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Three decades of mentoring honored by BEYA

Joe Lacdan

Lt. Gen. Bruce Crawford, the Army's chief information officer, congratulates future Sailors from Navy Talent Acquisition Pittsburgh after administering the oath of enlistment to them during a mass joint-service swearing-in ceremony at Heinz Field. Crawford was named the 2020 Black Engineer of the Year. (Photo by Petty Officer 1st Class Benjamin Dobbs)

It had been nearly 15 years since Lt. Gen. Bruce Crawford had last seen her, and Maj. Crystal Ernst had been a young specialist back then. But Crawford recognized his former troop from Iraq immediately and remembered her name when he saw her again at the Command and General Staff College.

"Watching (then Lt. Col.) Crawford and the way he looked out for the entire battalion, he was very personable," Ernst said. "He knew me personally even though I was only a junior Soldier. He probably had 600 Soldiers, but he knew (us)."

Crawford, now the Army's chief information officer and G-6, has spread his influence throughout the ranks. Of the 14 generals in the Army's Signal Corps, half have been mentored by him, including Maj. Gen. Maria Barrett, the commanding general of the Army's Network Enterprise Technology Command at Fort Huachuca, Arizona, and Brig. Gen. Robert Edmonson, G-6/chief information officer at Army Forces Command.

During a 34-year Army career, Crawford has mentored hundreds of Soldiers, from cadets and privates all the way up to colonels. He speaks at high schools and advises students on their career path. For this mentoring, he has been named the 2020 Black Engineer of the Year – only the second Army officer to win the award.

"Truly an honor," Crawford said of the award. "I think it says a lot about what BEYA is about and the enduring legacy of BEYA. I think the greatest thing they do is they create the awareness that becomes the pathway to opportunity for our young people, especially in the area of STEM (science, engineering, technology and math)."

Giving Back

Ernst enlisted in the Army in 2001 and deployed with the 82nd Signal Battalion during the onset of Operation Iraqi Freedom and then again to Ramadi, Iraq.

See BEYA on page 3

Renaissance Guardsman: Aircrew Flight Equipment keeps C-17 aircrew safe

David Bedard
176th Wing Public Affairs

Alaska Air National Guard Staff Sgt. Joseph Rotar helps pilots see in the dark, he is the admiral of a fleet comprising dozens of life rafts, and the work he does could provide aircrew with the pathogen-proof suits and masks they would need to survive a theoretical zombie outbreak.

Rotar, a native of West Palm Beach, Florida, is a 176th Operations Support Squadron aircrew flight equipment technician responsible for the upkeep, inspection and repair of scores of different types of equipment necessary to keep C-17 Globemaster III pilots, loadmasters and passengers alive when all else fails.

Master Sgt. Sam Cooper, AFE Flight Chief, C-17 Section, says Rotar and every other AFE technician under his supervision are responsible for a dizzying array of devices aircrew may not think about until right up to the intense moment their lives depend on it.

"Everything, from the chemical-defense equipment to the parachutes to the emergency passenger-oxygen systems to life preservers to life rafts, the aircrew knows no matter what, the equipment is done properly and is going to work if they have to bail out of the aircraft and end up in the water," Cooper said. "They will be taken care of until rescue can come and get them."

Though Rotar provides C-17 air crew a contingency lifeline today, his path to the AFE work bench was a serpentine route of pursuing education followed by seeking service.

Studying accounting and finance at a local university while working full time quickly led to burnout, Rotar said, and he found himself looking to follow in the footsteps of his brother, Anthony, who enlisted as an airborne Ranger in the active Army.

After a look at the regular Air Force, Rotar joined the Army as an airborne radio operator maintainer. After Basic Combat Training and Advanced Individual Training, the newly minted Soldier thought he would be assigned to the 82nd Airborne Division at Fort Bragg, North Carolina.

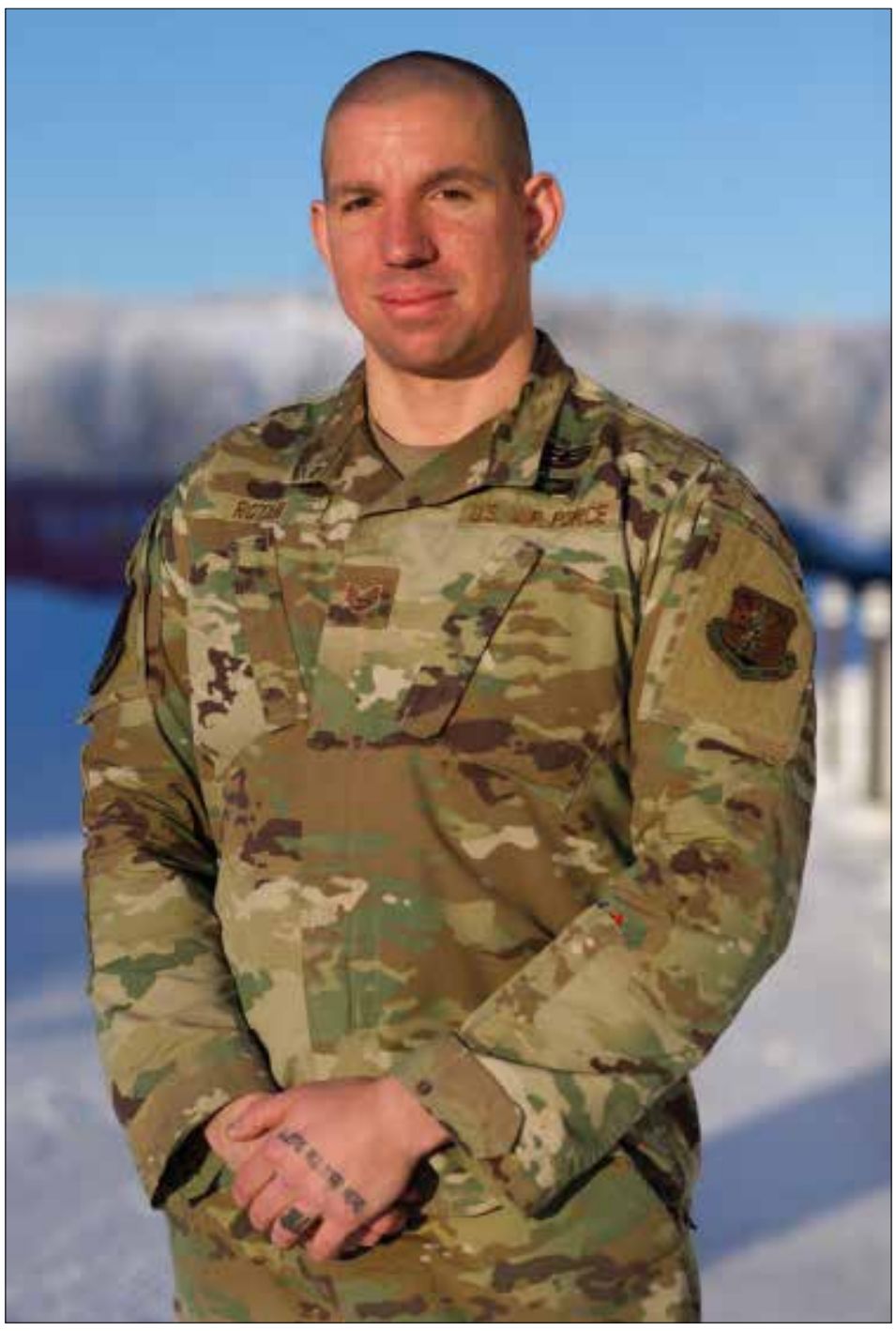
His pinpoint assignment however was with 4th Brigade Combat Team (Airborne), 25th Infantry Division, at Joint Base Elmendorf-Richardson, Alaska.

"When I got orders up here I thought it was a joke because I was born in Florida, did all of my training in Georgia — Fort Benning and Fort Gordon," Rotar recalled. "I had never been west of the Mississippi (River) until I was stationed up here."

Three months after signing into 4/25 with 1st Squadron (Airborne), 40th Cavalry Regiment, the paratrooper found himself Afghanistan bound for Khost province for a combat deployment. After seven years of service at JBER, Rotar said he decided to stay in the state that was once too cold and remote for the Floridian.

Landing a job as a loadmaster with a statewide aviation logistics carrier, Rotar said he fell in love with flying in the Last Frontier. That love would find him at the Alaska Air National Guard Recruiting office and a new job in AFE.

See C-17 on page 7



Alaska Air National Guard Staff Sgt. Joseph Rotar is a C-17 Globemaster III aircrew flight equipment technician with 176th Operations Support Squadron supporting 144th Airlift Squadron. Rotar is a former active Army paratrooper. (U.S. Air National Guard photo by David Bedard/Released)

WEEKEND WEATHER

Friday

Sunny. High: -2F.

Saturday

Mostly sunny. High: 5F.

Sunday

Snow likely and areas of freezing fog. High: 8F.

USO SPRING TOUR

March 4, 4-6:30 p.m.
Join us for the family-friendly USO Spring Tour for a free show! Who will be there? DJ J.Dayz, LOCASH, Matt Walsh, Scot Armstrong, Brad Morris, and Ilima-Lei MacFarlane!
Warm Storage Hanger, Bldg 2121.
Call 353-7775.

History Snapshot: Klondike Kutey during the winter of 1944/1945

On Feb. 24, 1947, the B-29 Superfortress Klondike Kutey took off on a classified mission from Elmendorf Air Force Base, and was never heard from again. Officially, the crew was conducting routine weather reconnaissance, but unofficially they were recording radio traffic and watching for any activity at nearby Soviet military bases. When the Klondike Kutey was overdue for her return to Elmendorf, it was assumed that the mission has taken extra time. It was eventually evident, however, that something had gone wrong and an emergency alert was issued. Available aircraft from Elmendorf, Ladd Army Airfield and Fort Randall Army Airfield in Cold Bay joined the search for the plane and her crew. The poor visibility and bad weather may have contributed to the plane's disappearance and also hindered the search and rescue efforts. On March 19, the search was officially called off, although the 10th Air Rescue Squadron continued to search until March 25. The wreckage was never found.

(Photo courtesy of Levi Ballard)

Army Emergency Relief Campaign

Jeffrey Rud, an Army Emergency Relief officer at Fort Wainwright, briefs members of 1st Stryker Brigade Combat Team, 25th Infantry Division, during the 2019 AER Campaign. (Courtesy photo)

With the Army Emergency Relief annual campaign beginning March 1, now is a good time to review the AER program and the benefits it provides to our Soldiers and Families.

Army Emergency Relief's history of helping Soldiers began in 1942. Since that time, AER has provided more than $2 billion in assistance, helping to meet the emergency financial needs of Soldiers, retirees and their eligible family Members.

Today's Army continues to carry on this 78-year legacy of Soldiers caring for Soldiers. During the annual Army Emergency Relief Campaign, which runs from March 1 to May 15, Soldiers are asked to contribute to this program through personal donations. Dollars donated to AER go directly to help other Soldiers in need, just as they have since 1942. This why the motto at AER is "Soldiers helping Soldiers."

As a non-profit 501(C) 3 organization, one of the AER program benefits is that all assistance is provided in the form of non-interest loans, grants or combinations of the two. Recent survey results show that three out of four Soldiers admit to using a predatory lender at some point in their military career, such as online lenders, pawn shops and payday loan establishments. These lenders target Soldiers, offering easy access to cash, while charging excessive interest rates that only cause further financial harm. AER wants to provide Soldiers a better option that is truly looking to assist them, not take advantage of them.

The goal for the AER campaign is to ensure that we reach every Soldier on Fort Wainwright and ensure they are aware of the programs that Army Emergency Relief provides them. AER wants to be the first place they turn, and the first place they refer their battle buddies to, when faced with a financial emergency.

In 2019 Army Emergency Relief provided $70 Million in assistance to over 40,000 Soldiers and Families worldwide. Locally, AER was able to assist 376 Fort Wainwright Soldiers and Families with over $579,000 in emergency assistance.

The Army Emergency Relief officers at Fort Wainwright are honored to serve America's Arctic Warriors and Families. We look forward to meeting with every unit and communicating our program benefits to every Soldier during this year's campaign. Thank you for your service to our nation!

If you find yourself in need of financial assistance, please contact Army Emergency Relief located within Army Community Services office in building 3401, or by phone at 907-353-4369.

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The Chaplain's Corner

By USAG Fort Greely Chaplain, Paul Fritts

I attended elementary school from 1972-78. As our nation's bicentennial in 1976 approached, my school emphasized the American "melting pot" theme that was enjoying a moment of popularity at that time. For those wanting to take a nostalgic trip down memory lane, search "The Great American Melting Pot" by Schoolhouse Rock on YouTube. The chorus of this catchy tune that first aired in 1977 is:

Lovely Lady Liberty
With her book of recipes
And the finest one she's got
Is the great American melting pot.
The great American melting pot.

"The Great American Melting Pot" reminds us that, except for Native Americans, our ancestors were all immigrants. While some will argue that we are, we are not, we never were, or we will never again be the melting pot of my childhood memory, others hope that our differences will not divide us as they melt away in this national melting pot, mixing simply as Americans.

More than forty years ago, the goal - the cultural ideal - was to be united in our sameness. And then the moment passed, giving way to a rising individualism that emerged in the following decades. This was not necessarily a bad thing. Various groups began to organize and assert themselves in ways that celebrated and empowered group members because of their differences. One example that comes to mind is the Special Olympics. An important cultural message the Special Olympics communicates is that our differences should inspire unity in a nation where all people are accepted simply because of our basic humanness.

Building on existing cultural trends and enabled by amazing technological advances, individuals today express their personal empowerment by customizing almost everything to their particular tastes. This development presents both opportunities and challenges. For example, medical science is now able to customize cancer treatments to a person's individual needs and type of cancer to much greater success than ever before. On the other hand, new gene editing techniques theoretically allow medical science to customize a human being before birth. And in this era of individual customization where even our morals can be tailored to personal preferences, resolving contemporary ethical dilemmas will be a challenge.

There is an ego dynamic involved in the cultural trend that moved us from the ideal of the melting pot to the individual. Many today lament our divisiveness. Our deep divisions are not a result of superficial differences, however, but more a consequence of our hubris that declares my differences are superior to your differences. The Apostle Paul writes in his letter to the Romans, "There is no difference between Jew and Gentile, for all have sinned and fall short of the glory of God, and all are justified freely by his grace through the redemption that

came by Christ Jesus" (Romans 3:22b-24). Sin is the great equalizer of humanity. That some may claim this or that sin is better or worse than other sins is disingenuous: holy God abhors all sin. By humbling ourselves as Jesus did, Christians have an opportunity to invite a divided world to church, a great sacred melting pot, united as sinners equally guilty and saved by God's grace.

For God and Country! The Fort Greely Chapel community is a traditional, protestant Army chapel service meeting on Sundays at 1000 with a weekly Communion observance. Interested? Please call 907-873-4397 or "Like" our chapel Facebook page at www.facebook.com/FGAChapel.

BEYA: Decades of mentoring

Continued from page 1

As a young specialist in the unit, she remembers battalion commander Crawford greeting each Soldier and making time to know them.

Crawford later wrote Ernst a recommendation letter for Officer Candidate School. She had originally planned to serve only five years, but said Crawford encouraged her to become an officer.

Ernst now serves as the executive officer for another Soldier Crawford has mentored through the ranks, Brig. Gen. Jeth Rey, the J-6 at U.S. Central Command, MacDill Air Force Base, Florida.

Rey met Crawford when Rey served as a battalion commander in 2012. Crawford helped advise the native of the U.S. Virgin Islands and taught him to value the abilities of the Soldiers he commands.

Crawford also taught him humility, Rey said. He turned to Crawford when he once struggled to work with a passive-aggressive leader. Crawford said to humble himself for the sake of the unit's larger goals and told him not to appease the leader, but voice his support.

Rey said Crawford can recall nearly every Soldier he has commanded.

"In the military, there's two things that people like," said Rey. "One is their name. If a leader remembers your name and remembers what you have done for them, that is a driving force. They will go anywhere and do anything for you.

"He appreciates what people have done for him and he can recall the time when that person did it for him. And that resonates with everyone else. That's rare. His leadership, his drive, they respect him for it."

Rey said Crawford not only offered him advice, but helped him land his current position at U.S. Central Command by writing a recommendation letter and speaking to Army leaders at the Pentagon.

Rey said that Crawford sets standards for the troops he commands in the way he communicates and his hard work. His ability to inspire his troops, Rey said, helped pave the way for him to be selected for the prestigious BEYA award.

Rey added that Crawford's award also marks a victory for the Army's massive modernization efforts.

"General Crawford has been a driving force," Rey said. "It shows the Army is actually leading the way in modernization of their networks and putting it as a major priority. That's really good to know (Army leaders) understand that the backbone of our services is the network itself. And the modernization that he is actually driving is going ensure that we win the next war."

Realized Potential

The annual BEYA conference, in some respects, parallels Crawford's accomplished career.

2020 marks the conference's 34th meeting, and Crawford, 57, has entered his 34th year in the Army. BEYA creates opportunities for students of color to realize their untapped potential in the areas of science, technology and engineering, just as that opportunity was created for Crawford one spring, nearly 40 years ago in Columbia, South Carolina.

The eldest of four children, Crawford had considered going into carpentry at age 18 to provide for his family, instead of going to college. Crawford was working at a local restaurant as a dishwasher.

Then he met Clarence Hill.

Hill encouraged him to attend South Carolina State University in nearby Orangeburg, where Hill served as an instructor. A couple nights a week, Crawford would hop in Hill's car ride 50 miles southeast to the SCSU campus where he learned about the school's engineering program. Hill convinced Crawford to attend the school and join its ROTC program with the promise of providing for his struggling family.

Then during the summer of his junior year at SCSU, Crawford attended ROTC advanced camp. There some of the best cadets in the country competed for active-duty commissions and job placement within the Army. "That was the proving ground," Crawford said.

During the middle of the camp, Crawford learned that he had performed so well during fitness tests, land navigation and marching drills that he ranked within the top 1 percent of the 4,600 cadets who attended the camp.

Crawford eventually graduated from SCSU as a distinguished military graduate, commissioning as a signal officer in 1986. He would later earn two master's degrees.

Army leaders often mention mentorship, a word preached to Soldiers of each rank. Early in his career, Crawford learned its value as a young lieutenant stationed in Europe toward the end of the Cold War.

His first battalion commander, then-Lt. Col. Fred Stein, asked his cadets to read a book called "Common Sense Training: A Working Philosophy for Leaders" by retired Lt. Gen. Arthur S. Collins. Stein asked his 30 lieutenants to read the book and write a two-page essay.

Only one lieutenant completed the assignment – Crawford.

From Stein, Crawford learned the importance of being technically competent and following instruction. Crawford also learned to take advice from leaders who came from a different background.

Leaders Are Grown

Perhaps a turning point in Crawford's career came after the U.S. victory in Operation Desert Storm, while he was stationed at Fort Bragg, North Carolina. Crawford had deployed as a signal officer during the conflict and now wanted to advance his career. The young captain had already completed Army Ranger School training and wanted to join an elite unit such as the 82nd Airborne. "I wanted to go to where the best-of-the-best live," he said.

But his leadership at the time encouraged him to interview for a company commander position under then-Lt. Col. Velma Richardson. Still wanting to join an airborne unit, Crawford reluctantly agreed to the interview. "That turned out to be the best thing that could possibly happen to me," he said.

Richardson, who went on to become the Signal Corps' only female African-American brigadier general, helped shape the leader Crawford would become. Richardson also helped found the BEYA program.

His time as a commander under Richardson helped launch the remainder of his 34-year career, a career that had humble beginnings in the Deep South.

Grounded Roots

A young African American who grew up in a working-class neighborhood of Columbia, South Carolina, he learned from his grandparents' and mother's example. Neither of his grandparents, Hayward and Gracie Spigner, could read or write. Growing up without his father, Crawford saw Hayward, a carpenter, as a role model who worked hard to help provide for Crawford and his siblings. Gracie worked as a nurse's aide.

"But they understood the importance of hard work and they understood the importance of education," Crawford said.

His mother, Sarah, couldn't always be home to care for him and his three siblings as she worked the night shift as a nurse's aide at a home for the elderly.

"I watched her lead as a young person and not have our circumstances overcome us," Crawford said.

Gracie Spigner died of cancer at only 52 years old in 1982. She never got see her eldest grandson rise through the ranks of the Army or head the Army's $12 billion technology enterprise.

But she witnessed her grandson start the collegiate career that would point him toward that path, at a time when most young men in his Columbia neighborhood pursued blue-collar professions.

"Success has many fathers and many mothers and many parents," Crawford said. "The first point that comes to mind is those who enabled me along the way – the people that came to my life at a time when young people come to a proverbial fork in the road."

One determined leader at the right time can make a big difference, he said.

For instance, BEYA creates connections among minority students with educators and STEM professionals much like then-high school senior Crawford connected with a young PhD candidate at South Carolina State.

"(The BEYA award) says a lot about the contributions of Soldiers over the years," Crawford said. "This award is much bigger than Bruce Crawford. I think it's part of an Army story that needs to be told."

U.S. Army Brevet Promotion Program

Army Talent Management Task Force

What is it?

U.S. Army Brevet promotion program selects officers for temporary promotion to serve at the next higher rank in a critical billet. A brevet promotion entitles an officer to be temporarily promoted to the next grade and avail the pay and benefits of the higher rank.

As authorized by the 2019 John S. McCain National Defense Authorization Act (NDAA), brevet promotion is one of the nine new authorities that provide the Army flexibility to determine the characteristics of a talent management system. The Army is authorized up to 770 brevet positions.

What are the current and past efforts of the Army?

The Army's Talent Management Task Force is helping the Army implement the most comprehensive reform of its officer personnel management system in over 70 years.

The Army can nominate officers to serve in a brevet position through either the Army Talent Alignment Process or through a command nomination. Nominations will be vetted by a General Officer Review Board and submitted to the Senate for confirmation.

In October 2019, Army senior leaders approved the critical position list for 225 positions for brevet. During the ATAP cycle for Summer 2020 (20-02) movers, 96 brevet positions were available. Of those 96 brevet positions, 19 officers of a junior grade were matched to a brevet position and may be nominated for a temporary promotion.

Officers serving in a brevet position will receive a Temporary Date of Rank for their brevet promotion rank and maintain their Primary Date of Rank for current selection and promotion timelines.

What continued efforts does the Army have planned?

The Army will gradually expand the number of brevet positions available beginning with the addition of 100 critical billets to the Winter 2020 (21-01) Army Talent Alignment Process. The Summer 2021 (21-02) Army Talent Alignment Process will advertise the 445 additional brevet positions bringing the total number of available brevet positions to 770.

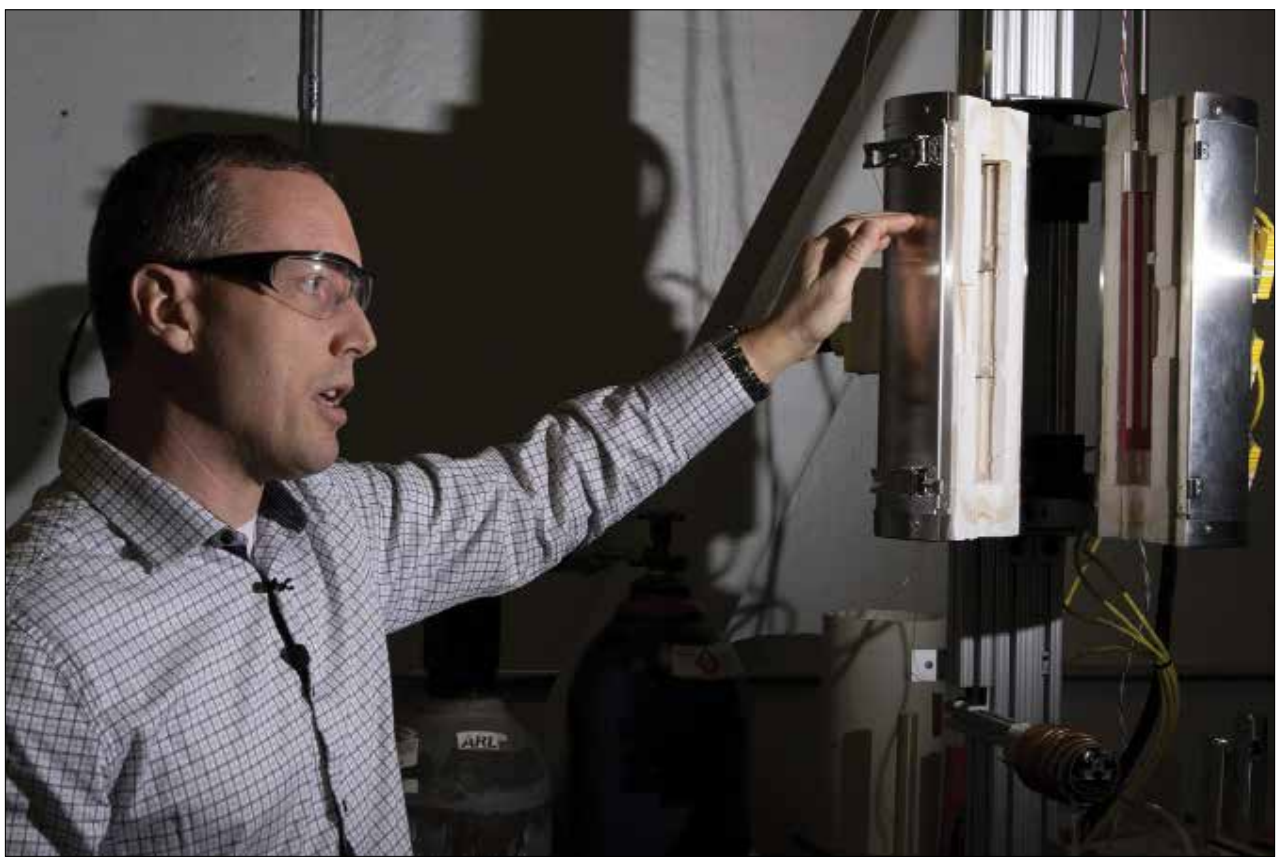
Why is this important to the Army?

The Brevet Promotion Program is intended to alleviate critical shortages of officers to better leverage the talents of junior officer, and to incentivize retention of those officer's in whom the Army invested for education and experience.

This new authority moves the Army toward more flexible career paths for its officers and allows the Army to fill critical shortages with officers who possess the right talent. Brevet promotions are just one of many important personnel reforms which will help the Army transform from an Industrial-era personnel system to a 21st century talent management system.

Army scientists develop cutting-edge, durable 3D printing technology

Thomas Brading
Army News Service



Dr. Eric Wetzel demonstrates dual-polymer filaments at the U.S. Army Research Laboratory on Feb. 10, 2020, at Aberdeen Proving Ground, Maryland. The technology is capable of delivering heavy-duty printed parts for Soldiers in remote locations from easy-to-use 3D printers. (Photo by EJ Hersom)

Army scientists are on the brink of a pioneering additive-manufacturing technology to help Soldiers quickly swap out broken plastic components with durable 3D printed replacements, says a top Army researcher.

In the past, troops have either lugged replacement parts around or ordered them from warehouses thousands of miles away, only to wait weeks for them to arrive.

But with dual-polymer 3D printed parts – developed by scientists at the U.S. Army Combat Capabilities Development Command Army Research Laboratory, or ARL – Soldiers could be a few clicks away from swapping out broken pieces and heading back to the fight within hours.

"We're crossing a threshold where low-cost, easy-to-operate and maintain printers will be proliferated on the battlefield – and able to produce engineering parts of very good quality with short turn-around times," said Dr. Eric Wetzel, ARL's research area leader for Soldier materials.

"In order to do that, we need printing technologies that can print parts that are accurate geometrically and have mechanical properties that are sufficiently robust to survive conditions in battle," he added.

The printing technology comes on the heels of Secretary of the Army Ryan McCarthy pushing an advanced manufacturing policy last October, intended to enhance supply chains in the field.

Until this point, 3D printing technologies that produce mechanically robust parts have required printers and print technologies that are not suitable for austere environments, while the printers suitable for austere environments produced poor-quality parts, Wetzel said.

That's where the ARL scientists come in. For the last few years, they have delved into this issue, Wetzel said. For the first time, ARL scientists have developed a cutting-edge filament capable of being used in off-the-shelf, low-cost 3D printers to produce mechanically strong, battlefield-ready parts.

"By summer, we hope to have samples of the filament distributed to Army transition partners," Wetzel added. Based on their feedback, ARL could ramp up production – with help from industry partners – and have it in the hands of Soldiers within the calendar year.

The Dual-Polymer Technology

"Conventional polymer filaments for 3D printing are made up of a single polymer," Wetzel said. "Our innovation is that we've combined two different polymers into a single filament, providing a unique combination of characteristics useful for printing and building strength."

The dual-polymer filament combines acrylonitrile butadiene styrene, or ABS, with polycarbonate, or PC. A critical design feature of the filament is that the ABS and PC phases are not simply mixed together, a common approach for creating blended polymers. Instead, a special dieless thermal drawing process developed by ARL is used to create an ABS filament with a star-shaped PC core. Once coupled, the filament is used as feedstock in a desktop fused-filament fabrication, or FFF, printer to create 3D prints with a heavy-duty ABS/PC mesostructure.

FFF printers work with a heated nozzle that emits thin layers of melted plastic, similar to molten glass. The filament is deposited onto a print bed, one layer on top of another until it forms the 3D printed part. In order to fabricate a unique part, the nozzle, print bed, or both move while the hot plastic streams down.

The two polymers found in the new filament technology have distinct melting temperatures, Wetzel said.

After the solid bodies are initially printed, they are put in an oven to build strength. During this annealing process, the deposited material layers fuse together while maintaining their geometry and form. This stability is caused by the higher temperature resistance of the built-in framework.

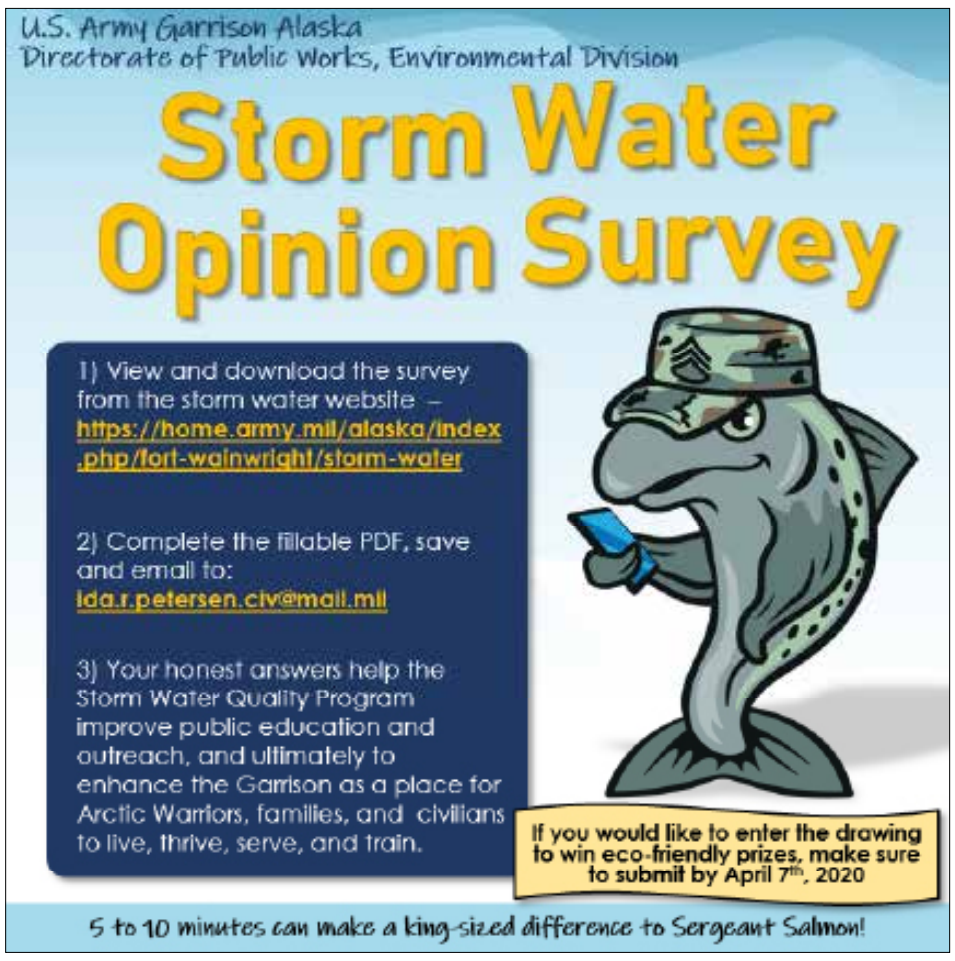
"The second polymer holds the shape like a skeleton while the rest of it is melting and bonding together," Wetzel said. "Through a series of filament design trials, we were able to identify that the star-shaped PC core provided a superior combination of part toughness and stability compared to other arrangements of ABS and PC in the filament."

Current filaments – traditionally consisting of a single thermoplastic – produce parts that are brittle and weak, and would deform excessively during the annealing process, he said.

"We focused in on what can we do to improve those mechanical properties," he added. "We wrote a series of papers getting very fundamentally down to the details of exactly why conventional single-polymer parts are not sufficient, what's happening in the physics of the polymer – really at a molecular level – that prevents conventional printed polymer parts from meeting these requirements."

The legacy thermoplastic deposits like a hot glue gun, he said. As the layers build, they don't stick very well to the previous layer because by the time the second layer adds, the first one is cooled off.

"So, you're not melting the layers together, you're just solidifying material on top of one another, and they never really bond between layers," Wetzel said. "Our technology is an approach that allows us to use these conventional desktop printers, but then apply post-processing to dramatically improve the toughness and strength between layers."



Virtual Reality helps Soldiers shape Army hypersonic weapon prototype

Nancy Jones-Bonbrest
Army Rapid Capabilities and Critical Technologies Office

Using virtual reality, Soldiers are getting a rare look at components of the Army's new prototype Long Range Hypersonic Weapon and influencing how the system is designed. (Photo courtesy Lockheed Martin)

In the blink of an eye, a multi-ton truck and trailer flips on its side to reveal what's underneath. Bolted-down equipment moves out of the way in seconds instead of hours. A bird's eye view reveals answers between the slimmest of openings.

Using virtual reality, Soldiers from Fort Sill, Okla. are getting a rare look at components of the Army's new prototype Long Range Hypersonic Weapon (LRHW) and influencing how the system is designed.

Through a mix of virtual reality, augmented reality and mixed reality technologies, Soldiers last month were able to walk around and "touch" the Army's new prototype LRHW system as an interactive, true-to-scale, three-dimensional model.

Inside the mixed reality lab, known as the Collaborative Human Immersive Laboratory, or CHIL, the Soldiers could view the equipment from any angle, at any distance and manipulate it as needed in order to better understand its operation and recommend improvements.

"We were able to stand as a group around an area called 'the cave,' which allowed all of us to see, in 3D, through special eyewear, the Transporter Erector Launcher and missile as one," said LTC Aaron Bright, the chief of the Operational Training Division of the Directorate of Training and Doctrine at Fort Sill. "I was able to grab pieces of the LRHW with my hands and move them weightlessly to the side to get a better look at another part, and to better understand how the system as a whole works. The kinds of things that would take hours with a crane, and several more hours with tools, we were doing on our own in seconds."

While hypersonics is often considered a futuristic, complex technology, the input received focused on seemingly low-tech items that are critical to Soldiers' operational experience, such as generator placement and access, excess equipment that could be removed to save weight, generator exhaust routing, and specific locations for skid plates.

As the prototype is built, this early Soldier feedback will help identify any quick-fix flaws and offer ways to improve the operational capacity. The system consists of a 40-foot Transporter Erector Launcher (TEL) with missiles and a Battery Operations Center (BOC). The truck and trailer combination, and the BOC, are all taken from existing Army stock, and are in the process of being modified to create new equipment that's never been used in this way before.

"You can apply virtual reality and augmented reality to almost any concept the Army or other component has and gain vital feedback," said 1st Sergeant Michael Weaver, with the 1-31st Field Artillery Battalion, 434th Field Artillery Brigade at the Fort Sill Fires Center of Excellence. "Identifying potential issues early on in the development process is crucial because it is easier and cheaper to adjust design during the concept phase as opposed to production."

The Army Rapid Capabilities and Critical Technologies Office (RCCTO) is charged with delivering the prototype LRHW to a battery no later than fiscal year 2023. The LRHW will introduce a new class of ultrafast, maneuverable, long-range missiles that will launch from mobile ground platforms. The prototype includes hypersonic missiles with a Common Hypersonic Glide Body (CHGB), the TEL and BOC.

This aggressive prototyping schedule, which pushes the Army's initial hypersonic capability delivery ahead by two years, can't wait until the hardware is modified and integrated for Soldier feedback. Virtual reality fills the void by enabling Soldier touch points on an early and regular basis.

"We have a very tight timeline with the LRHW," said COL Ian Humphrey, integration project manager for the RCCTO's Army Hypersonic Project Office. "We have to make it safe and we must meet very hard requirements. Although the LRHW is a prototype, the Soldier feedback we get here provides operational input early in the process. This is not only to help inform the LRHW, but also aid in the development of the Army's hypersonics program of record."

The mixed reality CHIL enables real-time collaboration through equipment including virtual reality headsets, 3D glasses, holograms, and handheld controllers. The facility is owned by Lockheed Martin, which is under contract to deliver the All Up Round plus Canister (AUR+C), which includes the missile stack, the Common Hypersonic Glide Body, and canister. The company also serves as the LRHW prototype system integrator.

Soldiers will be involved throughout the process and as more integrated and modified hardware becomes available, they'll get a chance to walk around the real system. Plans are also in the works to create a CHILNET, which would allow remote sites to utilize the simulations and interact in real-time from multiple locations.

Military committed to protecting environmental, cultural resources, service officials say

David Vergun
Defense.gov

Matthew Crabtree, a dig crew chief working for the Air Force, compares soil color on a Munsell soil chart for later analysis in the lab at Avon Park Air Force Range in Florida, April 18, 2019. The Air Force is excavating a newly found archaeological site and is going through the process of making it eligible for placement on the National Register of Historic Places. (Photo by Tech. Sgt. Perry Aston)

Senior officials from the Army, Navy and Air Force assured lawmakers that military readiness and environmental concerns can coexist.

The services' principal deputy assistant secretaries for energy, installations and environment testified last week at the House Armed Services Committee's readiness subcommittee hearing on building military readiness while protecting natural and cultural resources.

Jordan Gillis, representing the Army, said land is one of the most important resources needed to accomplish Army readiness. It provides maneuver space for units training, weapons range complexes, as well as land for Army military education complexes, he explained.

Examples of two of the most important training areas in the United States are the National Training Center at Fort Irwin, California, and the Joint Readiness Training Center at Fort Polk, Louisiana. Besides those, each installation has its own training area where troops prepare for larger-scale training at NTC and JRTC and real-world operations, Gillis said

Most installations were established decades ago, and some more than a century ago, he noted. At the time, he said, they were in remote locations to decrease the impact on local communities. However, over time, communities have grown, increasing encroachment issues that affect training, he said.

However, the Army is dedicated to working with local communities to mitigate encroachment challenges, such as noise from live-fire training or aircraft, Gillis said.

Gillis said that besides the goal of attaining a high level of readiness, he said, the Army is also committed to environmental and cultural protection of its land.

Jennifer L. Miller, representing the Air Force, and Todd C. Mellon, representing the Navy, said their land-based ranges also are critical to readiness, and they echoed Gillis in saying their services are committed to the environmental and cultural protection of their land.

The three officials told lawmakers that they consult and cooperate with the Department of the Interior, the U.S. Fish and Wildlife Service and state and natural resource agencies to prepare robust and integrated natural resource management plans.

Weekly Events

February 29 - March 7

1 **Ice Climbing with ODR**
March 8
8 a.m. - 6 p.m.

Join Outdoor Recreation for a fun day of frozen waterfall climbing! You will be heading down to Denali area to spend the day ice climbing. All skill levels are welcome! Registration deadline is March 1.

Outdoor Recreation Center, Bldg 4050
Call 361-6349, registration required

4 **USO Spring Tour**
March 4
4 - 6:30 p.m.

Join us for the family-friendly USO Spring Tour for a FREE show! Who will be there? DJ J.Dayz, LOCASH, Matt Walsh, Scot Armstrong, Brad Morris, and Ilima-Lei MacFarlane!

Warm Storage Hanger, Bldg 2121
Call 353-7775

5 **B.O.S.S. Installation Meeting**
March 5
1:30 - 2:30 p.m.

Join us for an installation B.O.S.S. Meeting every first and third Thursday of the month! You will have the chance to provide your input on upcoming B.O.S.S. events, express quality of life issues on Fort Wainwright, and most importantly stay informed!

Warrior Zone, Bldg 3205
Call 353-7648

7 **UFC Adesanya vs Romero**
March 7
Main event starts at 6 p.m.

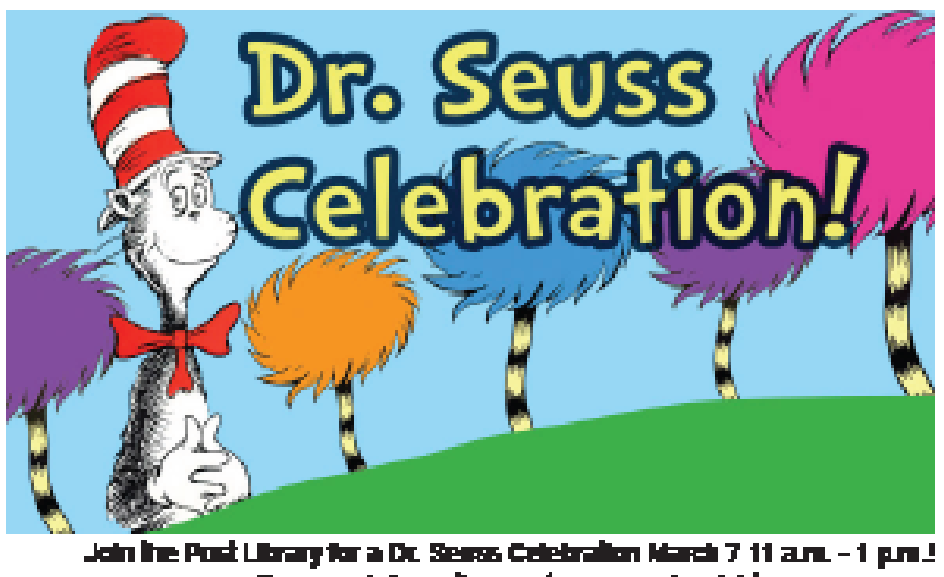
Come out to the Warrior Zone for all ticket UFC fights! Cost: $5 for Active Duty Service Members & $10 for non-Active Duty

Warrior Zone, Bldg 3205
Call 353-1087

7 **Birch Lake Ice Fishing**
March 14
8 a.m. - 5 p.m.

Join the Outdoor Recreation team for a little ice fishing action in our interior lakes. If you are new to ice fishing, then here is your chance to see how it's done. Registration deadline is March 7. Cost: $50 per person.

Outdoor Recreation Center, Bldg 4050
Call 361-6349, registration required



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"25th Army vs Air Force Hockey game"

Army player #7 Capt. Benjamin Cohen moves against an Air Force opponent during the 25th Army vs. Air Force Hockey match played Feb. 15, 2020 at the Carlson Center in Fairbanks. With each team coming to the game with 12 victories in the series, defending champions Army lost narrowly to Air Force 5-4. (Photo by Grant Sattler, Fort Wainwright Public Affairs)

Cadets research bioprinting to improve Soldier care in the future

Brandon OConnor

When Lt. Col. Jason Barnhill traveled to Africa last summer, he took with him not only the normal gear of an Army officer, but also a 3D printer.

Barnhill, who is the life science program director at the U.S. Military Academy, traveled to Africa to study how 3D printers could be used for field medical care. Barnhill's printer was not set up to print objects made out of plastics as the printers are frequently known for. Instead, his printer makes bioprinted items that could one day be used to save Soldiers injured in combat.

The 3D bioprinting research has not reached the point where a printed organ or meniscus can be implanted into the body, but Barnhill and a team of cadets are working to advance the research in the field.

Twenty-six firsties are doing bioprinting research across seven different projects as their capstone this year. Two teams are working on biobandages for burn and field care. Two teams are working on how to bioengineer blood vessels to enable other bioprinted items that require a blood source, such as organs, to be viable. One team is working on printing a viable meniscus and the final team is working on printing a liver.

The basic process of printing biomaterial is the same as what is used to print a plastic figurine. A model of what will be printed is created on the computer, it is digitally sliced into layers and then the printer builds it layer by layer. The difference is the "ink" that is used.

Class of 2022 Cadet Nicolas Shriver sets up a 3D bioprinter before using hydrogels to print an aortic valve. (Photo by Brandon OConnor)

Instead of heating plastic, 3D bioprinting uses a bioink that includes collagen, a major part of human tissue, and cells, typically stem cells.

"A lot of this has to do with the bioink that we want to use, exactly what material we're using as our printer ink, if you will," Class of 2020 Cadet Allen Gong, a life science major working on the meniscus project, said. "Once we have that 3D model where we want it, then it's just a matter of being able to stack the ink on top of each other properly."

Cadets are researching how to use that ink to create a meniscus to be implanted into a Soldier's injured knee or print a liver that could be used to test medicine and maybe one day eliminate the shortage of transplantable organs.

The research at West Point is funded by the Uniformed Services University of Health Science and is focused on increasing Soldier survivability in the field and treating wounded warriors.

Right now, cadets on each of the teams are in the beginning stages of their research before starting the actual printing process. The first stage includes reading the research already available in their area of focus and learning how to use the printers. After spring break, they will have their first chance to start printing with cells.

For the biobandage, meniscus and liver teams, the goal is to print a tangible product by the end of the semester, though neither the meniscus or liver will be something that could be implanted and used.

"There are definitely some leaps before we can get to that point," Class of 2020 Cadet Thatcher Shepard, a life science major working on the meniscus project, said of actually implanting what they print. "(We have to) make sure the body doesn't reject the new bioprinted meniscus and also the emplacement. There can be difficulties with that. Right now, we're trying to just make a viable meniscus. Then, we'll look into further research to be able to work on methods of actually placing it into the body."

The blood vessel teams are further away from printing something concrete because the field has so many unanswered questions. Their initial step will be looking at what has already been done in the field and what questions still need to be answered. They will then decide on the scope and direction of their projects. Their research will be key to allowing other areas of the field to move forward, though. Organs such as livers and pancreases have been printed, so far, they can only be produced at the micro level because they have no blood flow.

"It's kind of like putting the cart before the horse," Class of 2020 Cadet Michael Deegan, a life science major working on one of the blood vessel projects, said. "You've printed it, great, but what's the point of printing it if it's not going to survive inside your body? Being able to work on that fundamental step that's actually going to make these organs viable is what drew me and my teammates to be able to do this."

While the blood vessel, liver and meniscus projects have the potential to impact long-term care, the work being done by the biobandage teams will potentially have direct uses in the field during combat. The goal is to be able to take cells from an injured Soldier, specifically one who suffers burns, and print a bandage with built in biomaterial on it to jumpstart the healing process.

Medics would potentially be deployed with a 3D printer in their Humvee to enable bandages to be printed on site to meet the needs of the specific Soldier and his or her exact wound. The projects are building on existing research on printing sterile bandages and then adding a bioengineering element. The bandages would be printed with specialized skin and stem cells necessary to the healing process, jumpstarting healing faster.

"We're researching how the body actually heals from burns," Class of 2020 Cadet Channah Mills, a life science major working on one of the biobandage projects, said. "So, what are some things we can do to speed along that process? Introducing a bandage could kick start that healing process. The faster you start healing, the less scarring and the more likely you're going to recover."

C-17: Keeping safe

Continued from page 1

"This gives me time to still be hands on, still develop Airmen at a younger level," Rotar said of his new enlisted specialty, comparing it to his Army job. "I still get to work with people and do meaningful work."

Any time Rotar works on a piece of AFE, he pores over the technical order and ensures strict attention to the smallest of details.

"If I mess up on my end, it could cost someone's life on the other end," he said. "So I take extreme pride in knowing what I do could save somebody's life."

Working on everything from chemical-protective gear to quick-don masks to helmets, Rotar said he marvels at how many Army occupational specialties he would encompass with the knowledge he uses on a daily basis.

"We are the armorer," he said. "We are the rigger, we are everything in one entity. The amount of equipment and the amount of detail in each specific task for each piece of equipment makes it that much more challenging as far as the knowledge base of this career field."

During an inspection and repacking of a BA-22 Bailout Kit parachute, Rotar worked closely with Cooper to power through a particularly sticky performance step securing a nylon line.