



# HIGH MACH

Serving the World's Premier Flight Simulation Test Complex



Vol. 61, No. 1

Arnold AFB, Tenn.

PSRST STD  
US POSTAGE PAID  
TULLAHOOMA TN  
PERMIT NO. 29

January 13, 2014

## AEDC test workload increases 50 percent, technology up 25 percent in 2014

By Kathy Gattis  
ATA Public Affairs

2014 is shaping up to be one of the busiest testing years AEDC has seen in a long time.

AEDC Director of Test Operations Col. Patrick Tom expects this to be a challenging year with work across all of the business ar-

reas, including a 50 percent overall increase in testing and a 25 percent increase in technology workload.

"We have engines pinned in six test cells for the first time in eight years to include engine support of the DOD's (Department of Defense) priority F-22 and F-35 fighters," Tom said.

And the news gets better... the

Engine Test Facility (ETF), Propulsion Wind Tunnel Facility (PWT) and the von Karman Gas Dynamics Facility (VKF) are running concurrently for the first time in more than six years.

PWT is covering three shifts of operations, running 24-7.

On top of that, ATA is hiring up to 70 people to help with the

increased testing tempo and many Air Force civilians are becoming "hands on" testers for the first time at AEDC.

With shrinking defense budgets and cutbacks seen in so many government programs, 'what's going on at AEDC?'

"As DOD budgets shrink, the number of large programs may

also shrink; however, there are still a large number of labs, technical demos and commercial customers who need our expertise in addition to the large, major defense acquisition programs," Tom said.

"We have a reputation for supporting critical wind tunnels,

See **WORKLOAD**, page 2

## AEDC National Full-Scale Aerodynamics Complex completes tests of 757 vertical tail

By Michael Braukus  
Public Affairs Specialist NASA Headquarters, Washington

Boeing and the National Aeronautics and Space Administration have completed wind tunnel testing of a full-scale 757 vertical tail model equipped with active flow control technology.

A major objective of the tests is to show that active flow control can enhance the performance of a vertical tail enough to enable future designers to reduce the size of the structure for a whole family of airplanes. That could reduce the penalties that the vertical tail aircraft currently pay in drag and weight.

The testing, which began in early September and concluded on Nov. 4, 2013, took place at the Arnold Engineering Development Complex's 40x80 foot wind tunnel at the National Full-Scale Aerodynamics Complex at NASA Ames Research Center in Moffett Field, Calif. The test entry lasted roughly four and a half months with nearly 800 user occupancy hours, and over 100 hours were spent operating the wind tunnel. The test utilized the 40x80 external balance system for aerodynamic force and moment measurements and the high pres-

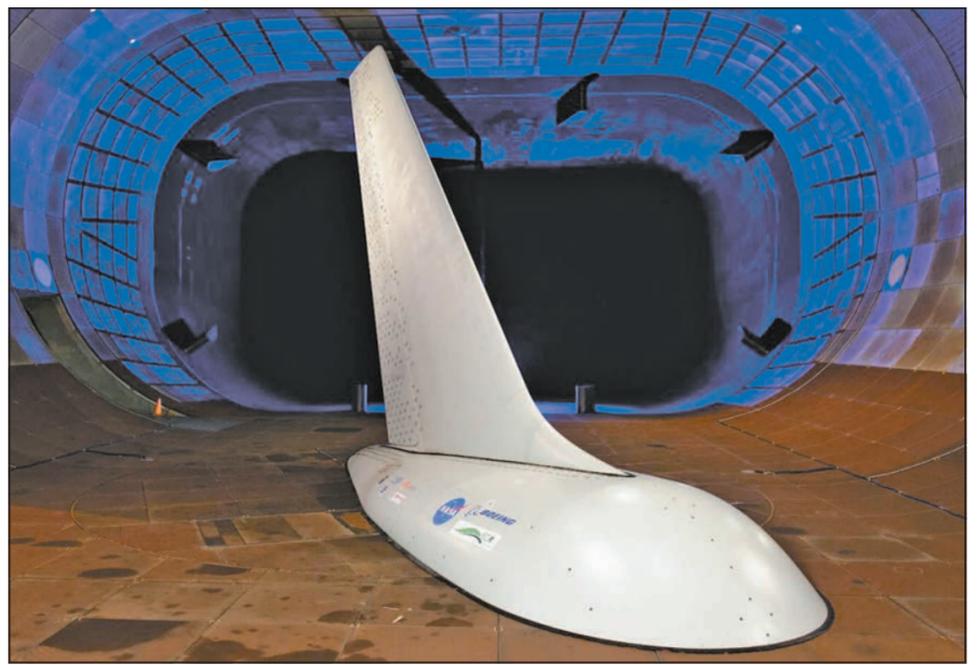
sure air system to power the active flow control components. An installation photo is provided below.

The flow control on the 757 vertical tail model comes from sweeping jet actuators, which are devices that essentially blow air in a sweeping motion along the span of the tail. The actuators are provided by NASA as part of a collaborative agreement under the NASA Environmentally Responsible Aviation program.

As the actuators blow air over the rudder, they help to redirect and reattach the air flow over the rudder that would otherwise be separated at some of the higher rudder angles. Eliminating separation on the rudder benefits performance.

The test vertical tail itself is an actual 757 vertical tail that came out of an aircraft bone yard in Arizona. With the help of a Boeing Test & Evaluation team, Advanced Technologies Inc. (ATI) of Newport News, Va., modified and refurbished the tail into a wind tunnel model.

This testing program is the culmination of technology development work over the last decade by Boeing and NASA in collaboration with small business and university partners. Boeing began small-scale wind tunnel testing on



A full-sized tail from a Boeing 757 commercial aircraft with active flow control was installed in the AEDC National Full-Scale Aerodynamic Complex 40x80 wind tunnel for testing. (NASA Ames Research Center)

representative vertical tail models about four years ago at Rensselaer Polytechnic Institute (RPI) in Troy, N.Y. Following that, NASA and Boeing extended the research to a larger scale wind tunnel model in collaboration with engineers and researchers from the California Institute of Technology in Pasadena, Calif. and the University of

Arizona in Tucson, Ariz. These same engineers and researchers were key contributors to the full-scale test.

The wind tunnel tests have enabled the Boeing-NASA team to observe "a wide array of flow control configurations across the whole low-speed flight envelope of the vertical tail," said Ed Wha-

len, Boeing Research & Technology project manager for the testing. The team will pick the most efficient and/or effective flow control configuration for future flight testing "to see how it performs in the real flight environment," Whalen said.

See **TAIL**, page 2

## AEDC's economic impact \$612 million in 2013

By Kathy Gattis  
ATA Public Affairs

AEDC economic impact – which includes AEDC and its remote operating locations the Hypervelocity Tunnel 9 at White Oak in Silver Spring, Md., and the National Full-Scale Aerodynamics Complex at Moffett Field, Calif. – was \$612.4 million in Fiscal Year 2013.

Each location impacted the local areas through payroll, secondary jobs, created through local spending, and other expenditures for supplies, utilities, fuel and services and the spin-off impact of those purchases.

AEDC employed a mixture of active-duty military personnel from the Air Force and Navy; Department of Defense civilians; and contractor personnel, which totaled 2,235 personnel in fiscal 2013. Of the 2,235 personnel, 50 were active-duty military; two Air Force Reserve and National

Guard; 289 appropriated fund civilian employees (includes general schedule, federal wage board and other military branches); 60 government non-appropriated fund employees; 36 other civilians (credit union, Base Exchange and commissary tenants); and 1,798 contractor and sub-contractor employees.

Additionally, using the Tennessee Valley Authority economic impact model methodology, AEDC estimated that more than 1,542 secondary jobs were created in the local area, for a total of 3,777 jobs directly related to AEDC. Examples of secondary jobs include those created by home construction and at local supermarkets, car dealerships and department stores.

During fiscal 2013, the payroll cost for AEDC government and contractor personnel was \$241.4 million. AEDC's direct expenditures – which include utility costs, service contracts

with outside vendors and military health insurance paid to local doctors and hospitals – was \$140 million. Furthermore, the indirect spin-off impact of these direct expenditures is approximately \$231 million.

The overall economic impact figure does not include more than \$100 million paid to the approximately 4,498 retired military personnel living in the local area. In total, this retired pay group generates more than \$147 million, including the spin-off effect.

The economic impact data and secondary employment estimates represent AEDC's economic impact during fiscal 2013, which runs from Oct. 1, 2012 to Sept. 30, 2013.

AEDC operates the world's largest complex of ground test facilities with a replacement value of more than \$11.8 billion. AEDC is the largest employer in Coffee and Franklin counties.

## AEDC Fellow Dr. John Adams Jr.'s contributions remembered

By Raquel March  
ATA Public Affairs

AEDC's evolution in computational fluid dynamics (CFD) will be remembered long after the passing of Dr. John C. Adams Jr. because of his technical and managerial leadership and research contributions.

Dr. Donald Daniel, a former AEDC chief scientist, said Adams was selected as a 1992 AEDC Fellow due to his "leadership and personal research contributions to the founding, advancement and application for computational fluid dynamics at AEDC."

CFD at AEDC is used to analyze how fluids, such as gases, interact with surfaces and boundaries using computer software.

Adams began working at AEDC in 1966 as a research supervisor with the Arnold Research Organization in the von Kármán Gas Dynamics Facility, where he served until 1980. He later served

as the manager of the technology branch. He was the author and co-author of more than 60 published papers and journal articles as well as 16 AEDC technical reports involving CFD.

Adams recently worked as an engineering consultant with Miratek Corporation, a high technology information systems, business and engineering services firm. He was an avid golfer and was a member of First Presbyterian Church in Tullahoma, the American Institute of Aeronautical Engineers and the American Society of Mechanical Engineers.

Adams is survived by his wife, Lanie Adams of Tullahoma; one son, Frank Adams and his wife Brandi of Smyrna; and one granddaughter, Anna Adams of Smyrna. Adams was 73 years old.

See an AEDC 60<sup>th</sup> Anniversary memoir written by Adams on page 3.

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## HIGH MACH

**Arnold Engineering Development Complex**  
An Air Force Materiel Command Test Complex

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Public Affairs



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The *High Mach* office is located at 100 Kindel Drive, Suite B212, Arnold AFB, Tenn. 37389-2212. Editorial content is edited and prepared by AEDC support contractor ATA. Deadline for copy is Wednesday at close of business the week before publication.

This commercial enterprise newspaper is an allowable ATA contractor publication for personnel at AEDC.

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### Core Values

- Integrity first
- Service before self
- Excellence in all we do



### Vision

"ATA will be a trusted partner in delivering best value warfighter support and assert stewardship to AEDC"

### Core Values

- Be accountable for our own actions
- Ensure the safety of individuals and equipment
- Demonstrate the highest integrity and ethical standards
- Communicate clearly and openly
- Deliver professional and technical excellence
- Nurture, enable and treat people fairly
- Align with customer goals and objectives
  - Use disciplined and innovative processes
- Continually improve in all that we do

# Leadership changes announced in the ATA Integrated Test and Evaluation Department

By Raquel March  
ATA Public Affairs

As the past director of the ATA Integrated Test and Evaluation Department (TE) Chip Stepanek leaves to venture into a new role with the ATA contractor lead company Jacobs Technology, four engineers will transition into new leadership positions at AEDC.

Dr. Rob McAmis, former deputy director of TE, will assume the role as director of TE. McAmis holds a doctorate in mechanical engineering from the University of Tennessee Space Institute and has served as the deputy director of TE for more than two years. He has held multiple leadership positions in the AEDC turbine engine testing area and has worked



**Rob McAmis**

at AEDC for 29 years.

Jeff Henderson will transition into the TE deputy director position after previously serving as the TE Test Operations branch manager. At the beginning of his 28-year career at AEDC, Henderson served in leading the Turbine Test Operations and then moved into plant management for multiple test facilities. He received



**Jeff Henderson**

his bachelor's degree in mechanical engineering from the University of Tennessee, Knoxville.

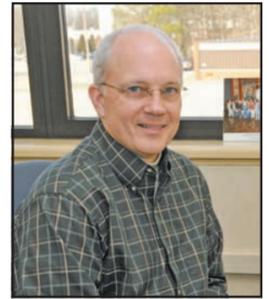
Roy Thompson, a mechanical engineer employed with AEDC for 24 years, will succeed Henderson in the position of TE Test Operations branch manager. He has a background in project engineering in the AEDC turbine test area and



**Roy Thompson**

was a lead test and systems engineer. Thompson also served as the Flight Systems Plant Assets branch manager. He holds a bachelor's degree from Tennessee Tech University.

Steve Taylor will join Thompson in leading the TE Test Operations branch. Taylor, a mechanical engineer, began his career at AEDC as a plant operations



**Steve Taylor**

engineer and later served as a test operations engineer. He also has experience as an AEDC investment project engineer and project manager and was the section manager for the AEDC Space and Missiles Test Operations. He has been employed at AEDC for 27 years and received his bachelor's degree from Tennessee Tech University.

## Base Legal Office offers tax help

By Leslie McGowan  
AEDC Contributing Writer

The 2013 income tax season has arrived and the Arnold AFB legal office is offering free Volunteer Income Tax Assistance (VITA) for eligible personnel.

All service members on active duty, retirees, and their dependents are eligible to receive these services. Unfortunately this year the legal office is unable to provide tax services to other categories of filers including DOD civilians due to manning and budgetary constraints.

IRS-trained volunteers assist tax-filers in preparing, reviewing, and electronically filing their income tax returns. Most customers receive their refund within two weeks.



**Leslie McGowan**

Tax assistance appointments are available and continue until the yearly tax filing deadline of April 15. Eligible personnel may call the Arnold AFB Legal Office at 454-7814 to schedule an appointment. VITA Volunteers can provide tax preparation up to *Advanced* and *Military* certification levels which include rental properties and Schedule A itemiza-

tions. However, taxpayers filing taxes that are beyond the VITA scope of training and certification, with complicated returns such as non-deductible IRA's, business with losses, and complicated capital gains and losses, will need assistance from a paid professional preparer for tax assistance.

Military members should access and print their W2s from the MyPay website at <https://mypay.dfas.mil/mypay.aspx> before arriving for their appointment.

If you prefer to "do-it-yourself tax returns," Military One Source has a free federal tax preparation and E-Filing program available to military members and their dependents through their website at [www.militaryonesource.com](http://www.militaryonesource.com). The website allows tax

filers to utilize a free online version of H&R Block'At Home. The software is a simple question and answer program that is a quick and easy way to complete and E-File your federal tax returns. The program also allows military members the option to E-File their state returns for a small fee.

If you prefer to file your federal and state taxes using the paper forms, these forms are now available on-line for download and printing at [www.irs.gov](http://www.irs.gov) or through the individual state tax websites. The IRS also offers a free tax program, Free File, at [www.irs.gov](http://www.irs.gov) where individuals who makes less than \$57,000 can also E-File for free. For more information, call the legal office at 454-7814.

For those who are not eligible for the military tax assistance programs, the IRS VITA program is offered at the Coffee County Lannom Memorial Library in Tullahoma and the Franklin County Library in Winchester by appointment only. For a tax appointment in Tullahoma, please call 409-3602 or you may call 967-3706 to make an appointment in Winchester.

If you live outside the Tullahoma or Winchester area and wish to locate your nearest VITA site, call the IRS information VITA line at 1-800-829-1040.

If you are interested in assisting taxpayers with tax preparation at the Arnold AFB legal office, contact Leslie McGowan at 454-7814.

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turbines, space, and missile programs. Customers know that the solutions provided by AEDC are solutions that both we and they can stand behind. The commitment and abilities of our people have been extraordinary over the years."

Still, Tom admits, it will be challenging to execute a robust workload with AEDC's smaller workforce and less funding than before, but he says the Complex can do it.

"When challenged, AEDC has always excelled," he said. "I believe this is a great opportunity to think differently about how we do T&E {test and evaluation} here and to think more innovatively about how we provide efficient, effective T&E to our customers. We should all be excited about this opportunity. I know I am!"

ATA Director of Integrated Test and Evaluation Dr. Rob McAmis agrees. He says ATA is excited about the variety of workload across test areas, and likes the Air Force emphasis to 'own the experiment.'

"The concept of owning the experiment allows our teams to dig technically deep in the planning, execution and

post-experiment assessment phase, ultimately providing our customers quality information in addition to basic data production," McAmis said.

"We like a challenge; we have highly technical folks who make up our test project teams, and they excel most during times of challenge."

McAmis said upcoming projects will require risk-tolerant approaches to cost and schedule; timely test peculiar hardware design and fabrication; unique installation and build up; energetic project management; and effective test execution and information production directed toward customer's needs for decision-quality-information.

In 2013, AEDC successfully provided test and evaluation for 39 programs to advance national capabilities in the crucial areas of aerodynamics, propulsion, space, and missiles.

Increasingly, AEDC is becoming known as a one-stop-shop Complex. The concept that all services from the design to model build-up to the testing and data analysis – all aspects of the test can be done by AEDC... one Complex can test the engines, the

aerodynamics, analyze store separations and conduct other specialized engineering development.

A prime example was last fiscal year as AEDC engineers, craftsmen, program managers, analysts and other members of the team worked together to determine the airworthiness of eight proposed leading edge modification candidates for the A-10.

"Our work with the A-10 led to the identification of a suitable replacement for the aircraft's actuated leading edge slats," Tom said. "We recommended corrections needed to end the estimated

\$25 million (in 10 years) of loss and repairs on the A-10. "Prior to the work done at AEDC, these slats were also the potential contributor to 125 mishaps."

Even though business is great now, ATA General Manager Steve Pearson reminded employees recently, "We need to continue to build our business to keep our people working, and when you sense a customer is getting away, start discussions with your company management and your Air Force counterparts. We must do everything possible to win work, deliver on time/schedule and at the level of quality

expected of AEDC."

While the future of many DOD technology programs in today's fiscal environment is murky, AEDC stands poised to help reduce the cost and cycle time of any programs DOD chooses to pursue. AEDC Commander Col. Ray Toth sums up the role of Arnold AFB by stating, "leveraging our highly-talented, innovative workforce of engineers, technicians, and support personnel, AEDC remains committed to Gen Hap Arnold's vision of ensuring the U.S. is never caught technologically unprepared to meet any adversary, any time, anywhere."

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The flight testing will be aboard the Boeing ecoDemonstrator program 757 flight test aircraft. The ecoDemonstrator program is Boeing's development and test program that focuses on improving environmental performance by bringing new technologies, materials and methods to implementation faster than ever before.

"The combined wind tunnel and flight tests will represent the first full-scale flight demonstration of this active flow control technology," Whalen said. "That will give us insight into how the system works, how effective and efficient it is, things that we're not completely sure of at this point."

Active flow control involves the manipulation of a flow field – through the addition of energy – to improve the aerodynamic performance of an aircraft structure. Active flow control can enable the design of simpler, smaller and more aerodynamically efficient structures that help reduce aircraft weight, drag and fuel consumption.

"The application of active flow control technology

throughout an aircraft system could affect the way future airplanes are designed," Whalen said. "There might be different wing shapes, you might choose different sweep angles, different aspect ratios of wings, based on the fact that

you know what the effect of flow control is ahead of time," he said. "And you could get an overall more effective and efficient system if you consider active flow control as part of the system rather than as a fix or add-on."



**A full-sized tail from a 757 commercial aircraft was modified and equipped with tiny jets called "sweeping jet actuators" that blow air across the rudder surfaces. (NASA Ames Research Center)**

# Give blood during National Blood Donor Month

By Raquel March  
ATA Public Affairs

January is National Blood Donor Month and AEDC employees will have an opportunity to donate blood with the American Red Cross during a blood drive Jan. 22 and Jan. 24, 11 a.m. – 3 p.m.

Red Cross provides a convenient method for

donating blood using a mobile blood collection lab.

The bloodmobile will move to a different location each day while stationed at AEDC.

The January bloodmobile blood drive will be conducted on Jan. 22 at the Administration and Engineering Building and on Jan. 24 at the Main

Auditorium. Employees may donate at the two locations during work hours with approval from their supervisor.

During this blood drive, donors will receive free T-shirts.

Some common struggles this time of the year with receiving donations are holiday schedules, inclement weather and win-

ter illnesses.

To be eligible to donate, you must be at least 17 years old (16 years old with parental consent), weigh at least 110 pounds and be in good health. The process usually takes about 30 minutes and includes a complimentary snack and t-shirt. Donors are asked to drink plenty of fluids - avoiding caf-

feine - and eat a meal that is rich in iron prior to donating. Bring identification in the form of a donor card or driver's license

The Red Cross Tennessee Valley Blood Services Region serves nearly 60 hospitals in Tennessee, Western Kentucky, Southern Illinois and parts of Missouri. They

must have approximately 600 people donate blood or platelets each weekday to meet the needs of hospital patients.

To donate blood at other locations see [www.redcrossblood.org/make-donation](http://www.redcrossblood.org/make-donation).

For more AEDC blood donation guidelines and information, call 454-5387.

# AEDC Fellow Memoir: NASA Space Shuttle External Tank Unsteady Buffeting Problem

By Dr. John C. Adams Jr.

In the early-to mid-1970s, the von Karman Gas Dynamics Facility (VKF) was heavily involved in configuration development testing of the NASA space shuttle, both orbiter and launch vehicles (external tank and solid rocket boosters). The external tank went through aerodynamic force and moment testing in VKF's Tunnel A over a range of Mach and Reynolds number with Harry Carroll from Martin Marietta (now Lockheed Martin) the on-site user representative.

Martin Marietta was the prime contractor to NASA

for external tank design and construction. At that time Billy Griffith was the assistant branch manager in the aerodynamics projects branch of VKF. Griff, as he was referred to, made a special point to meet with the on-site user representative early every morning to see how the previous night's testing had gone and if there were problems which needed to be addressed during that day in order to be ready for implementation the next night.

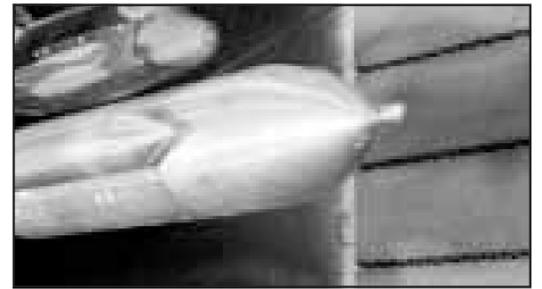
One morning Harry came in with a request for help - the external tank was experiencing an unsteady buffeting at some flow and model attitude

conditions. Griff called me in and we looked at the real-time Schlieren movies of the buffeting phenomena where it quickly became apparent that the root cause was the blunt-nosed cover for the oxygen valve on the very front of the tank. Harry referred to this blunt-nosed cover as the "fire hydrant" and indeed it did resemble a fire hydrant attached to the front of the tank.

Griff and I suggested that the "fire hydrant" be replaced with a sharp biconic nose cone, which Harry was agreeable to try. Using computational fluid dynamics (CFD), we designed an appropriate biconic nose cone, gave

a sketch of it to the VKF machine shop for modification of the external tank model and were ready to test that night. In our next morning meeting, Harry was ecstatic over how well this biconic fix had solved the buffeting problem. Martin Marietta refined and implemented this biconic nose cone concept on the production external tank and the entire shuttle flight program utilized this configuration.

Just another example of how AEDC has helped to locate and solve problems using ground test before flight. Remember the red white and blue AEDC button "TEST BEFORE FLIGHT" slogan.



NASA Space Shuttle's External Tank in the von Karman wind tunnel facility. (AEDC file photo)



Space Shuttle External Tank (NASA photo)

# ATA General Manager presents Jacobs scholarships

By Raquel March  
ATA Public Affairs

The Jacobs Engineering Foundation awards up to 20 academic scholarships of up to \$3,000 each year to qualified, eligible family members of Jacobs employees. For 2013, three children of ATA employees received the foundation's Dr. Joseph J. Jacobs Scholarship at a ceremony in December.

Recipient Marissa Power, daughter of ATA employee Greg Power and Rena Power, is a freshman attending Georgia Institute of Technology and majoring in mechanical engineering.

"Marissa's mother and I are very proud of her accomplishments in high school academics and music," said Greg. "In her first freshman semes-

ter at Georgia Tech she has demonstrated that she will continue to make us proud. We appreciate Jacobs' acknowledgement of her capability to succeed through this scholarship award."

Recipient Gareth Penfold, son of ATA employee Tom Penfold and Jackie Penfold, is attending The University of Tennessee at Knoxville and majoring in electrical engineering.

Tom expressed that Gareth is honored to receive the scholarship "in recognition of his high achievement and support for his educational goals and aspirations. We are very appreciative of this reward and support from Jacobs."

Gareth plans to become involved in cooperative education efforts and study abroad work-

ing on the development of new electronic control systems focused on electric vehicle innovations.

Recipient Eric Nelius, son of ATA employee Andy Nelius and Sharon (Johnson) Nelius, is also attending the University of Tennessee at Knoxville and majoring in nuclear engineering.

Eric's grandfather, Arlis Johnson, is a first generation retired AEDC employee who attended the scholarship ceremony and expressed his pride in his grandson.

He said that "it speaks volumes" that a prestigious organization like Jacobs would give scholarships to its employee's children.

Eric's paternal grandfather, Martin Nelius - who is deceased, is also a first generation AEDC re-

tiree. Andy remarked that Eric's family is proud that he received the scholarship due to the long history his family has had with AEDC.

Andy recalled that his father Martin became involved with AEDC through a summer hire program patterned similarly to a co-op program.

The Jacobs Engineering Foundation created the scholarship program in 2009 as a tribute to Dr. Joseph J. Jacobs - the founder of Jacobs Engineering Group Inc. - for his commitment to higher education and his goal to make an education affordable to children. The scholarship is made available to students majoring in any of the science and technology fields of study at an accredited four-year university worldwide.



Gareth Penfold (right), a recipient of the Dr. Joseph J. Jacobs Global Scholarship, accepts his scholarship from ATA General Manager Steve Pearson. (Photos by Jacqueline Cowan)



Marissa Power (right), a recipient of the Dr. Joseph J. Jacobs Global Scholarship, accepts her scholarship from ATA General Manager Steve Pearson.



Dr. Joseph J. Jacobs Global Scholarship recipient Eric Nelius (center) displays his scholarship alongside his father Andy Nelius (left), an ATA Engineer, and grandfather Arlis Johnson, a retired Sverdrup employee with AEDC.

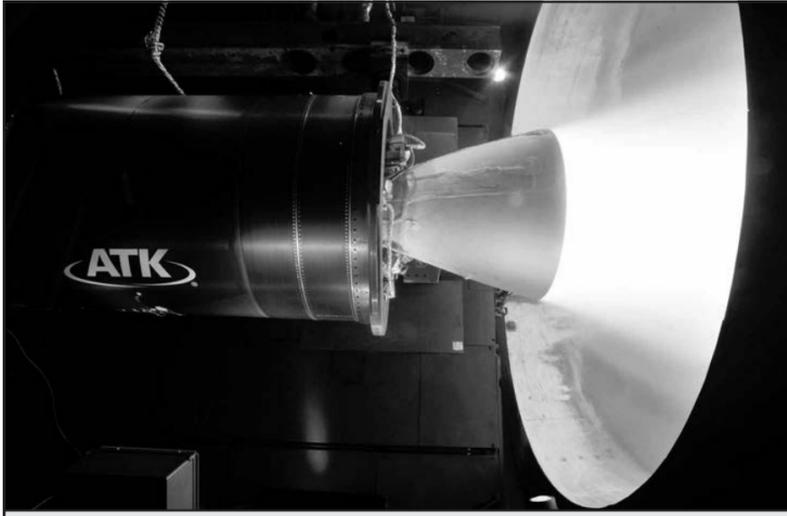
## Holt promoted to colonel



ATA Mission Support Deputy Branch Manager Warner Holt (center) was recently promoted to colonel in the U.S. Army. Shown here assisting with his pinning and promotion ceremony is Maj. Gen. Max Haston (left), the Adjutant General of Tennessee, and Holt's wife Nancy. (Photo by Rick Goodfriend)

# AEDC Year in Review

## TESTS AND SUPPORT.....



An Alliant Techsystems, Inc.'s (ATK) CASTOR® 30XL developmental rocket motor underwent testing in AEDC's J-6 Large Rocket Motor Testing Facility. "AEDC is the only place to test this motor, due to their unique capability of being able to simulate upper atmospheric conditions," said Jeff Winter, ATK program manager for CASTOR® 30XL. The J-6 Test Unit Support System was upgraded with state-of-the-art software and hardware for its new Facility Control System. (Photo by Rick Goodfriend)



ATA machinist Larry Phipps installs a Naval Surface Warfare Center thermal protection material wedge test article in the AEDC High-Enthalpy Arc-Heated facility H3 test cell prior to a test run at AEDC. (Photo by Rick Goodfriend)



The Pratt & Whitney Canada PT6A-68 turboprop engine that underwent testing at AEDC powers the Texan II which is used by the U.S. Air Force for basic pilot training and the U.S. Navy for primary and intermediate joint Naval Flight Officer and Air Force combat systems officer training. The engine is shown here installed in AEDC's SL-1 engine test cell and includes a special shroud to provide a simulated flight environment for the propeller. Without the shroud the propeller would create a pulse every time the blade passes at the closet point to the bottom of the test cell. (Photo by Rick Goodfriend)



Aviation Week & Space Technology magazine bestowed an Aeronautics/Propulsion award to a Speed Agile team that included employees of AEDC's National Full Scale Aerodynamics Complex (NFAC), Mountain View, Calif. From left, then AFMC commander Gen. Donald Hoffman and AEDC's National Full-scale Aerodynamic Complex (NFAC) Test Director Patrick Goulding II get a close look at a 23-percent scale model of the Speed Agile technology demonstrator that recently underwent aerodynamic testing in the world's largest wind tunnel at NFAC in Mountain View, Calif. (Photo provided)



ATA team members received a National Aeronautics and Space Administration (NASA) Group Achievement Award for their involvement in the second Alternative Aviation Fuel Experiment (AAFEXII) program. The team supported the emissions measurements testing during NASA's alternative fuels tests using a DC-8 aircraft and GE CFM-56 engines shown here at the Dryden facility in Palmdale, Calif. They were recognized for outstanding achievement in establishing the impact of hydro-treated renewable jet fuels on commercial aircraft engine performance and pollutant emissions utilizing a rake positioned behind the inboard engine. (Photo provided)

# AEDC Year in Review

## TESTS AND SUPPORT.....



Prior to a static performance test at the University of Tennessee Space Institute (UTSI) Propulsion Research Facility, Brad Besheres, an outside machinist in the ATA Technology Branch's instrumentation and diagnostics group, is inspecting AEDC's upgraded J85 Augmentor rig coupled to GE's developmental augmentor assembly, all of which is mounted on the facility's T-6 thrust frame. The test has two phases, with the first to characterize and evaluate the augmentor's durability and mission performance. The second phase focuses on instrumentation and diagnostics project activities. These focus on various measurement techniques (optical tail pipe camera stereoscopic imaging and gas sampling techniques) that can be applied to gas turbine engines. *(Photo by Rick Goodfriend)*



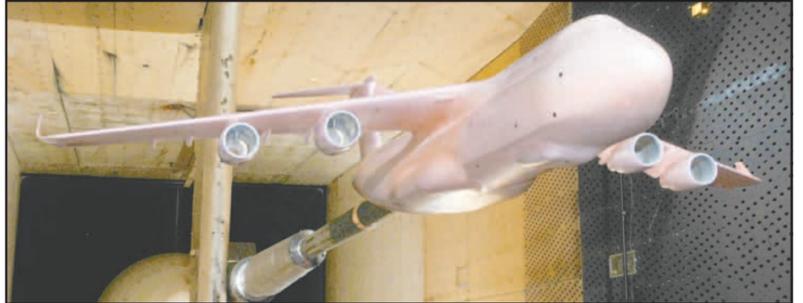
Keith Gipson, an ATA outside machinist, installs newly designed and fabricated nozzle actuators in the Propulsion Wind Tunnel's four foot transonic wind tunnel, 4T at AEDC. The actuators are electromechanically driven ball-screw jacks which move the flexible top and bottom plates in the 4T tunnel closer together providing variable Mach numbers or wind speeds. This new installation is one portion of an ongoing upgrade in 4T improving functionality for customers and synergy between wind tunnel control rooms. *(Photo by Rick Goodfriend)*



A team comprised of engineers, outside machinists, schedulers and other specialists at AEDC focused their ideas, energy and time over the past four years on completing the first major modernization program on the 1950s-era von Kármán Gas Dynamics Facility (VKF). In addition to the advanced test capabilities this effort brought to AEDC, the team of employees who worked on this effort during the period beginning with fiscal year 2011 and continuing through the first quarter of fiscal year 2013 earned the prestigious Jacobs Engineering Zero Accident Award for calendar year 2012. To earn this award, team members worked over 250,000 consecutive hours without an injury. Joe Syler, an Aerospace Testing Alliance outside machinist, is shown in this picture making an adjustment to the Ares I first stage booster model in the VKF Tunnel B prior to the resumption of heat transfer testing. *(AEDC photo)*



The Tiltrotor Test Rig (TTR) Team, including the AEDC National Full-Scale Aerodynamic Complex, received the Group Achievement Award at the NASA Ames Research Center NASA Agency Honor Award ceremony. The TTR is shown here on the calibration stand. *(NASA photo)*



During the American Institute of Aeronautics and Astronautics (AIAA) Tennessee Section annual awards program on May 29, an AEDC test team was recognized for their outstanding contributions to the C-5M Super Galaxy winglet upgrade test. Pictured here is the C-5M Super Galaxy model in Arnold Engineering Development Complex's (AEDC) 16-foot Transonic Wind Tunnel. The model is a pink color as a result of AEDC's application of Pressure Sensitive Paint (PSP) to it before the test was conducted. *(Photo by Rick Goodfriend)*



AEDC implemented Global Harmonization, a global agreement developed by the United Nations and adopted by over 65 countries. It standardizes information found on chemical material safety data sheets and product labels between countries. Larry Parks, in ATA Mission Support Department, applies the proper label to a drum. The new United Nations Global Harmonization System (GHS) requires all nations to follow the same labeling standards. *(Photo by Jacqueline Cowan)*



AEDC police began using the new Defense Biometric Identification System (DBIDS) to assist employees and visitors in gaining entry to the base. Office Jim Taylor operates the new DBIDS as ATA employee Mary Beth Barlow enters the AEDC main gate. The DBIDS scans an individual's Common Access Card (CAC) or similar DOD credentials when they enter the base security gates. *(Photo by Jacqueline Cowan)*



Information Protection (IP) office team members received the AFMC 2012 Information Protection Team of the Year Award. Team members shown in this photo left to right are: Loraine McElroy, ATA; Tamalena Breiding, ATA; Holly Petty, AEDC Test Support Division (TSD)-IP; Kathy Saine, ATA; Keena Cornelius, ATA; Jeannie Bowden, ATA; David Madison, TSD-IP; Angelia Garrard, ATA; Nichol Northcutt, ATA; Vivian Seals, ATA; and Elise Sherrell, ATA. Team members not shown are Jack Glasser, TSD-IP; Lindsay Haig, Test Operations Division (TST) - Tunnel 9; and Charles Ingalls, TST - NFAC. *(Photo by Rick Goodfriend)*

# AEDC Year in Review

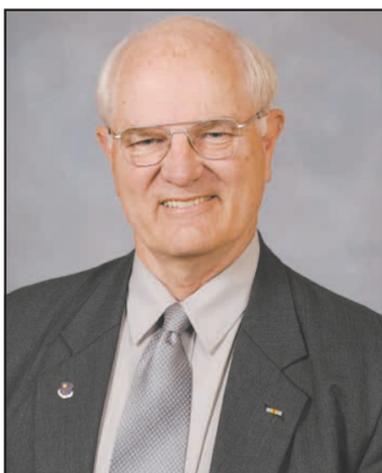
## SPECIAL EVENTS.....



Former astronaut Dr. Jan Davis was the keynote speaker for the Engineers Week banquet. The Techno Warriors, East Coffee Elementary School's Lego Team, demonstrated their robotics at the National Engineers Week Banquet, Feb. 21. The team met and talked with former astronaut Dr. Jan Davis and AEDC Commander Col. Raymond Toth. Pictured from left are Kyle Duke, 4th grade, Tyler Bernotas, 5th grade, Sarah Leedy, 5th grade, Dr. Davis, Col. Toth, Brason Fletcher, 4th grade, Ian Prater, 5th grade, and Grey Landrum, 7th grade. (Photo provided)



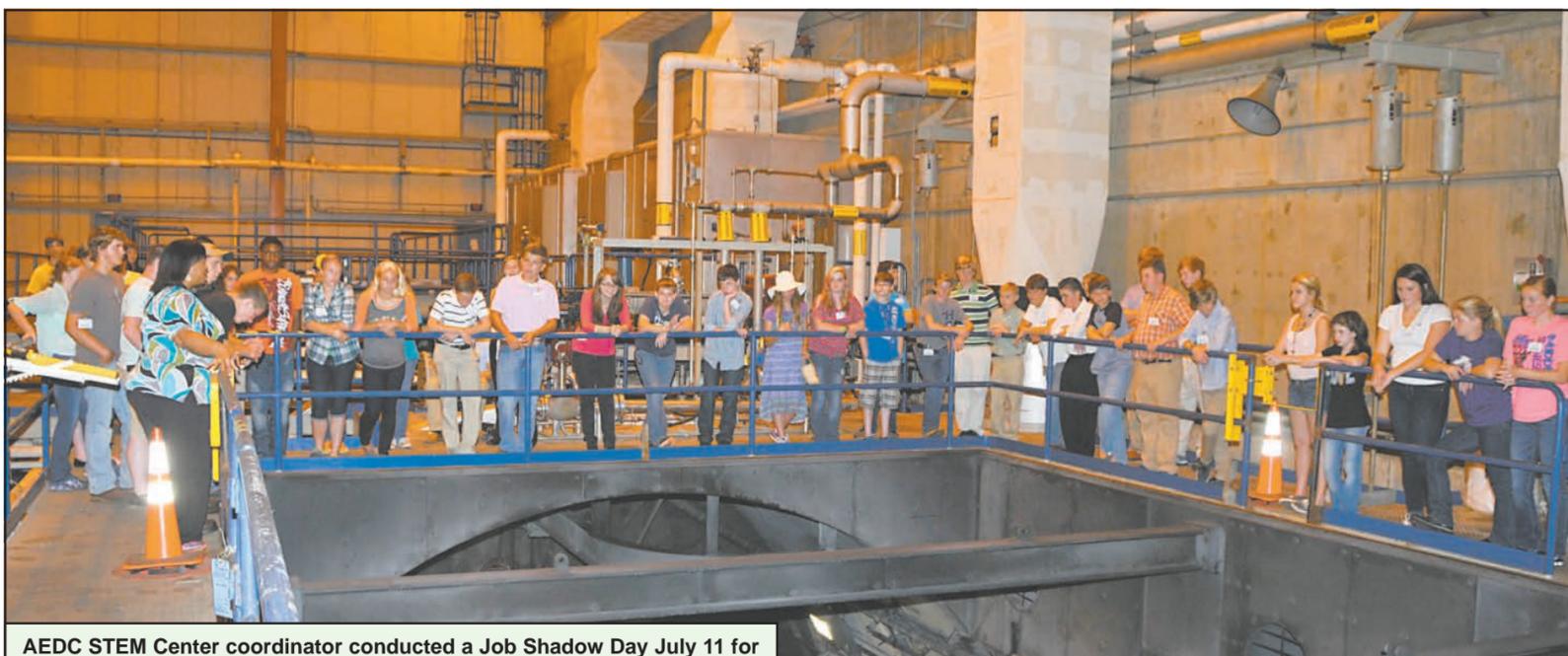
This Bird in Space sculpture was the inspiration for a student Erin Hedlund wind tunnel model tested in AEDC's Hypervelocity Wind Tunnel 9. The test article was based on L'Oiseau dans l'espace (Bird in Space), a series of sculptures by Constantin Brancusi, a Romanian artist. Artist Iñigo Manglano-Ovalle takes photographs of the Bird in Space student wind tunnel model. Manglano-Ovalle suggested creating a sculpture inspired from the wind tunnel to be displayed in new construction at the Federal Research Center at White Oak - the property that Tunnel 9 occupies with the Food and Drug Administration. (Photo by Arnold Collier)



AEDC leadership inducted new AEDC Fellows David Beale and Marvin Sellers and AEDC Lifetime Achievement Fellows Ron Polce and retired Maj. Gen. Michael Wiedemer at the annual AEDC Fellows Banquet June 25. (Photo by Rick Goodfriend)



The Arnold Community Council (ACC), a group who supports and promotes AEDC, made their annual trip to Capitol Hill for meetings with elected officials and key staffers at the Pentagon. They also collaborated with support councils from Edwards and Eglin Air Force Bases. One of the ACC's primary objectives was to encourage membership in the newly formed 'testing center' caucus. Shown in this picture (l-r) are former ACC President Steve Cope and Tullahoma Area Chamber of Commerce Executive Director Diane Bryant speaking with Congressman Diane Black about the caucus she recently formed. (Photo by Kathy Gattis)



AEDC STEM Center coordinator conducted a Job Shadow Day July 11 for the children of AEDC employees. (Photo by Jacqueline Cowan)



Almost 150 job seekers and 20 exhibitors participated in a job fair sponsored by Arnold Community Council (ACC) and Tennessee Senator Janice Bowling. A representative from Bridgestone is seen in this photo talking with a potential employee during the job fair. The event was open to ATA employees who were reduced in force, Air Force civilians who were furloughed and the community. (Photo by Jacqueline Cowan)



Arnold Community Council (ACC) members and AEDC leadership gathered to hear U.S. Air Force retired Lt. Gen. David Deptula at the ACC annual dinner Oct. 10. More than 290 people attended the event where there were 40 sponsors. The ACC, an independent organization of community leaders, area businesses and elected officials, was formed to support and promote AEDC. Outgoing ACC President Steve Cope (right) hands the gavel over to incoming President Ben Craig at the ACC dinner. (Photos by Rick Goodfriend)

# Milestones

**40 YEARS**

Gerald Echerd, ATA  
Thomas Hartvigsen, ATA

**35 YEARS**

Kenneth Simmons, ATA  
Philip Stich, ATA  
Robert Truesdale, ATA

**30 YEARS**

Debra Barnes, ATA  
Christopher Broadrick, ATA  
Frank Brown, ATA  
Edward Dorman, ATA  
James Farley, ATA  
Jeffrey Foster, ATA  
Larry Leathers, ATA  
Marcos Moré, ATA  
Michael Tucker, ATA  
Johnny Wilson, ATA

**25 YEARS**

Paul McGill, ATA  
John Meeks, ATA  
Richard Merrill, ATA  
Zakariya Mohyuddin, ATA  
Bradley Reid, ATA

**20 YEARS**

Stephen Arnold, ATA  
Teresa Butler, ATA  
John Knox, ATA  
Raquel March, ATA

**15 YEARS**

Angela Campbell, ATA

**10 YEARS**

Douglas Blake, AF  
Janet Hollowell, AF  
Joseph Maniscalco, AF  
James Summers, ATA

**5 YEARS**

Philip Franklin, ATA  
Charles Greeson, ATA  
Thomas Lombard, ATA  
Michael Mares, ATA  
David Whitton Jr., ATA

**OUTBOUND MILITARY**

Capt. Erica Elkins, AF

**RETIREMENTS**

Katherine Moran, ATA  
Floyd Sherman, ATA  
John Sutton, AF

**NEW HIRES**

Lon Britt, ATA  
Dustin Brown, ATA  
Adam Moon, ATA  
Kory O'Brien, ATA  
Brandon Simmons, ATA

**PROMOTIONS**

Kristi Farris, ATA  
Jeffrey Henderson, ATA  
Bryan Jones, ATA  
Robert McAmis, ATA  
Denis Nisbett, ATA  
William Owen, ATA  
Steven Taylor, ATA  
Roy Thompson, ATA  
Sarah Toll, ATA  
Stacey Wimberly, ATA

**GRADUATE / DEGREES**

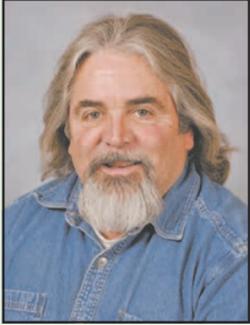
Keena Cornelius, B.S. Business/Information Technology  
Pamela McCullough, B.S. Organizational Leadership  
Rick Trull, M.S. Criminal Justice



**Marcos Moré – ATA Integrated Test and Evaluation, Project Manager**

What is your most memorable AEDC moment during your years of service?

*"Many hours (and years) of late night testing during the F119 test program in ASTF [Aeropropulsion Systems Test Facility]."*



**Christopher Broadrick – ATA Test Assets and Support, Planner/Scheduler**

What is your most memorable AEDC moment during your years of service?

*"There have been many and to pick one would be very hard to do. Having been blessed to work here for 30 years is a big one and all the great people I have worked for/with is probably the best. The friendships that have developed will last a lifetime and to me that is the most memorable."*



**Edward Dorman – ATA Information Technology and Systems, Senior Engineer**

What is your most memorable AEDC moment during your years of service?

*"On July 2-4, 2004, I was privileged to be part of a team that literally gutted and replaced the AU-Net infrastructure over a weekend. This effort was the culmination of more than six months of planning and preparation. There were 10 members of the core network engineering team who led the way, about the same number of computer-network technicians, and another 25-30 personnel involved in various support roles. The objective was to provide a seamless cutover so that when AEDC employees arrived at work on Monday July 5, they would be able to operate without issues. In addition we had to carefully coordinate with critical weekend staff, like emergency services and the AEDC Operations Center, to minimize their outage time. There were several significant challenges but the team persevered and made it happen successfully. The effort is documented in more detail in the August 12, 2004 edition of High Mach. This is my most memorable moment during my 30 years at AEDC and certainly my most rewarding effort."*



**Debbie Barnes**



**Jeffrey Foster – ATA Performance Management, Section Manager**

What is your most memorable AEDC moment during your years of service?

*"There are two. First, in April 1984, when I met my wife. She worked for Radgo Sales Company – a vendor in Cincinnati, Ohio that we purchased computer equipment from. I called checking on some past-due purchase orders and we married five months later. Second, in June 1999, when AEDC converted from the AIMS system to Synergen. It was a drastic change and was painful – as is expected when you convert to a new computer system."*



**Phil Stich – ATA Office of the General Manager, Deputy General Manager**

What is your most memorable AEDC moment during your years of service?

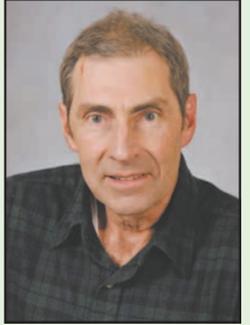
*"My favorite job was working on the Tunnel 4-5 Independent Drive System Project. It required a wide spectrum of AEDC capabilities including: Mechanical and Electrical Design, Fabrication, Procurement, Civil Engineering, Installation and Commissioning of the facility. AEDC is uniquely suited to accomplish all of this work scope."*



**Robert Truesdale – ATA Integrated Test and Evaluation, Engineer**

What is your most memorable AEDC moment during your years of service?

*"There are two: the first is any one of the many rocket firings that I was able to be the test conductor for, either in the J4- or J3 test cells in support of major rocket launch development programs. To be in charge of a rocket test – that is every kid's dream! The second is the two seasons I spent as a facilitator for the Ropes teambuilding course – probably the most rewarding fun that I ever got paid for!"*



**Thomas Hartvigsen – ATA Integrated Test and Evaluation, Engineer/Scientist**

What is your most memorable AEDC moment during your years of service?

*"Back when they [AEDC] were still running the 16S [wind] tunnel. I was invited to look at the structure inside the 16S compressor tailcone. They had been running the tunnel and had shut down. Of course, 16S gets pretty hot when it runs and it takes quite a while to cool down. They called me up and said, 'The compressor is down to 150 degrees now so we can go inside.' I said, 'That sounds like it is still too hot to me.' I went over and went inside of the 150 degree compressor tailcone. It was not as bad as I thought, but you don't want to stay in there for long. I have had many opportunities to do some very interesting work during my career at AEDC."*

# What are your New Year Resolutions?



**Vickie May**  
AEDC Protocol Chief  
Air Force Public Affairs  
30 years of service

*"My resolutions are to volunteer more in the community and find a hobby that REALLY interests me."*



**Gary Johnson**  
Forms/Publications Support Services  
Performance Management  
17 years of service

*"My New Year's Resolution is to eat more healthy foods and continue to drink more water and less tea and soft drinks!"*



**Rhonda Gray**  
Post Office Manager  
Information Technology and Systems  
20 years of service

*"I have started the New Year by taking control of my health and joined the Kiwanis club, a great organization that helps our Franklin County community. The most important 2014 wish is I pray the New Year brings good health and happiness to all my family and friends."*



**Donald York**  
Craft Supervisor  
Integrated Test and Evaluation  
25 years of service

*"I am retiring this month, the 24<sup>th</sup> of January will be my last day. I am looking forward to starting a new chapter in my life. I know I will miss my friends."*

(Photos by Jacqueline Cowan and Rick Goodfriend)



# First combat deployable F-22s arrive at Tyndall

By Staff Sgt. Rachelle Blake  
325<sup>th</sup> Fighter Wing Public Affairs

**TYNDALL AIR FORCE BASE, Fla. (AFNS)** – Tyndall Air Force Base received the first five-of-24 F-22 Raptors scheduled to transfer from Holloman Air Force Base, N.M., Jan. 6 as part of their new combat mission.

The aircraft are now a part of the 95th Fighter Squadron, which was reactivated in October

2013.

“We have been talking about the arrival of this mission for a few years,” said Lt. Col. Erick Gilbert, the 95th FS commander. “Unfortunately, we had a delay of a year, but today we were able to successfully bring in the first wave of aircraft. The next six will arrive in February, with six more in March and the final wave in April.”

The squadron’s mission is to project unrivaled combat power in support

of national military objectives and combatant commander requirements through strategic application of 5th generation air dominance fighter aircraft and personnel.

“The 95th Fighter Squadron showing up represents a new era in the capability at Tyndall,” said Col. David Graff, the 325th Fighter Wing commander. “No combat aviation unit has ever deployed out of Tyndall Air Force Base. Now, we will have the largest collection

of F-22s in the world and will stand ready to project air power and defend our nation’s freedom.”

Base officials expressed the importance of this as the next step towards the new combat mission, responsible for deploying a large number of Airmen and aircraft at any given time.

The new mission adds to Tyndall AFB’s current role as the home of F-22 pilot training. In total, more than 50 of the world’s most advanced

aircraft will call Tyndall home, making it the largest single-base contingent of F-22s in existence. More than 1,100 positions are associated with the new mission.

“We are bringing in close to 1,100 uniformed members to Tyndall plus their families, which will bring us back to a lively state like we had a few years ago,” Gilbert said.

The transfer of the planes and people does not come without its challenges, but base

leaders say they are confident the 95th FS will come out on top, thanks to the help from the Airmen and civilians at Tyndall and the local community.

“Bay County has not let us down in the 72 years we have been here and I know our partnership will continue to grow and prosper ... today is a great day,” Graff said. “The sound of freedom just got a little louder over the world’s most beautiful beaches.”

## Cadet research seeks to end costly bird-strikes on aircraft

By Amy Gillentine  
U.S. Air Force Academy

**U.S. AIR FORCE ACADEMY, Colo. (AFNS)** – Bird strikes cost more than \$700 million in damage annually to both military and commercial airplanes – putting both lives and property at risk.

But a group of cadets at the U.S. Air Force Academy, Colo., are working on ways to scare birds away from the aircraft, particularly during take-offs and landings; when the majority of bird strikes occur.

Led by professors in

the Aeronautics Research Center, cadet research focuses on the feasibility of mounting speakers onto airplanes, using noise to frighten the birds away.

Last spring, the cadets proved that noise is an effective deterrent, but are now experimenting to find out if speakers created for helicopter use can also be used on faster aircraft without damaging the speakers or losing volume.

“We are seeing if we can incorporate the type of speakers that are already designed for flight,” said Cadet 1st Class Nathan

Armes, who designed the wind tunnel experiment. “They really are designed for slower speeds, but we’re seeing if they can withstand faster flight.”

Helicopters generally travel about 150 mph while planes average about 260 mph. At faster speeds, volume tends to decline. The researchers are attempting to discover if the volume remains at the decibel levels necessary for birds to hear the noise and be scared away from the airplanes – even at faster speeds.

“The average bird has

a hearing between 1,000 hertz and 4,000 hertz,” Armes said. “So far, we know the speaker can be heard at 2,000 hertz. We’re pushing the speaker beyond its production limits. What we found is that we’re losing decibels at faster speeds, but there are some points when it can still be heard.”

The cadets are using one of the Academy’s wind tunnels to conduct their experiments, and results on the first experiments will be available by the end of January.

“It’s definitely within

the realm of feasibility,” Armes said. “We’re still assessing if it’s effective at higher levels and at stronger wind speeds.”

Cadets are investing still more effort into the idea. Cadet Blake Abrecht is in charge of research into how pilots could react to airplanes equipped with flashing lights and loud sounds to scare birds.

“We want to know if it will interfere with pilots,” said Capt. Jeff Newcamp, the Academy instructor overseeing the bird-strike research. “So, we’re including that in the

flight simulator. If there’s an aircraft landing, and there’s another plane with flashing light and noise – how will another pilot respond?”

With about 75 percent of the data collected, Abrecht says they’ve shown that pilots perform slightly better with the flashing lights and noise.

“Maybe it just helps them concentrate more,” he said.

Cadets will finish gathering data this semester, and begin to analyze their results during the spring semester.



# ATA makes STEM donations to local schools



ATA recently donated \$509.55 to the Cowan Elementary School toward the purchase of LEGO Techno Packs, a Science, Technology, Engineering and Mathematics (STEM) related learning tool for building simple machines. Shown in this photo (front row, l-r) are Cowan Elementary School students Reagan Sherrill, Sora Okawa, Lucy Barnes, Trenton Boswell, Carmen Guess and Peyton Garner; (back row, l-r) Ted Boswell, representative from the ATA Employee and Community Activity Committee, and Debra Skotte, Cowan Elementary School teacher. (Photo provided)



Pelham Elementary School received a \$1500 STEM donation from ATA toward the purchase of a Promethean Board. The board features interactive lesson instruction that includes manipulatives, modeling and math vocabulary on-line. Pelham Elementary School teacher Amy Houk (left) and Principal Willie Childers (center) are shown here receiving the donation from Tony Medley, from the ATA Flight System Plant Assets Branch Engineering and Planning. (Photo provided)

## AEDC sponsored FIRST® LEGO® League teams win awards at 2013 East Tennessee Championship



Electrons, Liberty School and Bedford County – Project Award, 1<sup>st</sup> Place (Photos provided)



Storming Stangs, McFadden School of Excellence, Murfreesboro – Project Award, 3<sup>rd</sup> Place



Mustachios, East Middle School, Tullahoma – Presentation Award, 3<sup>rd</sup> Place



Eagles, Westwood Elementary School, Manchester – Inspiration Award, 2<sup>nd</sup> Place



Eye of the Storm, Jacobs – Teamwork Award, 3<sup>rd</sup> Place



**Arnold Golf Course (GC)**  
454-GOLF, 454-FOOD

Check us out on Facebook! Arnold AFB Services Golf Course

**Winter Green Fee Special** through Feb. 28, \$10 green fee for unlimited golf. Cart fee not included.

**Hot dogs available in the Pro Shop** Monday through Friday. These hot-dogs are placed on the roller in the Pro Shop for your convenience. The hot-dogs are \$1 each.

**Mulligan's Grill** is open 10:30 a.m. to 2 p.m. Monday through Friday and 8 a.m. to 2 p.m. Saturday and Sunday. Call ahead orders for dine in or carry out, 454-FOOD (3663).

**Arnold Lakeside Center(ALC)**  
454-3350

Check us out on Facebook! Arnold AFB Services Arnold Lakeside Center and Arnold AFB Services Information, Tickets and Travel

**"3rd Day Free" ticket special offer for Universal Orlando** brought to you by ITT (Information, Tickets and Travel) at Arnold Lakeside Center. The 2-Day Base with 3rd Day Free Ticket entitles 1 guest admission to one theme park per day. Ticket is valid for any 3 calendar days during a 14 consecutive calendar day period which includes the first day any portion of the ticket is used. This ticket also includes 14 consecutive calendar days of admission to the paid entertainment venues of Universal City Walk which commences and includes the first day any portion of the ticket is used. First use of this ticket must be on or before May 9 to receive full benefit of the ticket entitlements. All ticket usage must be completed on or before May 22 when the ticket will expire in full. For complete details and to order tickets, call ITT at 454-4003.

**National Kite Flying Day** free event at the Arnold Lakeside Center Feb. 8 at 10 a.m. Join the ALC staff on the back patio to see how high you can make your kite soar. Attendees are welcome to bring their own kites or kites will be provided to those who sign up by the Feb. 3 deadline. Five participants are required for the event to take place. Call 454-3350 for more information or to reserve your spot.

**Introduction to Hula Hooping** at the ALC Feb. 15 at 10 a.m. All ages and skill levels are invited to spend their Saturday morning with instructor Christy Adams in the ALC ballroom for single and double hula hooping demonstrations. Bring your own hula hoop or use one provided by the ALC.

**Barber Shop** is located in the A&E Building in room A107 and is open Monday, Tuesday, Thursday and Friday from 8 a.m. to 4 p.m. Haircuts are \$8 and are by appointment. Call 454-6987.

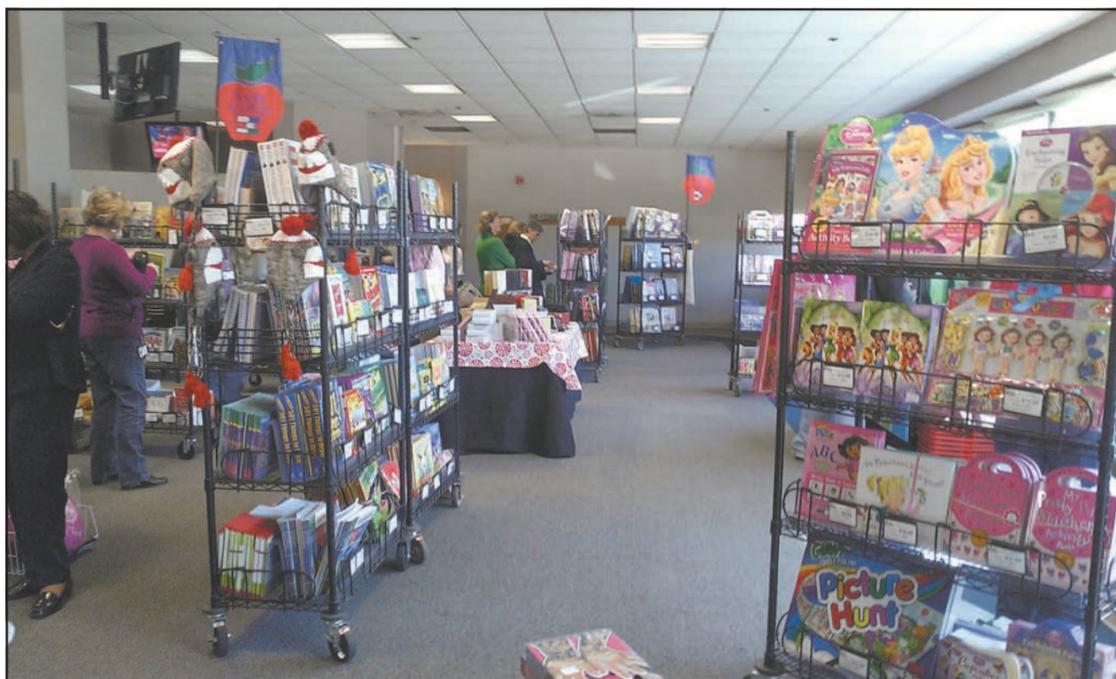
**Café 100**  
454-5885

**Daily \$6 specials** in Café 100: Every Monday is Lasagna served with salad, garlic bread and drink. Every Wednesday is Pulled Pork BBQ sandwich served with slaw, choice of chips or potato salad and drink.

**Café 100 Soup of the Day.** Warm up with one of our daily soup selections.  
Monday: Chicken Noodle  
Tuesday: Loaded Baked Potato  
Wednesday: Broccoli Cheddar  
Thursday: Vegetable Barley Beef  
Friday: Tomato

See **BREIFS**, page H3

## 'Books Are Fun' returns to Café 100 Feb. 4



Arnold Lakeside Center welcomes back Books Are Fun for a book fair from 9:30 a.m. – 3 p.m. Feb. 4 in the A&E building's Café 100. Discounted selections include paperbacks, best sellers, educational, reference, cookbooks, children's items, gift selections and more. Save up to 70 percent off retail prices.

## First Friday Jam Night Feb. 7 at Arnold Lakeside Center

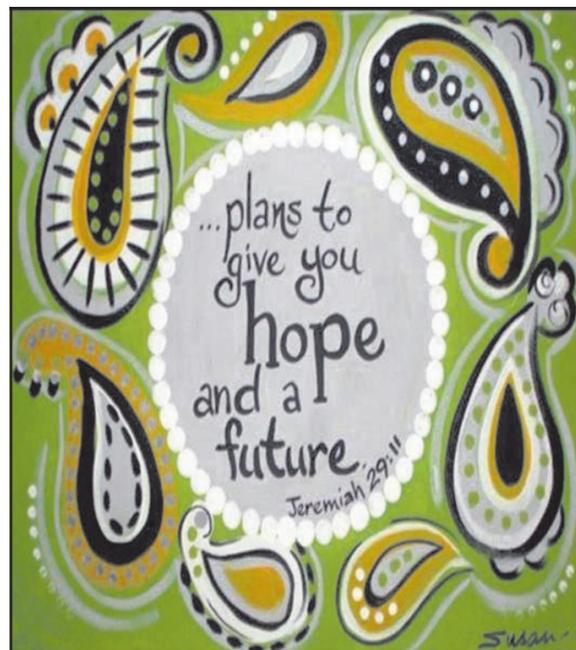
First Friday Jam will be held at 6 p.m. on Feb. 7. Come to play, listen, dance and enjoy. Join in with the band to play an instrument or sing or take over and do your own performance. First Friday Jam is a very informal, stress-free, kid friendly environment. If you would like to sing or play an instrument, please contact Jim "JJ" Jolliffe, [jajolliffe@aol.com](mailto:jajolliffe@aol.com) to get on the schedule, or simply show up with your instrument and/or singing voice. Room will be made for anyone wishing to perform. Dinner is available at the ALC from 5-8 p.m.

## Push Up, Pull Up, Sit Up Competition Feb. 12

The Fitness Center is hosting a push up, pull up, sit up competition Feb. 12 and may be completed anytime during the day. The top finisher in each category will receive an award for the highest number of reps performed in proper form. Call 454-6440 for more information.

## 'Twice the Fun' of Brushes and Bottles in Feb.

Brushes and Bottles will be held 6-8 p.m. at the GLC Feb. 13, and again 6-8 p.m. at the GLC Feb. 27. Bring your favorite beverage and quote to customize this month's painting and get ready to get creative as an instructor will lead you through a canvas painting work of art step-by-step. By the end of the evening you will have your own masterpiece to take home. These painting parties are for all skill levels ages 21 and over with a cost of only \$25 per person. All paint, brushes, aprons, easels, canvas and other necessary materials will be provided. All you have to bring is your beverage of choice. Light snacks will be provided and other beverages will be available for purchase. Deadline to sign up for this event is Feb. 7 and Feb. 21, respectively. Class size is a maximum of 15. Call 454-3350 to sign up or for more information. The participants artwork reflects their personal beliefs and personality. Bring your favorite quote to personalize this month's design.



## Valentine's Day Date Night Dinner for Two at the ALC



Arnold Lakeside Center will host an adults only Valentine's Day Date Night Dinner for Two, Feb. 14 from 6-9 p.m. The candlelight dinner for two includes 8 oz. prime rib (cooked medium rare), baked potato, salad, red velvet cake, and your choice of tea, water, or soft drink. Cost is \$16 per couple for members and \$17 per couple for non-members. Reservations are due Feb. 7. Call 454-3350 for reservations or more information.



Horizon is a Services Division publication designed to inform our customers of events and specials in Services Division activities. All program dates, times and prices are subject to change. Services Division mailing address is at 100 Kindel Drive, Suite C321, Arnold AFB, Tenn. 37389-3321

Services information written and provided by Holly Jones

This Services supplement is published by *The Tullahoma News*, a private firm in no way connected with the U.S. Air Force, under exclusive written contract with Aerospace Testing Alliance (ATA). This supplement is an authorized publication for members of the U.S. military services. Contents of this supplement are not necessarily the views of, or endorsed by, the U.S. Government, the Department of Defense, the Department of the Air Force or ATA.

Services is an exclusive area available to all AEDC personnel, active duty, retired military, National Guard, Reserve military and others as approved by the commander. Services activities include Wingo Inn (lodging), Arnold Lakeside Center (Club, Community Center, Information, Tickets & Travel (ITT), Barber Shop, Café 100), Outdoor Rec (Marina, FamCamp, Crockett Cove, Dogwood Ridge), Golf Course and Fitness Center. Those mentioned above are eligible to use any Services activity during regular operating hours unless it is specified as a "members only" event. Membership is a personal choice. However, only members are entitled to discounts and other benefits associated with membership.

## Services Division Phone Numbers

<b>Area code 931</b>	<b>DSN 340</b>		
Services Chief		454-7779	Human Resources
Services Deputy		454-5915	454-5481
Community Services Flight Chief		454-4062	Marketing & Sponsorship
Café 100		454-5885	454-3128
Arnold Lakeside Center (ALC)		454-3350	Recycling
Arnold Lakeside catering		454-3303	454-6068
Membership Information		454-3367	Wingo Inn
Information, Tickets & Travel		454-4003	454-3051
Gossick Leadership Center		454-4003	Fitness Center
Barber Shop		454-6987	454-6440
			Golf Course
			454-GOLF (4653)
			Mulligan's Grill
			454-FOOD (3663)
			Outdoor Rec (ODR)
			454-6084
			includes Marina, FamCamp, Crockett Cove & Dogwood Ridge

# February 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>GC Winter Green Fee Special continues through Feb. 28- \$10 green fee for unlimited golf, cart fee not included.</b>						<b>1</b>
<b>2</b>	<b>3</b> FC Interval Class 6 a.m. ALC Café 100 Lasagna lunch special \$6 FC Yoga 11 a.m.	<b>4</b> ALC AEDC Woman's Club ALC Book Fair, Café 100 9:30 a.m.-3 p.m. FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m.	<b>5</b> FC Interval Class 6 a.m. ALC Café 100 BBQ lunch special \$6 FC Yoga 11 a.m.	<b>6</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m. ALC Movie Night- "Captain Phillips," rated PG-13; dinner available 5-8 p.m.	<b>7</b> FC Interval Class 6 a.m. ALC First Friday Jam Night 6 p.m.	<b>8</b> ALC National Kite Flying Day event, 10 a.m., free, all ages
<b>9</b>	<b>10</b> FC Interval Class 6 a.m. ALC Café 100 Lasagna lunch special \$6 FC Yoga 11 a.m. FC Blood Pressure Checks in Café 100, 11 a.m.-noon	<b>11</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m.	<b>12</b> FC Push up, Pull up, Sit up Competition, all day FC Interval Class 6 a.m. ALC Café 100 BBQ lunch special \$6 FC Yoga 11 a.m.	<b>13</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m. ALC Movie Night- "Free Birds," rated PG; dinner available 5-8 p.m. ALC Bottles and Brushes, 6-8 p.m., \$25, 454-3350 to sign up	<b>14</b> FC Interval Class 6 a.m. ALC Valentine's Day Dinner for Two, 6-9 p.m., \$16/ per couple member-\$17/per couple non-member, 454-3350 to sign up	<b>15</b> ALC Introduction to Hula Hooping, 10 a.m., free, all ages
<b>16</b>	<b>17</b> Café 100, ALC, Barber Shop, GLC CLOSED FC OPEN 5 a.m.-6 p.m., classes as scheduled FC Interval Class 6 a.m., and FC Yoga 11 a.m.	<b>18</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m.	<b>19</b> FC Interval Class 6 a.m. ALC Café 100 BBQ lunch special \$6 FC Yoga 11 a.m.	<b>20</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m. ALC Movie Night- "Ender's Game," rated PG-13; dinner available 5-8 p.m.	<b>21</b> FC Interval Class 6 a.m.	<b>22</b>
<b>23</b>	<b>24</b> FC Interval Class 6 a.m. ALC Café 100 Lasagna lunch special \$6 FC Yoga 11 a.m.	<b>25</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m.	<b>26</b> FC Interval Class 6 a.m. ALC Café 100 BBQ lunch special \$6 FC Yoga 11 a.m.	<b>27</b> FC Cycling Class 11 a.m. FC Interval Class 3:30 p.m. ALC Movie Night- "Gravity," rated PG-13; dinner available 5-8 p.m. ALC Bottles and Brushes, 6-8 p.m., \$25, 454-3350 to sign up	<b>28</b> FC Interval Class 6 a.m. ALC Last Friday Trivia 6:30 p.m.	

### Hours of operation

**Arnold Lakeside Center:** Catering/Management offices by appointment. Operations Clerk Monday-Friday 7:30 a.m.-4 p.m. Dinner: full menu available Thursday 5-8 p.m., Friday and Saturday 5-9 p.m.; Main Bar Thursday 5-8 p.m., Friday 4-10 p.m. and Saturday 5-9 p.m.; Social Hour Friday 4-6 p.m., Movie Night Thursday 6:30 p.m. **CLOSED Jan. 20 and Feb. 17**

**Information, Tickets & Travel (ITT):** Office at Arnold Lakeside Center - Tuesday through Friday 10 a.m. - 3 p.m. except for Tuesday and Wednesday remote office in Café 100 10:30 a.m. - 1 p.m. **CLOSED Jan. 20 and Feb. 17**

**Café 100:** Monday through Friday 6:30 a.m. - 1 p.m. Lunch starting at 10:30 a.m. **CLOSED Jan. 20 and Feb. 17**

**Barber Shop:** by appointment - Monday, Tuesday, Thursday & Friday 8 a.m. - 4 p.m. **CLOSED Jan. 20 and Feb. 17**

**GLC (office located at Arnold Lakeside Center):** Monday through Friday 7:30 a.m. - 4 p.m. May vary depending on bookings. **CLOSED Jan. 20 and Feb. 17**

**Outdoor Rec:** Tuesday through Saturday 10 a.m. - 5 p.m. Also open Monday when in conjunction with a holiday weekend. Also open Monday when in conjunction with a holiday.

**Fitness Center:** Monday-Friday 5 a.m.-7:30p.m.; Saturday 8 a.m.-1 p.m.; Sunday Closed. **OPEN Dec. 24: 8 a.m.-4 p.m.- no classes; OPEN Jan. 20 and Feb. 17; 5 a.m.-6 p.m. classes as scheduled.**

**Arnold Golf Course:** Pro Shop & Driving Range 8 a.m. - 4:30 p.m. Closed during inclement weather. Driving Range open 24 hours with pre-purchased key card. Mulligan's Grill Monday through Friday 10:30 a.m. - 1:30 p.m., Saturday and Sunday 8 a.m. - 1 p.m.

**Recycling:** Monday through Friday 6 a.m. - 2:30 p.m.

**Wingo Inn:** Monday through Friday 7 a.m. - 6 p.m., Saturday and Sunday 8 a.m. - 4 p.m.

**Nonappropriated Funds Human Resources:** Monday through Friday 7:30 a.m. - 4 p.m.



**SPECIAL THANKS**  
to Marty Bartlett  
and Lockheed Martin  
for co-sponsoring  
*Children's Christmas Party 2013*

### BX/Commissary customer eligibility

AEDC government civilian and AEDC contractor employees have access to the following limited items at the base exchange (BX): consumable items including toiletries and over-the-counter pharmaceuticals, food items such as candy, chips, little meal items, hot dogs and soft drinks. Alcohol and cigarettes are not included as consumable items. However, only active duty and retired uniformed services personnel and their dependents are eligible to use the base commissary next to the BX. The commissary hours of operation: Tuesday, Wednesday and Friday 9 a.m.-5:30 p.m., Thursday 9 a.m.-6:30 p.m. and Saturday 8 a.m.-4:30 p.m. The BX hours of operation: Tuesday through Friday 9 a.m.-5:30 p.m., and Saturday 8 a.m.-4:30 p.m. For more information contact Christopher Floden, BX manager, at (931) 454-7153 or Patrick Jordan, Commissary manager, at (931) 454-5921.

### AAFES Dividends

Dividends generated from the Army and Air Force Exchange Service (AAFES) overall earnings are a major contributor to Services nonappropriated fund (NAF) construction and renovation projects as well as equipment purchases. Services would like to thank all AAFES customers for their support. Dividends received for December 2013 totaled \$4,203.23.



**BREIFs** from page H1

**Fitness Center(FC)**  
454-6440

Check us out on Facebook!  
Arnold AFB Services Fitness Center

**Group Class Schedule:** (for eligible users only)

**Cycling:** Tuesday and Thursday 11a.m.-12 p.m.

**Yoga:** Monday and Wednesday 11 a.m.-12 p.m.

**Interval/Circuit Training:** Monday, Wednesday and Friday 6-7 a.m.; Tuesday and Thursday 3:30-4:30 p.m.

If you want more options for classes, then try the **Fitness on Request (FOR) kiosk**. The kiosk provides virtual instructors leading exercises in areas such as Vibe Dance, Fusion Mind Body, Fit for Duty, Rev Cycling, TKO Kickboxing, Stomp Step and Kinetics. FOR can accommodate individuals or groups and is available any time during regular hours. Ask about kiosk orientation and scheduling.

**Blood Pressure Checks**

Feb. 10 in Café 100 from 11 a.m.-noon. Stop by the café and have a free blood pressure reading by a member of the Fitness Center staff. Note: Women that have had a mastectomy must notify staff before having reading. Call 454-6440 for more information.

**Outdoor Rec (ODR)**  
454-6084

Check us out on Facebook!  
Arnold AFB Services Outdoor Recreation

**Winter Rates now available at FamCamp.** RV sites at FamCamp will be \$12 per night, and \$300 per month, and tent sites will be \$4 per night. These rates will continue through May 1.

**Teambuilding Facilitation available through Outdoor Rec.** Book your team building event at least two weeks in advance and customize your activities to include

leadership, communication, trust, conflict resolution and more. Our kit has 289 activities and can serve up to 120 participants. Large group challenges can accommodate up to 60 people. This equipment must be facilitated by an Outdoor Rec staff member and is not available for rent for private use. Department of Defense organizations may utilize the program for free. All others have the option of half day (4 hours) for \$50 or full day (8 hours) for \$100. Call to find out more information or book your team building event.

**Outdoor Rec inflatables!**

There is an assortment of inflatables for almost everyone's needs. We have a huge backyard obstacle challenge measuring 40'L x 10'W x 13'H, and a double lane jump slide for only \$150 per day. We also have a giant basketball hoop for \$30 per day and a Rocket Bounce House for \$75 per day. If you need a water slide then our 18' Double Drop Wet/Dry slide will be great for any event and is only \$150 per day. Please contact Outdoor Recreation at 454-6084 to make your reservation today!

**Did you know ODR now has disc golf?**

Disc golf is a flying disc game in which individual players throw a flying disc at a target. Much like golf, the object of the game is to traverse a course from beginning to end in the fewest number of throws of the disc. The ODR course targets are portable so course location may change. Initial plans are to begin in the softball outfield behind the ODR building. Players may play for free with their own discs or rent discs from ODR for \$1 each. There are different sizes and weights of discs much like different clubs in golf to better serve the needs of the target desired. For more information on disc golf call ODR at 454-6084.

**Reservation Policy:**

FamCamp, Crockett Cove and

Dogwood Ridge reservations may be made 45 days in advance for active duty and reserve military, 40 days for retired military, and 30 days for all other qualified personnel. Boat reservations may be made 15 days in advance for active duty and 10 days for other eligible individuals. All reservations are made through the Outdoor Recreation by stopping by or calling 454-6084.

**Wingo Inn**  
454-3051

Check us out on Facebook!  
Arnold AFB Services Wingo Inn

If you have **family and friends visiting** and need extra space then call Wingo Inn. Reservations for Wingo Inn can be made 120 days in advance and room rates start at \$56 per night. Call 454-3051 for

reservations and more information.

Check us out on Facebook!  
**Gossick Leadership Center**  
454-4003

book! Arnold AFB Services Gossick Leadership Center

The **Gossick Leadership Center (GLC)** may be used for events such as meetings, conferences, luncheons, dinners, etc. and is booked through the Services Conference Center Manager (CCM) up to one year in advance. Requests must be made in writing by email to [arnold.glc@arnold.af.mil](mailto:arnold.glc@arnold.af.mil). All event coordinators are required to sign an agreement. Official unit functions are authorized at no charge and are defined as

bona fide official meetings or training held as part of the normal duty day. Unofficial and private functions may be held for authorized users at a fee. Community members may host events with the approval of the Services Director for a fee. Outside food and beverages are not allowed. First consideration must be given to Arnold Lakeside Center. In the event they cannot accommodate, an outside source may be utilized with CCM approval. For more information contact the CCM at 454-4003.

**AEDC Woman's Club**  
393-2552

Come and join the **AEDC Woman's Club Fashion Show**, hosted by Peebles of Tullahoma. This meet-

ing will be Feb. 4. Make sure you're in attendance to get a sneak peek of the new fashions for spring. Also, the cosmetologists from Estee Lauder at Peebles will be doing makeovers.

The Social Hour of the meeting starts at 9:30 a.m. at the Arnold Lakeside Center, with the business meeting and program at 10a.m. We hope to see you there! Reservations and cancellations for the Feb. 4 meeting must be made no later than noon on Jan. 28. Make reservations or cancellations by contacting Liz Jolliffe at 931-393-2552 or [jajolliffe@aol.com](mailto:jajolliffe@aol.com); or Jane Ricci at 931-636-4152 or [dickanjane@comcast.net](mailto:dickanjane@comcast.net).

*Disclaimer: This is a private organization which is not part of the Department of Defense or any of its components and has no governmental status.*

**February Movie Schedule**

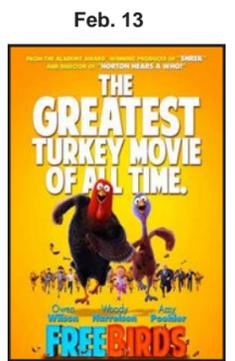
Movie nights are Thursdays with movie start time of 6:30 p.m. and dinner available from 5-8 p.m.



**Feb. 6** - "Captain Phillips," rated PG-13 (2 hr. 24 min.) starring Tom Hanks, Barkhad Abdi and Barkhad Abdirahman. The true story of Captain Richard Phillips and the 2009 hijacking by Somali pirates of the US-flagged MV Maersk Alabama, the first American cargo ship to be hijacked in two hundred years.



**Feb. 13** - "Free Birds," rated PG (1 hr. 31 min.) starring Woody Harrelson, Owen Wilson and Dan Fogler. Two turkeys from opposite sides of the tracks must put aside their differences and team up to travel back in time to change the course of history - and get turkey off the holiday menu for good.



**Feb. 20** - "Ender's Game," rated PG-13 (1 hr. 54 min.) starring Harrison Ford, Asa Butterfield and Hailee Steinfeld. Young Ender Wiggin is recruited by the International Military to lead the fight against the Formics, a genocidal alien race which nearly annihilated the human race in a previous invasion.



**Feb. 27** - "Gravity," rated PG-13 (1 hr. 31 min.) starring Sandra Bullock, George Clooney and Ed Harris. A medical engineer and an astronaut work together to survive after an accident leaves them adrift in space.



Movies are shown at the Arnold Lakeside Center

The Services insert to the High Mach is designed to inform our customers of events and specials in Services activities. All program dates, times and prices are subject to change.

# The Green Scene

brought to you by Services Recycling Program

## Please help us recycle

Break down cardboard boxes to save space and check for items left inside

Ensure bottles are empty and remove lids

**Thank You from The Green Team**  
Robbie Evans (manager), Doug Richards, Jenifer Garner  
931-454-6068

Please Recycle

