Group—the Boneyard—at Davis-Monthan AFB, Tucson, Arizona. A handful of aircraft now serve as gate guards at bases. Some of the Hoovers have been placed in museums.

But a few Vikings will live on. The NASA Glenn Research Center near Cleveland, Ohio, has four S-3Bs that have been modified and are being used for icing research missions. Four other Vikings are expected to remain in Navy service to support armament development testing at Point Magu, California. “Today is about beginnings, not endings,” Architzel said at the Atlantic Fleet S-3 wing disestablishment ceremony. “We recognize the impact this community has had, and the impact it will have. What was learned in the S-3 will pave the way for the future of naval aviation.”

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Harry Hillaker
Lockheed Martin aerospace engineer and designer Harry James Hillaker died on 6 February at his home in Fort Worth, Texas. He was eighty-nine.
Back in the mid-1960s, Hillaker spent four years designing the airplane of his dreams—a light aircraft. His spare-time project turned into an obsession. The obsession became a reality. Today, the F-16 Fighting Falcon is the standard against which all other fourth-generation fighters are measured.
Hillaker retired from the company (then General Dynamics) in 1985, after forty-four years of design work that included the F-16, F-18, F-111, and F-16. He remained active as a consultant to the US Air Force and industry. In 1989, he was inducted into the prestigious US National Academy of Engineering for his achievements. He also spent two terms as chairman of the Aerospace Vehicles Panel of the Air Force’s Scientific Advisory Board
The two-part Hillaker interview in Code One published in 1990, remains one of the most visited pages on the magazine’s website, www.codeonemagazine.com.
David P. Cooley
Lockheed Martin test pilot David P. Cooley was killed on 26 March in the crash of an F-22 aircraft, while he was flying a test mission from Edwards AFB, California. Cooley was born on 16 February 1964 at BAP Mildenhall, the US Air Force base in England where his father was assigned. He finished high school at Belvidere, Illinois, and graduated from the US Air Force Academy in Colorado Springs, Colorado, in 1982 with a degree in aeronautical engineering.
Early in his military career, he flew and then later instructed students in the F-111. In 1993, he transitioned to flight testing and conducted tests with the F-15 and F-19.
In 1998, Cooley was selected to be the operations officer of the F-117 Combined Test Force and was responsible for continued developmental flight testing of the Nighthawk. From 2001 to 2004, he served as the vice commander of the USAF Test F-16 Squadron at Edwards AFB.
Cooley retired from the Air Force in 2003 and was hired by Lockheed Martin as the F-18 chief test pilot. He joined the F-22 Raptor test team in 2006 and was part of the P-22 Combined Test Force.
First Marine F-35 Aviator
Maj. Joseph T. Bachmann became the first US Marine Corps pilot to fly the F-35 Lightning II on 19 March, logging the flight test program’s nineteenth mission. Bachmann took off from the Lockheed Martin facility in Fort Worth, Texas, and flew the aircraft to 15,000 feet, checking handling qualities and engine response before landing seventy-five minutes later. Bachmann’s first flight came in F-35 AA-1, a conventional take-off and landing test variant. With more than 2,000 hours of flight time in more than thirty different aircraft types, Bachmann is the second active-duty service member and the fifth test pilot to fly the F-35.
Taiwan P-3 Upgrades
Taiwan’s P-3 maritime patrol aircraft will receive extensive mission system and structural upgrades to extend expected service life to 15,000 flight hours. The aircraft will receive upgraded electronic support measures; acoustics, communications, electro-optic and infrared systems; new data management software and hardware; and new controls, displays, and mission computers. The service life extension kits include new outer wings, center wing lower surfaces, horizontal stabilizers, and nacelle components. Work will be performed at Lockheed Martin facilities in Minnesota, Virginia, Georgia, and South Carolina. The Taiwan Navy obtained twelve surplus P-3Cs under the US Foreign Military Sales program in 2007. The first upgraded P-3C is scheduled for delivery to Taiwan in 2012.
Traveling Bulldogs
The 525th Fighter Squadron at Elmendorf AFB, Alaska, returned home in early March after an extended deployment to Nellis AFB, Nevada, and Holman AFB, New Mexico. The squadron participated in a Red Flag exercise while at Nellis. Because of volcanic activity in Alaska, the Bulldogs, as the 525th is known, had to extend their deployment and then trained with the 49th Fighter Wing at Holman. At Red Flag, the 525th was able to complete all 350 scheduled sorties. Once the next Red Flag exercise started, a shortage of ramp space at Nellis necessitated the 525th relocating to Holman, which is now ramping up as the third operational F-22 base.
Vigilant Guard
Airmen from the 817th Contingency Response Group at McGuire AFB, New Jersey, guide a pallet onto a C-130J Super Hercules from the 129th Wing, the Baltimore-based Maryland Air National Guard unit, during the Vigilant Guard exercise held in Puerto Rico in March. The exercise involved more than seventeen Air Force, National Guard, and local and federal government agencies. It focused on providing a coordinated response following a simulated natural disaster in Puerto Rico. During the exercise, a hub-and-spoke operation was used to move passengers and cargo to four locations around the island.

The only timecard he ever signed is the one he’s signing in this photo used for the interview. That explains the grin.
Four pilots from the 301st Fighter Wing at NAS Joint Reserve Base Fort Worth paid Hillaker the ultimate tribute—performing the missing man formation in their F-16s over his funeral.
The last question Hillaker, the designer, answered in that interview was: “Are you comfortable with the title Father of the F-16?” His answer: “I’m flattered by it. As its father, I had the best part, preserving the dream. Now the generation period and much of what happened later was something else. Other people can take credit for what happened there. My interest is airplanes as the external shape. I’m not that interested in what goes inside, except as how it affects the outside shape.”
Harr y H i l la k e r
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ISIS On Station

American and Polish airmen delivered the first of five refurbished C-130E Hercules transports and spare parts to the Polish Air Force at Powidz AB, Poland, on 24 March. The new aircraft expands Poland’s ability to transport troops and equipment while providing support for evacuation and humanitarian operations. The C-130’s presence in the Polish fleet will also increase that country’s interoperability with other air forces. The Hercules received an escort to Powidz by F-16s from the Polish Air Force as the aircraft reached its final destination, where it will become part of the 14th Lift Squadron. The delivery of the five modernized aircraft is scheduled to be complete in mid 2010.

Welcome To Your New Home

The first crew of Patrol Squadron 8 (VP-8) landed at the squadron’s new duty station at NAS Jacksonville, Florida, on 27 May, after completing a six-month deployment to the Middle East and Japan. Last December, the Fighting Tigers, as the squadron is called, departed NAS Brunswick, Maine, where the unit had been based since 1971. While on deployment, a Fighting Tiger crew was the first to reach the MV Maersk Alabama after the container ship was attacked by Somali pirates in April. Under Base Realignment and Closure Commission action, NAS Brunswick is scheduled to close in May 2011. Five P-3 squadrons from Brunswick are being transferred to Patrol and Reconnaissance Wing 11 at NAS Jacksonville.

Lightning At Eglin

An F-35 Lightning II test aircraft was flown to Eglin AFB, Florida, on 21 April to educate the base and local community about the new fighter. The arrival of F-35A-1 at Eglin, which is slated to be the F-35 training wing, kicked off a week of events to showcase the aircraft. The Lightning II was later flown over the base and local area during a sortie on 23 April with two F-16 Fighting Falcon chase aircraft. The 33rd Fighter Wing at Eglin will transition from an operational fighter unit into a joint training unit in October 2009. The first F-35s are scheduled to arrive at the base in March 2010.

Polish Herk

Two C-5Bs and one C-5A were modified for test during the Avionics Modernization Program, which ran from December 2002 until November 2005, and the Reliability Enhancement and Re-engining Program, which ran from November 2005 until December 2008. Assembly of the fourteen aircraft in the first two LRIP lots is already under way, with initial F-35 deliveries to the US Air Force scheduled to begin in 2010. Eight development aircraft have entered testing. The remaining eleven test aircraft are scheduled to roll out by the end of 2009.

C-5M Testers Stand Down

The 418th Flight Test Squadron at the Air Force Flight Test Center at Edwards AFB, California, officially deactivated its Detachment 4 in Marietta, Georgia, in ceremonies on 13 April. The detachment was formed in 2002 to support developmental testing of the C-5 modernization effort. Detachment 4 worked with personnel from Lockheed Martin and personnel from the Air Force Operational Test and Evaluation Center at Kirtland AFB, New Mexico, as part of the C-5 Combined Test Force. Two C-5Bs and one C-5A were modified for test during the Avionics Modernization Program, which ran from December 2002 until November 2005, and the Reliability Enhancement and Re-engining Program, which ran from November 2005 until December 2008.

Paris 100

The Paris Air Show celebrated its centennial during the biennial aerospace gathering held at Le Bourget Airport outside Paris on 14-21 June. The show featured an array of historic aircraft alongside the newest types from around the world. More than 2,000 exhibitors from forty-eight countries participated in this year’s show, a new record. The fiscal realities of the times were reflected in a reduced number of aircraft on the ramp compared to previous shows. The crowds were glued to the daily flying displays, which included both a C-130J and an F-16. A full-scale model of the F-35 was on static display.

International F-35s Ordered

The US Department of Defense awarded Lockheed Martin a $2.1 billion contract modification on 3 June to produce seventeen F-35 Lightning II fighters in the third lot of low-rate initial production, or LRIP. The contract also includes two F-35B operational test aircraft for the United Kingdom and one F-35A for the Netherlands, which are the first aircraft ordered for the F-35 international partners. Assembly of the fourteen aircraft in the first two LRIP lots is already under way, with initial F-35 deliveries to the US Air Force scheduled to begin in 2010. Eight development aircraft have entered testing. The remaining eleven test aircraft are scheduled to roll out by the end of 2009.

SADL Up

Three C-130s conducted an operational utility evaluation of the Situational Awareness Data Link, or SADL, at Davis-Monthan AFB, Arizona, in mid-April. Similar to the Link-16 format used by other Air Force platforms, such as the A-10 and some F-35s, SADL is a military communications system that supports the exchange of tactical information between air and land assets in near real time. Operators can digitally access this information from command and control systems instead of receiving verbal reports and then annotating the information on paper. An MC-130P Combat Shadow rescue tanker and two C-130Js were used in the evaluation. SADL is expected to significantly increase capability for rescue forces.
Lt. Col. Case Cunningham, currently director of operations for the 43rd Fighter Squadron, the F-22 training unit at Tyndall AFB, Florida, was chosen by the US Air Force in June to lead the Thunderbirds aerial demonstration squadron in 2010. The selection of Cunningham marks the first time a Raptor pilot has been selected for the team. Team pilots, such as Cunningham, who currently fly different airframes than the Thunderbirds’ F-16Cs will undergo several months of F-16 familiarization training before they begin practicing aerial demonstrations with the other Thunderbird pilots. The Thunderbirds have been performing since 1953. Cunningham is the thirty-third officer to lead the team.

The F-35 Cooperative Avionics Test Bed, or CATBird, aircraft completed a two-week deployment to the Air Force Flight Test Center at Edwards AFB, California, in April. There, the highly modified 737 airliner was flown on ten test flights to evaluate the F-35’s radar operation; communications, navigation, and identification system; and electronic warfare infrastructure and sensor function. The airborne testing reduces hardware and software risks that cannot be mitigated in ground laboratories and individual sensor test beds. The joint industry/government F-35 Integrated Test Force at Edwards provided logistic support, ranges, and ground and air targets during the deployment. The first mission systems-equipped F-35 is scheduled to be tested later this year.

The US Navy Flight Demonstration Squadron, the Blue Angels, flew a special passenger at the Florida International Air Show in Punta Gorda, Florida, on 21 March. Retired Rear Adm. James H. Flatley, III, who made twenty-one unarrested full-stop landings and takeoffs in a KC-130F tanker aboard an aircraft carrier as a test pilot in 1963, got to experience a jet-assisted takeoff in the Blue Angels’ C-130T support aircraft affectionately known as Fat Albert. Flown by an all-Marine crew, Fat Albert has led off Blue Angels shows since 1970. At the end of the flight, the Fat Albert crew presented Flatley with a framed personalized lithograph to commemorate the flight.

A custom-built, specially painted Chevrolet Corvette honoring Vietnam-era Prisoners of War is now on display at the National Corvette Museum in Bowling Green, Kentucky. The car, which consists of parts from three vehicles, is painted in the gray-and-white scheme on the C-141 StarLifter transports that were used to fly American POWs out of Vietnam in 1973. The car features an image of a C-141 and an eagle breaking through barbed wire on the hood and the POW-MIA logo on the removable top. The car took more than 3,000 hours over fifty-one weeks to rebuild and paint. A team of eight Reservists and active duty Air Force members at Wright-Patterson AFB, Ohio, created the Corvette.