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AEDC supporting Golden Horde testing

By Jill Pickett
AEDC Public Affairs

WHITE SANDS MISSILE RANGE, N.M. – The 586th Flight Test Squadron, Detachment 1, a unit of the 704th Test Group of Arnold Engineering Development Complex, is currently supporting one of the Air Force Vanguard programs – Golden Horde.

Vanguards, part of the Air Force 2030 Science and Technology Strategy, are focused on advancing emerging weapons systems and warfighting concepts through prototyping and experimentation. Golden Horde, an Air Force Research Laboratory program, is an effort to create networked collaborative weapons capable of sharing data, interacting, and developing and executing coordinated actions to improve effectiveness of the weapons.

The 586th, Det. 1's involve-

ment began when Golden Horde became flight-test ready and in need of access to the Department of Defense's largest, fully-instrumented, open-air range – White Sands Missile Range in New Mexico. The Detachment serves as the liaison to all Air Force programs using the Range.

As the sponsor of AFRL and the 780th Test Squadron while at WSMR, Det. 1 introduced range personnel to the Golden Horde concept and then served as an advocate for the test to ensure necessary resources were available. The Detachment also manages the financial and operational documentation for the test, and will handle delivery of the data post-test.

"The Golden Horde effort is innovative and incredibly complex," said 1st Lt. Matthew Aston, 586th FLTS, Det. 1. "It is incorporating a variety of different systems from different con-



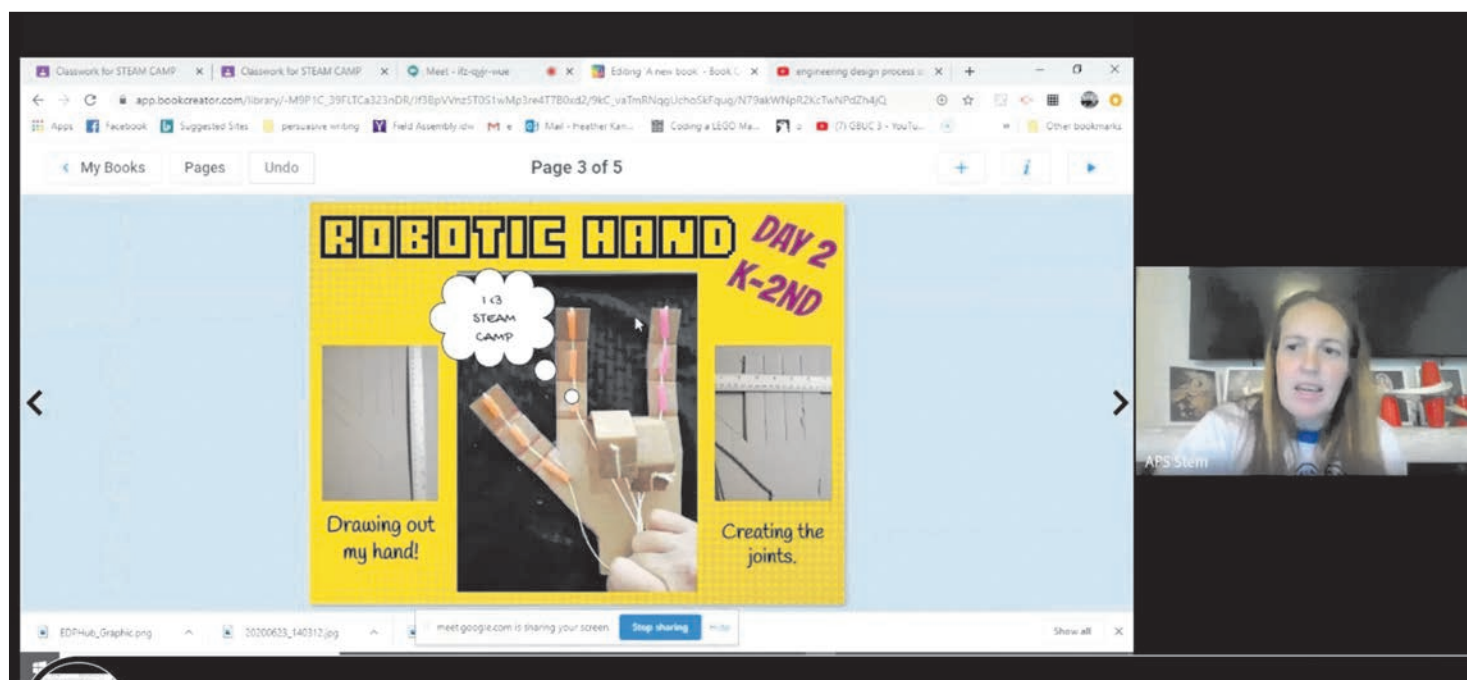
Collaborative Small Diameter Bombs are launched from the wing of an F-16 fighter from the Air Force Test Center's 96th Test Wing. Four of the bombs were dropped during the second flight demonstration of the Air Force Golden Horde Vanguard. (Courtesy photo)

tractors to make it a reality, and the successes that have occurred so far show how boundaries and capabilities can be pushed in a

short time. From the Detachment and 704 Test Group side of the house, it is an all-hands effort leveraging the wealth of

knowledge and experience here to host and support a successful

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Heather Kangas, 704th Test Group K-12 STEM Outreach coordinator, discusses how to create an online journal while leading a Virtual Summer Camp course in 2020. In her role, Kangas works to introduce elementary, middle and high school students in the Alamogordo Public Schools system to science, technology, engineering and math, or STEM, concepts and guides them through projects they complete themselves. (Courtesy photo)

Kangas hopes STEM outreach buds greater interest among area students

By Bradley Hicks
AEDC Public Affairs

HOLLOMAN AIR FORCE BASE, N.M. – Heather Kangas has made it her mission to take science, technology, engineering and math – otherwise known as STEM – beyond photos, charts and text and bring it to life for children living in close vicinity to Holloman Air Force Base.

"I think it's important just because not everybody's been exposed to it," she said. "Kids get science in school, but to see science in action or to see engineering in action, to bring those experiences to the kids, to engage them and just excite them, to let them know that there are options for your future, just getting them out there and seeing STEM in action, I think, is important."

Kangas has served as

the 704th Test Group K-12 STEM Outreach coordinator for the last three years. The 704th at Holloman AFB is a unit of the Arnold Engineering Development Complex, headquartered at Arnold Air Force Base, Tennessee.

In her role, Kangas visits classrooms throughout the Alamogordo Public Schools system to introduce thousands of elementary, middle and high school students each year to STEM concepts and guides them through projects they complete themselves.

Kangas said part of her twofold objective is to advance STEM involvement among the students.

"I think it's especially important where we live," she said. "We have a large minority population. We have a lot of females that it'd be great to target for STEM-type jobs. Women are typically under-represented in the STEM

fields, which makes it particularly important to spark their interest at an early age, typically before they reach middle school. That's why I like to do a lot with the elementary students and show them STEM is fun, we can be hands-on, and everyone can do it."

Secondly, Kangas wishes to show the youngsters the important role STEM plays at Holloman and introduce them to future career opportunities available not only to Airmen, but to contractors and civilians.

"My goal is to get kids excited about science, technology, engineering and math and then for them to recognize the opportunities that there are out here on this base," Kangas said. "We bring kids out for field trips to the Holloman High Speed Test Track where they are introduced to a variety of dynamic, high-

speed test capabilities such as ejection seats, hypersonic weapons, etc. In addition, at our guidance and navigation squadron, we introduce them to various GPS and inertial technology through fun hands-on exercises, like geocaching and other projects. We take them and tour them around and show them the opportunities that are available here, especially for future jobs, and let them know joining the Air Force is one option, but that's not the only option."

Kangas' interest in STEM education was spurred when her oldest daughter, in middle school at the time, began taking part in a *FIRST*® LEGO® League, or FLL. FLL teams research a real-world problem and are then challenged to develop a solution and present their results. The

See **KANGAS**, page 2

TMAS 2 contract awarded



Col. Jeff Geraghty

AEDC Commander, Col. Jeff Geraghty recently provided an update on AEDC's Source Selection efforts to the entire workforce via email. Below is his message sent April 20.

Team AEDC,

In our commitment to continued transparency, AEDC leadership is pleased to announce that the Canvas-QuantiTech team has been selected to perform the work required under the Test and Management Advisory Services (TMAS) 2 task order.

On April 6, the TMAS 2 contract was awarded to Canvas-QuantiTech Joint Venture (CQ JV). TMAS 2 is a five-year cost-plus fixed-fee contract that provides advisory and assistance services to AEDC. These services provide vital support for test planning and execution, technology development, program management and strategic planning across the Complex. This work will be performed at Arnold Air Force Base as well as AEDC's geographically separated units. Transition is already underway, and performance will begin October 1.

Col. Jeff Geraghty

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



Vision

"NAS delivers the best aerospace testing capabilities today and in the future."

Values

- Ethics. We are uncompromising in our integrity, honesty, and fairness.
- Safety & Health. We are relentless in keeping people safe from harm, and we provide a safe and healthy work environment.
- Security. We are disciplined and vigilant in protecting sensitive AEDC information and ensuring system integrity to support national security and our customers.
- Excellence. We thrive on challenge, accomplishment, and mission success.
- Quality. We are passionate about doing our work right the first time.
- People. We have a mission-focused, inclusive workforce who have a diverse skill set, are committed to success, demonstrate innovation and have a can do attitude.
- Culture. Our team is proud of our diversity, inclusiveness, and collaborative work environment. We are proud of what we do and how we do it.
- Relationships. We build positive, long-term business relationships through trust, respect, and collaboration.
- Innovation. We overcome challenges through creativity, perseverance, technology, and flexibility. We actively seek to continually improve.
- Sustainability. We plan and act for the long term benefit of our communities and our environment.

KANGAS from page 1



A rocket sled designed by the "Shockwave Team," a group of students from Alamogordo High School, heads down the Holloman High Speed Test Track at Holloman Air Force Base, N.M. (Courtesy photo)

teams are tasked with using LEGO kits to help demonstrate their proposed solutions, and their designs are showcased at competitions.

Seeing how much this STEM-centric program had benefited her daughter, Kangas went to the school of her younger children to see if it could be implemented there.

"The principal looked at me and said, 'That's great, Heather. You're going to run it,'" Kangas said.

Kangas, whose active-duty husband has been stationed at Holloman for the past 11 years, jumped at the chance and, through heading the program, she soon discovered an affinity for working with children and education. This led to her enrolling in New Mexico State University to pursue a degree in Early Childhood Education.

After earning a bachelor's degree, Kangas began work as a teacher in the Alamogordo Public Schools system while still leading the elementary school FLL. It was while working to bring other adults into this program she learned that the STEM coordinator position at Holloman would soon be open.

"I was training new coaches for the FLL and I jokingly said, 'If I could do STEM education all day, every day, I would,' not realizing that the current person holding this position was in my classroom," Kangas said. "She raised her hand and said, 'You want my job.'"

Although initially said in jest, as it turned out, the Holloman STEM position was opening. Kangas applied and was subsequently selected for the position. To aid her in her new post, Kangas earned a master's degree in educational learning technologies.

Kangas' existing relationship with Alamogordo Public Schools (APS) aided her in her efforts to reach area students.

"Having worked with APS, it was really easy to be able to get into the classrooms and do STEM educational outreach because they were comfortable with me, they were familiar with my teaching style and methodology," Kangas said. "So it's been a really good transition from working with them as an educator to coming back as the STEM coordinator, teaching, leading and mentoring not just the students but also the classroom teachers."

Each year, Kangas works to develop a variety of grade level-appropriate lessons aimed at providing students hands-on



Two FIRST® LEGO® League teams compete at the Alamogordo FLL qualifying event, which was hosted in collaboration between the 704th Test Group at Holloman Air Force Base, N.M., and Alamogordo Public Schools. (Courtesy photo) (This photograph was taken prior to the onset of the COVID-19 pandemic.)

STEM experiences. These have ranged from tutorials on making straw rockets and magnetic slime to lessons on circuitry that culminate with the students using copper tape, a battery and LED bulb to make their own light. Other lessons have included younger students being led through the construction of catapults using craft sticks and the programming of Sphero robots by middle schools students to high school students being shown the Holloman High Speed Test Track and creating CO2 cars to learn some of the scientific concepts behind a HH-STT sled launch.

Students are also invited to participate in grade level-appropriate FLL programs. This past year, lessons were also made available to area preschoolers.

Recently, high school welding students have participated in STEM lessons, learning about the process of assembling sleds for the Holloman High Speed Test Track.

Along with her in-classroom work, Kangas attends community happenings near Holloman, such as fairs and Earth Day events, to spread STEM awareness.

Kangas said another impor-

tant component of her job is "teaching the teachers." This includes providing them with overviews of the STEM lesson kits in advance and providing educators with access to a "lending library," which provides them access to STEM items such as robotics and 3D printers for hands-on lessons in their classrooms.

"I can only see so many children and classrooms, but the teachers see thousands of people throughout their lifetime, so another major goal is to train the teachers with these tools and these resources so they can share that knowledge with students throughout their career," Kangas said.

The COVID-19 pandemic has impacted Kangas' efforts as restrictions have prohibited Kangas from entering classrooms. In the 2019 fiscal year, she reached nearly 7,500 students. In the 2020 fiscal year, the STEM program reached just under 2,400 students. Still, she was able to reach students through STEM summer camps in which parents picked up kits and Kangas joined students virtually to help them complete projects. A similar approach was taken throughout the past

year with STEM lessons in area schools. Kangas provided kits to teachers, who were leading virtual classes, and Kangas joined the students online to walk them through projects and provide troubleshooting.

"It's definitely been a pretty big shift from what I'm used to," she said.

However, this hasn't stopped Kangas from planning for the future. This year, she wants to bring small CO2 cars into middle school classrooms to educate students on the science and engineering behind them and how it relates to the Holloman High Speed Test Track. This project would also culminate with the students launching the cars.

Kangas would also like to involve additional organizations at Holloman in her STEM outreach efforts to bolster STEM awareness among area students and expose them to additional opportunities at the base.

"We also have other wonderful, wonderful squadrons here, so I'm hoping to start working with them and developing grade-level programs that highlight each squadron's diverse capabilities and roles in the STEM fields," she said.

Smoking Policy

1. The following revised Arnold AFB smoking policy is effective immediately and applies to all individuals on Arnold AFB.
2. Traditional Tobacco products (e.g. cigars and cigarettes):
 - a. Smoking is permitted solely in Designated Tobacco Areas (DTAs) identified by designated signage. If no signage exists, smoking is not permitted in that area. It is the responsibility of all smokers to keep DTAs clean of cigarette butts.
 - b. Tobacco use on the Arnold AFB Golf Course is permitted, but discouraged based on the health hazards of tobacco use and secondhand smoke. No smoking is permitted within 50 feet of golf course buildings except in the approved DTA.
 - c. Smoking in government-owned/leased vehicles is strictly prohibited. Personnel are allowed to smoke in their personal vehicles at any time; however, at no time will personnel discard cigarette butts outside their vehicle.
 - d. For government employees, the fact that a person smokes has no bearing on the number of breaks they may take. Breaks should be taken in accordance with the current supervisory and personnel policies that afford all employees the same break opportunities consistent with good work practices and accomplishment of the mission.
3. Smokeless Tobacco products (e.g. snuff and dip): Smokeless tobacco products are not to be restricted to DTAs. Smokeless tobacco use will be permitted in all workplace areas (inside and out) subject to reasonable safety and sanitary conditions. Specifically, containers of tobacco waste product, including sealed containers, must not be left unattended or disposed of in trash receptacles. Users of smokeless tobacco must flush tobacco waste down the toilet.
4. Electronic Cigarettes (also known as "e-cigs"): Pursuant to Air Force Instruction (AFI) 40-102, Tobacco Free Living, e-cigs are considered to be equivalent to tobacco products; however, e-cigs are not restricted to DTAs and are allowed to be used outdoors at a minimum distance of 25 feet from building entry/egress points. (This policy is dated July 27, 2016)

Action Line

Team AEDC,

I believe in free and open communications with our Team AEDC employees, and that's why we have the Action Line available. People can use the Action Line to clear up rumors, ask questions, suggest ideas on improvements, enter complaints or get other issues off their chests.

The Action Line has been expanded to include an option for your ideas, comments, or suggestions on the AcqDemo personnel system. Simply call the normal x6000 commander's action line. You will then be prompted to select option 1 for the Commander's Action Line or Option 2 for the AcqDemo line. They can access the Action Line via the AEDC intranet home page and by calling 931-454-6000.

Although the Action Line is always available, the best and fastest way to get things resolved is by using your chain of command or by contacting the organization directly involved. I encourage everyone to go that route first, then if the situation isn't made right, give us a chance.

Col. Jeffrey Geraghty
AEDC Commander

Wildflowers bloom at Arnold AFB

By Jill Pickett
AEDC Public Affairs

The first week of May each year is recognized as National Wildflower Week, a celebration started by the Lady Bird Johnson Wildflower Center. According to the center’s website, the observance began in 1987 “to celebrate the beauty and importance of native wildflowers across the United States.”

The website acknowledges that

‘wildflower’ is not actually a scientific term but generally refers to wild, non-woody, flowering plants. According to an article on U.S. Department of Agriculture Natural Resources Conservation Service website, wildflowers provide habitat for pollinators, can improve soil health, prevent erosion, improve water quality and provide other benefits.

Environmental stewardship is an important part of responsibly execut-

ing the mission at Arnold Air Force Base. The Natural Resources team surveys and manages wildflowers listed as endangered or threatened by the state of Tennessee. Some of these wildflowers are only found in a few locations in the state, so management efforts by base personnel are important to their conservation. A few of the state-listed species that can be found at Arnold AFB include prairie gentian (*Gentiana puberulenta*), least trillium (*Trillium*

pusillum var. *pusillum*) and Kentucky lady’s slipper (*Cypripedium kentuckiense*).

The Base consists of approximately 40,000 acres of land, with much of that being wooded, and only an approximately 4,000 acres currently designated for use in support of the mission. Even within the confines of the fenced portion of base, wildflowers bloom adding color to the fields and woodlands.



A patch of spring beauty wildflowers bloom at Arnold Air Force Base, March 22. (U.S. Air Force photo by Jill Pickett)



A Kentucky lady’s slipper blooms at Arnold Air Force Base, May 19, 2020. (U.S. Air Force photo by Stevia Morawski)



Wildflowers known as tiny bluets bloom at Arnold Air Force Base, March 22. (U.S. Air Force photo by Jill Pickett)



Prairie gentian bloom at Arnold Air Force Base, Oct. 2, 2017. (U.S. Air Force photo by Stevia Morawski)



A bee harvests pollen from a native violet at Arnold Air Force Base, March 22. (U.S. Air Force photo by Jill Pickett)



A least trillium blooms at Arnold Air Force Base, March 29, 2017. (U.S. Air Force photo by Stevia Morawski)



An insect crawls over the bloom of a daisy fleabane plant at Arnold Air Force Base, April 7. (U.S. Air Force photo by Jill Pickett)

Air Force rewrites basic doctrine, focuses on mission command, airpower evolution

By Air University Public Affairs

MAXWELL AIR FORCE, Ala. (AFNS) – Air Force Chief of Staff Gen. Charles Q. Brown, Jr. recently signed perhaps the most sweeping change of Air Force basic doctrine in the service’s history, marking a major milestone in the service’s strategic approach to “Accelerate Change or Lose.”

Core themes to the revised Air Force Doctrine Publication-1: The Air Force are the foundation and evolution of airpower and the concept of mission command.

“When it comes to airpower, it’s about the fact that we can fly, fight and win anytime and anywhere. That is tried and true – how we exploit the air domain, operating in and through the air domain,” Brown said. “That’s what we’ve done since we became an Air Force, and that’s what we’ll continue to do. How we do that might change based on what we see happening in the world and where technology might take us.”

With the Air Force recently releasing its new mission statement – To fly, fight and win ... Airpower anytime, anywhere – the general said that “leaders need to ensure that all Airmen – active duty, Guard, Reserve or civilian – understand how much they contribute to airpower.”

The document defines the concept of mission command as a return to the philosophy of mission accomplishment guided by the commander’s intent, while operating in environments characterized by “increasing uncertainty, complexity and rapid change.”

“To drive commander’s intent, we have to be very broad in our think-



Air Force Chief of Staff Gen. Charles Q. Brown Jr. recently signed perhaps the most sweeping change of Air Force basic doctrine in the service’s history, marking a major milestone in the service’s strategic approach to “Accelerate Change or Lose.” Core themes to the revised Air Force Doctrine Publication-1: The Air Force are the foundation and evolution of airpower and the concept of mission command. (Screenshot from US Air Force video)

ing,” he said. “We have to give Airmen the leeway, without being very prescriptive, to lead and execute while still meeting intent. When Airmen are empowered, they’ll be able to make things happen that we didn’t even think about.”

In the document’s “CSAF Perspective on Doctrine,” Brown reminds Airmen: “Leaders must push decisions to the lowest competent, capable level using doctrine as a foundation for sound choices.” This core idea resonates throughout the rewrite.

AFDP-1 also updates the legacy airpower tenet of “centralized control, decentralized execution” to “centralized command, distributed control and decentralized execution.” This evolution allows for a frame-

work from which to develop new operating concepts, strategies and capabilities to address rapidly changing and increasingly challenging operating environments.

Brown’s new focus on mission command and centralized command, distributed control and decentralized execution postures the Air Force to execute what he lays out in his “Accelerate Change or Lose” vision: “We must focus on the Joint Warfighting Concept, enabled by Joint All-Domain Command and Control and rapidly move forward...”

While AFDP-1 marks a significant departure from the generally slow pace of change in doctrine, it represents the significant change in focus by the Air Force from retrospective

and incremental to future-focused and poised to seize opportunity.

Doctrine represents the best practices and principles that articulate how the Air Force fights. The recent rewrite of AFDP-1 represents a consolidation from 141 pages to 16 pages and a refinement of “the most fundamental and enduring beliefs describing airpower and the Airman’s perspective.”

With the March 2021 release of the “Interim National Security Strategic Guidance,” President Joe Biden reminded the nation “the distribution of power across the world is changing, creating new threats.”

AFDP-1 is poised to reorient the Air Force for the era of great power competition and accelerated change.

Around Arnold

Take advantage of safety advancements

By Richard Fleming
AEDC Safety

May is a month full of celebrations. Spring is in full swing, and Mother's Day, Armed Forces Day, World Laughter Day and Memorial Day are all celebrated in May. May is also Correct Your Posture Month (your mother was right – sit up straight), National Motorcycle Awareness Month, National Egg Month and has more than 40 other awareness or celebration observances.

One thing that caught my eye as I looked at May was that the Empire State Building in New York City opened on May 1, 1931. According to the Empire State Building website, www.esbnyc.com, when built 90 years ago, it was the tallest building in the world, the tallest man-made structure and the first building to contain more than 100 floors. It remained the tallest building in the U.S. until the World Trade Center was completed in 1973.

This landmark, including the design, planning and

construction, took just 20 months from start to finish. Using an assembly line process, they erected the new skyscraper in an astonishing 410 days. Using as many as 3,400 men each day, they assembled its skeleton at a record pace of four-and-a-half stories per week. The Empire State Building was finished ahead of schedule and under budget, but it also came with a human cost – at least five workers were killed during the construction process.

In the 1920s and early 1930s, a man named Lewis Hine was commissioned to make a series of work portraits highlighting contributions to modern industry. In 1930, he was commissioned to document the construction of the Empire State Building. He photographed the workers in precarious positions while they secured the steel framework of the structure, taking many of the same risks that the workers endured. In order to have the best vantage points, Hine was swung out in a basket that had been specially-designed

about 1,000 feet above Fifth Avenue. He remembered being hung above the city with nothing below but “a sheer drop of nearly a quarter-mile.”

I'm sure we have all seen the Lewis Hine pictures of iron workers posed sitting on an I-beam eating lunch hundreds of feet above the ground. In a time before fall protection and all the safety tools and resources we have today, it is absolutely amazing so few workers were killed.

Advance the calendar 90 years, today we have available advanced technologies, modern tools and safety equipment options too numerous to list, and the Occupational Safety and Health Administration and other regulatory entities to help protect and guide us and our employers to a safer workplace and world. The Bureau of Labor Statistics reports that there were 5,333 fatal work injuries recorded in the U.S. in 2019, approximately 15 per day. Incidents in Tennessee accounted for 124 of the fatal work injuries. Incident reports overall show

that between 80 to 90 percent have been attributed to human error. Knowing the various types of human error can help you learn how to prevent them in the workplace. A blog post at www.humanerrorsolutions.com lists some of the most common types of human error.

- Disregarding Safety - Employees often neglect even the most basic of safety measures, which results in workplace accidents that were otherwise completely avoidable.

- “Messing Around” - Horseplay in both a physical and verbal sense can be very hazardous, leading to personal injury, product and equipment damage, and/or coworker disputes.

- Fatigue - Exhausted employees will often neglect basic safety protocols, fall asleep on the job or even operate heavy machinery while drowsy.

- Speed Working - An

employee who rushes through their work to meet a quota or get the job done so they can leave will often intentionally skip over necessary details.

- Poor Training - Human error isn't isolated to just employees, and sometimes an employer is to blame for a workplace accident. When a manager expedites employee training or leaves out imperative training topics, workplace accidents and injuries can be all but inevitable.

Today, we have so many safety tools – nets, guardrails, harnesses and lanyards to keep us from falling; safety glasses to protect our eyes; hearing protection; hard hats; hard-toed shoes; and all the rest to keep us from getting hurt. Do not take a chance with your health. Take advantage of all the safety training and tools at your disposal. Do not take shortcuts or skip safety and stay safe both at work and at home.

Take care of each other.

Cop Corner: Arnold AFB firearm regulations

By TSgt Noah Piepenbrink
Arnold AFB Security Forces Office

Tennessee is changing state law to make it easier to carry firearms, but the rules governing Arnold Air Force Base will not change. Here is what you need to know.

On April 8, Gov. Bill Lee signed SB0765 (now Pub. Ch. 108) which amends Tennessee Code Annotated, Title 39, Chapter 14, Part 1; Title 39, Chapter 17, Part 13; and Title 40, Chapter 35, relative to firearms. The amendment takes effect July 1. A notable change resulting from

this amendment is that all adults age 21 and older and military members and veterans age 18 and older may now carry a handgun, openly or concealed, without a license or permit if not otherwise prohibited from possessing a firearm.

This change to state law does not apply at Arnold AFB. In accordance with 18 USC 930, the Commander of Arnold Engineering Development Complex maintains the authority to authorize, limit and restrict the extent to which firearms are permitted on base property. Pursuant to this authority, the Commander prohibits

privately-owned firearms within the gated or controlled areas of Arnold AFB. This includes the mission area, Arnold Village, Gossick Leadership Center or any base recreation area.

Credentialed law enforcement personnel performing official duties may carry their service weapons.

While traversing publically accessible roadways at Arnold AFB, such as Wattendorf Memorial Hwy, Decherd Hwy, etc., it is permissible to carry firearms with a valid permit, or in accordance with Pub. Ch. 108, and transport firearms in

accordance with state and federal laws. Possession of firearms within the AEDC Wildlife Management Areas is permissible in accordance with Tennessee Wildlife Resources Agency regulations.

Personnel who live in base housing may refer to the following link for information on how to properly register firearms – <https://www.arnold.af.mil/Home/Newcomer-Information/>.

Please direct any questions or suggestions for future articles to our distribution group: AEDC-Arnold.CopCorner@us.af.mil.

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deployment of the Golden Horde events.”

The first flight test of Golden Horde was conducted in late-2020. Two Collaborative Small Diameter Bombs, or CSDB, were launched from an Eglin AFB F-16 and successfully communicated between themselves to locate, self-assign and track two ground targets. However, due to a problem with the weapon Operational Flight Program the collaborative guidance commands were not accepted by the weapons and they detonated on fail-safe target locations.

A second flight test was completed earlier this year using four CSDBs. Again, the bombs successfully established communications amongst themselves. This time they identified a pop-up target, and then followed pre-programmed rules of engagement, resulting in the evaluation and striking of multiple targets in a synchronized manner.

A third test is scheduled for later this year.

As with most efforts over the past several months, COVID-19 complicated logistics for the tests.

“Maintaining social distancing and limiting traveling requires White Sands Missile Range and the customers to get creative and really determine who is needed on site to make the mission a success,” Aston said. “We were also able to leverage the Defense Research and Engineering Network between White Sands and Eglin Air Force Base, Florida, to have a larger party virtually present for the mission and they were able to see the target sites and telemetry in real time.”



Four Collaborative Small Diameter Bombs hang from the wing of a 96th Test Wing F-16 fighter. Two of the bombs were dropped during the first flight demonstration of the Air Force Golden Horde Vanguard. (Courtesy photo)

Reserve Airman makes history with innovative Project FoX/F-35 development

By Jamal Sutter

413th Flight Test Group
Public Affairs

ROBINS AIR FORCE BASE, Ga. (AFNS) – For the first time ever, Air Force personnel livestreamed F-35 Lightning II data directly from the aircraft's mission systems computers to a connected computer tablet during a recent ground test at Nellis Air Force Base, Nevada.

The event was a milestone for the Fighter Optimization eXperiment, or FoX, a project that seeks to rapidly integrate advanced software and hardware technologies to maximize the F-35's lethality and survivability, while creating an agile development test tool and fielded combat multiplier for all Defense Department aircraft.

"In order to stay competitive, we have to innovate," said Lt. Col. Raven LeClair. "It's as simple as that. We are trying to find ways to go faster for less money, to bring more capability per dollar, and to push more capabilities to the warfighter more quickly... We want to shift timelines from capabilities being fielded in years to being fielded in a matter of months or weeks; both hardware and software."

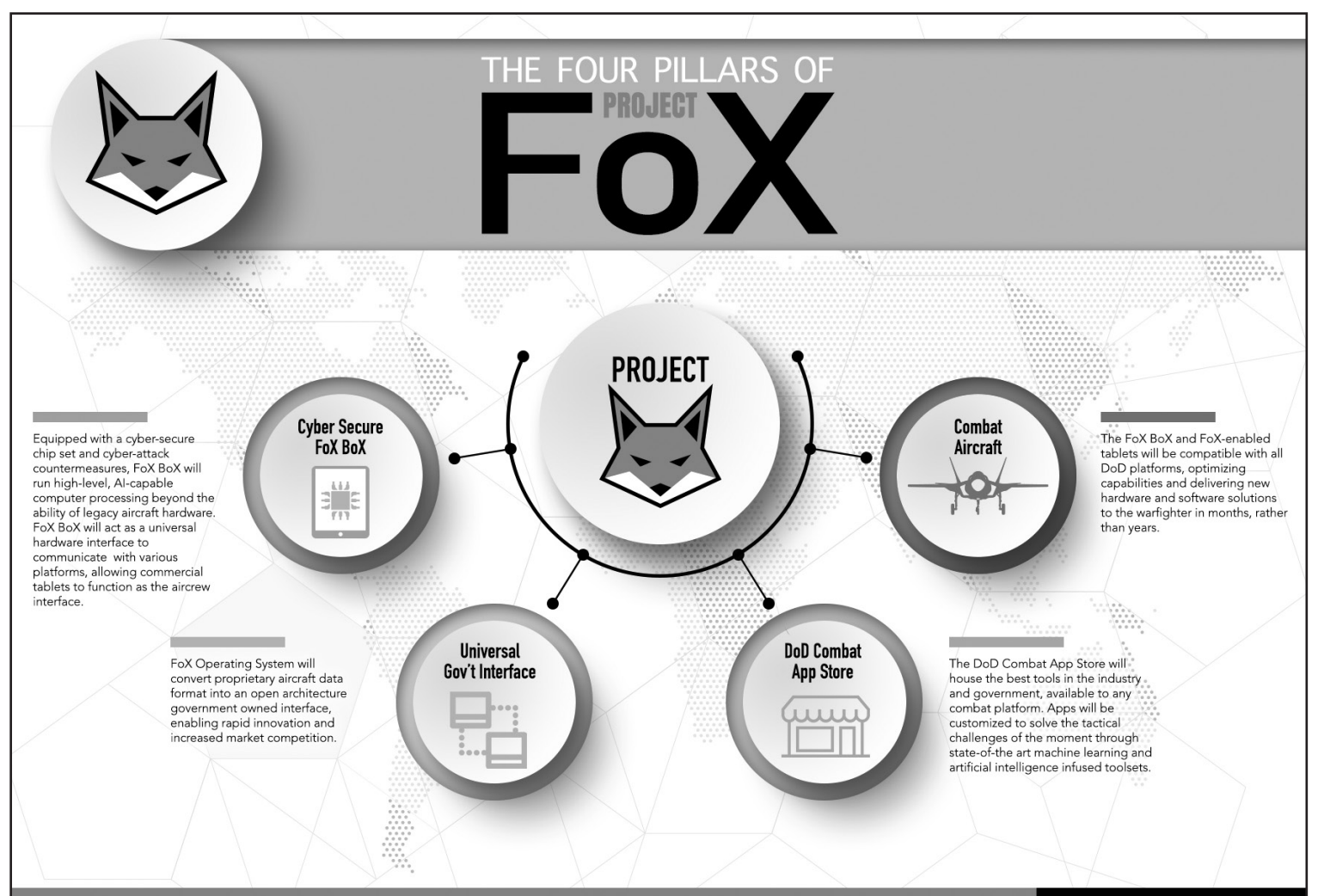
LeClair is a test flight commander stationed at Edwards AFB, California, with the 370th Flight Test Squadron, a unit assigned to the Air Force Reserve Command's 413th Flight Test Group. He's also the F-35 command chief instructor test pilot with the 461st FLTS, an active-duty unit at Edwards AFB, and one of the main players within Project FoX.

With the ground test, the Project FoX test team proved they could successfully take data output from a flight test instrumentation system and convert the F-35's data to communicate with mobile applications running on a commercial tablet. Two apps were tested to demonstrate the idea.

One app, the Battlefield Management Portal, was developed by a team from the 309th Software Maintenance Group out of Hill AFB, Utah, and presents surface-to-air threat information in a new format designed to maximize pilot effectiveness in the suppression of air defenses mission of the F-35. The second app, developed by Lockheed Martin's Advanced Development Programs branch, introduces the concept of advanced artificial intelligence to increase the F-35's advantages against advanced surface-to-air threats.

Many entities played a part in either managing or assisting the test in some capacity, including a Project FoX government software development team from the 309th SMXG, F-35 maintainers and 59th Test and Evaluation Squadron instrumentation lab specialists out of Nellis AFB, a team from Lockheed Martin and cyber security specialists from the F-35 Joint Program Office. Lt. Col. Mike Selzter, a leader with Nellis AFB's Defense Innovation Unit and a co-designer of one of the tested tablet apps, operated the cockpit during the test.

Project FoX was conceived by the 461st FLTS's Future Technology Team, led by U.S. Marine Corp. F-35 pilot, Maj. Jason Schulze. The team was formed with the mission of pursuing advanced aerospace technology and rapid innovation for the F-35, with Project FoX being one of the main vessels in attaining that goal. Together, Schulze and LeClair came up with the concept and roadmap for Project FoX after identifying capability gaps between the vision for agile software development and reality.



The Fighter Optimization eXperiment, or FoX, is a project that seeks to rapidly integrate advanced software and hardware technologies to maximize the F-35 Lightning II's lethality and survivability, while creating an agile development test tool and fielded combat multiplier for all Defense Department aircraft. The Project FoX team recently conducted a ground test at Nellis Air Force Base, Nev., where they proved they could successfully take data output from a flight test instrumentation system and convert an F-35's data to communicate with mobile applications running on a commercial tablet. Ultimately, the team seeks to transform the combat capability acquisition landscape by making the best tools in the industry and government available to any combat platform through a DOD Combat App Store. (U.S. Air Force graphic by Jamal D. Sutter)

Getting Project FoX from concept to reality took many months of coordination and planning, much of which were overseen by LeClair. However, he wasn't short on help. The F-35 JPO research and technology team, who assisted in the approval process of Project FoX, immediately recognized the potential of an integrated tablet to accelerate testing and fielding of combat capabilities. And the 309th SMXG led the development of the software and provided critical leadership during the ground test, proving the true power and distributed leadership of the Project FoX team.

With the test happening at Nellis AFB, approximately 200 miles away from the team at Edwards AFB, they placed their trust in the other members of the distributed team. LeClair said all he could do was wait patiently and standby for updates, confident he had innovative and resourceful leaders on the ground making it happen.

"I was definitely nervous and anxious that we were not going to be successful," he said. "I was very confident that the team would at least learn something that would be able to carry us forward. In my mind, failures are always on the path to success."

A day prior to the successful run, the team faced some issues that prevented them from being able to read data from the aircraft. However, after a few hours back in the software lab adjusting application code, they figured it out. The critical and agile software change worked and was enabled by the F-35 JPO cyber team being on site to participate in the testing, a precedent in regards to capability development.

Though this initial test was fielded on the F-35, the ambitions for Project FoX reach far beyond just the Lightning II. Its all-encompassing intent is to eventually optimize capabilities for every DOD platform through state-of-the-art methods, combat autonomous toolsets, and hardware and software solutions. Ultimately, the team seeks to transform the combat capability acquisition landscape by making the best tools in the industry and government available to any combat platform through a DOD Combat App Store and cockpit-integrated tablet, LeClair said.

"By opening up the opportunity for innovation, proven in the commercial sector app stores, we can bring the very best combat tools to the warfighter – customized and truly agile combat capability development where fixes can be pushed in days not months," he said. "It also opens up a whole new world of opportunity for live-fly modeling and simulation. We will be able to find software bugs that escape the lab sooner and fix them faster, rapidly integrate AI tools that could never be run on the actual aircraft due to hardware limitations, provide unprecedented cyber-attack awareness and protection, and crowdsourcing testing on multiple platforms."

"There is no reason why I can't test the same capability and app on F-18 (Hornet) before F-35 or risk reduce software on F-35 for use by unpowered aircraft. By connecting a tablet to an aircraft's data bus, the warfighter and tester will be able to utilize an entire DOD Combat App store of tools, customized to help solve tactical problems in real time."

The idea of Project FoX traces back to U.S. Navy Vice Adm. Mathias Winter's vision of the F-35 that he set near the end of the aircraft's first 10 years of flight test. Winter, the then F-35 program executive officer who oversaw the aircraft's development, imagined the aircraft being able to automatically download updates and new features overnight, similarly to an iPhone or Tesla.

"That is the vision he set out for us, which is a very challenging and inspiring mission, given how complex the aircrafts is," said Lt. Col. James Valpiani, 461st FLTS commander and F-35 integrated test force director. "It has tens of millions of lines of code. And, of course, it's different than an iPhone or Tesla in that people are trying to shoot it down. It is a very complex aircraft with a very complex mission and an adversarial mission. To incorporate agile development into that cycle has been the work of the last two years."

The 461st FLTS's Future Technology Team manifested around April of 2019, and when it came time to choose someone to lead the way, Valpiani said he knew no better person for the job.

"Rost has always, for me, been the epitome of someone

with an innovative spirit," Valpiani said. "He has an incredible talent of thinking outside the container, questioning why we do things the way we do and imagining different and better ways to do them. It's in his DNA to think and act boldly in the pursuit of innovation. So that's part of the reason – I mean it's not part of the reason – it is the reason why I asked him to take on the Future Technology Team position and the FoX tablet specifically."

Within about half a year, the Future Technology Team was ready to present their Project FoX concepts and in January of 2020, the team's idea was one of the winning presentations during Edwards AFB's Spark Tank competition. The Edwards Spark Tank competition is based on the larger service-wide campaign that allows Airmen to present innovation ideas to key agencies in order to garner support and funding.

With any revolutionary idea, however, the door is always open for pushback or disapproval, which could lead to hurdles that slowdown progression. Luckily for the Project FoX team, they received little to no negative feedback from what they are trying to do.

"We have tremendous support from combat aviators," LeClair said. "They want this, and they want it yesterday. Everybody who's ever flown with an electronic flight bag ... all understand the utility of this. And everyone understands the need to go faster and to innovate at a pace that we cannot do in our current method of software development."

F-35 pilots already fly with tablets in the cockpit, but plugging the tablet into the aircraft is a new idea being pioneered by Edwards AFB, Nellis AFB and Naval Air Weapons Station China Lake in California, he said. Realizing the concerns about safety and security, they started off with just a ground test. The team wanted to prove they could safely connect to the aircraft without interference to the jet's systems. From a security standpoint, they wanted to prove they didn't add additional risk.

Also in the works within Project FoX is the FoX BoX. The FoX BoX is slated to contain a cyber-secure chip set designed by a team conducting mission systems testing on the

F-18 at NAWA China Lake, just 60 miles north of Edwards AFB. The FoX BoX will run high-level, AI-capable computer processors that will serve as an operating system to communicate to aircraft, allowing the FoX Tablet to function mainly as a visual interface for aircrew.

From here, the team will continue to conduct ground tests to perfect data ingestion on the F-35. They will also soon start testing on the F-18, F-16 (Fighting Falcon) and F-22 (Raptor) to prove that Project FoX's universal concepts are truly compatible with any platform. Eventually, Project FoX capabilities will be tested during flight, hopefully later this year.

"We want to execute in baby steps and a build-up approach," LeClair said. "As with any new capability, we want to do it safely, securely and effectively."

Prior to transitioning to the Air Force Reserve in 2018, LeClair held his current F-35 instructor pilot position with the 461st FLTS in an active-duty capacity. He became an Active Guard Reserve member and joined the 370th FLTS but remained attached to the 461st FLTS as well, maintaining a certain amount of stability within the unit.

"In the active-duty [Air Force], our pilots rotate out on a regular basis every two to three years," Valpiani said. "It's difficult to develop real depth of expertise in a platform, especially one as complex as the F-35, in that period. So, the challenge that we face is making sure we have a few key cadre in the squadron who can serve as continuity, depth of experience, wisdom – the old hats if you will – who can train new people and give insight to the active-duty force."

LeClair was the first AGR test pilot hired by the 370th FLTS, and according to Lt. Col. John Mikal, 370th FLTS commander, he is a great example of what the Air Force Reserve can bring to table in a total force environment.

"What's interesting and positive about him being an AGR, is that he's had the bandwidth to do that," Mikal said. "He's doing a leadership job in the 370th as a flight commander, but [Project FoX] is his number one task, and it allows him to do that. I think that's why they've had success."

Developing Self: Airman's foundational competencies category

By Jennifer Gonzalez
Air Education and Training
Command Public Affairs

JOINT BASE SAN ANTONIO— RANDOLPH, Texas – The Air Force has identified 24 Airman's Foundational Competencies for all Airmen, as part of a systematic competency-based approach to develop the force. These competencies are universally applicable to all Airmen and are categorized into four groups: Developing Self, Developing Others, Developing Ideas and Developing Organizations.

In this series on Airman's Foundational Competencies the first group explained is Developing Self.

Developing Self includes the following Foundational Competencies: accountability, perseverance, communication, decision making, information seeking, flexibility, resilience, initiative, and self-control.

Accountability is when an Airman demonstrates reliability and honesty; takes responsibility for actions and possesses behaviors of self and team.

Though an Airman's rank, position, and even occupation may change, to be successful, accountability must be present throughout their career. Accountability includes looking after wingmen, upholding Air Force standards and core values, keeping promises, admitting mistakes, and taking personal responsibility for the team's work.

Observable behaviors for accountability include: leads by example, takes personal responsibility for unit performance and models profession-

alism and excellence in every endeavor

When accountability is present, Airmen make decisions even when they are difficult.

In addition to accountability, the category of Developing Self includes eight more competencies

- Perseverance is when an Airman displays grit in accomplishment of difficult long-term goals.
- Communication means an Airman effectively presents, promotes and prioritizes various ideas and issues both verbally and non-verbally through active listening, clear messaging and by tailoring information to the appropriate audience.
- Decision Making is about making well-informed, effective and timely decisions that weigh situational constraints, risks and benefits.
- Information Seeking Airmen demonstrate an underlying curiosity; desire to know more about things, people, one's self, the mission or issues; an eager, aggressive learner. Information seeking requires personal initiative.
- Flexibility describes an Airman who adapts to and works with a variety of situations, individuals or groups effectively.
- Resilience means an Airman negotiates, manages and adapts to significant sources of stress or trauma.



The Air Force has identified 24 Airman's Foundational Competencies for all Airmen. These competencies are universally applicable to all Airmen and are categorized into four groups: Developing Self, Developing Others, Developing Ideas and Developing Organizations. (U.S. Air Force graphic)

- Initiative is doing more than is required or expected to improve job results. Initiative as a foundational competency means an Airman takes action appropriately without being prompted. With initiative, an Airman strives to do a better job and thinks of creative ways to complete the job.
- Self-Control means keeping emotions under control and restraining negative actions when under stress. Self-control begins with emotional intelligence by knowing how to identify our own emotions and respond positively. Knowing what

to do if you feel frustrated, angry, overwhelmed, anxious and sad is valuable for positive outcomes.

Understanding where an Airman scores on individual Foundational Competencies will help an Airman take ownership of his or her development. See image graphics to view competency levels of each developing-self competencies.

Airmen who want more information on the Airman's Foundational Competencies and to participate in a self-assessment can log in to MyVector and select Air Force Competencies from the main menu. The myVector competency

assessment tool also allows Airmen to request feedback from their supervisors and/or 360-degree feedback from subordinates, peers and higher-ranking members. Also, the member is provided links to educational resources to address areas for improvement.

The Air Education and Training Command Directorate of Operations and Communications Competencies Division methodically developed the Airman's Foundational Competencies, which are a combination of knowledge, skills, abilities and other characteristics that manifest in observable and measurable patterns of behaviors.

AF commemorates Earth Day by doing its part to protect the earth, support the mission

By Secretary of the Air Force
Public Affairs

WASHINGTON (AFNS) – The Department of the Air Force is commemorating the 51st anniversary of Earth Day April 22 by encouraging Airmen, Guardians, civilian employees and their families to help the enterprise play an active role in becoming an environmental steward.

This year's theme, "Do Your Part – Protect the Earth, Support the Mission," highlights the Defense Department's commitment to help tackle the climate crisis, which senior leaders believe is key to defending the nation.

"Earth Day offers the chance to reflect on what we're doing to care for the planet," said Acting Secretary of the Air Force John P. Roth. "The Air and Space Forces, through efforts from climate-friendly building updates to exploring clean energy sources, are committed to President Joe Biden's and Secretary of Defense Lloyd Austin's charge to tackle the climate crisis."

As one of the most prominent energy consumers in the U.S. government in terms of fuel, the Department of the Air Force is reducing its footprint and innovating new technology by funding lucrative renewable energy projects and energy-saving performance contracts.

For instance, the Jigsaw, an innovative software to streamline aerial refueling scheduling, helped reduce fuel use by 180,000 gallons weekly Air Force-wide in 2020.

The Department of the Air Force has also made major advancements in its conservation goals, which ultimately helps protect the

nation's resources.

In fiscal year 2020, the Department of the Air Force collaborated with the U.S. Fish and Wildlife Service to provide a habitat for 123 threatened and endangered species on 54 installations. The Department of the Air Force also helps protect more than 598,000 acres of forested landscapes.

While the enterprise has made significant strides in becoming an environmental steward, it takes the creative minds of Airmen and Guardians to ensure it remains that way.

"The Air Force is committed to being a good steward of our earth," said Air Force Chief of Staff Gen. Charles Q. Brown, Jr. "When it comes to climate, our Airmen should continue to approach challenges with an innovative mindset – finding ways to create more resilient bases and reduce emissions in our operations."

Small, environmentally conscious acts Airmen, Guardians, civilian employees and their families can implement in their daily lives that can lead to notable outcomes include:

- Educating peers on conservation activities in local communities
- Participating in sustainable practices at home like composting, recycling and energy saving
- Supporting community gardens, planting trees and visiting local greenhouses
- Making efforts to clean up the natural environment in local communities

"As members of the Space Force,

we play a vital role in preserving the long-term sustainability of the earth and the space domain we all share," said Chief of Space Operations Gen. John W. "Jay" Raymond. "We are committed to being great stewards as we protect and defend

our nation from above."

Learn more about how the Department of the Air Force is tackling the climate crisis by visiting the Air Force Civil Engineer Center and the Installations, Environment and Energy websites.



Jolly Green II developmental testing complete

By Samuel King Jr.
96th Test Wing Public Affairs

EGLIN AIR FORCE BASE, Fla. – The Air Force’s new combat search and rescue helicopter, the HH-60W Jolly Green II, completed its developmental test program here April 13.

The final test by the Sikorsky and Air Force team was on the aircraft’s weapon systems. The goal of that test was to both demonstrate the performance of the weapons while optimizing weapon system configurations.

“The timely completion of this test program represents an amazing accomplishment by the HH-60W Integrated Test Team,” said Joe Whiteaker, the 413th Flight Test Squadron HH-60W flight chief. “The team consistently overcame tremendous adversity through a mix of innovation and sheer determination.”

The result of those labors ensured both the warfighter and the program’s decision-makers were well-informed on the Jolly Green II’s performance.

The test efforts began in May 2019 with the first HH-60W flight. The aircraft arrived here to the 413th FLTS in November 2019 although various tests took place in other lo-



An HH-60W Jolly Green II sits under bright lights used to create heat in the Arnold Engineering Development Complex McKinley Climatic Lab March 19 at Eglin Air Force Base, Fla. The Air Force’s new combat search and rescue helicopter and crews experienced temperature extremes from 120 to minus 60 degrees Fahrenheit as well as torrential rain during the month of testing. The tests evaluate how the aircraft and its instrumentation, electronics and crew fare under the extreme conditions it will face in the operational Air Force. (U.S. Air Force photo by Samuel King Jr.)

ocations. The integrated test team accumulated over 1,100 flight test hours across six aircraft testing the full spectrum of aircraft systems.

Some of the notable developmen-

tal tests were aircraft performance, communications systems, environmental test at the Arnold Engineering Development Complex McKinley Climatic Lab, aerial refueling, data links, defensive systems, cabin systems, rescue hoist and live-fire of three weapon systems.

The test aircraft located here, will be modified for operational use before being transferred to their respective Air Force rescue unit. The Jolly Green II’s developmental test mission will move to the Combat Search and Rescue Combined Test Force for

follow-on testing at Nellis Air Force Base, Nevada in 2022.

“I am incredibly proud of the many people from so many organizations who have come together to pull off a really challenging test program,” Lt. Col. Wayne Dirkes, the 413 FLTS commander. “The team’s relentless focus on keeping the end in mind, aligning activity with their goals and moving forward quickly with discipline resulted in execution of a safe and highly successful test program in the face of incredible pressure.”

ALC May 2021

Social Distancing and Mask Wear required as needed 454-3350
contractor employees are invited to attend in accordance with company policy and supervisor approval

14" with pizza sauce base, fajita chicken, pepperoni, sausage, and mozzarella cheese

MAY PIZZA SPECIAL

Club Members receive \$1 off on specials

Meat Feast Pizza \$16.95

Thursday & Fridays 5-8pm

Capture what Memorial Day means to you in a photo

Capture Memorial Day Photography Contest May 1-28

Submit your photo to the Arnold AFB Services Facebook messenger by Friday May 28

Winner will receive a \$50 Visa gift card!

*open to all ages
Winner announced Friday June 2

Taco & Drink Special In celebration of Cinco de Mayo

May 6 & 7 5-8 pm

3 hard shell beef tacos with lettuce, cheese, tomatoes, and Mexican rice with drink special \$10.95

TACO & DRINK SPECIAL 6-7

Club members receive \$1 off *while supplies lasts *menu items available

.75 Wings Special 5-8pm

Drink Specials 5-10pm

American Pie & Open Mic 6-9:30pm

FIRST FRIDAY OPEN MIC NIGHT 7

Enjoy a mini-dinner buffet with savory meatballs, spring rolls, meat and cheese platter, vegetable and fruit platter, and more!

May 14 5-9pm
Sign up by Friday May 7 *open to the first 10 couples or 20 guests *drinks purchased at the ALC Landing bar

*present any dietary or food allergies during signup
\$20 per couple (Non-Club Member)
\$15 per couple (Club Member)

COUPLES PAINT & SIP 14

Instructional painting class with a professionally contracted artist

Arnold Golf Course

SPRING OPEN

AIR FORCE GOLF

May 22-23

Sign up by May 19

\$60

plus green fees and cart

Two Day Individual Tournament

8am

454-GOLF

contractor employees are invited to attend in accordance with company policy and supervisor approval

Arnold AFB Milestones



Sharon Pegram, TOS
35 years

35 YEARS

Donald Hart, TOS
Joel Kennerly Jr., TMAS
Karl Nation, TOS
Sharon Pegram, TOS

Michael Smith, TOS

30 YEARS

Clay Dye, TMAS

25 YEARS

Bryan Jones, TOS
Michael Riddle, TOS

20 YEARS

James Lawson Jr., AF
Frank Logan, TOS
Clint Shetters, TOS
Brandon Stiles, AF

10 YEARS

Donna Casto, AF

5 YEARS

Keith Bowling, TOS
Jeremy Dinsmore, TOS
Travis Fann, TOS
Josh Goodman, TOS

Matthew Wheeler, TOS

OUTBOUND MILITARY

Capt. Johnathan Gutierrez, AF
Tech. Sgt. Nathanael Wood, AF

RETIREMENTS

Kerrie Adams, TOS
Jimmy Burrows Jr., TOS
Christy Charter, AF
Paul Gallagher, TOS
James Owens, TOS
Kevin Sipe, AF

NEW HIRES

Beth Carter, FSS
Matthew Dickman, TMAS
Christopher Gernaat, AF
Curt Gibbs, TOS
Susan Gibbs, TOS
Jeremy Gideon, TOS
Sheila Gideon, TOS
Matthew Gunzburger, TOS

Tristan Hasseler, TOS
Robert Hastings, TOS
Glendon Lazalier, TMAS
Cody Martin, TOS
Agusto Martinez, TOS
Shana Morris, TMAS
Christopher Phinizy Jr., TOS
Dane Rape, TOS
Melia Sproul, TOS
David Wang, AF
Michelle Young, AF

PROMOTIONS

Ryan Blount, AF, promoted to first lieutenant
Ryan Gill, AF, promoted to first lieutenant
Gregory Landrum, AF, promoted to first lieutenant
Riley Vaught, AF, promoted to first lieutenant

Air Force Recruiting unveils Tuskegee Airmen paint scheme for Indy 500, NASCAR races

By Master Sgt. Chance Babin
Air Force Recruiting Service
Public Affairs

JOINT BASE SAN ANTONIO-RANDOLPH, Texas (AFNS) – Air Force Recruiting Service and their partners at Richard Petty Motorsports and Ed Carpenter Racing, introduced their newest paint scheme April 20, which pays homage to the original trailblazers, the Tuskegee Airmen. The red tails, yellow stripes, and star emblem aren't just a visual cue, but a reminder great things can happen when we celebrate our differences.

“Our partnerships with Richard Petty Motorsports and Ed Carpenter Racing provide the Air Force with platforms to reach large audiences” said Maj. Jason Wyche, Air Force Recruiting Service National Events branch chief. “We’re excited to leverage these platforms to pay tribute to the Tuskegee Airmen. It’s more than just a paint scheme; it’s an incredible opportunity to educate millions on the history behind the Red Tails. We hope individu-

als find inspiration from the Tuskegee Airmen and their story.”

The Tuskegee Airmen were the first Black military aviators in the U.S. Army Air Corps, a precursor of the U.S. Air Force. Pilots, navigators, maintainers, bombardiers, instructors and support staff all trained at the Tuskegee Army Air Field in Alabama. The Tuskegee Airmen flew more than 15,000 sorties during World War II in Europe and North Africa.

The paint scheme is inspired by the Tuskegee Airmen’s P-51 Mustang used during World War II. The iconic red tail and the red and yellow stripes on the nose of the aircraft are prominent on the cars. The paint scheme will make its track debut this season first at NASCAR’s 2021 Geico 500 at Talladega Superspeedway, Florida, April 25 and then at the 105th Indy 500 at the Indianapolis Motor Speedway, Indiana, May 30.

The Air Force has been a partner with ECR since 2020 and involved with INDYCAR since 2018.

“I am continually honored and

humbled that Ed Carpenter Racing is able to represent the U.S. Air Force and assist in the mission of recruiting our next generation of Airmen,” said Ed Carpenter, ECR team owner. “While looking to the future, we also recognize the importance of paying tribute to the history of the U.S. Air Force during Memorial Day weekend. This year, we celebrate the Tuskegee Airmen, trailblazers from World War II. The design of Conor Daly’s No. 47 Chevrolet for the Indianapolis 500 draws inspiration from their aircraft, nicknamed Red Tails.”

The Air Force has been a partner

of RPM since 2009 and involved with NASCAR since 2000.

“I have enjoyed the opportunity to learn about the Tuskegee Airmen, and the important role they played in both the United States Air Force and our country’s history,” said Erik Jones, driver of the Richard Petty Motorsports No. 43 car. “It is an honor to partner with the United States Air Force to pay tribute to these brave Airmen through the Red Tail-inspired paint scheme.”

Additionally, NASCAR will also run the Tuskegee Airmen Red Tail paint scheme at the Bristol, Tennessee, race Sept. 18.



Air Force Recruiting Service and their partners at Richard Petty Motorsports and Ed Carpenter Racing introduced their newest paint scheme to honor the Tuskegee Airmen for the 2021 race season, April 20. The paint scheme is inspired by the Tuskegee Airmen’s P-51 Mustang used during World War II. The iconic red tail and the red and yellow stripes on the nose of the aircraft are prominent on the cars. The Tuskegee Airmen were the first black military aviators in the U.S. Army Air Corps, a precursor of the U.S. Air Force. Pilots, navigators, maintainers, bombardiers, instructors and support staff all trained at the Tuskegee Army Air Field, Ala. The Tuskegee Airmen flew more than 15,000 sorties during World War II in Europe and North Africa. *(Courtesy image)*

BATMAN team's support of SBIR project increases combat survival potential

By Leslie Heck

Air Force Research Laboratory
Public Affairs

WRIGHT-PATTERSON AIR FORCE BASE, Ohio (AFRL) – The Air Force Research Laboratory's Battlefield Air Targeting Man-Aided Knowledge team, referred to as BATMAN, lent its effort to the Air and Space Forces' Small Business Innovation Research program to make a few former Airmen's dreams come true and potentially deliver a badly needed survival radio charger to the warfighter.

These former Airmen formed the service-disabled, veteran-owned small business, Combat Power Solutions, to develop innovative technology that solves real-life warfighter challenges, such as those they'd seen as Special Warfare Airmen. Their company, CPS, had only been in operation for a little over a year when they submitted an idea to SBIR and were invited to present their idea at the very first SBIR/Small Business Technology Transfer Pitch Day in New York City March 6-7, 2019.

The Air Force held Pitch Day to introduce a faster, smarter method to get cutting-edge technologies and capabilities into the hands of warfighters by speeding up the investment and DOD process. CPS managing partner, Chris Larkin, said that he, with his business partners, presented their pitch in a 10-minute format much like the T.V. show, Shark Tank.

"The process that the Air Force use[s] [in Pitch Day] is really innovative," Larkin said. "Companies presented their technology concepts, [the government panel] did a small huddle to decide whether they were going to select us or not, we went next door, the government swiped their credit card, and we had money in our account –here we are, a small business with no inbound revenue before that."

The average contract award time and payment during Pitch Day took 15 minutes, and over \$131 million in total was awarded through various contracts during Pitch Day events.

"What is really unique about this opportunity is that the Air Force has invested heavily in the SBIR program

because they want to build up and increase the relationships in the military-industrial base and take advantage of the innovative spirit of Americans," Larkin said. "It's a really cool kind of win-win story where former Air Force guys are taking advantage of an Air Force program to help solve warfighter capability gaps."

With the above swipe alone, CPS was given \$150,000 for a six-month, Phase I contract to develop a large prototype of an in-line charging system for the Combat Survivor Evader Locator (CSEL) radio. The desired function of this system is to specifically power and charge the battery of the CSEL radio, a device already included in ejection-seat-housed survival kits used by downed pilots.

While AFLCMC's Special Warfare Systems Program Office at Wright-Patterson AFB awarded and managed the contract, it turned to the BATMAN program in AFRL's 711th Human Performance Wing for a technical point of contact (TPOC). The BATMAN team includes experts in a wide range of disciplines such as electrical, mechanical and biomedical engineering as well as software, who develop technologies for the Air Force's Special Warfare personnel, such as combat controllers and tactical air control. Lt. Patrick Assef, who had experience working on a previous CSEL battery project at a university in Michigan, served as the initial TPOC until very recently. Because the CSEL radio is a controlled item, he was vital in obtaining a mock CSEL radio from Air Combat Command for CPS to use and reference as they worked to develop a smaller charger prototype that would precisely fit the radio, Larkin said.

As a result of the successful SBIR Phase I effort, CPS applied for and was awarded a SBIR Phase II contract in order to further refine the functionality and size of the prototype. This development took place over an 18-month period, which saw CPS's Surge Tactical Charger device evolve through five different prototypes. Assef and the BATMAN team helped coordinate collaboration with other Air Force organizations for the testing of these prototypes.

The evolution of the pro-

totypes resulted from obtaining end user feedback from 20-25 different Air Force customers and three different testing situations, including bringing ACC personnel out to Nellis AFB to run prototypes through exercises with pararescue jumpers and survival evasion, resistance and escape personnel in the 57th Wing and the 414th "Red Flag" Combat Training Squadron. The feedback received allowed CPS to adjust things like the placement of the Surge charger's crank handle and add a strap to the device so that a downed pilot with a broken arm or dislocated shoulder could move the crank with one hand.

Assef and BATMAN personnel also helped connect CPS with acoustics experts, such as Drs. Frank Mobley and Brian Simpson, also of AFRL's 711 HPW, to test and help mitigate sound generated by the Surge charger.

"When we built the first prototype, it was horrendously loud," Larkin said. "So, we've slowly but surely made the device lighter, smaller, quieter, and really the success is we're building a capability that can potentially solve a warfighter capability gap in terms of giving an isolated person unlimited power in an escape and evade situation. Unprecedented. Never before have we had that."

A quieter Surge charging solution and its ability to keep a radio powered can be critical to a pilot who is hiding and trying to evade capture after being shot down deep in combat mission, said Sedillo, a former survival teacher and retired active-duty Air Force aircrew life support member.

"This might make a difference between whether an isolated person (IP) gets rescued or not, whether that IP becomes a POW," Sedillo said. "We're not just going to go get an IP like we've been doing in Afghanistan. The IP is going to be there for a while. We've realized we better come up with a solution, and simply adding more batteries [to the survival kit] isn't the answer because if we add anything, something else has to come out. There's no more room in that survival kit."

CPS's final prototype of its Surge charging device eliminates the need to carry extra CSEL radio batteries with a size and weight similar to a CSEL radio battery—specifi-



A removable hand-crank provides on-the-go power to the Surge charging device, shown here with the Combat Survivor Evader Locator radio, top, and battery, bottom, all connected. (Photo courtesy of Combat Power Solutions, LLC)

cally 2.7 x 3.7 x 2.6 inches and just over a pound. The device provides compatibility and capability to charge the radio battery via any of four different methods, including solar. Directly, its crank-operated handle generates charging power at a physically sustainable rate for humans while on the move. The time it takes to charge the battery is variable based on the battery's current state of depletion.

"It is a lot of cranking, but it's a capability that you never had before," Sedillo said. "From a psychological perspective, it gives the evader confidence that they are doing something to affect their survival. The CSEL radio only needs a microburst of information; so, you just need to get it [charged] up enough to send out a quick message."

"But this thing is not just a one-trick pony. It's not just going to recharge the bat-

tery for the survival radio; it charges the battery while you're using the radio, and it has a USB output so that you can charge peripheral devices."

Sedillo acknowledged the steps CPS and the BATMAN team took together to achieve developments like these.

"[CPS] understand[s] the importance of [radios]," he said. "When they say they're going to do something they do it. This whole program from the beginning all the way to the end has been very lockstep. Every time they briefed a new version, they had solved problems or issues that we had brought up, and it kept evolving. It was a collaborative effort that we allowed them some resources they would not have had otherwise, such as contact with the user community, opportunities to go test at exercises, testing acoustics, and so on."

