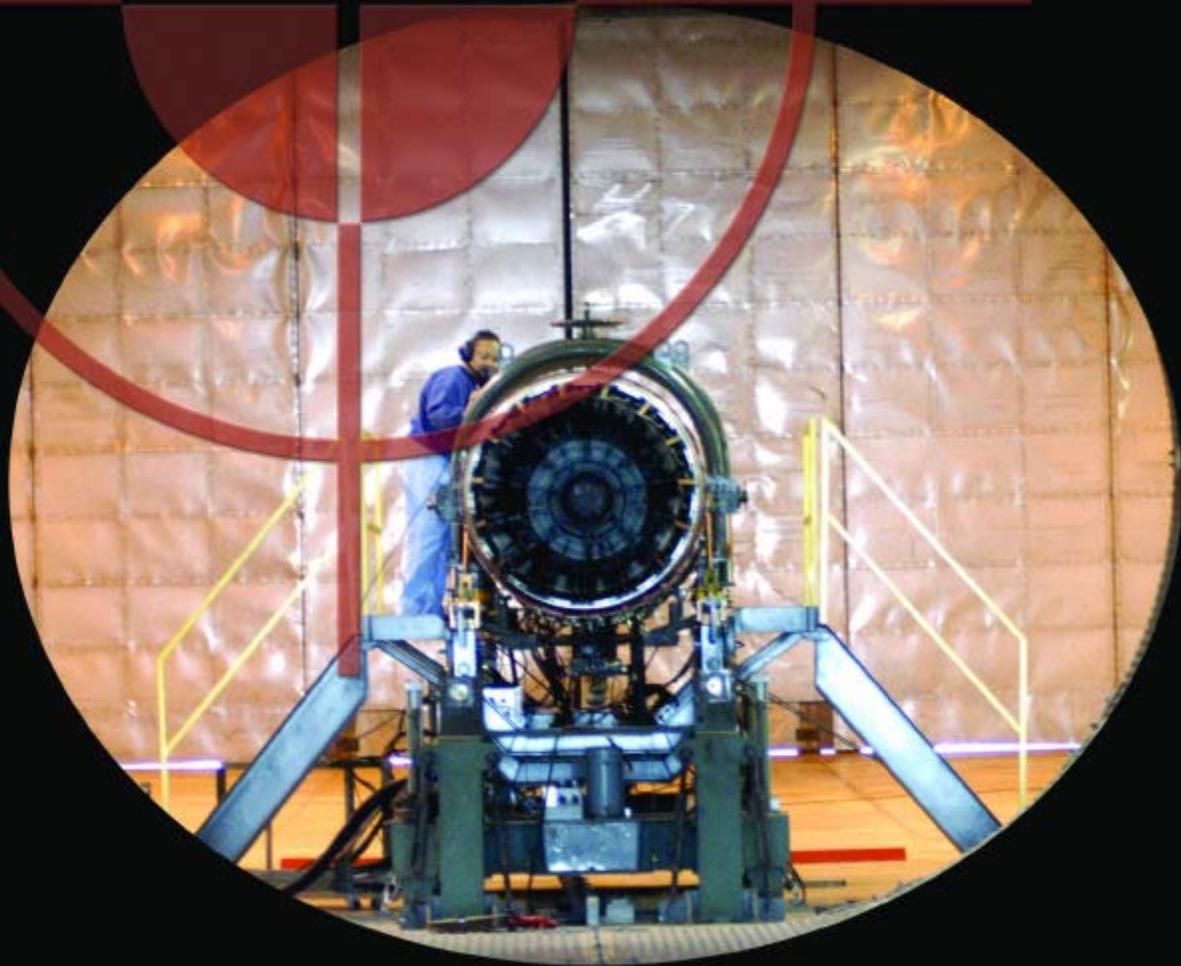


June 2004

Leading Edge

Air Force Materiel Command



TARGETING TESTING

LEADING EDGE

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Command

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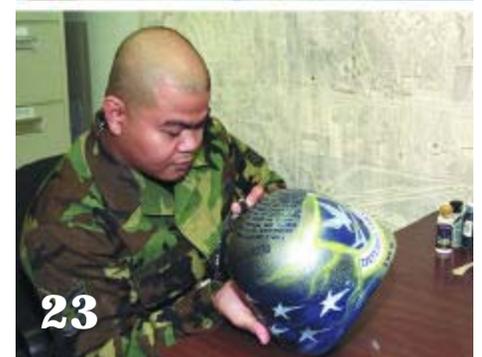
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E-3 Sentry (AF photo)

First batch of fuel mixed for the airborne-attack laser

EDWARDS AIR FORCE BASE, Calif. — The Integrated Maintenance Facility at Edwards AFB transitioned from storage to mixing functions recently as Airborne Laser Test Force members created the first batch of “mixed-base” hydrogen peroxide to fuel the world’s first airborne-attack laser.

MHP, as the mixed-based hydrogen peroxide is known, is one of the main chemicals used in the ABL aircraft’s Chemical Oxygen Iodine Laser, or COIL, according to Gregg Garza, ABL IMF lead.

“Hydrogen peroxide is mixed with three bases — sodium hydroxide, lithium hydroxide and potassium hydroxide — forming a laser fuel that’s combined with chlorine and iodine gases to create energy and produce a powerful laser beam or light,” Mr. Garza said. “This beam of light is to be focused on a boosting missile’s fuel tank, causing it to rupture and explode.”

ABL is an airborne-directed energy weapon system. The YAL-1A is a prototype that employs a highly-modified, 747-400 airframe equipped with sensors, lasers and sophisticated optics to find, track and destroy ballistic missiles in their boost, or ascent, phase.

“Although the ABL is complex, our team is up to the challenge,” said Lt. Col. William Dodd, ABL Test Force director. “The ABL’s mission — ballistic missile defense — is crucial in today’s volatile world, and that fact keeps us focused. The first mix of the laser’s fuel takes us one step closer to our ultimate goal.”

— *AFFTC Public Affairs*

AWACS voice recognition may enhance accuracy

HANSCOM AIR FORCE BASE, Mass. — The Airborne Warning and Control System Program Office is developing software that could make the mouse an endangered species on the E-3 Sentry.

Voice recognition software allows an air battle manager to control his radar screen by speaking to it, instead of using a traditional trackball or mouse, keyboard, and function keys.

“We estimate that, by adding a robust speech recognition capability to the E-3 weapon system, the operator is able to reduce his or her workload by up to 40 percent, improve accuracy, and increase overall situational awareness,” said 1st Lt. Jeff LaFleur, AWACS Advanced Technology program manager.

If further development and testing are successful, a technology insertion program would be initiated to integrate the speech recognition software into a spiral development of the AWACS Block 40/45 major system upgrade, following initial operating capability planned for 2010.

“While the program is just getting started, the outstanding potential to provide increased situational awareness for air battle managers has generated strong interest from the AWACS community and could pave the way for international AWACS, Airborne Early Warning and Control aircraft and other platforms to be voice-enabled in the future,” said Col. Brian Waechter, AWACS Materiel Wing director.

— *ESC Public Affairs*

Dynamic mission planning enables rapid response

HANSCOM AIR FORCE BASE, Mass. — Technology is helping put today’s warfighters at the right fight at the right time with the flexibility to change target identification or redirect aircraft in flight.

Electronic Systems Center experts are taking advantage of maturing satellite technology to support planning for fast-changing battlefield environments with the new Joint Mission Planning System.

According to Don Goodale, Air Force Mission Planning system program office, one of the main benefits of JMPS will be machine-to-machine information transfers replacing manually re-entering information as it is passed from one system to the next.

Regarding JMPS, Col. Bill Nelson, Air Force Mission Planning system program office director, said, “During the execution of a mission, plans can be updated in near real-time speeds and aircraft re-directed in flight.”

During Operation Enduring Freedom,

air component commanders even altered unmanned aerial vehicle missions such as Global Hawk.

“They were able to re-task it during the execution of a pre-planned mission to go off on a vector and collect imagery on a set of new reconnaissance targets,” said Mr. Goodale. “The images were forwarded to a ground station and then to operational units who confirmed the targets and directed their airborne resources accordingly.”

Air Force experts will begin JMPS operational testing on the F-15 this summer and deliver in late spring 2005. Colonel Nelson said ESC plans to release JMPS in spiraled increments, adding new functionality every 12 to 18 months.

Each increment will move JMPS closer to a completely Web-enabled system that transfers data automatically from machine to machine.

— *ESC Public Affairs*

Around the command

★★★★ Gen. Gregory S. Martin



AFMC the visionary command

**AFMC Strategic Principle:
War-winning capabilities...
on time, on cost.**



1st Lt. Patrick Dodd, Kirtland AFB, N.M., operates the controls of a Humvee-mounted illuminator laser that can spotlight enemy soldiers nearly a mile away. Initially developed by AFRL's directed energy directorate as a mobile counter sniper platform, the system also carries an infrared illuminator and camera. Invisible to battlefield combatants, it allows an operator to observe troops on TV monitors without alerting those being watched. (AF photo)

America is fighting an enemy consumed by a radical ideology and with no apparent boundaries for treachery. When you couple that with the fact that we have been engaged in five significant conflicts in the past 13 years, it is evident we must adapt to the changing face of this enemy as we prosecute the Global War on Terror. AFMC, more than any other command, must think in terms of the challenges of tomorrow as we carry out our mission today.

AFMC has a vitally important and undeniably relevant mission. We are tasked to ensure that our Air Force is properly armed and equipped to dominate our nation's enemies — in any battlespace — now and into the future. AFMC provides the work force and infrastructure necessary to keep our Air Force number one.

Many of our people have or are deployed in support of our worldwide commitments or contingency operations. They have learned firsthand the value of the equipment we develop, field and sustain. And when they return to their AFMC responsibilities, they are able to help educate our entire workforce with regard to the real needs of our warfighters.

On a daily basis, the women and men of this command are engaged in researching and developing new technologies, devising and implementing developmental programs, performing tests that evaluate systems performance, acquiring and fielding new weapon systems, maintaining our Air Force test and depot infrastructure, ensuring the sustainment of weapon systems, and preserving our legacy aircraft for the future use by the Air Force and our allies. Day-in and day-out this responsibility rests upon our shoulders.

With such a broad spectrum of responsibility, it is critical that we have specific goals and standards for AFMC. Soon, those goals and standards will be ready for rollout and review.

In the meantime, use the following strategic principle or central idea as a guide: war-winning capabilities on time, on cost. Whether we are developing new technologies, flight-testing the CV-22 Osprey, fielding the F/A-22 Raptor, sustaining the T-38 Talon, or preserving the B-1 Lancer, AFMC delivers war-winning capabilities. Our customers want it on time, on cost. This strategic principle promotes and guides actions, serving as a litmus test for decisions, and promotes strategically

AFMC Vision: To be a valued team member... of the world's most respected Air and Space Force.

consistent decisions at all levels of the command.

Now, to fully execute our mission on time and on cost, it is essential that we focus on two things.

First, we must make it a priority to understand and anticipate our customer's needs. By doing this, we can more efficiently structure ourselves to satisfy present-day demands while simultaneously predicting the warfighter's needs of tomorrow.

Second, we must understand six constituencies external to AFMC who have an interest in our operations and sometimes affect our progress — Headquarters Air Force, Congress, unions, the external S&T community, the acquisition community and MAJCOMs.

I need you to understand the concerns of our external constituents, be sensitive to them and reach mutually agreeable solu-

tions for those important initiatives within AFMC.

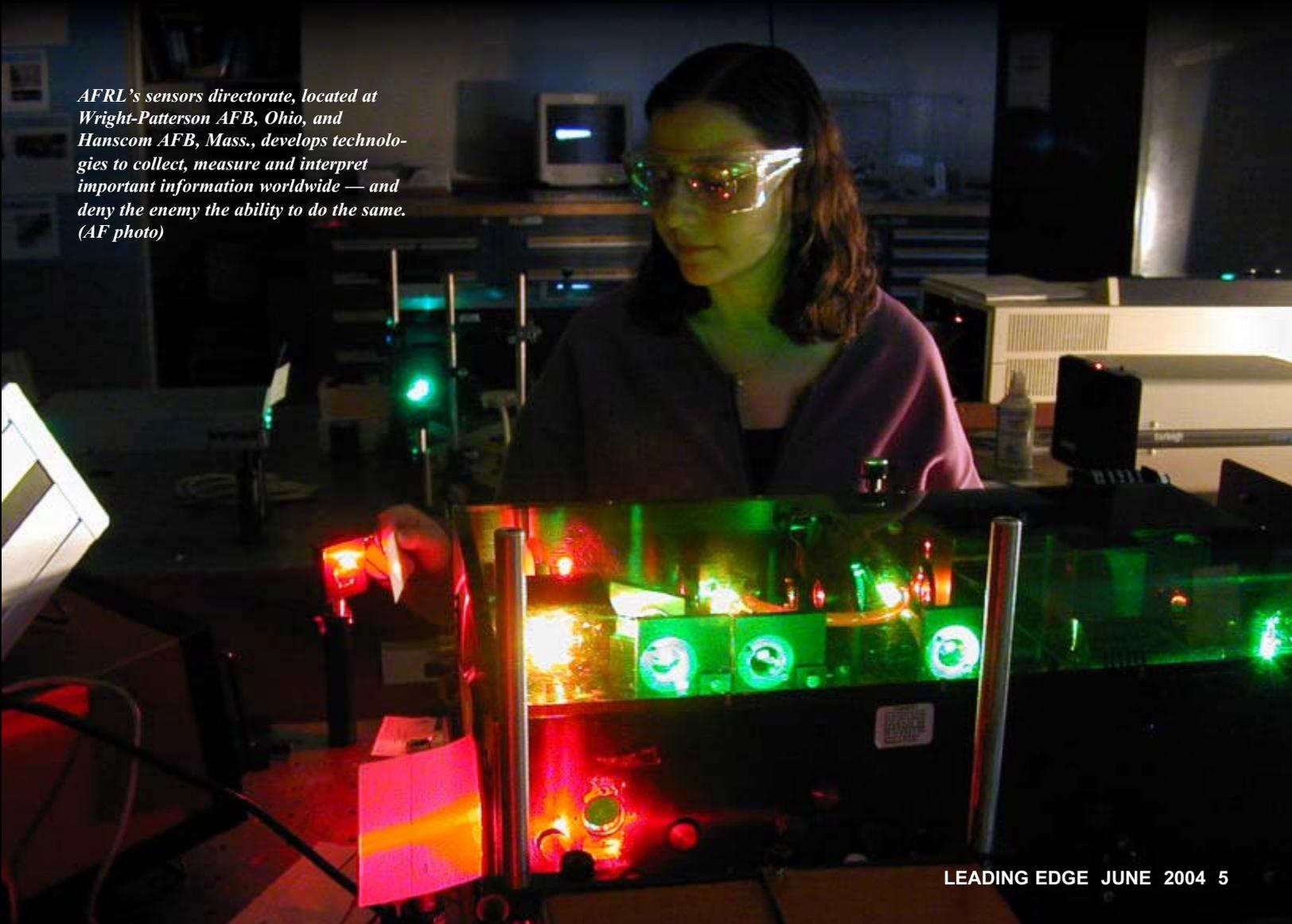
By working with this mindset, I am confident the AFMC team will positively influence the command and moreover, help to make the world's premier air and space force even better.

The greatest success in the past year is the achievements of our people. Our work force represents America's finest who joined us voluntarily. Each job in the Air Force is an opportunity to serve and learn. Our people are hungry for information so they can see how their jobs align with the Air Force mission and make informed decisions about their future.

I want to thank all of you for your hard work and dedication to the Air Force and AFMC. Public service is challenging, but extremely rewarding.

I encourage you to make the most of it, for the nation you lead

AFRL's sensors directorate, located at Wright-Patterson AFB, Ohio, and Hanscom AFB, Mass., develops technologies to collect, measure and interpret important information worldwide — and deny the enemy the ability to do the same. (AF photo)



Denying the enemy At the speed of light

Rich Garcia
AFRL Public Affairs

Picture this: A group of enemy soldiers are attacking. Suddenly they experience unbearable pain as if their skin is on fire. They turn and flee – and the pain vanishes as quickly as it began, with the soldiers having no lasting damage. Should they revisit their attack, however, the pain will likely return.

These soldiers would have been hit with a beam of millimeter-wave energy called “Active Denial,” a technology being developed by Air Force Research Laboratory directorates at Kirtland Air Force Base, N.M., and Brooks City-Base, Texas.

Intended as a non-lethal alternative to using deadly force, Active Denial has been under development for about 12 years and moving closer toward being operational.

The technology uses a transmitter producing electromagnetic energy at a frequency of 95 gigahertz and an antenna to project that energy over hundreds of yards to an advancing adversary. Traveling at the speed of light, the energy passes through a person’s clothes, penetrating less than 1/64th of an inch into the skin. It heats the person’s skin to around 130 degrees and triggers the person’s pain sensors.

The result is intolerable pain. Once the beam is turned off or the person moves out of the beam’s path, the skin’s temperature returns to normal and the pain disappears.

Despite the painful sensation, laboratory officials emphasize that the beam does not cause injury. This is because of the low levels of energy used and the shallow penetration depth of that energy.

The laboratory’s directed energy directorate at Kirtland AFB is the technical manager for the program and is responsible for prototype development. The laboratory’s human effectiveness directorate at Brooks AFB is managing the human

effects characterization research and test aspects of the program.

The Brooks directorate conducted several years of successful and safe laboratory testing, using small spot sizes. In 2000, testing began at Kirtland AFB, using a full-scale technology hardware demonstration system. It enabled larger areas of volunteer test subjects to be exposed to the energy beam. It also provided more realistic military field conditions.

Testing at Kirtland AFB was to ensure the technology produced the desired response, was militarily effective, and could be used safely without lasting effects. Test officials used animals and human volunteers in their test program, which was conducted under the procedures, laws and regulations governing animal and human experimentation.

Follow-on testing is continuing and, as with the initial tests, are reviewed and approved by a formal institutional review board with oversight from the Air Force Surgeon General’s Office. An independent panel of medical experts from outside the government periodically reviews and advises on the planning aspects and results of the research and test activities.

In 2001, the Kirtland AFB testing demonstrated that Active Denial hardware worked. It produced a first integration of key technology elements, including the millimeter-wave source, cooling system and planar array antenna. It also worked at full weapon power and distance, and set the stage for the next evolution of the system.

That next step was to go to an Advanced Concept Technology Demonstration program. This is the process used by the Defense Department to rapidly move mature technologies into the hands of the warfighter for military evaluation.

In this case, that meant integrating and packaging the system’s components into a mobile, nearly militarized system. A High Mobility Multi-purpose Wheeled Vehicle – commonly referred to as a Humvee – was chosen to do this. The Humvee-

mounted prototype is slated for completion and turn-over to the services’ operational forces later this year.

The services will then determine how



they might use the technology, evaluating it under varying environments and scenarios. Depending on the results of their evaluations, which are projected to be completed at the end of 2005, a decision will be made to produce and operationally deploy the system.

This Advanced Concept Technology Demonstration program is being sponsored and funded by the Office of the Deputy Under Secretary of Defense for Advanced Systems and Concepts, the DoD's Joint Non-Lethal Weapons

Directorate and U.S. Joint Forces Command.

Approximately \$51 million has been invested in the technology, developed in response to DoD needs for troops to have options short of deadly force. Non-lethal technologies can be used to protect defense resources, for peacekeeping and humanitarian missions, and other situations in which the use of lethal force is undesirable.

Active Denial Technology will provide these capabilities at short distances as

well as longer standoff ranges.

Air Combat Command at Langley AFB, Va., is the operational manager and is leading the services in developing concepts of operation and managing an assessment of the system's military utility.

The Electronic Systems Center at Hanscom AFB, Mass., is the transition manager, leading the planning activities necessary to transition the system into the formal DoD acquisition process, should a decision be made to equip U.S. forces with the technology.





An F-15 engine is tested in the hush house at Robins AFB, Ga. The tunnel behind the engine allows fire and exhaust to escape. (AF photo by Sue Sapp)

Breaking the silence —

Hush house workers have something to shout about.

Lisa Mathews
WR-ALC Public Affairs

Early in March, the engines revved up and the silence in the hush house came to an end. A foreign object damage incident last June led to the decision to curtail engine runs in the hush house and to revamp the facility used to test F-15 engines at Robins Air Force Base, Ga.

“As a result of that FOD incident, we wanted to determine what happened. We also did a top-to-bottom review,” said Maj. Ray Shankles, F-15 maintenance supervisor who oversees the production efforts for the F-15 Production Branch. “We wanted, not only to prevent another mishap, but to take the opportunity to go back and make it a first-class operation.”

Testing, testing ...

The hush house is used to run engines prior to installation, but Major Shankles said they hope that in the future they can test engines in the facility after being installed on aircraft.

The hush house works as advertised. “You can tell an engine is running if you are standing somewhat close to the hush house,” the major explained. “It actually suppresses the sound very nicely.”

“Prior to the (FOD) mishap, two people worked in the hush house part time,” Major Shankles said. “We all know that no one washes a rental car. So one of the things we decided was to have a sense of ownership. We've put four people working there full-time. It's not a large crew, but it's a very professional crew. They take great care of the facility.”

People, time and attention are providing greater capability for the facility, according to Major Shankles.

“We started with getting the system program office and center safety involved. We also included our in-house engineers, civil engineers, environmental, fire department, item managers and the communications squadron - a lot of players,” Major Shankles said.

The group traveled to Eglin AFB, Fla., to observe procedures used in the hush house there. Explaining the group was not trying to reinvent the wheel, the major

said they chose to take something that worked and copied it down to the letter.

Almost everything.

Robins AFB's hush house uses exclusive software to test engines.

“This test cell is unique in that, while the facility looks the same as Eglin, the software is one-of-a-kind in the Air Force. We're the first one to get it,” the major said.

Each day is different

Barbara Estrada, an aircraft engine mechanic in the shop, said she volunteered because she enjoys learning new things and, in the hush house, lots of new things crop up and each day is different.

In fact, the only drawback to working in the hush house is the temperature.

“It's cold in here. The building is a lot of concrete and metal. There are a lot of open doors and a lot of free, fresh air. So it's cold,” she said.

Melvin Bates and Skip Stuart, two other mechanics in the shop, both had prior experience running engines.

Both enjoy the trouble-shooting aspect of the job and the variety of challenges they face in doing so.

“That is the part I think is neat,” Mr. Stuart said, “trying to figure out what the engine is doing.”

Melvin Bates, aircraft jet engine mechanic, runs an F-15 engine from inside the cab at the hush house facility. (AF photo by Sue Sapp)



Steppin' up to the stand off

Long Range Attack Joint System Program Office

A Joint Air-to-Surface Standoff Missile approaches and demolishes an above-ground hardened bunker following a 200-mile trip from the launch aircraft. (Photo courtesy of Lockheed-Martin)

The way Air Force and Navy aircrews attack targets in the future will change with the go ahead to purchase more than 5,000 new cruise missiles.

The Joint Air-to-Surface Standoff Missile, which has standoff ranges exceeding 200 nautical miles, is designed to defeat heavily defended enemy targets with the versatility of a dual penetrating or surface blast/fragmentation warhead. It weighs approximately 2,200-pounds and incorporates a 1,000-pound warhead.

Currently, the weapon can be outfitted on the B-52 Stratofortress, F-16 Fighting Falcon, B-1 Lancer, and B-2 Spirit aircraft, as well as the Navy's F/A-18E/F, which is currently integrating JASSM on the Super Hornet.

According to Navy employee Dario Ramirez, a key program leader, the missile's software gives it increased lethality by reducing the time and complexity required to attack targets.

It can be programmed to attack not only surface/soft targets but also buried command and control structures.

"This multiple attack mode, with standoff, with survivability are a combination the Air Force has been wanting for many years," added Dale Bridges, JASSM program director.

The program is also developing an Extended Range version of JASSM. The JASSM ER range increases the effective combat range to more than 500 nautical miles, and is targeted for carriage by the B-1B, which has set multiple new world records for speed and broke five previously set records.

"The JASSM ER program reflects the success of the baseline missile system and the desire by the warfighter to add additional range to that success," said Maj. Stephen Davis, JASSM ER program manager.

The recent JASSM milestone highlighted a program that began after the cancellation of the failed Tri-Service Standoff Attack Missile program in the early 1990s. The JASSM program began in September 1995 with a focus of speed and affordability in weapons acquisition.

"JASSM performance is outstanding, but when you add the low price [\$400,000 average for 2,400 units] to this performance, you get value that is hard to match," said Edie Levin, a financial management specialist in the program office.

"This milestone is what the program has focused on for a long time," said Gerry Freisthler, Long Range Attack program director. "Many people and programs have attempted this [successful program] task prior to JASSM, but only this missile succeeded."

UAV stretches its legs

X-45A drops bomb for first time

2nd Lt. Brooke Davis
AFFTC Public Affairs



An F/A-18 Hornet flies chase for a Joint Unmanned Combat Air Systems X-45A during a test drop of a GPS-guided munition over China Lake Warfare Center Weapons Division Range, China Lake near Ridgecrest, Calif. (Photo courtesy of Defense Advanced Research Projects Agency)

The Air Force's unmanned aircraft program took another giant step forward recently after an X-45A successfully released an inert Global Positioning System-guided munition for the first time.

"The Joint Unmanned Combat Air Systems has been making steady progress as it matures into a viable weapon system, said Dr. George Ka'iliiwai," Air Force Flight Test Center technical director.

"The next step - formation flying - will enable the J-UCAS team to more effectively ingress into the target area and deliver more weapons when and where needed."

Sunday's mission tested the X-45A's ability to fly from Edward Air Force Base's range to China Lake Warfare Center Weapons Division Range, China

Lake, Calif., releasing an inert GPS-guided Small Smart Bomb.

The aircraft performed the mission, which included bay door operations and weapon release sequences.

"The mission was short and flawless," said Rob Horton, Boeing X-45A chief operator. "It was a lot of hard work getting to this point, but the aircraft performed exactly as it was designed to work."

The operator provided the consent command for the weapon's release, and the 250-pound weapon hit within a few feet of the target, said Mr. Horton.

The weapon was released at 35,000 feet while the UAV was flying approximately 440 mph, according to Defense Advanced Research Projects Agency.

Range safety was a challenge for the team, and for more than a year, the team worked to ensure the aircraft was safe and mature enough to fly out of Edwards AFB airspace with a weapon, said Sam Kim, Boeing X-45A test director.

"This was the furthest the airplane has

flown from Edwards; in the three years it has been here, it has only flown in Edwards' airspace," said Mr. Kim.

J-UCAS engineers used modified Joint Direct Attack Munitions technology to miniaturize the weapon to fit onto the X-45A's weapons rack, said Pete Sedovic, Boeing St. Louis weapons software engineer.

The J-UCAS team is part of a joint DARPA, Air Force Flight Test Center and Navy effort with Boeing and NASA Dryden.

The team is planning ahead for next month's multiple-vehicle coordinated flight, and the collaboration between multiple operational vehicles' sensors will eventually increase the operational potential of the UAV with faster, more accurate targeting.

Maintainers have begun regression testing for next month's coordinated flight.

"We've already run two X-45A engines at the same time," said Dave Abel, X-45A Boeing crew chief, "and the next step is to taxi two X-45s simultaneously on the ground."

Bill Wade
46th Test Wing

T esting

Twenty-one miles off the Florida coastline, an F-15E Strike Eagle locked onto its target. Soon after, the pilot dropped an inert, precision laser-guided bomb, striking its target — its test target.

This event opened an entirely new testing era at Eglin Air Force Base, Fla.

The Offshore Scoring Demonstration Test is the first in a spiral development program to build an offshore scoring system (a variety of sophisticated test and evaluation platforms and targets) in the Eglin Gulf Range.

The program will allow large footprint weapons like the Small Diameter Bomb and the Joint Air-to-Surface Standoff Missile to be tested throughout their full operational flight limits and make Eglin AFB the only Defense Department test range with the capability, according to Col. Robert Nolan, 46th Test Wing commander.

The recent success is part of the Offshore Test and Training Area program that Colonel Nolan said will help the 46th Test Wing achieve its goal of testing all weapon systems in all operational conditions by 2010.

Colonel Nolan said he placed OTTA at the top of his most important initiatives to provide large footprint weapons test and training capability to the nation's warfighter.

"I'm very excited about this success and what it means to the future of Eglin's role in future LFW weapons testing," he said. "I'm extremely proud of the efforts and accomplishments of the entire OTTA team including participation by our Navy and Coast Guard partners."

Offshore Scoring Demonstration Test planning and development began in September 2003, as wing leadership wanted the warfighter to be able to fully exercise modern weaponry throughout realistic operational envelopes. Until the recent success, the ability to fully evaluate 21st century LFWs in open air testing did not exist anywhere in the United States.

This inability to test LFWs has, in the past, forced the warfighter to go to combat without evaluating a weapon's full operational capabilities, Colonel Nolan said. This put both the warfighter and the combat mission at additional risk. With Eglin's new LFW test capability, weapons evaluation can now include long standoff scenarios, beyond hundreds of miles.

"This demonstration places Eglin and the Joint Gulf Range Complex as the only U.S. Department of Defense test range capable of LFW full operational testing," said Col. Tim Moore, OTTA Director.

Based on recent achievements, B-2 JASSM Force Development Evaluation Program experts said they'll conduct an operational mission in excess of 150 miles against an OTTA Program offshore target in June.



Enters a New Era



A GBU-12 Laser Guided Bomb is less than a second from impacting a barge during the Offshore Scoring Demonstration test. (Courtesy photo)



Leigh Anne Bierstine
416th Flight Test Squadron

Members from the 416th Flight Test Squadron successfully fire the new X variant of the AIM-9 Sidewinder missile for the first time from an F-16 Fighting Falcon. Maj. Ray Toth, 416th FLTS test pilot, and Capt. Nick Hague, 416th FLTS project engineer, flew the F-16 during mission. (AF photo by Tom Reynolds)

Newest Sidewinder ready for combat

F-16 pilots will soon have a new combat capability thanks to an Edwards Air Force Base, Calif., team successfully firing the new X variant of the AIM-9 Sidewinder missile from the fighter aircraft.

The Sidewinder is a supersonic, heat-seeking, air-to-air missile carried by fighter aircraft. To date, the AIM-9X has been fired only from F-15s and U.S. Navy F-18s.

The test mission is part of the F-16 M4+ test project currently ongoing at Edwards. M4+ is an upgraded avionics system slated for the entire active-duty F-16 fleet — about 600 aircraft.

This was the first test shot toward clearing the new variant for operational use on the F-16, said Capt. Chad Hale, 416th Flight Test Squadron operations engineer for the M4+ project.

Also included in the testing is how the new Sidewinder variant works with the Joint Helmet Mounted Cueing System. The X model is compatible with the system, which allows the pilot to tell where the missile

is looking and helps the pilot put the missile seeker on the target.

According to pilot Maj. Monte Cannon, 416th FLTS F-16 safety chase pilot for the mission, test results will have big payoffs for F-16 combat pilots.

“The AIM-9X test marks a tremendous increase in combat capability for the F-16. Together, the Joint Helmet Mounted Cueing System and the missiles will provide a lethal combination for pilots who find themselves in visual engagements.”

— Maj. Monte Cannon
416th Flight Test Squadron

“The AIM-9X test marks a tremendous increase in combat capability for the F-16,” said Major Cannon. “Together, the Joint Helmet Mounted Cueing System and the missile will provide a lethal combination for pilots who find themselves in visual engagements.”

The latest Sidewinder variant has the same rocket motor and warhead as the AIM-9M, which is the most current operational variant. However, the AIM-9X has major physical changes from previous versions, including an advanced seeker and thrust vectoring to increase flight performance.

The test team will continue the F-16 flight tests for the AIM-9X with the next missile shot planned for late June.

(Jim Palmer and Joel Fortner, AFMC Public Affairs, contributed to this story.)

Eco-friendly gas sampling

Tina Barton
AEDC Public Affairs

An environmentally friendly gas sampling system developed at Arnold Engineering Development Center, Arnold Air Force Base, Tenn., will save turbine engine test customers time and money.

The Continuous-Sweep Gas Analysis System, developed under the Small Business Innovative Research program, provides simultaneous sampling and analysis of more than a dozen emissions present in the exhaust of turbine engines.

According to co-system creator Paul Jalbert, no other test facility in the nation has this multi-gas sampling, and the data it acquires helps military engine manufacturers ensure they comply with environmental regulations, as well as helping them understand engine fuel consumption.

“The payoff for aeropropulsion testing will allow the customer to reduce the number of required test periods by being able to perform all exhaust analysis simultaneously while achieving other propulsion test objectives,” Mr. Jalbert said.

“The basing of military aircraft is dependent on the exhaust gas emission levels the aircraft contribute to the local environment,” Vince Zaccardi, co-creator, said. “Before entering service, an engine design must be certified by the regulatory agencies to ensure it does not produce more than the allowable level of emissions during landing and takeoff.”

By analyzing the engine samples for the presence of carbon monoxide and oxygen in the exhaust, the manufacturer can determine how the engine burns fuel.

The same concept is behind the continuous-sweep system for turbine engine testing. However, the AEDC system can analyze more than a dozen different elements simultaneously instead of one at a time using separate instruments.

According to Mr. Zaccardi, older methods of gas sampling testing, required longer engine run times, extra personnel and materials to operate the engine. The older analysis systems required large trailers to house the test computers.

The new system consists of small multi-gas analyzers mounted on a cart that can be rolled into a test cell next to the engine. Each analyzer is connected by a heated gas sample tube to a rake containing 16 probes designed to withstand exhaust temperatures up to 4,000 degrees Fahrenheit.

The gas sampling rake is then mounted on a sliding mechanism placed at the exit of an engine’s exhaust nozzle.

During engine operations, the test conductor controls the rake as it continuously sweeps through the exhaust from two inches per second to two inches per minute. The probes gather samples of the gases in the exhaust stream.

The samples travel through a special heated line to the gas



Arnold Engineering Development Center, Arnold AFB, Tenn., engineer Denise Bryant, left, and outside machinists, Steve Lepley, center, and Elvy Davis, position the continuous-sweep gas analysis probe in the exhaust path of the Pratt & Whitney XTE67/SE1 experimental test-bed engine in the center’s Aeropropulsion Systems Test Facility. (AF photo by Gary Barton)

analyzers, which immediately provide data on exhaust composition. The test conductor transmits the resulting processed data file to a computer in the test control room allowing the customer to view the results within five minutes of the sampling.

Since March 2001, the AEDC crew has conducted 13 validation test periods using the Middle Tennessee State University facility at the Smyrna, Tenn., airport.

In 2002, the system provided exhaust gas analysis of the Tactical Tomahawk engine and various combustor rigs. AEDC crews also used it for facility safety checkouts. The latest use provided combustion analysis for the Dual Combustion Ramjet test in the center’s Aerodynamic Propulsion Test Unit, a blow-down facility designed for true temperature aerodynamic, propulsion, and material/structures testing.

All system designers and assemblers are employees of AEDC mission support contractor Aerospace Testing Alliance.

One-stop shopping for maintainers

Senior Airman Tim Beckham
116th Air Control Wing Public Affairs

Aircraft maintenance at Robins Air Force Base, Ga., just got a lot easier due to new e-tools maintainers have at their disposal.

Through a pilot program being conducted at the 116th Air Control Wing, Robins AFB, Ga., the 116th Maintenance Group is integrating a new wearable computer to be used across the maintenance spectrum.

The computers are small PCs that can be worn either on the chest or hip of the person using them. They are being tested to possibly replace Tough Books, currently used in the 116th.

“The significant advantages are immediate access to a wireless environment and the very near migration of the Northrup Grumman Web-based computer software called Phoenix,” said Col. Terry Kinney, 116th MXG commander.

“With Phoenix as the wearable computer’s new Integrated Electronic Technical Manual, the flightline mechanic will have access to a wealth of information needed to perform their duties,” said IETM Project Manager Tech. Sgt. Matt Jones. “The primary goal is to get the IETM to the next generation of what we presently use, which is the Joint Integrated Maintenance Information System.”

“The software applications are significantly more user-friendly. The vision of having these tools at the maintainers’ fingertips is actually a virtual office on the flight line,” said Colonel Kinney. “It will have much of the same desktop software that we currently use, like e-mail capabilities and the capabilities to identify, order, ship and pay for parts.”

Airman 1st Class Treva Pittman, 116th Maintenance Squadron crew chief, performs a routine inspection using the new wearable computer on an E-8C Joint Surveillance Target Attack Radar System aircraft. (AF photo by Senior Airman Tim Beckham)

The wearable computers will also have an electronic copy of E-8C Technical Orders, which maintainers use to perform their jobs. Not only will maintainers have their technical orders at their disposal, but they will also have the capabilities of sending streaming video of peculiar damage back to the shop and aircraft engi-

“The vision of having these tools at the maintainers’ fingertips is actually a virtual office on the flightline.”

**— Col. Terry Kinney
116th MXG commander**

neers through a wireless local area network.

“It provides a safer more unencumbered work environment by allowing the maintainer to have his TO at immediate disposal,” said Colonel Kinney.

The 116th maintenance group is also looking at undergoing another pilot pro-



gram that will incorporate the use of a Unique Identification system, which may benchmark the way the Air Force controls parts inventory.

“It makes good sense to leverage the wearable computer and the UID, DoD funded pilot projects,” Colonel Kinney said. “Together they have the potential to change business on the flight line ... the capability to repair, order, ship and pay for parts on the ramp will significantly reduce the amount of time it currently takes to do the same business. A great spin off is it will reduce the need for human intervention and potential administrative errors.”

UID is an Office of the Secretary of Defense mandated program that goes into effect in 2005.

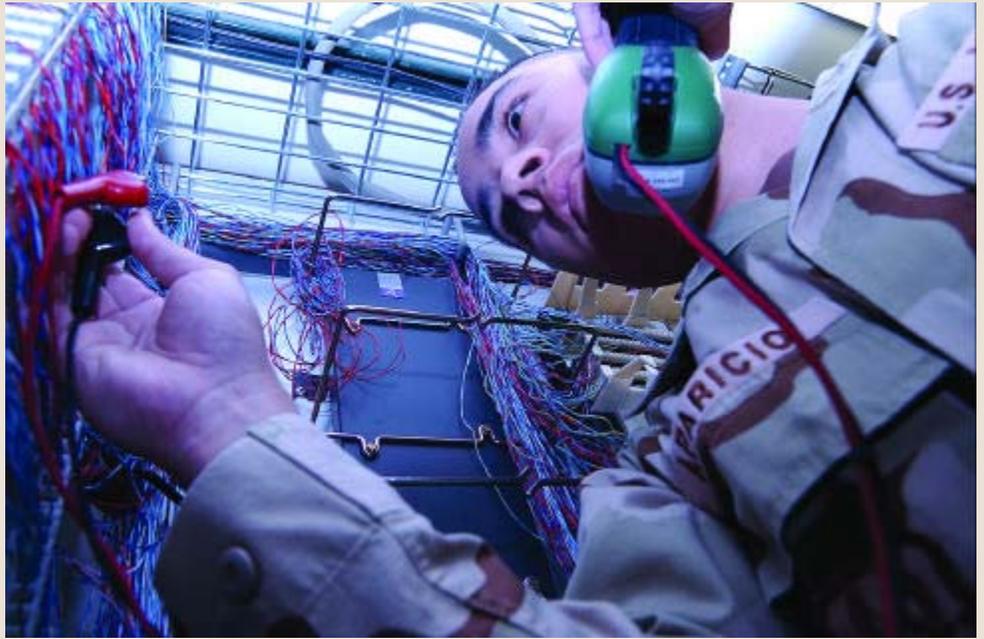
The Air Force designated pilot program will try to “partner up” the new wearable computer and the UID system to make life as easy as possible for the people working on the flight line.

It is the goal for the 116th Maintenance Group to take these two pilot programs to a status where they will become a departure point for implementation DoD wide.



Red or blue wire?

AL UDEID AIR BASE, Qatar – Senior Airman Rudy Aparicio, a telephone systems journeyman, tests a phone line for a dial tone Friday. The telephone maintenance crew keeps more than 1,000 phone lines operational at the Combined Air Operations Center here. Airman Aparicio is deployed from the 96th Communication Squadron at Eglin Air Force Base, Fla. (AF photo by Airman 1st Class J.G. Buzanowski)



AFMC Warfighters



Airmen help connect Iraq's future

BAGHDAD, Iraq — Sarah Izet, an Iraqi native and Skylink USA information technician, and Airman 1st Class Brendon Vanzile, a 447th Expeditionary Communications Squadron telephone maintenance journeyman, attach connectors to communications wiring. Airmen here helped lay more than 700 feet of fiber optic cabling to bring high-speed access to the Baghdad International Airport. A team of 447th Air Expeditionary Group cable maintenance shop and telephone systems Airmen are establishing high-speed computer and satellite communications capability to the airport. After Skylink, the contractor responsible for bringing the entire airport up to international commercial standards, ran short on some supplies and tools, the communications squadron provided support. The team identified problems with the way the former Iraqi regime installed communications lines and substandard materials and lacked proper equipment to boost signals. The Air Force donated surplus fiber optic cable, cable connectors, tools, media converters and communication switches to help correct the situation. Training Iraqi employees who will maintain the system in the future is a key part of the joint Air Force and Skylink effort. To that end, Iraqis followed the Airmen through every task, from running cables through floors to attaching equipment to the cabling. (AF photo by Master Sgt. Sean Cobb)

Med group facilities get clean bill of health

EGLIN AIR FORCE BASE, Fla. — Inspectors recently announced the 96th Medical Group’s laboratories here received their highest marks in its College of America Pathology and American Association of Blood Banks inspections. The lab passed five major inspections this year, including the Unit Compliance Inspection.

Lt. Col Kimberly Robinson, deputy commander of the Pathology Flight, said the inspectors found zero discrepancies in either the laboratory or the blood bank program, which employs approximately 40 military and civilian personnel.

The inspectors perform an on-site inspection every two years. In the off years, the hospital conducts a self-inspection using checklists sent from the CAP.

The CAP accredits the entire department of Pathology; in addition, the blood bank is accredited by the AABB and licensed by the Food and Drug Administration.

The CAP usually has a blood bank specialist on the team who is also qualified to do the AABB inspection, which delves deeper into specific blood bank



Airman 1st Class Adam Antonioli, lab technician with the 96th Medical Group, Eglin AFB, Fla., draws blood from patient Peggy White. (AF photo by Lois Walsh)

procedures.

“The team watched the technicians do procedures and looked at our processes,” Colonel Robinson said. “Both are very thorough inspections that are conducted not just on military hospitals but on any laboratory from small clinics up to multiple trauma facilities.”

Besides its inspection kudos, the lab-

oratory team was recently recognized as the best in Air Force Materiel Command, and three individuals were also singled out for recognition at command.

According to Colonel Robinson, the award validated everything they worked on all year.

— AAC Public Affairs

Air Force Materiel Command blasts Air Force Assistance Fund goal

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Air Force Materiel Command as a whole surpassed its collective Air Force Assistance Fund goal this year, contributing \$176,072.82 more than initially targeted.

Setting the command’s sights on \$668,297.67, the AFAF campaign ended with the command reaching 126

percent of that amount, according to Staff Sgt. Heather Walker, command AFAF monitor.

“Not only did the command surpass this year’s goal by more than \$175,000, this year’s tally is \$129,831.10 more than that contributed in the 2003 campaign; and that campaign surpassed that year’s goal by more than \$115,000,” Sergeant Walker said.

The annual Air Force Assistance Fund was established to raise funds for the charitable affiliates that provide support to the Air Force family — active-duty members, retirees, reservists, guardsmen and their families to include surviving spouses in need. These organizations are the Air Force Village Foundation, the Air Force Aid Society, the Gen. and Mrs. Curtis E. LeMay Foundation and the Air Force Enlisted Village Foundation.

These organizations help Air Force people with aid in an emergency, with educational needs or to have a secure retirement home for widows or widowers of Air Force members needing financial assistance.

“Requests for assistance have continued at record levels since Sept. 11, 2001. Last year the Air Force Aid Society helped 30,000 Airmen with more than \$22.6 million in assistance — that’s a lot of help,” said retired Lt. Gen. Mike McGinty, Air Force Aid Society chief executive officer. “Contributions are vital for the society to sustain this kind of help — it is truly an Airmen-helping-Airmen program.”

— ASC Public Affairs

Base	Campaign goal	Total \$	% of goal	A-D Participation
Arnold	\$2,063	\$4,405	214	70.5 percent
Brooks	\$23,319	\$42,601	183	63.4 percent
Edwards	\$58,474	\$79,193	135	27.6 percent
Eglin	\$112,217	\$100,368	89	19.6 percent
Hanscom	\$39,548	\$48,174	122	25.7 percent
Hill	\$70,791	\$91,374	129	30.1 percent
Kirtland	\$62,551	\$71,110	114	22.9 percent
Robins	\$86,273	\$92,296	107	21 percent
Tinker	\$90,561	\$109,142	121	22.3 percent
Wright-Patterson	\$122,472	\$205,710	168	46.3 percent
AFMC Total	\$668,297.67	\$844,370.49	126.3	28.1 percent



Jammin'

Master Sgt. David Mitchell, right, lead guitarist, and Staff Sgt. Kenneth Maurais, bass guitarist, perform at the Coalition City Plaza for the 379th Expeditionary Wing in southwest Asia. The U.S. Air Force Band of Liberty, Hanscom AFB, Mass., recently returned home from a historic two-week deployment to the Middle East where they played for troops at six forward locations. This was the first time in history bandmen deployed with an Air Expeditionary Force. The U.S. Air Force Band of Flight, Wright-Patterson AFB, Ohio, will most likely deploy this summer to play at several venues for troops in Afghanistan and Iraq. (AF photo by Tech. Sgt. Demetrius Lester)

Radium poses no risk at facilities

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Official test results from six Air Force facilities indicate building occupants and visitors are not at risk from radioactive material left over from luminous paints used at the bases some 60 years ago.

Air Force Institute for Operational Health experts from Brooks City-Base, Texas, examined facilities at the former Griffiss Air Force Base, N.Y.; Wright-Patterson Air Force Base, Ohio; Hill Air Force Base, Utah; Robins Air Force Base, Ga.; Tinker Air Force Base, Okla.; and Fairchild Air Force Base, Wash.

The team focused on these six bases because people assigned there used radium paint and repaired items coated with the radioactive substance during the World War II era. Radium was used in paint to make aircraft instrument markings glow in the dark.

This maintenance was done in rooms officially designated as “luminous paint units” or LPUs. The team also checked the buildings for radon, a byproduct of radium decay.

“Radium is a naturally occurring element found at low levels in soil, water, rocks and coal,” said Maj. Kevin Martilla,

AFMC radiation programs chief.

“Radiation exposure levels were not expected to be much greater than exposures from radium found naturally in the environment and building materials. The Air Force confirmed this through this investigation.”

According to the report, AFIOH investigators found fixed residual radium at more than 15 locations on the former radium paint room floors and several associated areas. Major Martilla said this has been absorbed into building materials and does not present significant hazard unless disturbed through invasive activities like demolition or cutting.

Elevated, but not dangerous to the public, radioactivity was detected in five of the six former luminous paint units investigated, according to the report. No residual radium was found in Tinker AFB’s former radium paint room.

Although radiological exposures under current conditions are below federal guidelines and limits, investigators said cutting into drains, sewer lines or through concrete flooring in some of the contaminated systems could cause personnel exposures to exceed those levels.

— AFMC Public Affairs

Rome cuts ribbon at new research facility

ROME, N.Y. — The U.S. Air Force partnered with New York State for a \$24.8 million construction and modification project, creating the most current state-of-the-art research environment.

The Air Force Research Laboratory Information Directorate Research facility is the centerpiece of a \$24.8 million program that also included modifications to an existing adjacent building and site enhancements.

New York was given congressional approval to provide \$12 million toward construction costs. The Air Force funded the remaining \$12.8 million.

Gen. Gregory S. Martin, commander, Air Force Materiel Command, joined local officials and dignitaries in ribbon-cutting ceremonies for the facility.

“The construction of these new facilities, like the research lab in Rome, spurs technological growth and helps enhance the morale of our work force,” said General Martin. “Thanks to the support from the state of New York, the new Rome lab will provide a fertile environment for innovation for years to come.”

New York Governor George Pataki said the ceremony symbolizes the strong partnership between New York and the Air Force and underscores the state’s commitment to national defense.

The facility will house more than 300 government employees and contractors and will consolidate the directorate’s technical divisions into a single complex, including the adjacent existing building.

— AFRL Public Affairs



Gen. Gregory S. Martin, AFMC commander, Governor George Pataki and AFRL Information Directorate Director Raymond P. Urtz open new Rome facility. (AF photo by Albert P. Santacroce)

Med group docs bring 'MIRACLES' TO BOLIVIAN PATIENTS

Mention the word “deployment” and most people think of Iraq or Afghanistan. For 10 medics from the 377th Medical Group at Kirtland Air Force Base, N.M., deployment means their recently completed humanitarian mission to Bolivia.

The medical team included military members from Kirtland AFB, Columbus AFB, Miss., and Barksdale AFB, La., specializing in family practice, pediatrics, dentistry, optometry, clinical nursing, pharmacy and language interpretation. Team members ranged in rank from airman first class to colonel.

The medical team that included Kirtland AFB members provided primary medical, dental and eye care for the people in the El Alto region on the outskirts of La Paz, Bolivia.

Col. Karen Mathews, 377th Medical Group deputy commander, was the officer in charge of the trip. “I learned so much from a cultural, social and medical standpoint about the Bolivian people we served,” she said. “The experience taught me to value my own medical resources as well as what was available locally in Bolivia to compliment our medical management.”

The team of volunteers saw nearly 6,000 patients during a 10-day period, including 2,165 family medicine, 1,049 pediatric and 29 surgical visits. Dentists saw 764 patients and optometrists saw 1,072 people and prescribed 1,031 pairs of glasses.

“I was amazed with the humility and hope that the Bolivian people had,” said Capt. Casey Andrus, an optometrist from Columbus AFB. “Some people wept with gratitude after they put on eyeglasses that allowed them to see for the first time in years, maybe their whole life.”

In hopes of minor miracles such as these, thousands of people waited for days to be seen by the Air Force doctors including Capt. Aaron Engels, a dentist from Kirtland AFB. “I think we all learned a lot on this mission. What stands out most for me was how gracious and overly thankful all of the patients were. I feel we really made a difference in their lives.”

2nd Lt. Michelle Estep
377th Air Base Wing Public Affairs



(Top) Maj. Joe Simon, Family Practice, working with a Bolivian interpreter, discusses a patient's health concerns. (Bottom) Karen Mathews, 377th Medical Group deputy commander and leader of the medical mission team, excises a facial skin lesion. (AF photos)





Martian Living

Hangar 110 at Eglin Air Force Base, Fla., sprouts space habitats as area fifth-graders prepare to embark on a simulated trip to Mars. More than 250 students from four local elementary schools came together to build space habitats during Marsville, the culmination of six weeks of study about space and Mars in particular. The students broke off into teams and spent the first half of the field trip constructing their 'cells,' made of thick plastic sheets taped together and inflated by fans. Once assembled, the teams entered their habitats to eat lunch - only 22 ounces of food per astronaut - and discuss key considerations of living on Mars, including communication, food and waste, transportation, air use and recreation. (AF photo by Greg Murry)



Books for Baghdad

Air Force volunteers pack away books donated to Baghdad University by AFRL personnel and the Rome New York community. (AF photo)

Francis Crumb
AFRL Public Affairs

The Company Grade Officer's Council at the Air Force Research Laboratory's Rome Research Site is sending a text message to Baghdad University.

Nearly 5,000 books, predominantly textbooks and university-level literature, have been amassed from AFRL personnel and community donators since the project was instituted earlier this year.

"I was listening to the radio on the way to work back in mid-January and I heard a report on Baghdad University," said 2nd Lt. Scott J. Robertson, CGOC project manager. "It talked of how the students of Baghdad University were in the process of taking finals at the end of the first year of classes since Operation Iraqi Freedom, but were somewhat despondent about the quality of their education due to the lack of books."

"The university's library was burned to the ground during a firefight on the night when U.S. troops were ambushed on the University's Campus," said Lieutenant Robertson. "What little survived the fire was subsequently looted. The few books they have are as 'current' as the 1960s."

The project was initiated in early February with donation boxes placed in the lobbies of four AFRL buildings. It was expanded in March to Rome Free Academy at the Griffiss Business & Technology Park and community sites at the Church of Jesus Christ of Latter-day Saints and the First Presbyterian Church of Rome.

A team of about 15 military and civilian personnel sorted and packed all the books by the end April. They were delivered to the Al-Sharaka Program for Higher Education in Iraq, a consortium of four Oklahoma universities and five institutions of higher education in Iraq. Al-Sharaka is funded through a \$5 million cooperative agreement with the U.S. Agency for International Development.

"Can you imagine trying to get a good college education without books and without a library?" pondered Lieutenant Robertson. "All these books that had been stashed in a corner of the attic, in a closet or a garage can now make a real difference in the lives of some Iraqi students."

Thousands of books donated by schools in the Rome community wait to be packed and sorted before they make the long journey to Iraq. (AF photo)



LIFE'S A CANVAS

Jeanne Grimes
OC-ALC Public Affairs

It's the artist in Staff Sgt. Yves Daos that looks at the ordinary trappings of life and sees extraordinary possibilities and endless canvases.

Anything I can put color into," he said, "if there's a tool out there to put color in something, I'll use it."

Sergeant Daos, an evaluator for flight personnel in the 72nd Security Forces Squadron, Tinker Air Force Base, Okla., recalled doodling whenever he was bored in class. Then one day the art teacher at his Richmond, Calif., high school challenged him to put his artistic gift to better use.

By giving him a brush and paint, the teacher helped him tap into a wellspring of talent. It wasn't until he was finishing Airman Leadership School that others learned of his artistic bent. It was almost graduation and the Airmen were stymied at what would be an appropriate parting gift for their instructors.

"They said, 'Who's got an extra skill?'" Sergeant Daos recalled. "I said, 'I can draw or paint.' At the last minute, I drew a caricature of the three instructors."

Chief Master Sgt. Walt Kula, security forces manager, saw the caricature and made Sergeant Daos an irresistible offer.

"If you can do that," the chief said,

"maybe you can make our squadron look a little nicer."

The chief handed Sergeant Daos a photograph and showed him a blank wall in the security forces' guard mount.

Sergeant Daos transformed the wall into a mural showing security forces personnel at work at Tinker AFB.

"The actual photo showed the faces of Air Force personnel," he said. "I made my own faces and put them up there along with a military working dog."

He also changed it to include the Navy. The squadron furnished him helpers to prep the wall, mix paint and even do some of the painting. Still, the mural took almost two months to complete.

The mural's unveiling in 2003 fixed his reputation as an artist in the security forces community here.

Until he painted the mural, Sergeant Daos' art was mostly limited to portraits and like projects for his family. Occasionally, he would airbrush scenes onto the gas tanks of motorcycles.

Co-workers, knowing a departing master sergeant's love of motorcycles, wanted to give him a helmet, providing another canvas for Sergeant Daos.

The result was a red, white and blue flag with an eagle's head reaching from

front to back. It was so well-received that it wasn't long before the sergeant had another commission — this one a Kevlar helmet.

With his imagination and airbrush, Sergeant Daos painted the Kevlar dark blue and added streaming stars and a first sergeant's symbol.

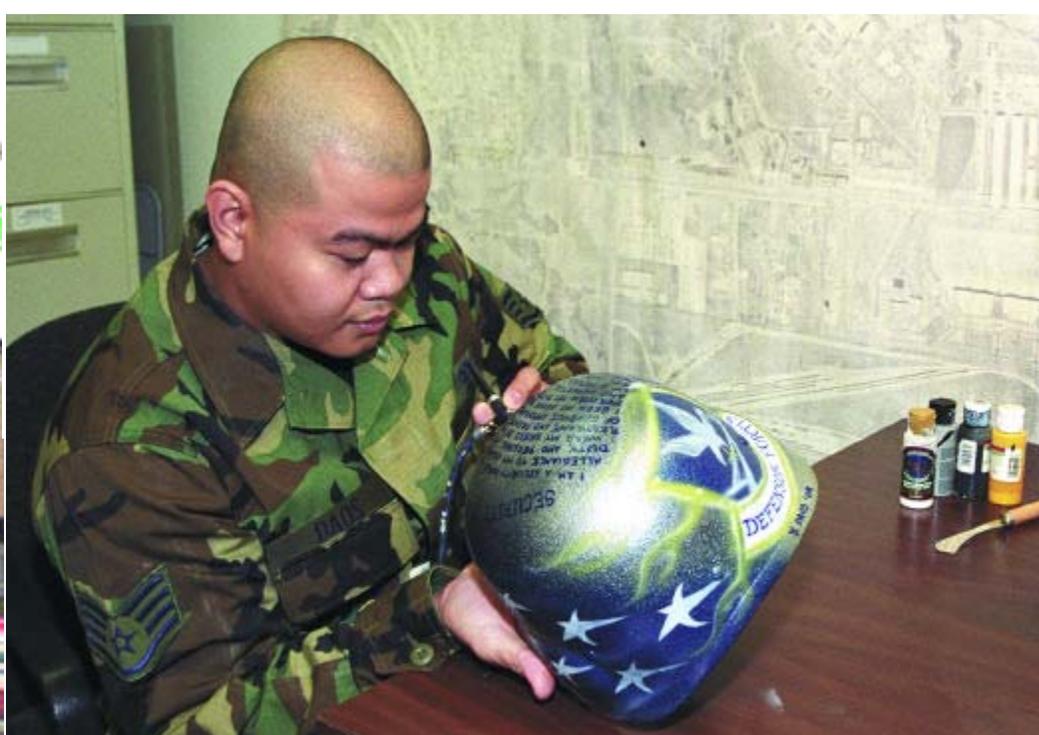
Sergeant Daos needs just two days to complete a helmet. Although he doesn't accept pay for his time, he does receive help with art supplies from the squadron.

Sergeant Daos and his wife, Juleen, have two children — Anton, 4, and Dagon, 8 months. They left Tinker AFB May 1 — wife and children back to California and Sgt. Daos to a new assignment at Osan Air Base, Korea.

It's too early, he said, to know for certain if he's passed his art skills to a new generation, but there are signs.

"If Anton gets a chance," Sergeant Daos said, "he'll draw on my walls."

Staff Sgt. Yves Daos air-brushes stars onto a Kevlar helmet intended as a gift for a fellow 72nd Security Forces Squadron member. (AF photo by Eddie Edge)





**We put
eyes in
the sky...**

AFMC