



# HIGH MACH

Serving the World's Premier Flight Simulation Test Complex



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## AEDC Spark Tank: Innovative integration of smart radios to enhance 586th FLTS flight test capabilities

By Deidre Moon  
AEDC Public Affairs

**HOLLOMAN AIR FORCE BASE, N.M.** – The 586th Flight Test Squadron at Holloman Air Force Base, New Mexico, will be integrating new smart radios to improve and adapt the current flight test capabilities and meet the increasing need to support rapid software-based development technologies.

The 586 FLTS is part of the 704th Test Group, which is a unit of Arnold Engi-



(U.S. Air Force graphic by Brooke Brumley)

neering Development Complex, headquartered at Arnold Air Force Base.

According to Gerardo Sanchez, mechanical engineer with the 586 FLTS, the

smart radio technology is a much needed upgrade to the current technology in place.

“Smart radio technology will provide high bandwidth, real-time access, self-healing connectivity, simplified integration and the ability to operate on and off the Major Range Test Facility Base,” Sanchez said. “Our older bridge platforms are not equipped with this real-time datalink capability. Installing this new radio system will allow our modified Beech 1900C C-12J Huron and T-38C Talon to bridge

experimental applications to fifth generation platforms faster and cheaper.”

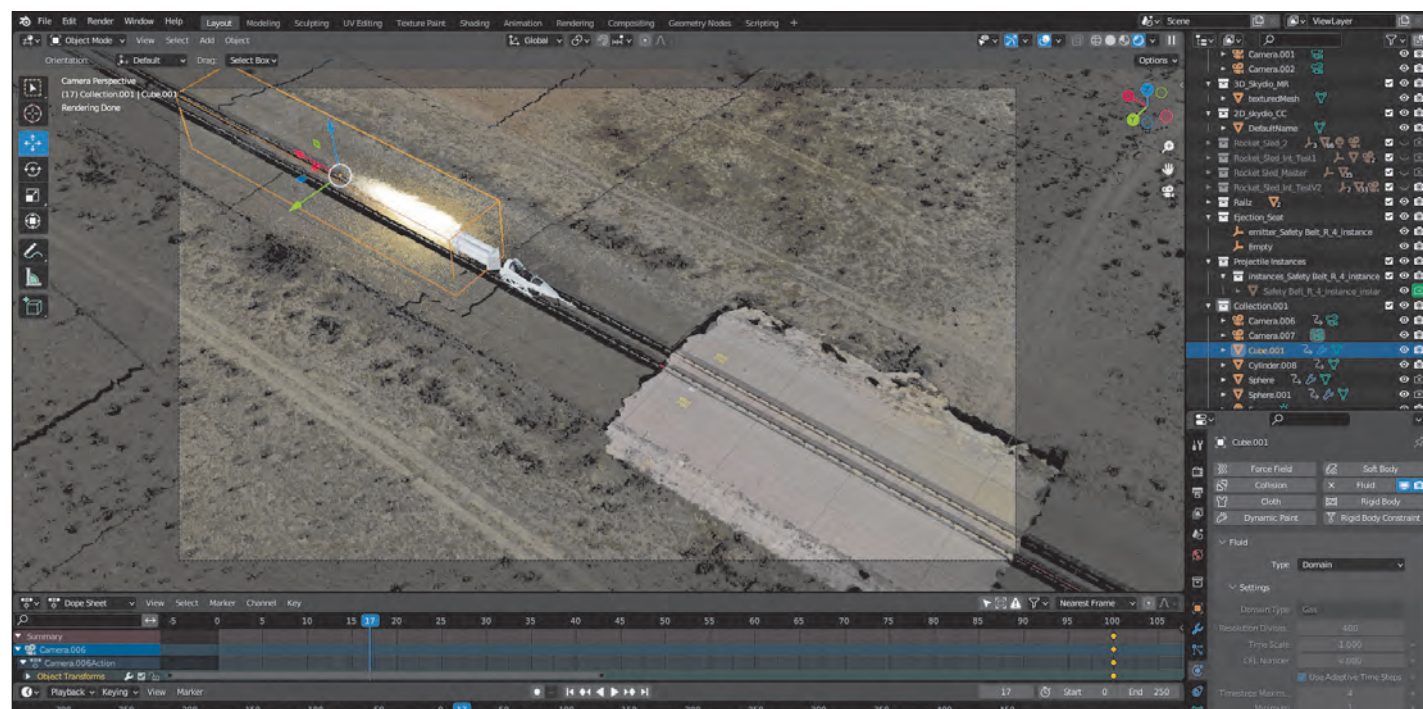
He added that this will avoid the “test-fix-test” process.

“We will have real-time sensor and software performance and the ability to adjust in real time,” Sanchez said.

The 586 FLTS team also anticipates an increase in monitoring capabilities for the T-38C by helping mitigate unsuccessful test missions, creating a near immedi-

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## AFMC organizations team to increase safety, efficiency of debris collection at HHSTT



A digital recreation of the Holloman High-Speed Test Track with an ejection seat test setup was created as part of Project Zero, an effort to train drones through machine learning to conduct automated, artificial-intelligent driven operations and data analysis at the track to improve safety and efficiency. (Courtesy illustration)

By Jill Pickett  
AEDC Public Affairs

**HOLLOMAN AIR FORCE BASE, N.M.** – In the desert of New Mexico the men and women of the 846th Test Squadron, 704th Test Group, Arnold Engineering Development Complex send test articles strapped to rocket sleds hurtling along rail tracks up to 10 miles long.

Some tests, such as ejection seat and target penetration testing, send debris across the desert; which is catalogued as part of the data collection for the test.

Project Zero is an effort by the 846 TS and the Strategic Development Planning and Experimentation Office, or SDPE, of the Air Force Research Laboratory, which aims to automate the task of identifying and tracking both planned and unplanned debris from tests at the Holloman High Speed Test Track, or HHSTT, with the use of small, unmanned

aircraft systems, or sUAS, better known as drones, and machine-learning algorithms, a subset of artificial intelligence, or AI.

“If successful, Project Zero would reduce Airmen’s time searching and finding debris components, and increase safety by ensuring explosive ordnance disposal personnel spend less time in an area of dangerous wildlife, unexploded ordnances and desert heat,” said Maj. Ryan Middleton, C-130 navigator and experimentation lead with SDPE. “Project Zero may also improve data collection, providing a unique perspective to capture tests.”

The 846 TS has used sUAS to obtain a bird’s-eye view at the track, but it was done in a manual mode, as opposed to the automated, artificial-intelligent driven operations and data analysis being pursued through Project Zero.

“We are always open to automating

manual processes and exploring solutions that may increase efficiency and safety,” said 2nd Lt. Aaron Runnells, a rocket sled test engineer with the 846 TS. “The idea of leveraging machine learning to train drones for use in the real world, or use in real-world scenarios, may unlock a new means of data collection without the hazards of having to be physically on location.”

The effort at HHSTT provides an opportunity to compare the use of synthetic data against using real-world data for the training of models. The team is also studying how digital environments may be used to understand vulnerabilities and resiliency in machine-learning algorithms prior to being deployed.

“The partnership between the Air Force Test Center’s 846th Test Squadron and AFRL’s SDPE division is a per-

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## Arnold CGOC hosting celebration for Air Force’s 75th birthday

By Deidre Moon  
AEDC Public Affairs

The Arnold Company Grade Officers Council, or CGOC, invites Arnold Engineering Development Complex team members and retirees to celebrate the 75th birthday of the Air Force on Sept. 16 at the Arnold Lakeside Complex.

The event starts with a social at 3 p.m. The cash bar will be open for the social and remain open throughout



the celebration.

Dinner begins at 5 p.m. and includes a buffet of barbecue pulled pork, chicken and ribs, along with all the traditional sides. The food is being

catered from Piggy’s Place in Tullahoma.

Following dinner, a DJ will provide music for everyone’s enjoyment, and attendees are invited to dance.

Tickets to the 75th birthday celebration are \$10 per person or \$20 per couple. Those interested in attending are asked to RSVP at the following link: <https://einvitations.afit.edu/inv/index.cfm?i=688986&k=04694A007351>

RSVP cutoff is Sept. 7.

Retirees outside of base who RSVP to the event have the option of paying at the Medical Aid Station on base prior to the event or on the day of the event at the Arnold Lakeside Complex.

For more information about the event, call 931-454-7675.

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

## AEDC intern, former Air Guardsman appreciates Arnold experience



Zachary Collins

By Deidre Moon  
AEDC Public Affairs

Every summer, interns get to experience what a career with Arnold Engineering Development Complex might be like and are mentored by AEDC employees in their different fields of interest.

Zachary Collins, pursuing a bachelor of science in mechanical engineering from Tennessee Technological University in Cookeville, was one of the interns this year at Arnold Air Force Base. As a previous member of the Air National Guard, he said that it was interesting to get an up-close view of the research and development side of the different aircraft and engines that he’s seen out in the field.

“Learning that most of the engines in the U.S. Air Force were tested here was definitely a huge eye-opener,” Collins said.

While in the Air National Guard, Collins served as a 7-level avionics specialist with the 134th Air Refueling Wing at McGhee Tyson Air National Guard Base near Knoxville.

“In this position, you really take on more of a teaching and supervision role,” he said. “It involves taking airmen out to the flight line and teaching them about the aircraft or watching them perform tasks to ensure they are competent in their career field.”

Collins joined the Air National Guard

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HIGH MACH



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Core Values

- 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.

# AEDC team members encouraged to vote in Spark Tank competition

By Deidre Moon  
AEDC Public Affairs

An idea submitted by an Arnold Engineering Development Complex team member has advanced to the next phase of the 2023 Air Force Spark Tank competition.

The submission, which offers supporting the innovative ideas of AEDC personnel through the Innovation Center at Arnold Air Force Base was made by Dr. Justin Garrard, Reliability Engineering manager with the AEDC Test Operations and Sustainment contractor.

According to Garrard, additional funding would help to greatly improve the facility housing the Innovation Center.

"In the 2017-2018 timeframe, some initial renovations were performed on the building," he said. "In 2020, new project leadership developed a plan to finish building renovations and set up initial capabilities. Some of these capabilities have been added, but we still have much to do in getting the center where we want it to be."

Garrard mentioned that the additive manufacturing lab at the center remains unfinished, though two 3D printers have been installed. Additionally, a high enthalpy test bed and a Mach 8 shock tube are other unfinished projects he'd like to see in the Innovation Center.



From right, Adam Moon, Air Force project manager for the Arnold Engineering Development Complex Innovation Center, and Dr. Justin Garrard, AEDC Test Operations and Sustainment contractor project manager for the center, discuss potential uses of the low-speed wind tunnel recently installed in the center at Arnold Air Force Base Sept. 29, 2021. The Innovation Center is being created to provide engineers a space to research and experiment. (U.S. Air Force photo by Jill Pickett)

"The initial phase of completion has not yet reached initial operational capability, but as these initial capabilities have been stood up, there has been a ground swell of interest in utilizing them," Garrard said. "We are, however, currently unable to complete all these initial capabilities and other building renovations at the Innovation Center, including quality of life upgrades such as adding HVAC. Meanwhile, we are also planning to add more additive manufacturing and maker space equipment, as well as a small turbine engine test stand."

AEDC personnel, DOD, military, and contractors alike, can now vote and help this submission make it to the next round. Voting for this round started Aug. 22 and will continue until Sept. 16.

Those interested in voting will need to register on the Guardians and Airmen Innovation Network, known as GAIN, by following instructions at the following link: <https://www.afmc.af.mil/News/Article-Display/Article/3048342/2023-spark-tank-open-for-submissions/>.

Once registered, voters will head over to the GAIN homepage: <https://gain.apps.dso.mil/>. AEDC voters will then select AFMC as the MAJCOM to vote.

Below are the different phases of the competition:

**Wild Card Voting Round 1 – Pairwise:** All submissions enter a round of Pairwise voting from Aug. 22-Sept. 16 where Airmen and Guardians will receive 15 votes per pre-heat, maximum 255 votes per person. The top four se-

lections from each pre-heat campaign, 68 maximum, will move to Wild Card.

**Wild Card Voting Round 2 – Token Voting:** The top four concepts, as determined by Wild Card Voting Round 1 rankings, from each of the 17 command pre-heat campaigns will consolidate and compete for token "investments" during this round, Sept. 19-Oct. 31. Each Airman and Guardian will receive 25 tokens and can distribute between one and five tokens per submission. At the end of Round 2, the concepts with the highest total token investment, if not designated by a Command for advancement, will be advanced to a spot in the Quarter Finals to further compete with Command-designated "auto-bid" concepts for a maximum of 40 quarterfinalists.

## April 1954 - Dec. 2022: A retirement story – A new chapter

By Jason Austin  
Chief AEDC Public Affairs

For the last dozen years I have been the steward of a publication that has touched generations of our proud AEDC family. For 67 years the contractor Public Affairs team has produced a hard copy High Mach on various schedules in various formats and with a wide range of features.

However, with the annual Year in Review edition in December, we will retire the newspaper in its current format and, consistent with AEDC's spirit of innovation, move fully into a new chapter of digital publishing.

Anecdotally, I've been told the end of Swap-n-Shop ended widespread readership; however, the data seems to prove this claim. Every two weeks our partner, Lakeway Publishers Inc., prints 2,150 copies of the paper, mails 370 to our nationwide operating locations, and puts the remainder into newsstands across Arnold AFB.

Every two weeks, we recycle the ~60% of the local papers which remain untouched in their ordered stacks.

Twice in April we asked you, our readership, what you wanted to see in your paper. Five of you responded – an estimated 0.23% response rate.

Your lack of interest is understandable. We no longer publish

photos of the beauty pageants or the record bucks harvested and Swap-n-Shop is gone. And with the slow move to digital publishing, the average story in the High Mach has been public on our website and social media for an average of 26 days by the time it appears in ink in your building.

We know that the ability to access digital content on base is limited for those not working on a computer throughout the day. Coincidentally, we know that the craft workforce is our most dedicated readership. So, we will continue to publish, on a predictable schedule, a one-page document with QR code links to those stories highlighting your accomplishments and featured on the Arnold AFB website and on the various AEDC social media platforms.

We realize it won't be the same as reading a printed newspaper, but most retirees will happily report that life is better in retirement – more time to do what you want. Similarly retiring the printed High Mach will allow the PA team more time to produce content, capture our visual history and provide you the information you need to be a "fully informed, smooth-running team."

Through digital publishing we hope to bring more timely, engaging and interactive content allowing you to provide input to the products through your reactions,



A clipping from the first issue of High Mach. Leif J. Sverdrup was the president of Arnold Research Organization, the first operating contractor of Arnold Engineering Development Center. (U.S. Air Force image)

comments and sharing.

To do this, we will need your help. The Public Affairs team cannot document and publicize what you and your team are doing if you don't reach out to us early and often. Not everything we document will be releasable in the near term, but we must preserve our vi-

sual history by being engaged for future generations.

I encourage you to give us feedback on how we're doing and how we can improve the products which tell our story. The High Mach team can be reached by emailing [AEDC.ArnoldHighMach@us.af.mil](mailto:AEDC.ArnoldHighMach@us.af.mil).

### 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. Randel Gordon  
AEDC Commander



# Third iteration of AFTC Data Hackathon an innovation success



Members of the Arnold Engineering Development Complex team for an Air Force Test Center Data Hackathon work on a project to identify possible ways to increase on-condition time in the von Kármán Gas Dynamics Facility Aug. 10 at Arnold Air Force Base. The project would maximize the amount of test data that could be gathered for test customers. (U.S. Air Force photo by Jill Pickett)

By Tech Sgt. Robert Cloys  
*Air Force Test Center Public Affairs*

**EDWARDS AIR FORCE BASE, Calif.** – Air Force Test Center hosted its third Data Hackathon virtually and in person at Edwards Air Force Base Aug. 8-12.

The AFTC Data Hackathon is a way to match data-talented or data-curious members of the AFTC community with real-world problems that desperately need their help. These events provide zero-cost solutions in the areas of Data Science and Data Engineering.

Participants, aka hackers, get experience working on real problems by implementing the data tools at our disposal via local resources.

Working virtually in real-time, participants across AFTC, the 412th Test Wing at Edwards AFB; the 96th Test Wing at Eglin Air Force Base, Florida; and Arnold Engineering Development Complex, at Arnold Air Force Base, Tennessee, combined efforts to tackle complex sourced problems with open-source and Air Force provided tools.

The Hackathon, organized by Capt. Troy Soileau, 96th Cyberspace Test Group Chief Data Officer, and Nathan “CAP’N” Cook, 96th Operations Group Chief Data Officer, is now on its third iteration and has already attracted attention from Air Force level offices.

“We’ve come a long way since November of last year, in terms of our event maturity, our technology base, and also in terms of the sophistication and scale of the solutions that we’re coming up with during each of

these events,” said Soileau. “We use this event as an opportunity to simultaneously identify and develop organic capability (in terms of both people and technology), solve real data problems, and drive digital transformation within Test.”

During the August event, ten problems were presented and each successfully assigned a team of problem solvers from not only AFTC participants but members of Air Combat Command and Air Force Special Operations Command as well.

“This event is like an iceberg, there’s so much work that goes into it behind the scenes and we get so much value from the process of putting it on,” said Soileau. “Helping the problem owners think about their mission problem as a big data problem, coaching new members of the team in the skills required to lead teams of data experts, and educating the workforce on what tools are out there.”

Though the participants worked collectively from different locations, they utilized the VAULT cloud data science platform from the Air Force Chief Data Office, to collaborate their efforts.

“This platform – VAULT – brings a capability to your normal NIPR machine that most people would only dream of,” said Soileau. “During the event, we were able to, within one day, provision a Databricks cluster (industry-leading data science computing platform) on VAULT which allowed us to achieve massive compute scale. Other units can do the same.”

Scott Bolen, 461st Flight Test Squadron RADAR test engineer, hopes to implement a similar fo-

rum where he works and focus on programming with Python to make tools and utilities. Specifically specifying periods where team members can set aside time and focus solely on a singular problem and solution.

“Having the ability to do that is very valuable and I think that we could make leaps and bounds,” said Bolen.

Similarly, 2nd Lt. Noah Dimamon, 418th Flight Test Squadron flight test engineer, participating in his first Hackathon event, took away a much broader end game.

“Coming into this I’m realizing some cool capabilities that we have now,” he said. “Even outside of the Hackathon I can get together with people and start pushing our own software for the squadron to start alleviating some of the pressure we have.”

At the end of the Hackathon week, the participating teams were judged and awarded 1st through 3rd place recognition by an AFTC leadership panel. Additional recognition was awarded for overall Impact, creativity, and completeness.

## Hackathon Winners (Descriptions Provided by Teams)

*1st – Team Orange  
(The Multi Domain Test Force Environment Truth Characterization)*

The Multi Domain Test Force worked to utilize test events known as Automatic Dependent Surveillance-Broadcast along with current Time-Space-Position Information to validate mission data. Team Orange was tasked to gather all data for a given time period to compare with

current TSPI data for a given Test Event. The team then created a Dashboard available to those with Vault access that not only gathers ADS-B data but also gives a visual representation of flight paths for a given area.

## 2nd – Team Gold (28 TES Commander Dash)

With this prototype, we are revolutionizing the way Commander’s retrieve, view, and act on unit data to make decisions. We’re taking manual data scraping and static excel dashboards to the grave and bringing in existing, free, enterprise business systems to enable real-time, integrated, interactive dashboards that serve as a common operating picture for all commander unit data needs. We demonstrated several easy-to-use SharePoint tools for Commander project/schedule tracking workflows. Most importantly, we explored the art of the possible with consolidated commander unit dashboards in Envision, which already has all the data needed to drive such a tool, and garnered interest from several parties to commission the development of such a dashboard on Envision for use AF-wide.

## 3rd – Team Blue (Skyborg)

The team used the Skyborg datasets from flight test in Orange Flag 21-3 to determine the datalink dropouts between the nodes of the Skyborg’s Autonomy system. They used a regularly reported position message as a heartbeat to find when the datalink was down. The team then used Plotly to create visualizations to more easily see what the aircraft was doing during the datalink issues.

## Additional Recognition

- Overall impact – Team Brown (AEDC Test Cell Condition)
- Overall creativity – Team Turquoise (412 CEG Match Enterprise Environmental, Safety, and Occupational Health Management Information System Data with Air Quality Regs)
- Overall Completeness – Team Gold (28 TES Commander Dash)

Additional teams worked on projects to include 96th Test Wing Target Utilization, Test Pilot School Flying Qualities, ET-CTF Skyborg Data Analysis, Version Control Software Guides, Hacker Questionnaire Analysis, and Air Commando Development Apps.

In the future, the Data Hackathon hopes to indicate that successful runs thus far show Center and MAJCOM leadership the value of increasing VAULT capabilities to a higher classification level.

“Special Access Programs data is where the juice is really worth the squeeze,” said Soileau. “If we can get this level of success just on NIPR, what can we achieve there?”

More information about the AFTC Data Hackathon can be found in DAF365 teams by searching “AFTC Data Hackathon” or by using the join code b4x02wc.

The representatives of the Data Hackathon encourage more people from any career, regardless of skillset, to participate to widen the improvement of data analytics.

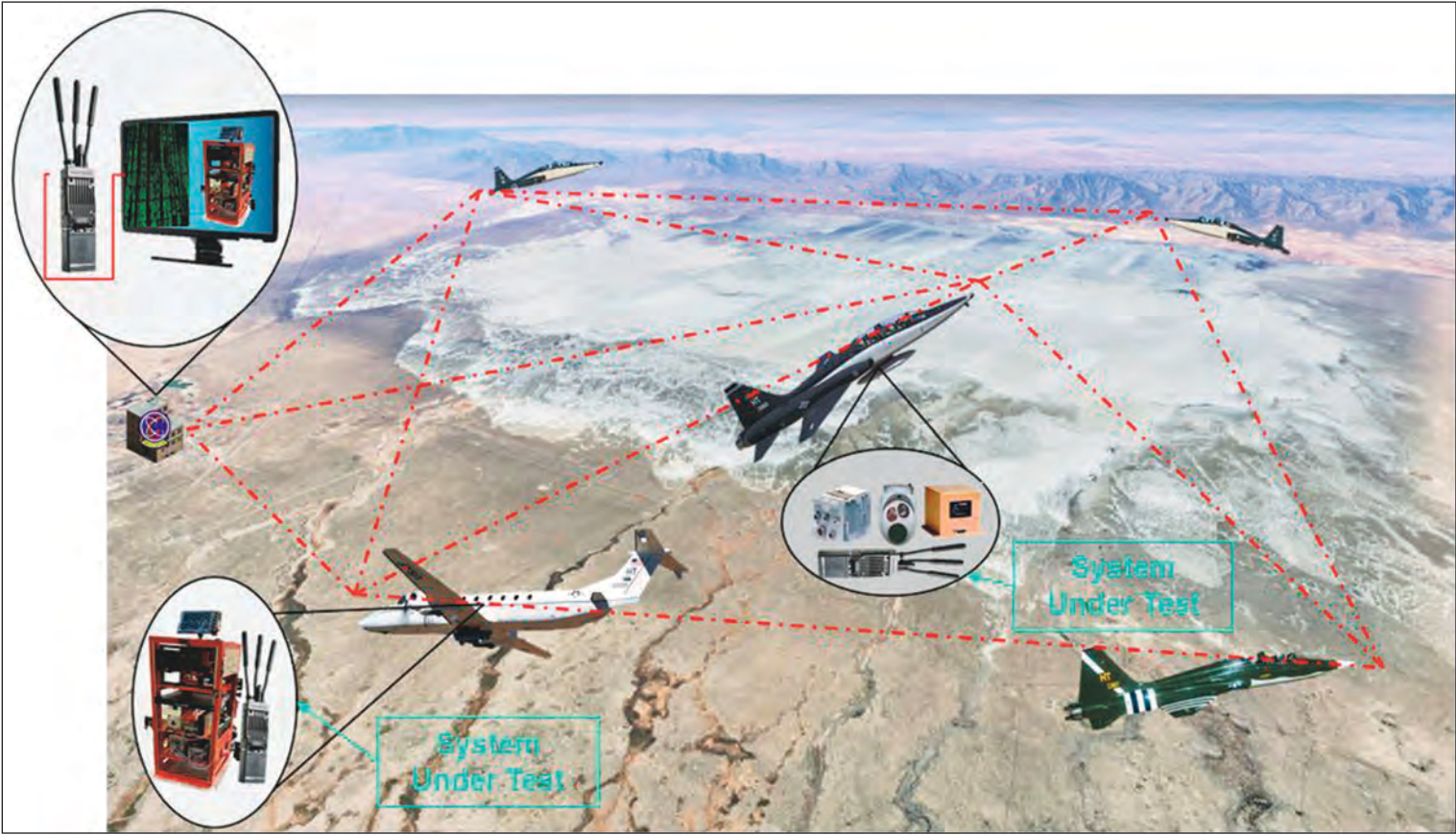
## SPARK TANK *from page 1*

ate return on investment.

“The innovation can be applied to other AEDC and Air Force Test Center units, such as the 746th Test Squadron’s NAVWAR [Navigational Warfare] mission Time Space Position Information and jamming field monitoring and the Test Pilot School Test Management Program efforts,” said 1st Lt. Andrew Servis, a flight test engineer.

The funding for the smart radios was provided through the 2022 AEDC Spark Tank program. The Spark Tank, which was open to military, DOD civilians and contractors across all AEDC units, allowed members of the workforce to propose suggestions for how to improve AEDC processes, products and test capabilities. Those awarded funding were notified in mid-February.

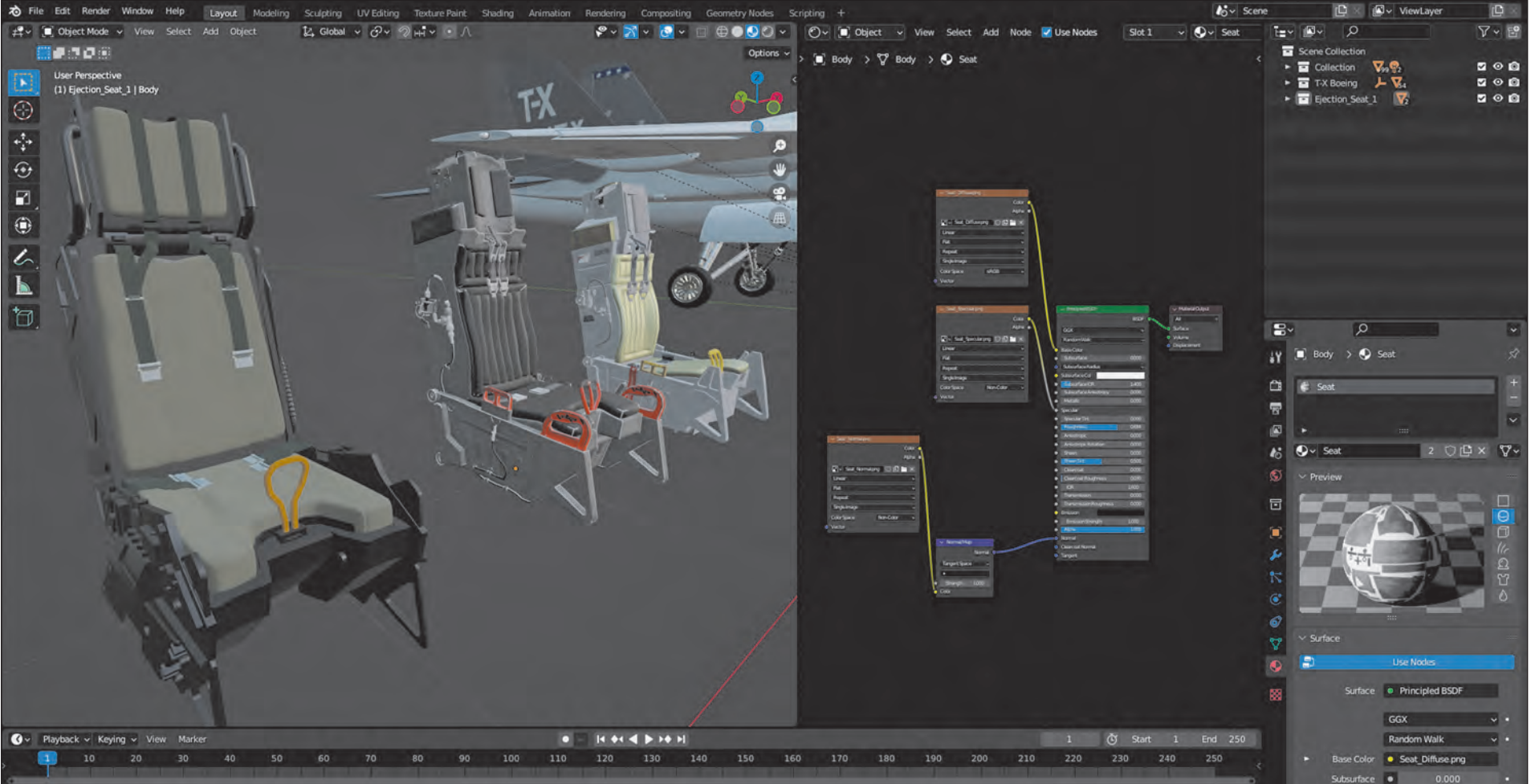
The 586th FLTS team members expect to receive and start using the smart radios this fall.



This graphic shows an example of how smart radios would be implemented in flight test. The 586th Flight Test Squadron at Holloman Air Force Base, New Mexico, will be integrating new smart radios to improve and adapt the current flight test capabilities and meet the increasing need to support rapid software-based development technologies. (U.S. Air Force graphic)



DEBRIS *from page 1*



A digital recreation of an aircraft seat was created as part of Project Zero, an effort to train drones through machine learning to conduct automated, artificial-intelligent driven operations and data analysis at the track. (Courtesy illustration)

fect match; we offer a relevant use-case, along with decades of data to train models, and SDPE provides the expertise and experimentation team to quickly determine how quickly we can field this capability,” Runnells said.

The test case scenario for Project Zero involves testing ejection events on a variety of aircraft. When the ejection system is used, the canopy is fractured to allow for the pilot to be ejected from the aircraft. This creates a field of debris that must be identified, located and collected.

Project Zero is digitally recreating the HHSTT with open-source tools from the entertainment and video-gaming indus-

try. Within the digital HHSTT, ejection system testing will be recreated based upon physics models and using video-gaming engines, and utilized to train machine-learning models to identify, track and report location of the debris.

“The digital environment allows for efficient training by modeling different scenarios – environmental conditions, test scenarios, malfunctions – to increase the resiliency of the models,” Middleton said. “And our open-source approach is how we move fast – we tap into the world-wide community of software developers for updates, bug fixes and new tools.”

Conducting research to find

scalable ways of ensuring artificial-intelligence and machine-learning models are safe and resilient, such as Project Zero, is in line with the Department of Defense strategy for responsible AI.

“The 846th Test Squadron, with its unique mission, multidisciplinary team and range, offers the proving ground for machine learning experimentation with real-world use cases,” Middleton said. “SDPE is excited to partner with the 846th Test Squadron, not just for the experimentation opportunity, but also that Project Zero may improve data collection and improve safety for the 846th Test Squadron. The open-source, digital tools that create the en-

vironment can be used by other organizations in the DOD to build their own events to train ML [machine-learning] models.”

Runnells agreed.

“If we get this right, we will demonstrate the ability to train a drone with machine-learning in a digital environment where simulations can be repeated multiple times saving time and money,” he said.

Middleton also noted how efforts such as Project Zero provide opportunities for DOD to obtain support from industries which are not traditionally seen as part of the defense industrial base.

“This is one example of how to attract new and non-tradi-

tional talent to support AEDC mission sets,” he said. “The innovative vision of the 846th Test Squadron leadership allows for new partnerships with industry, and the technical competence of AEDC engineers excites industry engineers to support critical DOD mission sets.

“Project Zero includes virtual effects artists from Hollywood’s entertainment industry as well as roboticists and machine learning experts – some who would not traditionally consider working with the DOD. They were drawn to this effort given the complex engineering challenges of the HHSTT, and the idea that outcomes could increase safety for pilots and explosive ordnance disposal personnel.”



# Around Arnold

## Suicide Awareness: What you can do to help

By AEDC Safety

September is National Suicide Prevention Month and there is a new easy-to-remember number to call for help. 988 is the new number to reach the National Suicide Prevention Lifeline that is now available to everyone across the United States.

The former lifeline phone number, 1-800-273-8255, will remain available.

These trained counselors will listen, understand how the callers’ problems are affecting them, provide support and connect them to resources if necessary.

The Veterans Crisis Line is also accessible by dialing 988. By pressing 1 a caller will be connected to the Veterans Crisis Line. Veterans may also still reach the Veterans Crisis Line with the previous phone number, 1-800-273-8255 and pressing 1, or by texting 838255, and through chat, <https://www.veteranscrisisline.net/get-help-now/chat/>.

Veterans Crisis Line responders are continuing to support veterans, service members and their families via 988. Responders are trained in crisis intervention and military culture.

The lifeline’s network of more than 200 crisis centers has been in operation since 2005, and has been proven to be effective. It’s the counselors at these local crisis centers who answer the contacts the lifeline receives every day. Numerous studies have shown that callers feel less

suicidal, less depressed, less overwhelmed and more hopeful after speaking with a lifeline counselor.

Here are some facts and figures to help us be aware of what to look for and what actions to take.

The number of suicides in 2020 was 45,979, which is 3% lower than the 47,511 suicides in 2019. According to the Centers for Disease Control and Prevention suicide is now the 12th leading cause of death In the United States, down from 10th.

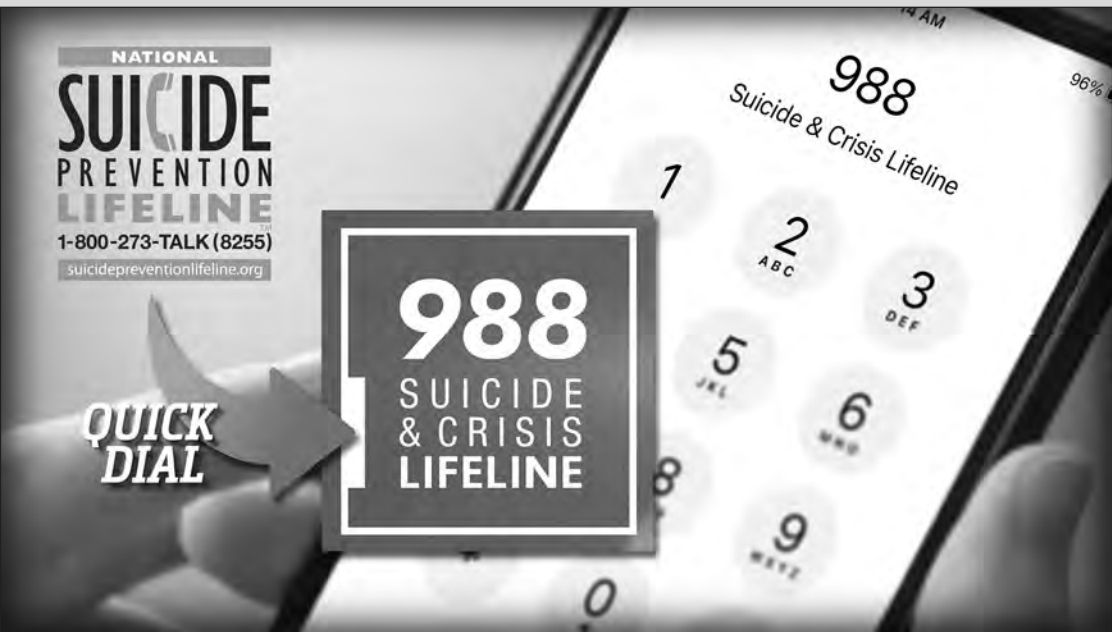
Each day, approximately 126 people take their own lives; this is about one death every 11 minutes. Approximately 17 of these deaths are U.S. Military veterans. The U.S. Department of Veterans Affairs’ 2021 National Veteran Suicide Prevention Annual Report shows that the overall veteran suicide count and rate are declining.

### Warning Signs and Actions to Take

The National Council for Behavioral Health provides a list of clues and actions to take to help you tell if someone is feeling suicidal.

#### Warnings Signs:

- Talking about wanting to die or kill oneself.
- Talking, writing or posting on social media thoughts on death, dying, or suicide.
- Looking for ways to commit suicide: seeking access to pills, weapons or other means.
- Talking about feeling hopeless or having no purpose.



988 has been designated as the new three-digit dialing code that will route callers to the National Suicide Prevention Lifeline. (U.S. Air Force graphic)

- Acting anxious, agitated, rage, anger, seeking revenge or dramatic changes in mood.
- Talking about feeling trapped with no way out or being in unbearable pain.
- Acting recklessly or engaging in risky activities, seemingly without thinking.
- Increasing alcohol or drug use.
- Withdrawing from friends, family, or society, talking about being a burden to others.
- Sleeping too much or too little.

#### Actions to take

Ask and assess for risk of suicide or harm. Research shows that a person who is having thoughts of suicide feels relief when someone reaches out to them in a caring way. Findings suggest that acknowledg-

ing and talking about suicide may reduce rather than increase suicidal ideation.

*Be there and listen nonjudgmentally.* An individual is more likely to feel less depressed, less suicidal, less overwhelmed and more hopeful after speaking to someone who listens without judgment.

*Give reassurance and information to help someone stay connected.* Studies indicate that helping someone at risk create a network of resources and individuals for support and safety can help them take positive action and reduce feelings of hopelessness.

*Encourage appropriate professional help and follow up.* Studies have also shown that brief, low cost intervention and supportive, ongoing contact may be an important part of suicide prevention, especially for an individual after they have

been discharged from hospitals or care services.

If at any point you think someone may be considering hurting himself or herself ask them directly, are you thinking about suicide or hurting yourself?

If the answer is no, keep listening and supporting.

If the answer is yes, ask, do you have a plan? How – When? Do you have what it takes? If they answer yes to these questions call 911 and get help immediately.

If you are unsure about what to do or if you wonder about someone, ask them directly or go to human resources, your supervisor or a trusted friend. Sometimes there are no clues and we do not know to help. But do not miss an opportunity to help when you suspect a problem.

Take care of each other.

# Cop Corner: Surveillance detection

By Dan Hawkins  
Antiterrorism Program Manager

How many items in the photo at right could be used by an adversary to conduct surveillance on Arnold Air Force Base assets? Answers will be featured in a future High Mach edition.

**Bonus Question:** Can you name any items in the photo that are illegal to possess and/or use within the mission area on Arnold AFB?

Please direct any questions or suggestions for future articles to our distribution group: [AEDC.Arnold.CopCorner@us.af.mil](mailto:AEDC.Arnold.CopCorner@us.af.mil).



Various items that could be used for surveillance are shown in the front seats of a vehicle. (U.S. Air Force photo by Dan Hawkins)

### COLLINS from page 1

because he wanted to follow in the footsteps of his dad and grandfather.

“They both served in the Air Force, and I wanted to serve my country as well,” he said. “The Air National Guard is a little bit of a secret, as it is a part of the Air Force but no one really hears a lot about it. However, the ANG holds the majority of air refuelers in the Air Force and with the increased mission, it al-

lowed me to serve as active duty military while in the reserves, so it was a really cool experience.”

Now pursuing a career as an engineer, he said he heard about AEDC through a friend who works at Arnold and mentioned the possibility of applying for an internship.

Collins, who interned with the AEDC Test Operations and Sustainment contractor, National Aerospace Solutions, LLC,

said that his internship has offered countless learning opportunities.

“I have had the privilege of working in multiple areas during my time here, which include condition-based maintenance, design engineering, space and missiles and the Hypersonic Systems Test Branch,” he said. “I have thoroughly enjoyed my experience at AEDC.”

When asked if he has plans

to apply for a full-time job with AEDC after finishing his degree, Collins said that he is unsure at this time.

“I was recently married in December and I have to consider what my wife wants as well. That being said, she has suggested the idea of finding jobs at the beach while we are both young and then moving back later on. With that in mind, I have been looking into Eglin Air

Force Base and the McKinley Climatic Lab, as it is also part of AEDC. However, I am keeping my options open.”

Whether he comes back to AEDC in a full-time position or not, Collins notes that he really appreciates the few months he spent at Arnold.

“This summer has been a tremendous learning opportunity and I am very thankful to have met the great people of AEDC.”



# In assessing his first year, Kendall sees achievement but many challenges ahead

By Charles Pope  
*Secretary of the Air Force Public Affairs*

**ARLINGTON, Va. (AFNS)** – With his West Point pedigree and nearly five decades serving in active duty, the upper reaches of the Department of Defense, and assorted national security endeavors, Frank Kendall had a highly refined idea for what he would face when took his seat as Air Force secretary in 2021.

Now, after one full year on the job, Kendall’s assessment of what his leadership has brought (and what it hasn’t), and how that has shaped the Air Force and Space Force to better address the global threats facing the United States, is generally positive.

“I’m reasonably comfortable with where we’ve come in the last year,” Kendall said in recent interview that ranged across a broad number of topics relating to how he has performed in the last year and how that translates to where the Air Force and Space Force are headed.

But with his experience and knowledge, Kendall quickly offered some well-informed nuance.

“I think now there’s, if not quite a consensus, at least close to it in terms of the direction of change that we need,” he said. “So that’s all positive. Now it’s going to be up to us to execute.”

He also offered a blunt assessment of the stakes confronting not just him but the entire Total Force and the nation and why the challenge from China must be understood and met without delay.

“I regard the current situation (posed by China) as more stressing than the one I experienced for 20 years during the Cold War,” Kendall said, offering an assessment that is all the more remarkable given his habit of being understated and for carefully choosing his words.

Today, with the emergence of China, “We have a well-resourced, strategic, innovative competitor who is trying to defeat not just our current capabilities but thinking ahead to the capabilities that we’re going to field and already started down the road of developing capabilities to counter those,” he said.

“It’s a game of chess in which we have to think a few moves ahead and we have to take action. ... Our ability to sustain deterrence depends upon our success doing that. And I think this is a greater challenge even than the ones that I faced and was part of during the Cold War.”

That, more than anything, explains perhaps Kendall’s clarion call during his first year as secretary – seven Operational Imperatives is the blueprint he developed for rapidly changing the hardware, policies and cultures of the Air and Space Forces



**Chief Master Sgt. James Guldjord, 18th Air Refueling Squadron air refueling superintendent, teaches Secretary of the Air Force Frank Kendall about the air refueling station on a KC-46A Pegasus at McConnell Air Force Base, Kansas, April 3. While at McConnell AFB, Kendall toured a KC-135 Stratotanker followed by a flight on a KC-46A Pegasus to take an in-depth look at the air refueling airframes to highlight modernization and compare old and new airframe capabilities. (U.S. Air Force photo by Airman 1st Class Zachary Willis)**

to better position them to confront current and emerging threats. The Operational Imperatives are the tool by which Kendall hopes to reshape and refocus the services to contest, and if necessary, defeat China and other near-peer powers.

On more than one occasion over the last year, Kendall acknowledged that the Air Force is working to close a capability gap and that being forced to carry older, less capable equipment is slowing progress at a time when time is short.

That reality is the reason that the Air and Space Forces must transform, and fast, Kendall emphasized nearly every day, pointing out urgency is needed, and the Joint Force must become more seamless.

That is one reason the first of the seven imperatives is focused on space. On that front, Kendall said frequently in public appearances that the Space Force “is developing a resilient force design to modernize and deliver new capabilities at operationally relevant speeds” in a once “benign” domain that is now a highly contested area.

He endorsed the military-wide push toward a new generation of joint operation known as Joint All Domain Command and Control, or JADC2, but with a caveat. The Air Force’s contribution to the larger effort, known as the Advanced Battle Management System, is showing promise, Kendall said. However, the “deliverable” must be “identifying the tangible benefits we need to get into the hands of warfight-

ers to make an operational impact.”

That focus is another common refrain for Kendall, based largely on his role as high-ranking procurement officer in the Department of Defense during the Obama administration. Pilot programs, vague prototypes and good ideas without a strong basis for an actual product at the end are a constant target for Kendall. Those efforts, he said, will end up in the valley of death at a time when combatant commanders need actual equipment and practices that are ready to be used in the field.

“We have plenty of risk to manage in the portfolio that we have today,” Kendall said. “But what I’m focused on more than anything else is ensuring that our programs are structured and resourced to get real capability into the field, to get meaningful operational capability into the hands of our operators as quickly as possible.”

There remain other thorny problems too, Kendall said. They include traditional ones such as retention and quality of life, determining the correct mix of “capability versus capacity” and surprises such as Russia’s invasion of Ukraine, the bumpy withdraw from Afghanistan, the continued stubborn presence of COVID-19, and coping with the financial fallout of unexpected inflation.

But across his first year, Kendall said even with those big, unanticipated issues, he is satisfied with how the year was navigated.

As for the Total Force, Kendall, the for-

mer Army officer, is impressed.

“I’m delighted with the capabilities and the talent and the sense of mission that I encounter everywhere I go in the Air Force and the Space Force,” he said. “These are people who are dedicated to serving their country; they work tirelessly, have an enormous amount of capability, and they serve the country very well every day.”

Kendall said he is comfortable with the budget proposed for the next fiscal year, for instance, and more importantly, that Congress has generally embraced the reasons driving the request even if they have questions about some line items. He is pleased with the continued growth of the fledgling Space Force and with the leadership of Chief of Space Operations Gen. John “Jay” Raymond. The same is true for Air Force Chief of Staff Gen. Charles CQ Brown, Jr. and Gina Ortiz Jones, the department’s under secretary, Kendall said.

“It’s been just a delightful experience to have such a cohesive senior leadership team to work with,” he said. “From day one, that’s been very positive, and I think it’s allowed me to do a lot of things from my perspective over the last year that have moved the Air Force and the Space Force both forward and in the direction we need to go.”

He has been heartened by the way the Total Force has embraced his, “One Team, One Fight” credo.

Those realities provide the foundation for progress on what Kendall says is the most important – and urgent – priority, his Seven Operational Imperatives.

“That list of seven Operational Imperatives has been how I focused effort within the Department of the Air Force to identify the things that we need to do to stay ahead of the threat,” he said.

The purpose is twofold, Kendall said. First, is articulating goals and tasks that are specific enough to generate actual results and, in Kendall’s words, “put capability directly into the hands of warfighters.”

The second, and according to Kendall, more important, is to instill a sense of urgency.

“One of things that I’ve said over the past year is that if there were one thing I could do, it would be to inculcate everyone involved a sense of urgency about getting on with things and moving forward,” he said.

“I still feel that way. I think that’s something of a cultural change, which is still in progress. I think we’ve made a lot of progress on that, but I’m not sure that everybody appreciates the need for that sense of urgency and how important that is.”

# AFTC summer internship creates next gen leaders

By Tech Sgt. Tabatha Arellano  
*Air Force Test Center*

**EDWARDS AIR FORCE BASE, Calif.** – Created by former Secretary of the Air Force, Dr. Heather Wilson as part of a force renewal initiative, every summer since 2018, the Air Force Test Center has hosted a variety of internship programs for students 18 years old and up. This opportunity has capitalized not only at Edwards Air Force Base, Calif., but at Eglin Air Force Base, Fla., and Arnold Engineering Development Complex, Tenn.

This 10-12-week summer internship provides a variety of science engineering opportunities, gives students the chance to test out a hands-on experience, and learn more about operations in that specific job.

“Since this was my second summer at the Benefield Anechoic Facility, the internship met my expectations. Last summer, when I started, I didn’t really know what to expect other than I would be working with radio frequency equipment. My boss and team did an amazing job of incorporating me into the flight, teaching me how to use the equipment, and ultimately preparing me for a job as an RF engineer,” said Jesse Brunet, 772nd Test Squadron radio student trainee, at Edwards, AFB.

“At the 772nd Test Squadron Benefield Anechoic Facility, I worked several projects relating to our antenna patterns and radar target simulator capabilities. These included developing software for

instrument automation, characterizing new equipment, and leading an effort to evaluate and upgrade our polarimetry system,” said Brunet. “My favorite experience as an intern has probably been the opportunity to work with our radar target generator, ARES. This capability allows us to simulate a target for a radar so that the radar can be tested without having to actually fly the plane around. Working with ARES helped me learn a lot about radar and how advanced some modern radar systems are becoming.”

Dayana Contreras, 412th Test Engineering Group/812th Aircraft Instrumentation Test Squadron engineering student trainee, worked in the instrumentation department designing and analyzing a support system for the Reconfigurable Airborne Sensor, Communication and Laser – or RASCAL – pod at Edwards, AFB.

Contreras wrapped up the summer internship program, leaving with more on-the-job knowledge.

“[For those who are considering the program, my advice would be to] try your best and approach every situation and challenge with an open mind,” Contreras said.

The S&E hosts multiple internship programs every summer and interns are typically college students with at least 60 credit hours and a 2.95+ GPA.

AFTC executive director, Dr. Eileen Bjorkman said, “Intern programs are a great recruiting tool, and they help us to hire the right college graduates. First

of all, the intern programs help us reach college students who might otherwise not be aware of the exciting opportunities we have in the Air Force Test Center. Second, the programs allow us to get to know someone before we hire them and lets the students learn about the different options available across AFTC.”

“When we hire someone right out of college who’s been an intern for us, we get someone already several months ahead of their peers regarding AFTC, and we already have a good idea of where to place that person to maximize the benefit to both them and AFTC,” said Bjorkman.

The program’s success over the years is attributed to the Talent Acquisition managers.

“I have over five years of experience working with the Force Renewal Programs in Air Force Life Cycle Management Center and Air Force Sustainment Center. I am responsible for acting as the liaison between AFTC organizations, interns, and Air Force Personnel Center/ Air Force Material Command S&E Career Field Team Program Offices,” said Katherine Ficklin, AFTC S&E Talent Acquisition manager. “The duties under that umbrella include, but are not limited to, ensuring recruiting, onboarding, promotions, conversions and evaluations happen in a timely manner for all AFTC locations. We currently have over 160 participants in our Force Renewal Programs (PCIP, SMART, PAQ).”

Interns are selected through the Direct Hiring Authority, providing the

most suitable students from across the country, with the goal of developing the next generation of the Air and Space Force’s leaders.

“The best part of the job for me is recruiting the best and the brightest S&E candidates to fill AFTC’s pipeline to ensure we are providing warfighters quality products, at or below cost in a timely manner,” said Ficklin. “Being able to follow the career of interns from recruiting all the way to becoming a PM or Supervisor. As an engineer, internships were hard to come by for me so I try to ensure to cast the net for AFTC’s internships as far as I can to ensure we are reaching as many qualified candidates as possible.”

At this moment, AFTC has 50 internship positions available for summer 2023 between Edwards AFB, Eglin AFB, and Arnold AFB.

For more information or to register, visit the sites below:

412th Test Wing Intern Opportunities: <https://afcs.experience.crmforce.mil/s/events?eventId=a02t0000009enxvAAA>

96th Test Wing Intern Opportunities: <https://afcs.experience.crmforce.mil/s/events?eventId=a02t0000009eo4mAAA>

Arnold Engineering Development Complex: <https://afcs.experience.crmforce.mil/s/events?eventId=a02t0000009eo4rAAA>

Arnold Engineering Development Complex (Holloman AFB) Intern Opportunities: <https://afcs.experience.crmforce.mil/s/events?eventId=a02t0000009eoENAAAY>





# Grey Wolf flies with all-Air Force crew for first time

By Samuel King Jr.  
96th Test Wing Public Affairs

**EGLIN AIR FORCE BASE, Fla. (AFNS)** – Lt. Col. Mary Clark stepped out to the MH-139A Grey Wolf with confidence.

Confidence gained from taking part in and leading in the developmental efforts of the Air Force’s first acquisition helicopter. Those early labors from concept to reality culminated as she climbed into one of the pilot seats for the MH-139A’s first flight under Air Force ownership at Eglin Air Force Base Aug. 17.

“This milestone really represents the beginning of Air Force testing for the Grey Wolf,” said Clark, a former requirements officer with the Grey Wolf program, now at the 96th Operations Group. “We can now open up those test points for the military and push the envelope more to ensure we’re delivering that operational capability the units need out of the helicopter.”

The Grey Wolf achieved this milestone after earning its military flight release Aug. 12. The new status allows Air Force-only aircrew to conduct testing on military capabilities of the MH-139A as the program moves forward. Prior to the military flight release, military and Boeing contractors shared the flight

duties since the aircraft’s arrival here in December 2019.

During that two-and-a-half-year period, the military testing fell to the 413th Flight Test Squadron and the Air Force Global Strike Command Detachment 7, in which Clark was a former commander. The 413th FLTS is the Air Force’s only rotary-wing developmental test unit.

“We learned a lot over the last two years,” Clark said. “That experience allowed us to shape our test plans and ultimately save time. We already know some baseline foundational things we don’t have to re-establish in our own program.”

The aircraft’s first flight under its new call sign, Lycan, meaning werewolf, took place above and around Duke Field, an auxiliary field north of Eglin AFB. The goal of that flight was to validate processes, checklists, maintenance, emergency procedures and aircrew communication and coordination.

Tech. Sgt. Alexander Graves, an AFGSC Det. 7 special missions aviator, was part of both MH-139 first flights with Boeing in early 2020 and now the all-Air Force flight. The Airman said he hadn’t reflected on his place in Grey Wolf history as the first enlisted to fly in and instruct on one of the Air



An MH-139A Grey Wolf lifts off for a mission Aug. 17 at Eglin Air Force Base, Florida. The Grey Wolf sortie was the first flight since the Air Force took over ownership of the aircraft Aug. 12. It marked the first all-Air Force personnel flight in the Air Force’s newest helicopter. (U.S. Air Force photo by Samuel King Jr.)

Force’s newest aircraft.

“What an honor,” said Graves, a former C-130 Hercules loadmaster, who was chosen to be part of the Grey Wolf program. “I never thought in my career I’d be in a position to do something like this. It’s so rewarding to finally test the things we’ve been building up and to see that work we put in over the last two years pay off now.”

The goal for the next 15 months of testing on the four MH-139As here will be to validate the safety of the aircraft

and define the limits and maneuvers that can be performed. The developmental testing here will make sure the MH-139A meets AFGSC requirements for operational missions and define baseline operational capabilities upon which to build tactics, techniques, and procedures. The MH-139A will replace the Air Force fleet of UH-1N aircraft, increasing capabilities in speed, range, endurance, payload, and survivability. The Air Force will acquire up to 80 helicopters, training devices, and associ-

ated support equipment. The aircraft will provide vertical airlift and support to four major commands and other operating agencies.

From those humble beginnings in concept to feeling the MH-139A’s wheels leave the pavement, Clark said it was truly a magical moment.

“It’s just extremely satisfying to now own and fly something we worked so hard to get,” she said. “Today the leash was off, and we could finally run with the Grey Wolf.”



## Quickstrike inspection

Capt. Jonathan Acker, 20th Bomb Squadron navigator, inspects an MK-62 Naval Quickstrike Mine under a B-52H Stratofortress in support of exercise Rim of the Pacific 2022 at Barksdale Air Force Base, Louisiana, Aug. 1. The world’s largest international maritime exercise, RIMPAC provides a unique training opportunity while fostering and sustaining cooperative relationships among participants critical to ensuring the safety of sea lanes and security on the world’s oceans. (U.S. Air Force photo by Senior Airman Jonathan E. Ramos)

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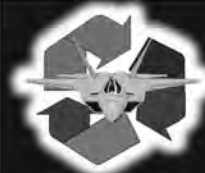
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Michael Glennon, AF  
Danita Marsh, TOS

## 25 YEARS

John Taylor, TOS

## 20 YEARS

Russell Arbuckle, TOS  
Larry Bishop, TOS  
Gary Cunningham, TOS  
Jimmy Newman, TOS

## 15 YEARS

Timothy Bagley, TOS

Michael Cleek, TOS

## 5 YEARS

Brandon Ables, TOS  
Kathleen Bishop, TOS  
Donald Fontenot, TOS  
Bradley Hicks, TOS  
Matthew Lance, TOS

## INBOUND MILITARY

2nd Lt. Patrick Robbins, AF  
2nd Lt. John Simpson, AF  
2nd Lt. Benjamin West, AF

## OUTBOUND MILITARY

Master Sgt. Jose Flores, AF  
1st Lt. Michael Hareld, USSF  
1st Lt. Gregory Landrum, AF

## RETIREMENTS

Warren Gilbert Jr., TOS  
Ralph Lance, TOS

## NEW HIRES

Anna Burger, AF  
Austin Bowser, TOS  
Anthony Cadzow, TOS  
Andrew Carrigan, TOS  
Alex Colby, AF  
Gavin Graham, TOS  
Carlos Hadley, FSS  
James Hall, AF  
Alexis Holloway, AF  
Jennifer Johnson, TOS  
Paul Lindlau, TOS  
Asha Marcrom, TOS  
Stephen McCluskey, FSS  
Jason Montgomery, FSS

Matthew Nguyen, TOS

Justin Norris, TOS  
Matthew Parulski, TOS  
David Pennington, TOS  
Bryan Rippey, TOS  
Jennifer Sayre, AF  
Rayford Thompson III, TOS  
Amy Turner, AF  
Clayton Whitten, TOS  
Jessica Worley, TOS  
Mickael Young, TOS



Michael Glennon, AF  
35 years



## A look at airpower

A U.S. Air Force flight engineer assigned to the 352nd Special Operations Wing looks across the ramp of a CV-22B Osprey during local training over the United Kingdom, Aug. 2. Continuous training on advanced aircraft, tactics and air refueling techniques ensures the 352nd SOW is ready to respond any time, any place. (U.S. Air Force photo by Senior Airman Alex Kaelke)

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**FITNESS: 454-6440**  
M-F 5am-7:30pm  
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**ALC: 454-3350**  
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# Modified X-62 helps accelerate tactical autonomy development

**By Patrick Foose**  
*Air Force Research Laboratory Strategic Development Planning and Experimentation Office*

**WRIGHT-PATTERSON AIR FORCE BASE, Ohio (AFRL)** –The Air Force Research Laboratory Strategic Development Planning and Experimentation office has invested \$15 million upgrading a decades-old workhorse to make it relevant for 21st century warfighter challenges.

AFRL’s Autonomous Aircraft Experimentation team is using a highly modified Air Force Test Pilot School NF-16, an aircraft recently designated the X-62, to accelerate the development of tactical autonomy for uncrewed aircraft.

Matthew Niemiec, the autonomous aircraft experiment portfolio lead, said the upgrades to the X-62, also known as the Variable In-flight Stability Test Aircraft, or VISTA, include software that allows it to mimic the performance characteristics of other platforms. He said it also could host a variety of autonomy behaviors, including those from the Skyborg Autonomy Control System and others provided by third-party industry partners.

Skyborg is a Department of the Air Force Vanguard project that has informed the transition of

open, modular autonomy to enable combat mass using low-cost uncrewed aircraft. These vehicles will be equipped with autonomy systems and will assist human-piloted aircraft perform critical missions.

Since March 2021, the Autonomous Aircraft Experimentation team executed 16 live test events focused on evaluating the Skyborg Autonomy Control System on the Kratos XQ-58 Valkyrie, UTAP-22 Mako and General Atomics MQ-20 Avenger uncrewed air vehicles.

“The data generated during these tests, along with feedback provided from our user community, show that in order to rapidly develop and mature tactical autonomy on an appropriate timeline, investment in, and utilization of, a mature, tactically relevant platform is required,” Niemiec said.

The X-62 uses a “safety sandbox” that allows integration and flight of modeled air vehicles, control laws and autonomy capabilities. Unlike the uncrewed aerial vehicles such as the Valkyrie, Mako and Avenger, the X-62 has room for a crew of two, including a pilot who can supervise the autonomy control system’s performance, similar to the way the automotive industry tested autonomous driving features.

“Ground and flight testing on X-62 is one of several steps we are taking to



**Crews from the U.S. Air Force Test Pilot School and Calspan work on the X-62, also known as the Variable In-flight Stability Test Aircraft, or VISTA, Aug. 3 at Edwards Air Force Base, California. (U.S. Air Force photo by Giancarlo Casem)**

build out critical information networks and physical storage infrastructure necessary to enable rapid autonomy development,” Niemiec said. “The goal by fall 2022 is to have it flying alongside an uncrewed platform, with both using tactically-relevant sensors while flying autonomy behaviors. We’re also building out a robust simulation environment to capture operator feedback and integrate their inputs into our autonomy development process.”

Two systems have been modified in the X-62. One is the VISTA simulation system, which allows the aircraft to mimic the flight characteristics of a different airplane. The other is the system for the autonomous control of the simulation, which enables different autonomous behaviors

to fly the airplane.

“When you stitch those two capabilities together, you get a tactically relevant aircraft that enables rapid test of autonomy capabilities while also proving out the interface requirements necessary for different vehicle platforms,” Niemiec said.

He said Skyborg and other advanced autonomy development efforts like DARPA’s (Defense Advanced Research Projects Agency) Air Combat Evolution can leverage the X-62 as a surrogate for testing high-risk autonomous maneuvers, in parallel with uncrewed aircraft development efforts that are evaluating new high-risk vehicle model designs.

“Because we have a safety pilot, we can always turn it off, and improve our throughput for testing autonomy capability by 10 times,” Niemiec said.

VISTA’s safety trip system also could automatically disengage the VISTA simulation system when the boundaries of its safety sandbox are violated, allowing larger and riskier steps to be taken with no impact on flight safety, he said.

Dr. M. Christopher Cotting, USAF Test Pilot School director of research, said VISTA is maintained and operated under a partnership with the Calspan

Corporation and Lockheed Martin Skunk Works. The USAF Test Pilot School acts as VISTA’s prime integrator, manager and test organization.

“The USAF Test Pilot School has been the home of NF-16D VISTA since 2001,” Cotting said. “It has been used to expose students to a wide range of aircraft dynamics, allowing students to experience firsthand both ‘good’ and ‘dangerous’ aircraft after they have been discussed and analyzed in the classroom.” VISTA has also been a risk mitigation platform for future USAF technologies.

“After a long track record of supporting the [USAF] Test Pilot School and the Air Force, the research systems on the aircraft were becoming dated and unsupportable,” Cotting said.

As part of the transformation into the X-62 VISTA, Lockheed Martin Skunk Works designed the system for Autonomous Control of the Simulation, a new system for VISTA. This highly flexible computer architecture enables VISTA to test a wide range of autonomous systems.

Another integral part of the transformation was the new VISTA simulation system Calspan Corporation designed and installed. Lockheed Martin Skunk Works contributed

the model following algorithm, an enhanced modeling framework capability to the simulation system. The improvements allow VISTA to support a wider range of aircraft simulation and multiple research control laws.

Cotting said the model following algorithm supports a modeling framework that can be openly distributed to researchers.

“Once researchers have integrated their simulation models, the new VISTA simulation system can take those models and easily implement them into the X-62,” he said.

“Normally a new control system for an aircraft can take years to implement on an aircraft,” Cotting said. “With VISTA, a new control system can be installed and flown in just a few months. Once installed, changes can be made overnight to modify the control system based on information learned during that day’s flight test.”

The X-62 VISTA is built to be a technology demonstrator and risk reduction platform. For example, the control laws used to fly the Joint Strike Fighter were first flown on VISTA before the strike fighter’s first flight, reducing significant technical and safety risk.

“VISTA’s simulation framework is flexible enough to allow aircraft designers a chance to fly their aircraft before it ever leaves the ground,” Cotting said. “While modern simulation laboratories are getting much better at simulating aircraft, they still cannot replicate some of the unknowns of operating an aircraft in a relevant flight environment. VISTA and its simulation system allow digital aircraft designs to be ‘flight tested’ before the aircraft is ever built.”

Niemiec said AFRL is working with multiple industry partners to integrate advanced, tactical performance vehicle designs along with cutting edge autonomy capabilities onto the X-62.

“VISTA will allow us to parallelize the development and test of cutting edge artificial intelligence techniques with new uncrewed vehicle designs,” he said. “This approach, combined with focused testing on new vehicle systems as they are produced, will rapidly mature autonomy for uncrewed platforms and allow us to deliver tactically relevant capability to our warfighter.”



# Leadership talks strategy, future, current issues at AFMC Power Hour

By Marisa Alia-Novobilski  
Air Force Materiel Command

**WRIGHT-PATTERSON AIR FORCE BASE, Ohio** – The Air Force Materiel Command leadership team held a virtual Power Hour all-call, August 25. The event was an opportunity for the leadership team, including newcomers Gen. Duke Z. Richardson, AFMC Commander, and Lorna B. Estep, AFMC Executive Director, to discuss their perspectives on the command and the future while also answering questions from across the enterprise. Chief Master Sgt. David A. Flosi, AFMC Command Chief, also participated on the panel.

“It never ceases to amaze me the great work this MAJCOM [Major Command] does across all six of the centers. It is encouraging to see the enthusiasm and passion for the mission within the AFMC workforce. I’m also seeing the same thing when I interact with the MAJCOM commanders. I see a lot of respect for what AFMC brings to the fight,” said Richardson during opening remarks.

Richardson started the event with an overview of the forthcoming AFMC Strategic Plan, outlining his focus and priorities. The developing plan will hone in on delivery of integrated capabilities, revolutionizing processes, strengthening the team and enabling a warfighting culture. The most important factor in the plan is the AFMC workforce.

“We’ve got a really strong team right now. They really are the foundation. We want to make sure everybody on our team has the ability to self-actualize,” said Richardson. “What we’ve got to learn to do is make sure that we can connect every job to that [the mission]. Most of us only have one small sliver of what needs to get done; what’s cool is if you integrate all that together, you have it all.”

Richardson went on to explain the role digital will play in the execution of the plan and its importance to the future success of the enterprise. His overall message to Airmen is to, “Think big, start small, scale fast,” in order to ensure the Air Force can stay ahead in the current competitive space.

“What our centers do will continue to be done, but how we do this is going



The Air Force Materiel Command leadership team held a virtual Power Hour all-call, August 25. (Courtesy photo)

to change. We now have tools that can enable teams in different areas to collaborate, test and make changes virtually,” said Richardson. “This gives us the ability to design things much faster. We continue to work at figuring out how to get these things funded and to teach our workforce.”

The discussion transitioned into the topic of COVID and ongoing policy and guidance changes. Richardson restated the importance of individuals remaining informed and aware of changes to guidance from the Centers for Disease control, and that the leadership team continues to monitor and implement the guidelines provided by the Air Force and Department of Defense.

“National level policy and guidance changes so frequently in this area. I want to make sure the team knows that we are continuing to stay current as best we can,” said Richardson. “Sometimes these policy changes happen at a very high level, and it takes a while for them to flow through to the Air Force. We’re doing our best to keep up. Local commanders on the field are always going to know best the situation in their areas, so we’re going to continue to lean on them as we implement the policies.”

Following the COVID discussion, leaders addressed questions from the field regarding the status of improvements to command hiring processes. Estep discussed some recent changes already in place and stated that efforts continue to seek ways to improve timelines across the enterprise.

“Our hiring timelines are down across

the command, but we are still not where we want to be as an Air Force. We are using things such as direct hire authority and panels to help in diversity and in ensuring we hire based on merit principles. It is something that continues to be measured and monitored, and we continue to look ways to improve,” she said.

The leaders also took time to address telework and ongoing efforts to determine the way forward as post-COVID reintegration begins across the Nation. Richardson commended command-wide efforts to carry-on the mission during COVID and mass telework, and he stated that the Air Force continues to examine lessons-learned as it develops the workforce plan for the future.

“We’re not going to be at the level that we were pre-pandemic where we didn’t use the tool much, but we’re also probably not going to be at the level where we have been using it [telework] heavily out of necessity. We’re going to settle somewhere in the middle,” said Richardson. “We are looking at some sort of a hybrid solution where there’s going to be some work that can be done through telework means, and other work that’s going to have to be done face-to-face in order to get where our Command is going to need to be able to solve some of our toughest problems.”

Other personnel-related topics touched upon during the event included diversity, equity, inclusion, and accessibility; enlisted promotion system changes; ongoing AFMC We Need efforts; and affordable housing. Richardson reiterated his ongoing support for DEIA and AFMC

We Need efforts, and he said that while progress has been made, the command still has improvements to make in both areas.

On housing, Flosi explained that AFMC and Air Force leaders are actively aware of and working to address the challenges facing Airmen and families everywhere.

“Leadership at all department of the Air Force levels are engaged in addressing the housing issues institutionally. Unfortunately, the Department can’t react as fast as the economy changes,” said Flosi. “So, while we’re working to do things like out-of-cycle assessments to get our housing allowance rates adjusted to account for changes in the economy, we also have programs like Military OneSource and the Military Family Readiness Center, and they are connected to some aid organizations that can help our Airmen.”

The event concluded with a discussion on AFMC warfighting culture and its importance to the success of the mission and the Air Force. Richardson stated his continued pride in the organization and the importance of collaboration to the future.

“The work that we do is so complex. We need to work together to do what we need to do,” said Richardson. “I am proud of the AFMC patch. You should swell with pride when you say you work for the Air Force, especially AFMC. The Air Force doesn’t run without us.”

The full recording of the AFMC Power Hour is available to internal audiences at [https://usaf.dps.mil/v:s/AFMC-PA/ERHw6nZ2vZNOgg-UoRQHNeIBgEi-Ft\\_A5hjwds0jAA4ka6w?e=HxwJTH](https://usaf.dps.mil/v:s/AFMC-PA/ERHw6nZ2vZNOgg-UoRQHNeIBgEi-Ft_A5hjwds0jAA4ka6w?e=HxwJTH).

## Minuteman III test launch showcases readiness of U.S. nuclear force’s safe, effective deterred

By Air Force Global Strike Command  
Public Affairs

**BARKSDALE AIR FORCE BASE, La.** – A team of Air Force Nuclear Weapons Center experts supported the recent launch of an unarmed intercontinental ballistic missile to verify its accuracy and reliability, providing valuable data to ensure this safe, secure, effective nuclear deterrent is ready every day to defend the United States and its allies.

Air Force Global Strike Command Airmen launched an unarmed Minuteman III intercontinental ballistic missile equipped with a test re-entry vehicle from Vandenberg Space Force Base, California, at 12:49 a.m. Pacific time Aug. 16 to demonstrate the readiness of U.S. nuclear forces and provide confidence in the lethality and effectiveness of the nation’s nuclear deterrent.

This test launch is part of routine and periodic activities intended to demonstrate that the United States’ nuclear deterrent is safe, secure, reliable and effective to deter 21st century threats and reassure our allies. Such tests have occurred more than 300 times before, and this test is not the result of current world events.

The ICBM’s re-entry vehicle traveled

approximately 4,200 miles to the Kwajalein Atoll in the Marshall Islands. These test launches verify the accuracy and reliability of the ICBM weapon system, providing valuable data to ensure a continued safe, secure and effective nuclear deterrent.

“Make no mistake – our nuclear triad is the cornerstone of the national security of our country and of our allies around the globe,” said Col. Chris Cruise, 576th Flight Test Squadron commander. “This scheduled test launch is demonstrative of how our nation’s ICBM fleet illustrates our readiness and reliability of the weapon system. It is also a great platform to show the skill sets and expertise of our strategic weapons maintenance personnel and of our missile crews who maintain an unwavering vigilance to defend the homeland.”

The test launch is a culmination of months of preparation that involve multiple government partners. The Airmen who perform this vital mission are some of the most skillfully trained and educated the Air Force has to offer.

Airmen with the 341st Missile Wing at Malmstrom AFB, Montana; 90th Missile Wing at F.E. Warren AFB, Wyoming; and 91st Missile Wing at Minot AFB, North Dakota, were selected for the task

force to support the test launch. The three missile bases have crew members standing alert 24 hours a day year-round, overseeing the nation’s ICBM alert forces.

“Our test launches are scheduled well in advance and are not reactionary to world events,” said Maj. Armand Wong, Task Force commander. “A meticulous planning process for each launch begins six months to a year prior to launch. Our best Airmen from each of the three missile wings worked in conjunction with the 576th Flight Test Squadron to proudly showcase some very technical skills that comprise the heart of our nuclear deterrence mission.”

The ICBM community, including the Department of Defense, the Department of Energy, and U.S. Strategic Command, uses data collected from test launches for continuing force development evaluation. The ICBM test launch program demonstrates the operational capability of the Minuteman III and ensures the United States’ ability to maintain a strong, credible nuclear deterrent as a key element of U.S. national security and

the security of U.S. allies and partners.

Air Force Global Strike Command is a major command with headquarters at Barksdale Air Force Base, Louisiana, in the Shreveport-Bossier City community. The command overseas the nation’s three intercontinental ballistic missile wings; the Air Force’s entire bomber force, to include B-52, B-1 and B-2 wings; the Long Range Strike Bomber program; Air Force Nuclear Command, Control and Communications systems; and operational and maintenance support to organizations within the nuclear enterprise. Approximately 33,700 professionals are assigned to two numbered Air Forces, nine wings, two geographically-separated squadrons and one detachment in the continental United States and deployed to locations around the globe.

The LGM-35A Sentinel ICBM will replace the Minuteman III with an initial operational capability in 2029. Until full operational capability of the Sentinel is achieved in the mid-2030s, the Air Force is committed to ensuring Minuteman III remains a viable deterrent.



