TEST BEFORE FLIGHT
ARNOLD AIR FORCE BASE, TENN.

HIGH MACH

Serving the World's Premier Flight Simulation Test Complex

HAP ARNOLD'S LEGACY
AN AIR FORCE SECOND TO NONE

PRSRT STD
US POSTAGE PAID
TULLAHOMA TN
PERMIT NO. 29

Vol. 69, No. 18 | Arnold AFB, Tenn. | September 19, 2022

AEDC Spark Tank: AEDC engineer proposes new high-temperature measurement, calibration techniques

By Brad Hicks and Deidre Moon
AEDC Public Affairs

To say temperatures produced by some of the test facilities within the Arnold Engineering Development Complex are hot is a bit of an understatement.

Such test cells, like the arc-heated facilities at Arnold Air Force Base, headquarters of AEDC, can produce temperatures up to 3,000 degrees Celsius. That's hotter than the earth's thermosphere, the center of a campfire, the surfaces of both Venus and Mercury, and lava.

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

With the innovation funding received as part of the Arnold Engineering Development Complex 2022 Spark Tank event earlier this year, AEDC technology engineers at Arnold Air Force Base are exploring new techniques in measuring these high temperatures.

David Plemmons, a senior scientist with the AEDC Technology Innovation Branch, who presented the proposal, explained that the current measurement system is lacking some capabilities but being able to accurately measure these high temperatures is important.

"Hypersonic vehicles that fly through the earth's atmosphere are heated to extreme temperatures, ranging up to thousands of degrees Fahrenheit," he said. "These temperatures are generated by the friction of the air flow over the vehicle's surface. Loosely speaking, the heat generated by the friction is proportional to its speed. The vehicle speed is specified by its Mach number. A Mach number of 1 is the speed of sound. Hypersonic speeds are at or above Mach 5.

"At hypersonic speeds, surface tem-

See **SPARK TANK**, page 3

Ben Holton, right, deputy, 716th Test Squadron, 804th Test Group, Arnold Engineering Development Complex, uses a model of the Propulsion Wind Tunnel facility at Arnold Air Force Base to explain how the wind tunnels operate to Gen. Duke Z. Richardson, left, commander, Air Force Materiel Command, during Richardson's visit to Arnold AFB, headquarters of AEDC Aug. 26. The PWT facility has two 16-foot wind tunnels, one transonic and one supersonic, and one 4-foot transonic wind tunnel. The 16-foot transonic wind tunnel is the largest one in the U.S. used for store separation testing. *(U.S. Air Force photo by Jill Pickett) (This image has been altered by obscuring a badge for security purposes.)*

AFMC commander visits Arnold Air Force Base

Col. Jason Vap, center, commander, 804th Test Group, Arnold Engineering Development Complex, speaks to Gen. Duke Z. Richardson, commander, Air Force Materiel Command, as Richardson tours Arnold Air Force Base, headquarters of AEDC, Aug. 26. Richardson visited multiple ground test facilities and was briefed on the capabilities of AEDC at Arnold AFB and the complex's multiple geographically-separated units. *(U.S. Air Force photo by Jill Pickett)*

Gen. Duke Z. Richardson, commander, Air Force Materiel Command, shakes hands with Frank Wonder, Arcs Section chief, before a briefing during a visit to Arnold Air Force Base, headquarters of Arnold Engineering Development Complex, Aug. 26. The 718th Test Squadron, 804th Test Group, AEDC, operates the arc heaters to simulate the aerodynamic heating and mid-to-high shear pressures of extreme environmental conditions experienced in re-entry and hypersonic flight. *(U.S. Air Force photo by Jill Pickett)*

Gen. Duke Z. Richardson, commander, Air Force Materiel Command, speaks with Mike Niederhauser, left, and Brian Skelton, both participants in the AFMC Community Liaison Program, during a visit to Arnold Air Force Base, headquarters of Arnold Engineering Development Complex, Aug. 26. Skelton is also a past-president of the Arnold Community Council and Niederhauser is the ACC legislative chair. The Arnold Community Council is a nonprofit founded to support AEDC and represents multiple Tennessee and Alabama counties. *(U.S. Air Force photo by Jill Pickett)*

ICBM Developmental Test Branch at Hill stood up as 719th Test Squadron

Col. Jason Vap, left, commander, 804th Test Group, passes the 719th Test Squadron guidon to Lt. Col. Jason Heersche, charging him with command of the squadron during a change of command ceremony Aug. 31. Also pictured is Master Sgt. Sean Haugan, guidon bearer and superintendent, Air Force Operational Test and Evaluation Center Detachment 3. *(Courtesy photo)*

By Deidre Moon
AEDC Public Affairs

HILL AIR FORCE BASE, Utah – The Intercontinental Ballistic Missile Development Test Branch at Hill Air Force Base, Utah, stood up as the 719th Test Squadron during a ceremony Aug. 31.

As a unit of the Arnold Engineering Development Complex, headquartered at Arnold AFB, Lt. Col. Jason Heersche, commander of the 719 TS, stated the standing up of the squadron is to align with AEDC moving to a wing construct.

"The unit currently operates as a branch and is being converted to a numbered squadron in order to support developmental testing of ICBMs," Heersche said. "This includes sustainment and upgrade testing of the fielded Minuteman III [MMIII] weapon system and the development of the replacement Sentinel weapon system. The squadron is expected to grow over the next couple of years to support the engineering and manufacturing development of the Sentinel ICBM leading to

See **ICBM**, page 3

In This Issue....

HIGH MACH
Arnold Air Force Base

Col. Randel Gordon
Commander

Jason Austin
Chief, Public Affairs

Richard Tighe, Ph.D.
General Manager, National Aerospace Solutions

High Mach Staff:
Darbie Sizemore
NAS Executive Editor

Jill Pickett
NAS Editor

High Mach is published by Lakeway Publishers, Inc. a private firm in no way connected with the U.S. Air Force, Arnold Air Force Base, Arnold Engineering Development Complex (AEDC) or National Aerospace Solutions (NAS), under exclusive written contract with NAS at Arnold AFB, Tenn., 37389.

Everything advertised in this publication will be made available for purchase, use or patronage without regard to race, color, religion, sex, national origin, age, marital status, physical handicap, political affiliation or any other non-merit factor of the purchaser, user or patron.

The *High Mach* office is located at 100 Kindel Drive, Suite A236, Arnold AFB, Tenn. 37389-1236. Editorial content is edited and prepared by NAS. Deadline for copy is Wednesday at close of business one week before publication.

This commercial enterprise newspaper is an allowable NAS contractor publication for personnel at Arnold AFB.

The content of *High Mach* does not necessarily reflect the views of the Air Force, Arnold AFB, AEDC or NAS. The appearance of advertising in this publication does not constitute endorsement of the products or services advertised by the Department of Defense, the Department of the Air Force, Arnold AFB, AEDC, NAS or Lakeway Publishers, Inc.

For general information about *High Mach*, call 931-454-5655 or visit *www.arnold.af.mil*.

Use High Mach to market your products and services. Contact Joe at 931-455-4545 or *jmartin@tullahomanews.com*

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 Spark Tank 2023 kicks off Oct. 1

By Deidre Moon
AEDC Public Affairs

Building off the success of this year's AEDC Spark Tank program, AEDC personnel are once again being asked to submit their latest innovative ideas for the next one starting Oct. 1.

All AEDC team members, including DOD civilians and contractors across all AEDC units, including those geographically separated, who have suggestions for improving or simplifying day-to-day operations or know of a possible cost-savings are invited to share these ideas. Doing so could lead to funding of their innovation.

"No idea is too big or too small," said Dr. Justin Garrard, project manager for the Innovation Grant project with the Test Operations and Sustainment contractor. "The Spark Tank is meant to allow AEDC employees the opportunity to present their ideas on how to improve current AEDC processes, products, or test capabilities. We had several great projects submitted during our last call for ideas, and we hope even more AEDC team members will submit this next go-round."

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

Submissions will be accepted through Dec. 31. The ideas will then be reviewed by a board, and the Spark Tank forum is anticipated for mid-February. Those selected to present to the Spark Tank panel will receive an email to schedule their briefing. Team leads will be asked to pitch their submission to board members and feedback will be provided on all submissions presented.

"We are looking for process improvement, or ideas for the use of new technologies. All will be considered in the Spark Tank initiative," said Michael Glennon, a senior engineer and AEDC innovation-lead for the AEDC Technical Management, Plans and Programs office.

The expected funding period of the innovation projects chosen, as part of the AEDC Spark Tank, is March 1 to Aug. 15, 2023.

Submission templates may be found on AEDC SharePoint under AEDC Science and Engineering Information. Final submissions should be placed in the "2023 AEDC Spark Tank Submissions" folder prior to the December deadline. Look for the direct link to be posted soon in an announcement on the AEDC SharePoint site.

Those with questions or wishing to receive additional information on the AEDC Spark Tank may contact Garrard or Glennon.

September is National Preparedness Month: AEDC Emergency Management recommends planning ahead

By Deidre Moon
AEDC Public Affairs

Federal Emergency Management Agency recognizes September as National Preparedness Month. This year's theme is "A Lasting Legacy." *(Courtesy graphic)*

September is National Preparedness Month and, as part of this campaign, the Arnold Engineering Development Complex Office of Emergency Management team wants to remind the AEDC workforce how important it is to be prepared in the event of an emergency.

In 2014, the Federal Emergency Management Agency, or FEMA, began National Preparedness Month as its annual national outreach, sponsored by its FEMA Ready Campaign. It is observed each September to raise awareness about the importance of preparing for disasters and emergencies that could happen at any time.

The 2022 National Preparedness Month theme is, "A Lasting Legacy: The life you've built is worth protecting." This is meant to encourage people to prepare for disasters to create a lasting legacy for themselves and their families.

According to James Dill, the installation emergency manager at Arnold Air Force Base, planning is crucial in keeping the people and facilities on base safe.

"Ninety-nine percent of our efforts are to ensure there is a viable and tested plan to respond, mitigate and recover from any and all situations," Dill said. "This process includes collaborating with other AEDC organizations and inspector general. Checklists are developed and followed as a guideline in order to keep each organization on track."

In addition to the workforce being prepared for an emergency that may occur on base, the AEDC Emergency Management team wants everyone to also be ready and equipped in case of an emergency when not at work.

Neil Felver, an Emergency Management specialist at Arnold, reminds AEDC personnel to have a plan in place at home in the event of an emergency situation.

"Before an emergency happens, be sure to sit down with your family and decide how you will get in contact with each other, where you will go and what you will do in the event of an emergency," Felver said.

Items to put on a home checklist may include the following: planning an escape route, staying in contact with family, shutting off utilities if needed, having insurance papers and other vital records on hand, reviewing safety skills, caring for any animals and assembling an emergency supply kit.

In the event that an Arnold employee witnesses or is involved in an emergency situation while at work, immediately dial 911 and advise that the emergency is on base.

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

SPARK TANK *from page 1*

peratures on flight vehicles exceed the limits of conventional contact temperature sensors such as thermocouples and RTDs [resistance temperature detectors] that must be in physical contact with the surface where the temperature is measured."

Plemmons mentioned that because of this, hypersonic ground test facilities at Arnold have been using other techniques to measure temperatures on the surface of hypersonic models.

"[An] optical pyrometer works by measuring and analyzing light that is emitted from a heated surface and does not require contact with the surface," he said.

Plemmons noted that extreme heat can cause a test article, support structure and even the facility itself to undergo thermal expansion, which can cause the model to move.

"This can cause erroneous temperature measurements," he said. "But using the new technique, we offer a solution to both challenges: non-contact temperature measurement and compensation for model movement. In my opinion, it will be an asset in any high-temperature hypersonic ground test facility."

According to Plemmons, using the measurement technique will also help increase data accuracy, allowing AEDC to deliver better quality data to its test customers.

"Accurate temperature measurements are critical for thermal protection systems testing," he said.

Calibrating new high-temperature measurement devices

Because the pyrometers used to measure these high temperatures can only be calibrated up to a temperature of 3,000 degrees Celsius, the blackbodies used for calibrating pyrometers cannot reach those temperatures either.

With temperatures in the high-enthalpy arc heater facilities exceeding this limit, the extension of available technology to meet a high temperature range is also being researched by AEDC team members.

This effort is another one of the eight projects that received funding through the AEDC Spark Tank. Like with the high-temperature technique exploration project, Spark Tank money was awarded through several sources. The high-temperature calibration proposal received AEDC Innovation Grant funding.

With this funding, a proof-of-concept system was developed to demonstrate how an increase in measurable temperatures can be achieved.

The Spark Tank proposal and the proof of concept borne from it centered on the use of a blackbody light source, which is a thermal light source that produces a broad spectrum of white light. The shape and intensity of a blackbody spectrum is temperature dependent.

"Calibrated blackbodies are available that can be operated up to a temperature of 3,000 degrees Celsius," said Plemmons, who, along with principal investigator Joseph Braker, an optical engineer for AEDC, worked on the proposal. "We test systems at AEDC that exceed these temperatures. These higher temperatures are primarily observed in the arc heater. However, hypersonic testing in general produces elevated temperatures because of the high speeds."

The ultimate purpose of the Spark Tank project is the development of a synthetic blackbody source that will be used to calibrate the optical pyrometers and allow for measurements above the current 3,000-degree threshold. This artificial high-temperature blackbody can be made by properly combining the output of multiple LED lights at various wavelengths.

The synthetic blackbody will reproduce the spectral shape of a thermal source at temperatures above 3,000 degrees Celsius.

"A blackbody source emits an optical spectrum that is well-defined and accurately modeled by the Planck function," Braker said, adding the Planck function describes how much of a particular wavelength is emitted at a certain temperature and can be used to find radiance as a function of wavelength for a given temperature. "By using LEDs to generate an optical spectrum that is also defined by the Planck function, we can emulate a blackbody source very precisely without needing to reach comparable temperatures. We can then use this emulated blackbody source to calibrate spectrum-based measurement devices with no theoretical upper bound."

Plemmons said if the project is brought to fruition, AEDC could gain a new capability that will increase the accuracy and quality of data delivered to test customers.

And while the arc-heated facilities are expected to be the primary user of this capability, Plemmons said it would prove useful in other high-temperature and hypersonic test facilities.

"This will benefit AEDC by reducing uncertainty in temperature measurements in hypersonic test facilities and improving test data quality," he said.

With the proof-of-concept system now complete, the next step is the production of a prototype that can be implemented in a test facility. Additional funding would be needed to complete this.

"If sufficient funding is obtained, I would expect that a prototype system could be fielded in fiscal year 2023," Plemmons said.

ICBM *from page 1*

first missile flight and with the goal of fielding the system to all three ICBM wings."

In May of this year, AEDC activated the 804th Test Group as part of its reorganization toward a more traditional Air Force structure. The 804 TG, formerly designated as the AEDC Test Division, consists of the 719 TS, four squadrons, which were stood up in May, and two branches. The other squadrons are the 716th Test Squadron, formerly the Aerodynamic Test Branch; the 717th Test Squadron, formerly the Propulsion Test Branch; the 718th Test Squadron, formerly the Space Test Branch; the 804th Test Support Squadron, formerly the Test Systems Branch and was previously the Test Systems Sustainment Division. The branches are the Integrated Analysis Branch, formerly the Technology, Analysis and Evaluation Branch; and the Hypersonic Systems Test Branch.

An integral part of the developmental test and evaluation for the modernization and service life extension of ICBMs, the 719 TS, which includes a Sentinel Combined Test Force, provides personnel with the necessary skills to support ICBM developmental test and evaluation.

The squadron also works alongside the Air Force Nuclear Weapons Center MMIII and Sentinel Program Offices, the 576th Flight Test Squadron at Vandenberg Air Force Base, California, and the Air Force Operational Test and Evaluation Center.

Jack Daniel Distillery's first female assistant distiller Lexie Phillips signs a bottle of Jack Daniel's whiskey Sept. 6 at the Base Exchange at Arnold Air Force Base. ***(U.S. Air Force photo by Jill Pickett) (This image has been altered by obscuring a badge for security purposes.)***

Jack Daniel's assistant distiller visits Arnold Base Exchange

Jack Daniel Distillery's first female assistant distiller Lexie Phillips signs a bottle of Jack Daniel's whiskey Sept. 6 at the Base Exchange at Arnold Air Force Base. ***(U.S. Air Force photo by Jill Pickett)***

This photo from 2018 shows what the Elk River Dam looks like today. Construction of the dam, built to create Woods Reservoir, was completed 70 years ago this month. Since that time, Woods Reservoir has supplied cooling water to the test facilities at Arnold Air Force Base. *(U.S. Air Force photo)*

Woods Reservoir completed 70 years ago this month

By Bradley Hicks
AEDC Public Affairs

Before the first foundation was poured or stone set, a site for the proposed Air Engineering Development Center would have to be chosen that could meet three primary needs.

Along with finding a suitable tract of land for the center and a place where large amounts of electrical power were available, planners would need to find a location with access to copious amounts of water. It was determined early on that center operations would require millions of gallons of cooling water.

Camp Forrest, a former Army training area, hospital and prisoner of war camp near Tullahoma, was selected for the site of the AEDC in April 1948. The center soon became known as the Arnold Engineering Development Center and eventually the Arnold Engineering Development Complex headquarters. And it wasn't long after this site was picked that work to supply the necessary water was finished.

The construction of the Elk River Dam was completed 70 years ago this month. The purpose of this project was the creation of what came to be called Woods Reservoir, a 4,000-acre repository that has continued to provide AEDC test facilities at Arnold Air Force Base with cooling water and the public with a spot for outdoor recreation in the decades since it was formed.

In October 1949, President Harry S. Truman signed the Unitary Wind Tunnel Plan Act and the Air Engineering Development Center Act of 1949. These bills authorized a unitary plan for the construction of transonic and supersonic wind tunnels and authorized the $100 million appropriated by Congress for the construction of the AEDC.

The Army Corps of Engineers was tasked with overseeing part of the AEDC design and all of its construction. The Tullahoma District of the Army Corps of Engineers was established in November 1949 for this purpose.

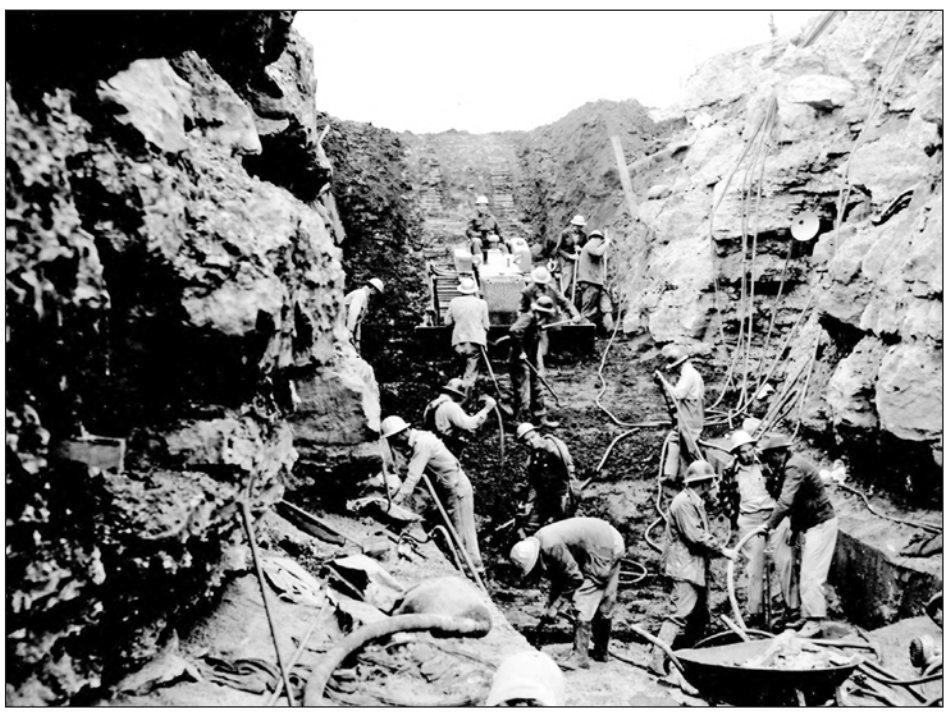
Soon after this district was formed, the dam became a major topic of focus. In January 1950, the first construction directive for the AEDC was issued by the Headquarters of the Air Force to the Army Corps of Engineers chief of engineers. This charge covered preliminary investigation and design of the dam and preliminaries to land acquisition, as well as administrative expenses for the recently-established Tullahoma District.

Planners recognized that by damming the Elk River, a 4,000-acre reservoir with a capacity of 26 billion gallons could be created.

Several sites along the Elk River were studied for the site of the earth fill and concrete gravity dam, with a point on the waterway about 5 miles from the test center chosen.

Prior to the official selection of this site, St. Louis, Missouri-based engineering firm Sverdrup & Parcel Inc. is-

See **RESERVOIR**, page 5



Crews work in April 1951 in the north end core trench of what would soon become the Elk River Dam. The dam, constructed to create Woods Reservoir, was completed 70 years ago this month. Woods Reservoir has since supplied cooling water to the test facilities at Arnold Air Force Base. *(U.S. Air Force photo)*

Children play in the water near the Woods Reservoir beach in 1975. Woods Reservoir opened for public fishing and recreation on May 30, 1953, and quickly became a destination for swimmers, skiers and fishermen. It was also used for Arnold Engineering Development Center picnics and other functions. *(U.S. Air Force photo)*

RESERVOIR *from page 4*

The reservoir created by the construction of the Elk River Dam was dedicated in the memory of Col. Lebbeus Woods in 1953. Pictured at the dedication ceremony are Woods' wife Dorothy and son. Woods was one of the first two Air Force officers to arrive at AEDC for the center project. He served at AEDC until February 1952, when he was given one of the top posts within the then-active Air Materiel Command. ***(U.S. Air Force photo)***

An aerial view of construction on the Elk River Dam is seen in this photo from the 1950s. ***(U.S. Air Force photo)***

Much of the 4,000 acres comprising Woods Reservoir is seen in this aerial photo from the early 1980s. The Elk River Dam is also seen in the image. ***(U.S. Air Force photo)***

Progress on the spillway section of the Elk River Dam is seen in this photo from May 1951. ***(U.S. Air Force photo)***

sued a report on requirements for the Elk River reservoir. According to this study, the cost of the reservoir, excluding the land, was estimated to be nearly $3.6 million. It was recommended that the reservoir design criteria be determined by the Army Corps of Engineers.

According to this report, the amount of water required annually for AEDC operations would be more than 22.4 billion gallons. Of this, the vast majority – nearly 21 billion gallons – would serve as cooling water for the test facilities. The remainder would be used for air conditioning, sanitary water and fire protection.

In early March 1950, less than five months after Truman signed the bills that cleared the way for its establishment, the Secretary of Defense approved the construction of the AEDC. The process began quickly. The first contract for center construction – the manufacture of Engine Test Facility cranes – was awarded by late March 1950.

Work on the Elk River Dam would begin soon after. That June, the Army Corps of Engineers awarded a contract to build a dam over the river. By that December, the dam and reservoir undertaking was estimated to be 6% complete.

The additional land required for construction of the reservoir was acquired in early January 1951. At that time, the Headquarters of the Air Force requested that the Army Corps of Engineering chief of engineers proceed with the purchase of 6,650 acres needed for the waterbody. This was in addition to the initial 633 acres acquired in September 1950 that were to be used for the dam and part of the reservoir.

A diversion channel for the Elk River Dam was completed in late January 1951, and the river was diverted into it by means of an earth coffer dam.

By July 1951, the construction of the dam and reservoir was approximately 30% complete and was deemed to be well ahead of schedule. Work would continue to roll along at a good pace. By late December 1951, the project was 83% complete compared to the scheduled progress by this point of 53%.

The impoundment of water in the reservoir began on May 1, 1952, and construction of the Elk River Dam was completed that September. The daily cooling water requirement for the test facilities was described at the time as "an amount more than the daily requirement for a city the size of Washington, D.C."

According to a May 1953 Tullahoma District of the Army Corps of Engineers report that detailed the agency's efforts in the design and construction of AEDC, the finished dam was 90 feet high at the center valley section and 3,000 feet long. The spillway, with a design capacity of 104,000 cubic feet per second, was 170 feet long and controlled by three 25- by 50-foot tainter gates.

The concrete non-overflow section was 360 feet long.

The area of the reservoir was just shy of 4,000 acres with a storage capacity of 80,600 acre-feet at normal pool, according to the same report.

When filled, the lake formed behind the dam would measure about 12 miles long with a shoreline of approximately 75 miles.

"The primary purpose of the Elk River Dam and Reservoir is for the storage of water to be used for cooling purposes required by the test facilities, although it will serve to reduce floods slightly in the lower reaches of the Elk River basin," the Tullahoma District report stated.

A Primary Pumping Plant was constructed on the north side of the reservoir upstream of the dam. This plant provided an initial capacity of 100,000 gallons per minute. Eight-thousand horsepower were required to operate its four 25,000-gallon per minute vertical pumps.

The plant was needed to pump water from the Elk River reservoir to a secondary reservoir located within the AEDC test area. Transmission of the water from the Elk River reservoir to the one located at the center was provided by a high-pressure steel pipeline measuring 5 feet in diameter and approximately 4 miles long.

The secondary reservoir located within the AEDC mission area had an initial capacity of 13 million gallons. That amount was increased to 58 million in 1961 following the completion of a 45-million-gallon expansion project. It would be the job of a Secondary Pumping Station located within the main AEDC area to pull water from this secondary reservoir and transmit it to the test facilities.

"As the capacity requirements increase, provisions have been made for additional pump capacity and pipelines," the Tullahoma District document stated.

Features were implemented that allowed cooling water to be returned to the Elk River reservoir once it had served its purposes in AEDC test areas.

"The temperature of the cooling water, after use in the testing facilities, is not expected to exceed 135˚F," the Tullahoma District report stated. "A gravity outfall, or discharge ditch of adequate design and capacity, built for the cooling water to return from the center to Rollins Creek was constructed. From thence, the discharge water will meander down the natural channel of this creek and return to an arm of the Elk River reservoir immediately above the dam."

A service road leading from the AEDC test area to the Primary Pumping Plant and from the plant to the Elk River Dam was constructed. The only road relocations required were the county roads and bridges that would be inundated by the filling of the reservoir.

The only significant road relocation resulting from the reservoir project required the construction of approximately 1-mile embankment and a four-span continuous steel bridge with concrete deck at Morris Ferry.

In June 1953, the Elk River reservoir was named Woods Reservoir in honor of the late Col. Lebbeus B. Woods. A dedication ceremony attended by Woods' wife and son was held the following month at the reservoir. Woods was one of the first two Air Force officers to arrive at AEDC for the center project. He served at AEDC until February 1952, when he was given one of the top posts within the then-active Air Materiel Command. While at AEDC, Woods served as the deputy chief of staff for materiel and was responsible for much of the early organizing, staffing and master planning for the center project.

Woods Reservoir opened for public fishing and recreation on May 30, 1953. The lake quickly attracted swimmers and skiers, and the beach areas around it served as ideal locales for AEDC picnics, beauty pageants and get-togethers with family. Still considered a haven for anglers, Woods Reservoir is home to several types of bass, crappie and catfish. There are several boat access points and public fishing piers around the lake.

Airman's innovation saves time, money

By Airman 1st Class Alvaro Villagomez
100th Air Refueling Wing Public Affairs

RAF MILDENHALL, United Kingdom (AFNS) – Thousands of hours are spent each year removing and installing a boom cover on a KC-135 Stratotanker aircraft – hours that could be used elsewhere. One 100th Maintenance Squadron Airman has invented a new boom cover tool that has the potential to save the U.S. Air Force 40,000 man-hours and approximately $1 million per year.

"I noticed as soon as I got to Mildenhall that removing and installing the boom cover was tedious and time consuming," said Airman 1st Class Jacob Helzer, 100th MXS hydraulics maintenance journeyman. "Removing the cover the conventional way involves calling the Aerospace Ground Equipment backshop for an aircraft stand and requires two Airmen and a substantial amount of time."

The current conventional method hinders daily operations, whereas the innovative solution Helzer created is easier, takes less time and lessens the impact on the flow of operations.

"One of the maintenance crew chiefs reached out because he knew I enjoy 3D printing and design and believed I could come up with a solution for the boom cover," Helzer said. "I then came up with a prototype for a tool that could make the process much smoother."

Tech Sgt. Steven Jakubowski said Helzer is always looking for ways to innovate and constantly asking questions to gain further knowledge.

"He spent a lot of his free time, outside of work, designing the boom cover tool," Jakubowski said.

Helzer, using his skill and knowledge with 3D printing, created a prototype called the "Boom Cover Tool." The tool was manufactured with Helzer's 3D printer and resembles a butterfly net on the end of a retractable pole with a hoop mechanism that tightens and loosens the net covering on the opposite end.

"Once I created the prototype, I brought it to my section and tested it out," Helzer said. "A 30-minute job became a one-minute job with the Boom Cover Tool."

The Boom Cover Tool greatly reduces the number of man-hours needed every time a cover needs to be removed or installed on an aircraft and the cover itself better protects the boom pod during adverse weather conditions.

Each Boom Cover Tool costs roughly $200 to produce.

"The projected savings were calculated by him and I while submitting for Spark Tank by using the 2021 comptroller document for wages," Jakubowski said.

"I did the math and the projected savings for the Air Force if they utilized the Boom Cover Tool for the entirety of the refueling fleet would be approximately $1 million and potentially 40,000 man-hours annually," Helzer added.

In order to meet this goal, Helzer has been collaborating with the MXS fabrication flight to produce the test prototypes for each aircraft here.

"Once we have everything streamlined, we can move into the beta testing phase, which is roughly six months, then move on to scaling up for the entire KC-135 Stratotanker aircraft fleet," Helzer said.

Moving forward, Helzer plans on developing a batch of tools for the local KC-135 fleet to prove the design concept. Helzer would then like to contract the fabrication of a final, more durable prototype and share the Boom Cover Tool throughout the entire fleet and modify the design to be adopted for other variations of refueling aircraft.

Airman 1st Class Jacob Helzer, 100th Maintenance Squadron hydraulics maintenance journeyman, uses the Boom Cover Tool on a KC-135 Stratotanker aircraft at RAF Mildenhall, United Kingdom, July 22. The Boom Cover Tool, created by Helzer, is expected to save 40,000 man-hours and $1 million annually. ***(U.S. Air Force photo by Airman 1st Class Alvaro Villagomez)***

Airman 1st Class Jacob Helzer, 100th Maintenance Squadron hydraulics maintenance journeyman, holds the first prototype of the Boom Cover Tool at RAF Mildenhall, United Kingdom, July 28. Helzer is the mind behind the Boom Cover Tool that enables Airmen to install and remove a boom cover off a KC-135 Stratotanker aircraft in less than two minutes. ***(U.S. Air Force photo by Airman 1st Class Alvaro Villagomez)***

"Helzer has been a go-getter from the moment he arrived on station and is always hungry to learn all aspect of his job, and his critical thinking skills are some of the bests I've ever seen," Jakubowski said.

Helzer has always been motivated to improve himself and the way things are done at his job, and one example of this is the Boom Cover Tool.

"This is how change starts, by questioning the way we do things and coming up with a solution that will benefit Airmen at all levels," Helzer said. "I created the Boom Cover Tool to make the lives of my Wingmen easier and inspire Airmen to devise and implement new ideas to help improve even the simplest tasks."

Airman accelerates change through persistence, develops tool for RPAs

By Tech. Sgt. Kaylee Clark
27th Special Operations Wing Public Affairs

CANNON AIR FORCE BASE, N.M. (AFNS) – In 2015, the 3rd Aircraft Maintenance Unit was tasked with reducing cargo taken on an MQ-1 Predator alert package with the goal to decrease the need for two C-17 Globemaster IIIs to only one. Then Tech. Sgt. Bridget Carroll had an idea to help achieve this goal with the creation of a "bird-in-a-box" later known as the Digital Aircraft Link Emulator, or DALE.

Though Carroll created the solution, she was not met with instant success. Her journey took seven years.

- Spring 2015 – Need was discovered.
- July 2015 – First MQ-1 DALE prototype created.
- September 2015 – Airman Powered by Innovation submitted.
- Spring 2016 – Space Dynamics Lab at the University of Utah created two DALE MQ-9 Reaper prototypes.
- August 2018 – Air Force Special Operations Command 2019 Spark Tank competition submitted.
- October 2018 – API disapproval.
- October 2018 – Notified that MQ-9 DALE had won AFSOC Spark Tank Top 5.
- February 2019 – DALE presented at Air Force Association Spark Tank.
- Present – DALE Jr. developed and employed.

"If we could mobilize our capability without an actual aircraft then we could get down range and get operational faster," Carroll said. "I had the idea to put the minimum amount of aircraft parts in a box to still do line-of-sight checks with our control stations after we set up a field site."

During her planning phase of DALE, the Air Force was retiring the MQ-1, which resulted in a lower risk if the aircraft parts were damaged during the project's initial stages.

"Once all the parts came in, I took the MQ-1 computer, gutted an electronics case that was awaiting DRMO, spliced cables, drilled mounting brackets, and pieced together the first "bird-in-a-box" prototype," she said.

Before the existence of DALE, this process would require more than 10 Airmen to accompany the package, set it up and tow the remotely piloted aircraft around the airfield to ensure link connections were made.

Today, the DALE can be unloaded and ready for use with two Airmen in less than an hour. It is used to establish line of sight connections on a remote airfield and can be unloaded, set up and prepared for link checks in a more efficient manner.

Staff Sgt. Chase Ward, 727th Special Operations Aircraft Maintenance Squadron avionics craftsman, operates the third generation of the digital aircraft link emulator in front of an MQ-9 Reaper remotely piloted aircraft, and two older generations of DALE on Cannon Air Force Base, New Mexico, Aug. 25. Master Sgt. Bridget Carroll created DALE seven years ago to reduce the size of RPA maintenance packages loaded onto cargo aircraft when deploying. *(U.S. Air Force photo by Staff Sgt. Candin Muniz)*

Carroll's idea and her creation of DALE serve as an inspiration for all Airmen to lean into innovation to accelerate change.

"Spark Tank is a chance to celebrate our Air Force risk-takers, idea makers and entrepreneurs who refuse to accept the status quo and have determined their own fate by developing solutions that make it easier for us to bring our very best to the fight," said Lauren Knausenberger, Spark Tank director.

Innovation competitions like Spark Tank create an avenue for Airmen to think outside of the box and in Carroll's case, put her idea in a box.

"Don't give up," she said. "There's always people and other avenues out there that will help you."

Staff Sgt. Chase Ward, 727th Special Operations Aircraft Maintenance Squadron avionics craftsman, began working alongside Carroll and the DALE Jr. prototype last year and has witnessed the impact of her innovation. He said that the final version of DALE is in the process of being manufactured and sent out Air Force wide.

"I appreciate being able to watch this process go full circle," Ward said. "It is awesome to know that our ideas do matter."

Carroll's journey and level of success is a testimony to hard work, dedication and the impact of empowering Airmen with a culture of innovation. She did not allow a hurdle such as not winning a competition prevent her from accomplishing her goals.

Master Sgt. Bridget Carroll, 727th Special Operations Aircraft Maintenance Squadron MQ-9 Ground Control Station section chief, stands in front of an MQ-9 Reaper remotely piloted aircraft and three generations of the digital aircraft link emulator she designed on Cannon Air Force Base, New Mexico, Aug. 25. Carroll created DALE seven years ago to reduce the size of RPA maintenance packages loaded onto cargo aircraft when deploying. *(U.S. Air Force photo by Staff Sgt. Candin Muniz)*

DAF counters insider threat risks

By Secretary of the Air Force Public Affairs

ARLINGTON, Va. (AFNS) – Every September, all departments and federal agencies team up to raise awareness amongst the workforce to promote reporting of insider threat risks. The goal is to get employees to lookout for and report risky behavior that could be indicative of potential harm to themselves, others or the organization.

Led by the National Counterintelligence and Security Center and the Department of Defense, National Insider Threat Awareness Month, or NITAM, has become institutionalized within the DoD as a reoccurring effort to reenergize the force and remind everyone affiliated with DoD to do their part in keeping our installations, information, resources and personnel safe.

This year's theme is focused on 'Critical Thinking in Digital Spaces.' According to the NITAM website, "Critical thinking helps individuals become less susceptible to various types of risks, to include social engineering, solicitation by adversaries, (foreign and domestic) and information designed to malign" and "COVID, isolation, and working from home has made it more difficult to discern between true coworkers and phishing attempts for proprietary or sensitive information. It has also led to more interactions on social media which makes individuals more vulnerable to deception."

By emphasizing 'Critical Thinking in Digital Spaces,' the services can help prevent those with authorized access from causing harm to the DoD. We must all do our part, not just during the month of September, but every month.

John Massey, director of the Department of the Air Force Counter-Insider Threat Hub, expressed that every month is Insider Threat Awareness Month. "Within every unit, installation, and organization across the DAF, we each have the essential responsibility of ensuring behaviors of concern and information of those at risk are reported in a timely manner. Only then can mitigation actions be taken to reduce risk to national security information and the organization itself. For us, every month is Insider Threat Awareness Month."

Massey leads the DAF's centralized risk analysis center, known as the Counter-Insider Threat Hub, tasked with supporting leaders across the United States Air and Space Forces in detecting, deterring, and mitigating risks that insiders pose. His team, based in San Antonio, Texas, works tirelessly to gather, compile, and inform commanders and civilian leaders of risks within their command. Yet, the DAF Counter-Insider Threat Program needs help from the Total Force.

The most crucial way that all members of the Total Force can help this program is by reporting concerning behaviors and potential risk indicators. Report of concerning behaviors and potential risk indicators should be submitted to your security managers or assistants, information protection offices, commanders, or the Office of Special Investigations' anonymous Tip Line, to ensure it is reported to the Counter-Insider Threat Hub in a timely manner. When reported, all efforts are exhausted to assist "at risk" Airmen and Guardians to ensure they get the help they need.

"The DAF is committed to creating a safe and secure environment, it is my top priority," said Anthony Reardon, administrative assistant to the Secretary of the Air Force and senior official of the Counter-Insider Threat mission for the DAF. "We want to see every Airman and Guardian thrive and continue to be a positive asset and contributor to their service and our nation. We all face adversities in our life, our goal is to support those at risk before it's too late and thwart negative events. We all have a role in mitigating insider threat risks and countering that threat."

The NITAM website has more information and resources including posters, videos, job aids, case studies and more. The workforce can also register and attend the Virtual Counter-Insider Threat Social and Behavioral Science Summit, a 30-day virtual education, awareness, and training event that is held every year during NITAM. The event provides informative webcasts, new research efforts, and in-depth looks at Counter-Insider Threat professionals' efforts to detect, mitigate and prevent concerning behavior.

Staying agile

U.S. Air Force F-15E Strike Eagles, assigned to the 335th Expeditionary Fighter Squadron, fly alongside Saudi Arabian Air Force F-15E aircraft during an Agile Combat Employment exercise within the U.S. Central Command area of responsibility, Sept. 5. Joint training enhances international partnership and interoperability in the interest of regional security. ***(U.S. Air Force photo by Staff Sgt. Christian Sullivan)***

Airmen train, deliver humanitarian aid to Honduras

By Senior Airman Karla Parra
60th Air Mobility Wing Public Affairs

U.S. Airmen assigned to the 22nd Airlift Squadron configure the ramp for pallet loading on a C-5M Super Galaxy as part of a Major Command Service Tail Trainer mission at Peterson Space Force Base, Colorado, Aug. 24. During the trip, the aircrew also delivered over 90,000 pounds of humanitarian aid to Soto Cano Air Base, Honduras. *(U.S. Air Force photo by Senior Airman Karla Parra)*

SOTO CANO AIR BASE, Honduras (AFNS) – Airmen assigned to the 22nd Airlift Squadron and 60th Aircraft Maintenance Squadron from Travis Air Force Base, California, collaborated to deliver more than 90,000 pounds of humanitarian aid to Honduras during a combined Major Command Service Tail Trainer (MSTT) and Denton cargo mission Aug. 21-31, 2022. Members of Youngstown Air Reserve Station's 76th Aerial Port Squadron helped palletize and load the cargo.

Maj. Zachary Barrington, 22nd Airlift Squadron C-5M Super Galaxy pilot instructor, led a 14-member crew that delivered approximately $38,000 worth of medical supplies and other goods to support the Denton Program, which allows private U.S. citizens and private organizations to transport humanitarian goods to approved countries in need.

The crew consisted of pilots, flight engineers, loadmasters and crew chiefs with varying levels of experience. Each member received real-world operations training for the C-5M, enabling some members to become fully qualified and ready to support rapid global mobility.

"It was incredible to witness how the crew divides and conquers each challenge to successfully deliver aid where it's needed," said Staff Sgt. Darren Hopkins, a recently cross-trained 22nd AS C-5M flight engineer.

With the guidance of his instructor, Tech. Sgt. Beverly Castro, 22nd AS C-5M flight engineer instructor, Hopkins transitioned from simulators and theoretical systems studies to real-world applications in operations for the first time on this mission.

Each student on board received guidance and debriefs during flight and upon completion of their performance at every stop from their respective career field instructor.

"One of our goals during these MSTT missions is obviously to expedite students' upgrade training, but just as important is to build our loadmasters' competence and confidence," said Tech. Sgt. Jacob Buruato, 22nd AS loadmaster instructor.

These long missions allow pilots, flight engineers and loadmasters the opportunity to check off tasks required to reach proficiency.

"These training missions are imperative to the development of our students' skillset and ultimately, to mission success." said Buruato. "Whether you are a pilot, flight engineer or a loadmaster student, MSTTs equip our Airmen with additional knowledge and real-world experience to tackle obstacles in the future should they face any."

Both students and instructors benefit during these training missions.

"The moment when your student understands and realizes the importance of their role during a mission is very rewarding," said Buruato, "And missions tend to drive that newfound mindset home."

U.S. Air Force Tech. Sgt. Dominic Thibodeaux, 22nd Airlift Squadron C-5M Super Galaxy loadmaster instructor, oversees a pallet onload onto a C-5M at Youngstown Air Reserve Station, Ohio, Aug. 25. During the trip, the aircrew also delivered over 90,000 pounds of humanitarian aid to Soto Cano Air Base, Honduras. *(U.S. Air Force photo by Senior Airman Karla Parra)*

Dual-purpose missions like these tend to do just that.

"Flying into Honduras was a unique experience on its own," said Hopkins. "Realizing that these supplies contribute to the development of that country helped me put things into perspective."

The rest of the training consisted of stops to unique places such as Colorado, Ohio, Florida, South Carolina and Portugal.

"One of my personal takeaways from my first flight in my new career field is witnessing how these trainings support growth on the road, enhance communication and draw the crew closer to become one team, one fight when it comes to rapid global mobility," said Hopkins.

AFMC Connect September Focus: Commitment

Dedication, loyalty, responsibility – each of these attributes are a key component of commitment, the AFMC Connect topic of focus for September. *(U.S. Air Force graphic)*

By Air Force Materiel Command

WRIGHT-PATTERSON AIR FORCE BASE, Ohio – Dedication, loyalty, responsibility – each of these attributes are a key component of commitment, the AFMC Connect topic of focus for September.

Commitment is a pledge or promise to be involved in something, or dedicated to a course of action. It impacts all aspects of an individual's personal and professional life, and it plays a key role in one's sense of purpose. Commitment is strongly correlated with care and the capacity to look out for oneself and those around them.

To focus discussions on commitment as it pertains to the workplace and the Air Force Materiel Command family, leaders can focus discussions on:

- Individual roles in the Ask, Care, Escort models in mental health
- Command helping agencies and their offerings
- How individuals can demonstrate commitment to the work team through caring activities

Additional information on commitment can be found in the AFMC Connect guide for September at ***https://www.afmc.af.mil/Portals/13/AFMC%20Connect%20-%20COMMITMENT%20%28Sep%202022%29.pdf***.

General information on the AFMC Connect program is available at ***https://www.afmc.af.mil/Connect/.***

Modernization of Armed Forces a collaborative effort, official says

By Dave Vergun
DOD NEWS

ARLINGTON, Va. – The Defense Department, in collaboration with academia, industry, allies and partners, is developing cutting-edge technology to ensure the warfighter has the upper edge on the battlefield.

Heidi Shyu, undersecretary of defense for research and engineering, provided virtual opening remarks at the Inaugural Defense Department Basic Research Conference Sept. 12 in Arlington.

The fiscal year 2022 National Defense Strategy sets out three main themes, she said.

The first theme is integrated deterrence. Research and engineering, or R&E, is working to ensure that the joint force can operate seamlessly across all domains – air, land, sea, cyber and space – and in concert with allies and partners, she said.

R&E is advancing several international partnerships, including with Australia, the United Kingdom, Israel and NATO, she said.

"Our foreign comparative test program also promotes coalition interoperability and strengthens our shared defense industrial base. Our mission engineering division is using modeling and simulation to assess joint capability gaps, and how we're integrating critical enabling technologies into mission architectures," Shyu said.

The second theme is campaigning. This relies upon R&E's efforts to work with partners across the interagency, including the Departments of Treasury and Commerce, the State Department and the Small Business Administration, she said.

Members of the AGM-183A Air-launched Rapid Response Weapon Instrumented Measurement Vehicle 2 test team make final preparations prior to a captive-carry test flight of the prototype hypersonic weapon at Edwards Air Force Base, California, Aug. 8, 2020. *(U.S. Air Force photo by Kyle Brasier)*

The Rapid Defense Experimentation Reserve program has embarked on a continuous campaign of joint experimentation to close the gaps in joint warfighting capability, she said. These joint experiments are scenario-based and will be conducted in six-month cycles starting next year.

This experimentation, she said, will involve 14 critical technology areas for the warfighter. The technology areas include biotechnology; quantum sciences; advanced materials; future G, which is beyond 5G technologies that also have a lot of commercial development, trusted artificial intelligence and autonomy; microelectronics; space technology; renewable energy; integrated network; systems of systems; advanced computing and software; human-machine interfaces; hypersonics; direct energy; and integrated sensing and cyber.

The third theme is building enduring advantages, Shyu said. R&E is working to identify reforms to accelerate the development and acquisition of critical technologies and is making necessary investments to the workforce.

"We're supporting the future defense innovation base through initiatives to support small businesses, startups and other nontraditional companies and encouraging them to work with the DOD," she said.

R&E's mission has three focal points:

First, the DOD is leveraging the United States' incredible science and technology innovation community to solve the department's toughest operational and engineering challenges with cross-cutting solutions that benefit all military services, she said.

Second, R&E is setting the foundation today to attract and build a strong talented future technical workforce that will work in modernized laboratories and test facilities, she said.

R&E-supported university affiliated research centers and federally funded research and development centers work on cutting-edge technologies including space dynamics, system engineering, applied physics, software engineering, and geophysical detection, she said.

"We're committed to fostering a culture that encourages innovation and risk taking. Our future depends on our STEM workforce, so we must invest in multiple talent pipelines for the defense innovation base," Shyu said. STEM refers to science, technology, engineering and math.

Shyu mentioned that the department is also working with underrepresented talent in academia, including historically Black colleges and universities and other minority institutions.

The third focal point is success through teamwork.

"We're working collaboratively with partners across the technology ecosystem to strengthen our foundation. The work that's being done by our basic research office and by all of you is foundational for the continued technological dominance of the United States. Basic research is a core of what we do in research and engineering. And it's a core of every single system that we use. Collaboration is the key to creating new and novel ideas," Shyu said.

DOD prohibited substances: Marijuana, CBD, and Hemp

By Greg Chadwick
Air Force Materiel Command Health & Wellness Team

WRIGHT-PATTERSON AIR FORCE BASE, Ohio – The use of marijuana and marijuana-related substances is prohibited by all military service members (Active Duty, Reservist, and Guard members) and Department of Defense civilian employees. Even though some states have decriminalized or legalized marijuana for medical or recreational use, under federal law, marijuana remains an illegal Schedule I Controlled Substance, with a high potential for abuse and no currently accepted medical use.

Marijuana use is the leading cause for a positive military drug test, accounting for 78.7 percent of all unique drug positive results among Air Force active duty members. This is according to the Status of Drug Abuse in the Department of Defense – FY 2020 Drug Testing Statistical Report and Analysis.

What is Marijuana?

Marijuana comes from the cannabis plant and contains many naturally occurring compounds including Tetrahydrocannabinol (THC). THC is the psychoactive chemical that produces impairment and the "high" that marijuana is often known for.

What is CBD?

CBD is short for "cannabidiol" and it comes from hemp. You might find CBD used in:

- Pills, capsules, and softgels
- Gummies
- Oils
- Topicals like lotions, creams, and salves
- Skin care products, including beauty products, acne treatments and bath bombs

Other than one prescription drug product to treat seizures associated with Lennox-Gastaut syndrome, the U.S. Food and Drug Administration (FDA) has not approved any other CBD products.

What is Hemp?

Hemp comes from the cannabis plant. Hemp may be found in common products including:

- Hemp milk and coffee
- Granola and energy bars
- Chips and crackers
- Protein powder and yogurt
- Shampoo and conditioner
- Lotion, soap, and hand sanitizer

It is important to read the ingredients of food, drinks, lotions, and oils before use. Hemp and CBD products are unregulated by the FDA and may contain underestimated-levels of THC.

The DOD and Service-level policies prohibit Service members from eating and using products made or derived from hemp to include CBD no matter the claimed or actual THC levels. This policy is necessary to ensure military readiness while securing the reliability and integrity of the drug testing program. The prohibition does not apply to durable goods such as clothing.

For Federal employees, using marijuana products by any method – smoking, eating, and/or applying as an ointment – is prohibited regardless of state or local laws.

The FDA has cautioned the public to beware using commercially-available hemp and CBD products. The THC-concentration levels of these products are not certified and may contain higher levels of the psychoactive THC than what the product label states. DOD and the component Services have an active drug test program for both military and civilian employees that readily detects THC use.

The use of marijuana and marijuana-related substances is prohibited by all military service members (Active Duty, Reservist, and Guard members) and Department of Defense civilian employees. Even though some states have decriminalized or legalized marijuana for medical or recreational use, under federal law, marijuana remains an illegal Schedule I Controlled Substance, with a high potential for abuse and no currently accepted medical use. *(Courtesy graphic)*

For those whose lives are negatively affected by Marijuana use, there are many options that lead to recovery. If you or a loved one need help, contact the Employee Assistance Program or Military OneSource for free and confidential information and treatment referral.

Military and families: Military One Source 1-800-342-9647 or visit ***militaryonesource.mil***.

Civilian employees and families: Employee Assistance Program 1-866-580-9078 or visit ***AFPC.af.mil/***.

For information on education materials for DOD prohibited marijuana-related substances, visit ***USAFwellness.com*** or contact your local Civilian Health Promotion Services team.

The Substance Abuse and Mental Health Services Administration collects information on thousands of state-licensed providers who specialize in treating substance use disorders and addiction. For help finding treatment, contact ***FindTreatment.gov***, or call 1-800-662-HELP (4357).