



2023 GLOBAL DEFENDER

A GUIDE TO USASMDC



U.S. Army Space and
Missile Defense Command





COMMANDER'S MESSAGE

LT. GEN DANIEL L. KARBLER

Welcome to the 2023 *Global Defender!*

It is my incredible honor to lead the 2,700 professionals who make up the U.S. Army Space and Missile Defense Command and Joint Functional Component Command for Integrated Missile Defense. These men and women are our greatest strength, and it is a privilege to serve alongside them as we execute our no-fail mission of providing the Army and joint force trained and equipped space and global ballistic missile defense forces, and space, missile defense and high altitude capabilities.

As commanding general of this People First organization, my number one priority is investment in our Soldiers and Civilians. To fight and win on tomorrow's battlefield, they must have the education, training, practice, and experience required for setting the theater and maintaining continued land dominance. Just as important is prioritizing their safety, health, and well-being – and that of their families, whose love and support enable them to serve. I am proud to report that this commitment, shared by the organization's leaders at all levels, recently resulted in USASMDC's designation as a 2021 Best Place to Work in the Federal Government and ranking among the top two commands Army-wide in consecutive Federal Employee Viewpoint Surveys.

In the pages that follow, you will read more about our important role as the Army Service component command to U.S. Space Command and U.S. Strategic Command, the vital support we provide U.S. Northern Command in the homeland defense mission, and much more about what makes SMDC and JFCC IMD so uniquely suited to support both the Army and joint force. You will also get a better understanding of why

today's complex security environment has led to increasing reliance on our expertise, forces, and capabilities – and why demand is sure to grow as we enter this decisive decade.

Rest assured, we are ready. The many initiatives we are undertaking to achieve the Army of 2030/2040 include:

- Amplifying the lethality and deterrent effect of our ground combat forces by better integrating and synchronizing Army Space capabilities, allowing maneuver commanders to match the best interceptors with the best sensors for any threat;
- Improving resiliency of the overall space architecture in denied, disrupted, intermittent, and limited bandwidth environments via high altitude platforms that provide reliable coverage on short notice;
- Adopting alternative approaches, innovative concepts, and advanced technologies to develop cost-effective defense against missile strikes;
- And developing a cross-domain operating concept that will converge cyber, space, and special operations forces capabilities to influence and deter across the full joint competition continuum.

With that, I want to thank you for taking time to learn more about SMDC, JFCC IMD, and the many team members whose contributions enable the Army and joint force to deter, deny, and defeat any challenge. We could not do it without them, and I am grateful to have this opportunity to update you on all they do.

Secure the High Ground! Vigilant for the World!

2023 LEADERSHIP



CSM John Foley
Command Sergeant
Major



BG Isaac Peltier
Deputy Commanding General
for Operations



Richard De Fatta
Deputy to the
Commander



CW5 Anson Seebeck
Command Chief
Warrant Officer

100th Missile Defense Brigade



COL Joe Paladino
Commander, 100th Missile
Defense Brigade

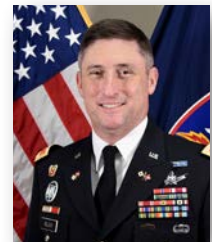


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Commander,
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The **Global Defender** is an authorized publication to inform and educate members and partners of DOD and the U.S. Army Space and Missile Defense Command. The editorial content of this publication is the responsibility of the USASMDC Public Affairs Office.

USASMDC
SMDC-PA
Building 5220, Martin Road
Redstone Arsenal, AL 35898

Dist. A: Approved for public release #2136



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USASMDC

The U.S. Army Space and Missile Defense Command is the Army's force modernization proponent and operational integrator for global space, missile defense and high altitude capabilities. It occupies strategic key terrain that lies at the nexus of integrated deterrence between three combatant commands: U.S. Space Command, U.S. Strategic Command and U.S. Northern Command. It has a unique perspective on the convergence of space and missile defense in multi-domain operations and the role it plays in integrated deterrence.

USASMDC provides trained and ready space and missile defense forces and capabilities to the warfighter and nation.

It builds future space and missile defense forces for tomorrow by researching, testing and integrating space, missile defense, cyber, directed energy, hypersonic and related technologies for the future.

The common link uniting USASMDC's 2,600 Soldiers and civilians across 13 time zones and 19 dispersed locations is a commitment to defending the nation and its allies.

Along with the command's Technical Center and Space and Missile Defense Center of Excellence, it has two major subordinate military elements, the 100th Missile Defense Brigade (Ground-based Midcourse Defense) and the 1st Space Brigade.

The missile defense brigade operates the Ground-based Midcourse Defense System and functions as the missile defense component of the missile defense enterprise of the command.

Operating under the brigade are Soldiers of the 49th Missile

Defense Battalion. These Soldiers operate the GMD system and provide security for the Missile Defense Complex at Fort Greely, Alaska.

Leading the command in space operations is the 1st Space Brigade. The brigade consists of the 1st Space Battalion and 2nd Space Battalion, as well as the 117th Space Battalion under a direct support relationship.

The 1st Space Brigade conducts continuous space force enhancement and space control operations in support of combatant commanders, enabling and shaping decisive operations. The brigade also contains five Missile Defense Batteries that operate the AN/TPY-2 radars in forward-based mode conducting ballistic missile search, track and discrimination operations in support of regional and homeland defense. Additionally, the forward-based mode radar can enable space operations and conduct data collection.

The Technical Center manages science and technology, research and development, and



Cody Eberly, lab manager, Directed Energy Systems Integration Lab, explains the lab's equipment and capabilities, Dec. 2, 2022. The lab, part of the U.S. Army Space and Missile Defense Command Technical Center's Technical Complex located on Redstone Arsenal, Alabama, expects to start testing for customers in early 2023. (U.S. Army photo by Carrie David Campbell)



Spc. Brandon O'Neal serves as a sensor manager with the 10th Missile Defense Battery at Joint Base Pearl Harbor-Hickam, Hawaii. There are five missile defense batteries located worldwide that operate the AN/TPY-2 radars in forward-based mode conducting ballistic missile search, track and discrimination operations in support of regional and homeland defense. Additionally, the Forward-Based Mode Radar enables space operations by conducting data collection. (U.S. Army photo)

conducts test programs for space, integrated air and missile defense, directed energy, hypersonic and related technologies. It develops and transitions space and missile defense technology to the warfighter to address current and future capability gaps in persistent communication; intelligence, surveillance and reconnaissance; force protection; and strike. It provides critical technologies enabling warfighter effectiveness in the core competencies of directed energy, space, high altitude systems, cyberspace and missile defense.

The Space and Missile Defense Center of Excellence is the command's architect for future force design. The team is charged to design, build, modernize, train and educate Army space and missile defense forces and is the Army's force modernization proponent responsible for managing Army change to

doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy.

USASMDC is also the proponent for the Army astronaut program and provides support to NASA with an Army detachment assigned to Johnson Space Center in Houston, Texas.

The USASMDC commanding general also has several other responsibilities: he serves as the senior commander of both Fort Greely and U.S. Army Garrison – Kwajalein Atoll, Republic of the Marshall Islands, where he is responsible for the care of service members, families and civilians, and for enabling unit readiness; he is the Army's Air and Missile Defense Enterprise Integrator; and he serves as the commander of U.S. Strategic Command's Joint Functional Component Command for Integrated Missile Defense.



USASMDC *A globally responsive command*



**2,600 DEDICATED EMPLOYEES WORLDWIDE
WITH MORE THAN 600 OPERATIONAL FORCES FORWARD STATIONED OR DEPLOYED**





ARMY SPACE CAPABILITIES KEEP SOLDIERS SHOOTING, MOVING, COMMUNICATING

The U.S. Army Space and Missile Defense Command focused on integrating Army space capabilities in many of its 2022 operations.

USASMDC provided support to U.S. European Command's response to operations in Ukraine following Russian President Vladimir Putin's unprovoked invasion in February through its Force Tracking Mission Management Center and by providing space operations support to combatant commanders through its 1st Space Brigade.

"We have Army space experts over there who are helping enable those space capabilities for the maneuver commanders on the ground," said Lt. Gen. Daniel Karbler, USASMDC commanding general. "Our space experts are doing everything from looking at what the bad guys' satellites are doing to what our satellites are capable of doing, in terms of providing communications, GPS, as well as precision-guided weapons. We ensure Soldiers can shoot, move and communicate."

In addition to ongoing operations within each of the combatant commands, the Force Tracking Mission Management Center had a significant increase in operational requirements in 2022.

They distributed 16.5 million force tracking reports daily for 280,000 devices including support to U.S. Space Command for Human Space Flight Support; Air Combat Command and the Personnel Recovery mission; and U.S. Northern Command and defense support to civil authorities to manage resources during critical operations.

Between September and November, USASMDC's 1st Space Brigade also led Army space efforts in Project Convergence 2022, joining United Kingdom and Australian service members, researchers and industry partners to experiment with and assess nearly 300 technologies while focusing on advancing joint and multinational interoperability in future operational environments.

The brigade filled a vital role in the event by demonstrating the concept of "close space support" in a tangible way to warfighters in the maneuver, special operations and cyber realms, said Col. Donald K. Brooks, 1st Space Brigade commander.

"We pride ourselves on being the Army's sole deployable multi-component space brigade and take our responsibility very seriously to push the envelope on employing space effects at the tactical level," Brooks said.

In August, USASMDC's satellite communication mission, performed by the U.S. Army Satellite Operations Brigade, officially transferred to the U.S. Space Force.

"This is a historic moment for the Department of Defense and military satellite communications as we bring all military SATCOM capabilities under one service for the first time ever," Karbler said.

The brigade comprising the 53rd Signal Battalion and the Satellite Communications Directorate transferred approximately 200 civilian and 300 military billets.

Also in August, at the 25th annual Space and Missile Defense Symposium in Huntsville, Alabama, Karbler announced that Army space had teamed up with U.S. Army Cyber Command and U.S. Army Special Operations Command to create a triad that supports future multi-domain and full-spectrum operations and provides the joint force with an enhanced capability to see, sense, stimulate, strike, and assess across the spectrum.

"There is a great expectation that the first shots in combat are going to be fired with cyber or in space. It will greatly impact the outcome and impact the battlefield," Karbler said.

He said the three organizations are natural integrators who all support multiple combatant commands.

Army Astronaut Lt. Col. (Dr.) Frank Rubio completes a spacewalk tethered to the International Space Station's starboard truss structure, Nov. 15, 2022. (NASA photo)



“When you look again at what the triad brings as part of integrated deterrence – being able to affect the adversary’s calculus – the triad will impact that,” he added. “Our first step is integrating across joint and multiple combatant commands and with our allies and partners.”

In September, Army Astronaut Lt. Col. (Dr.) Frank Rubio launched from the Baikonur Cosmodrome, Kazakhstan, aboard a Soyuz MS-22 spacecraft, for a six-month mission aboard the International Space Station.

Rubio, one of 10 selected out of 18,300 applicants by NASA for the 2017 Astronaut Candidate class, is an active-duty Army physician and NASA astronaut.

“Lt. Col. Rubio represents a ‘human element’ to Army space capabilities, like so many of our SMDC Soldiers stationed around the world,” Karbler said. “He is a great representative of the Army’s role in space. To have that human presence in Earth orbit is only a small part of Army space capabilities.”

The Army astronaut detachment, though small in number, has a strategic impact as they represent Soldiers and the Army on the ultimate high ground, Karbler said.

“Army astronauts are more than astronauts,” Karbler said. “They represent the Army, serving

as ambassadors to the public. NASA has long recognized the skills and leadership qualities of Army astronauts.

In October, the command celebrated its 65th birthday.

USASMDC traces its heritage to the Redstone Anti-Missile Missile System Office, which was established by the Ordnance Corps, Oct. 3, 1957. The office was the first Army organization with a missile defense and space mission.

As in the past, the command’s missions have evolved to meet the needs of the nation. Even today it develops and provides current and future global space, missile defense and high-altitude capabilities to the Army, joint force and America’s allies and partners, to enable multi-domain combat effects; enhance deterrence, assurance, and detection of strategic attacks; and protect the nation.

“We are the SMDC family and my time here is just a small window in the big history of the command and who knows what the next 65 years are going to bring,” Karbler said. “Whatever you do to support this command, it is an incredible privilege and honor for me to be able to serve you as your boss and I couldn’t do it without all of you.”



100TH MISSILE DEFENSE BRIGADE



The 100th Missile Defense Brigade's full command group stands ready for inspection by Col. Joe Paladino, the brigade's incoming commander, during the Change of Command on July 21, 2022. (U.S. Army National Guard photo by Maj. William Smith)



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The 100th Missile Defense Brigade is tasked with conducting the presidentially directed national security mission to defend the United States against the threat of intercontinental ballistic missile attack.

Purpose

The 100th Missile Defense Brigade operates the Ground-based Midcourse Defense System and functions as a component of the missile defense enterprise of the U.S. Army Space and Missile Defense Command. The GMD mission is the ultimate defense of the homeland, conducted in support of the U.S. Northern Command commander and manned by Army National Guard and active-component Soldiers in Colorado, Alaska and California.

The 100th Missile Defense Brigade is tasked with conducting the presidentially directed national security mission to defend the United States against the threat of intercontinental ballistic missile attack. It is a role the brigade has fulfilled for nearly two decades.

The brigade, headquartered in Colorado Springs, Colorado, includes brigade staff, Headquarters and Headquarters Battery and five Missile Defense Element crews operating at Schriever Space Force Base, Colorado. As part of a 2020 Colorado National Guard organizational realignment, the 100th Missile Defense Brigade was assigned administrative and operational control of the 117th Space Battalion. The 49th Missile Defense Battalion, the brigade's major subordinate element, is located at Fort Greely, Alaska.

Missile Defense Element crews from the 100th Missile Defense Brigade man and control the GMD System 24/7/365. These

Soldiers are responsible for the strategic-level execution of the GMD mission to protect the homeland. The five-Soldier crews provide both operational and tactical recommendations to the commander of USNORTHCOM while synchronizing operations and conducting fire distribution.

Impact

Soldiers of the 100th Missile Defense Brigade are part of a unique multi-component National Guard organization. The brigade headquarters consists mainly of full-time active Guard and Reserve Colorado National guardsmen. The unit also includes a small contingent of active-component Soldiers.

To perform their national security mission, brigade Soldiers, to include the 49th Missile Defense Battalion, automatically transition between Title 10 federal active-duty and Title 32 National Guard status. The brigade and battalion commanders are dual-status commanders

and are uniquely authorized by the president to simultaneously command Soldiers in either status.

At Detachment 1 at Vandenberg Space Force Base, California, a small contingent of California National Guard Soldiers perform liaison and asset management of the ground-based interceptors located there. There is also a detachment of Soldiers and Department of the Army civilians located at Fort Drum, New York, that is responsible for the security of the In-Flight Interceptor Communications System Data Terminal.

While GMD Army National Guard Soldiers are able to move between operational crew positions and staff, or between GMD units in the three states, the 100th Missile Defense Brigade does not rotate its forces like active-component Army units. This is because there are no other GMD units in the Army. The brigade and battalion have no sister units because they are truly one of a kind. As such, life-cycle management decisions are determined within the brigade and their respective National Guard states.

Training

To be gunnery-table certified to operate the GMD Fire Control System, a Soldier is required to complete the seven-week GMD Fire Control Qualification Course at Schriever Space Force Base. The Soldier will then undergo positional and crew training directly with their newly assigned crew.

The Soldier will then be gunnery-table certified with the crew by the USASMDC Operational Readiness Evaluation team. This entire process of certification may take anywhere from three months to six months to complete, depending on the Soldier's previous qualifications and school availability dates.

USASMDC oversees the rigorous GMD training and gunnery-table certification program. The minimum passing academic score for any GMD written examination or hands-on practical certification is 90 percent due to the critical no-fail nature of the GMD mission.

System

The GMD System utilizes leap-ahead concepts and technologies through a spiral development

acquisition process. The tip of the spear for the system is its ground-based interceptor equipped with an Exoatmospheric Kill Vehicle. Once the ground-based interceptor is outside the atmosphere, the boost vehicle releases the EKV on an intercept trajectory toward a hostile missile's warhead.

From release, the EKV seeks out the target using multispectral sensors, a cutting-edge onboard computer and a divert and attitude control system used for independent course correction in space. The EKV hones in on its target with pinpoint accuracy and destroys it by direct collision using only kinetic energy.

The GMD enterprise is a system of systems, involving shooters, sensors, and command, control and communication systems. GMD sensors consist of space-based infrared satellites, upgraded early warning radars, Cobra Dane, transportable X-band radars (AN/TPY-2), Aegis weapon system radars on select U.S. Navy warships, and the massive Sea-based X-band radar. These sensors provide information to the GMD Fire Control System to calculate precise intercept points for the ground-based interceptors and EKVs.



Military police stationed at Fort Greely, Alaska respond to a rollover training exercise during Exercise Guardian Watch 23 on Oct. 31, 2022. The Soldiers participating in Guardian Watch are part of the 49th Missile Defense Battalion, Alaska National Guard, and 113th Military Police Company, Mississippi National Guard. (U.S. Army National Guard photo by Sgt. Taylor Lakey-Tamacori).

49TH MISSILE DEFENSE BATTALION



Spc. Devin Greenway, a military policeman with Company A, 49th Missile Defense Battalion, takes notes from the prior shift through a changeover during Exercise Guardian Watch at Fort Greely, Alaska, Nov. 1, 2022. Guardian Watch 23 focused on conducting ground-based midcourse defense and critical installation security, which are the battalion's two missions. (Alaska National Guard photo by Staff Sgt. Katie Mazos-Vega)

Purpose

Soldiers of the 49th Missile Defense Battalion operate and secure the Ground-based Midcourse Defense System at Fort Greely, Alaska, and are an integral piece of the homeland defense mission to protect the U.S. from intercontinental ballistic missiles using ground-based interceptors. The 49th Missile Defense Battalion shares the same presidentially directed national security mission to defend the United States against the threat of an ICBM attack as its higher headquarters, the 100th Missile Defense Brigade.

Impact

The primary functions of the 49th Missile Defense Battalion are services of the Fire Direction Center and a military police company.

Fire Direction Center crews operate the GMD System 24/7/365 in conjunction with 100th Missile Defense Brigade personnel at Schriever Space Force Base, Colorado. They are responsible for the tactical-level execution of the GMD mission to protect the homeland – that is to say they “fight the current fight.” These five-Soldier crews provide tactical recommendations to the commander of U.S. Northern Command while synchronizing and coordinating activities on the Missile Defense Complex.

The 49th Missile Defense Battalion's military police ground-based interceptor security company is a

one-of-a-kind MP company and is the only MP company in the U.S. Army Space and Missile Defense Command. The Soldiers of Alpha Company conduct 24/7/365 site security operations at the MDC. The MDC is a national defense critical site where 40 of the nation's ground-based interceptors are emplaced.

These MPs perform their duties in some of the most austere conditions in the United States, with winter temperatures plummeting to 50 degrees below zero (60 below with wind chill) and with fewer than four hours of sunlight in the winter months. In this harsh environment, the MP Soldiers also support the U.S. Army Cold Region Test Center by testing the latest cold weather gear and other equipment.

Epitomizing diversity in support of the mission, Alpha Company's Soldiers hail from all over the nation, including Puerto Rico, New York and South Carolina. This company is where the entire nation comes together to support the defense of the homeland.

The 49th Missile Defense Battalion is manned exclusively by active Guard and Reserve Alaska National guardsmen. All 49th Missile Defense Battalion Army National Guard Soldiers operate in a dual status, Title 10 and Title 32. The battalion consists of the battalion staff, Headquarters and Headquarters Battery, five Fire Direction Center crews and Alpha Company.

EXERCISE SHOWCASES BATTALION'S READINESS

Soldiers from 113th Military Police Company, Mississippi National Guard, patrol the missile defense complex as part of exercise Guardian Watch 23 at Fort Greely, Alaska, Nov. 2, 2022. Guardian Watch 23 focused on conducting ground-based midcourse defense and critical installation security, which are the two missions of the 49th Missile Defense Battalion. (Alaska National Guard photo by Staff Sgt. Katie Mazos-Vega)



Soldiers of the 49th Missile Defense Battalion (Ground-based Midcourse Defense), Alaska National Guard, showcased resiliency and readiness in exercise Guardian Watch 23 at Fort Greely, Alaska, Oct. 31 to Nov. 3, 2022.

During the exercise, Soldiers responded to several mock security threats to the Missile Defense Complex as part of their installation security and ground-based midcourse defense essential tasks.

Seventeen Soldiers from 100th Missile Defense Brigade, Colorado National Guard, evaluated the battalion on 16 different collective tasks.

“Exercises like these are so important because we are not only being evaluated on our mission essential tasks, but on how we are responding,” said Lt. Col. Christopher Stutz, 49th Missile Defense Battalion commander. “They will be looking at if we are making timely decisions and thinking through our decisions.”

The battalion resides in Alaska but takes mission directives from the 100th Missile Defense Brigade out of Colorado. The battalion conducts two missions. Company A secures the missile defense complex where most of the nation’s ground-based interceptors are located. Meanwhile, the

Fire Direction Center from Headquarters and Headquarters Battery controls tactical-level execution of ground-based midcourse defense.

Carrying the responsibilities of such an essential mission can take its toll, but the Soldiers handle the pressure with fortitude. Stutz said that exercises like this are important for his Soldiers to learn to ‘embrace the suck,’ as the popular Army phrase goes.

“These Soldiers eat it up. When things get harder, they step up to the plate,” he said. “A lot of that I can attribute to their sense of purpose. Their resiliency ties into their sense of purpose.”

Their performance as a battalion does not go unnoticed. Twelve Soldiers recently won the 2022 awards for Alaska Missile Defenders of the Year, Top Missile Defense Crew and the Ted Stevens Memorial Award.

“Overall, I’ve seen a lot of improvement throughout the years,” said former 49th Missile Defense Battalion Soldier Sgt. Joseph LaCroix, an exercise evaluator with the 100th Missile Defense Brigade. “The way they are heading now shows that they are going to become one of the greatest units in the National Guard.”



THE FACES of USASMDC





1ST SPACE BRIGADE



Lt. Col. Jason Romanello, 1st Space Brigade executive officer, attaches a Safety Streamer of Excellence to the 2nd Space Battalion's unit colors, Aug. 5, 2022, during a ceremony with the entire formation. (U.S. Army photo)



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The brigade is in constant support of combat operations worldwide with 25 percent of its forces globally dispersed and 60 percent of its strength executing 24/7/365 missions.

Purpose

The Army's only space brigade manages space warriors and capabilities enabling the joint force to deploy, fight and win decisively against any adversary in a multi-domain, high-intensity conflict.

Headquartered in Colorado Springs, Colorado, with a global footprint across 17 locations in 10 countries and six time zones, the 1st Space Brigade, with its many unique mission areas, ensures warfighters' freedom of action in using space capabilities to shoot, move and communicate with unmatched speed and precision.

The brigade prides itself on its diverse multi-component force comprising Soldiers and civilians from all branches and backgrounds. The brigade is in constant support of combat operations worldwide with 25 percent of its forces globally dispersed and 60 percent of its strength executing 24/7/365 missions. They use their tools, training and experiences to integrate space operations during competition, crisis and conflict.

Impact

The 1st Space Brigade activated in 2005 to fill a capability need that became particularly important as the Global Positioning System, Army Space Support Teams, and long-haul satellite

communications became essential battlefield components. The brigade continues to support Army, joint and coalition warfighters around the world through the activities of two subordinate battalions and two associated unit relationships. Subordinate battalions include the 1st Space Battalion, established in 1999, and the 2nd Space Battalion, which stood up in 2017. Associated units include five Missile Defense Batteries and the Colorado National Guard's 117th Space Battalion.

The 1st Space Battalion consists of a Headquarters and Headquarters Company; 2nd Space Company with seven Space Control Planning Teams; 4th and 18th Space Companies with Space Control Platoons; and 19th, 20th, 21st and 22nd Space Companies (Theater Missile Warning) providing missile warning at four Joint Tactical Ground Stations in Italy, Korea, Japan and Qatar.

The 2nd Space Battalion, a U.S. Army Reserve unit, consists of a Headquarters and

Headquarters Company, and the 3rd, 5th, 6th, 8th and 23rd Space Companies. These citizen-warriors make up 18 of the brigade's Army Space Support Teams and six Space Control Detachments.

Both battalions integrate and synchronize space technical operations and support to joint forces across the globe as well as contingency activities in support of Army, joint and combined forces, as well as civil authorities.

The 1st Space Brigade also contains five Missile Defense Batteries forward-stationed across U.S. Indo-Pacific Command, U.S. European Command and U.S. Central

Command. These batteries operate the AN/TPY-2 radars in forward-based mode conducting ballistic missile search, track and discrimination operations in support of regional and homeland defense. Additionally, the Forward-Based Mode Radar enables space operations by conducting data collection.

The 117th Space Battalion, activated in September 2001, currently has 12 ARSSTs in the 217th and 1158th Space Companies and remains a steady and reliable presence in support of the U.S. Central Command area of responsibility since inception. The 1st Space Brigade is in constant support of combat operations worldwide, and the capabilities that 1st Space Brigade Soldiers and civilians leverage in space translate to mission success across all domains and warfighting functions.

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The 1st Space Brigade is in constant support of combat operations worldwide, and the capabilities that 1st Space Brigade Soldiers and civilians leverage in space translate to mission success across all domains and warfighting functions.

Over the last fiscal year, the 1st Space Brigade supported more than a dozen Army, joint and multi-national exercises around the world. The brigade supported the perennial

warfighter series, quarterly exercises focused on corps and division operations in a large-scale combat operations environment. Overseas, the brigade participated in Defender Pacific and several nested exercises, working with joint and multi-national partners to ensure readiness and interoperability.



1st Space Brigade Soldiers support Army, joint and multi-national exercises around the world. (U.S. Army photo by Carrie David Campbell)

1ST SPACE BATTALION



Soldiers operate Joint Tactical Ground Station radars in four globally dispersed locations to provide assured 24-hour theater ballistic missile warning to forces on the ground and joint force commanders. (U.S. Army photo by Carrie David Campbell)

Purpose

The 1st Space Battalion, headquartered on Fort Carson, Colorado, plans, integrates, synchronizes and executes global theater ballistic missile warning, space situational awareness, space and technical operations support, and assigned contingency activities in support of the Army, joint and combined forces and civil authorities.

The battalion generates and provides space combat power for Army and joint forces to conduct global and continuous multi-domain planning and operations. The battalion supports the nation's strategic land power to fight in, from and through space. Its purpose is to provide teams of Soldiers who know how to fight, how to plan, and are experts in Army and space operations. The combat power provided by the 1st Space Battalion is a critical part of the Army's strategy to extend combined arms warfare across all domains.

Impact

The battalion postures to meet operational requirements with trained and ready space forces capable of meeting the demands of modern warfare and leading multi-domain warfighting efforts across all levels of war. The battalion consists of eight companies, each with specific contributions to Army warfighting functions, operating 24/7/365 conducting space operations across 10 locations globally.

The Headquarters Company executes deployments in support of training and operational readiness requirements. It ensures the readiness of forward-stationed units and remains prepared to support multiple, global contingencies.

2nd Space Company supports combatant commanders and joint task force commanders with Space Control Planning Teams. SCPTs remain the Army's only element designed to provide planning for, and integration of, space control. They focus on supporting the commander's intent with subject matter expertise. SCPTs integrate space control capabilities to include coordinating effects, timing and tempo in support of operations.

4th and 18th Space Companies support Army and joint force commanders by deploying platoons and crews into positions of advantage to seize and retain key terrain in the electromagnetic spectrum. These platoons deploy globally on land to monitor friendly satellite communications and report on sources of electromagnetic interference. They can be employed geographically proximate to an adversary capable of expeditionary maneuver and projecting long-range precision fires. This makes the Army uniquely suited for this critical land-based space warfighting operation.

19th, 20th, 21st and 22nd Space Companies provide warning of missile attacks to Army and joint forces through four globally dispersed Joint Tactical Ground Stations that are forward-deployed, space ground systems. Each company receives data from satellites used to report missile launches and battlespace events within a hemisphere of the Earth. Soldiers disseminate the warning to forces on the ground and joint force commanders so they can take action to protect their forces and respond as necessary.

2ND SPACE BATTALION



Capt. Gregory Schoon and Sgt. Vernon Salter, 2nd Space Battalion, 1st Space Brigade, conduct space operations training as part of battle assembly at Fort Carson, Colorado. (U.S. Army photo)

Purpose

The 2nd Space Battalion, the U.S. Army Reserve's only citizen-Soldier space battalion, is based at Fort Carson, Colorado, and represents citizen-Soldiers from 34 of the 50 states. As part of the 1st Space Brigade, the battalion's mission is to plan, integrate, synchronize, and execute space situational awareness, space, and technical operations support, and assigned contingency activities in support of the Army, joint combined forces, and civil authorities.

Impact

The 2nd Space Battalion comprises a Headquarters and Headquarters Company, and the 3rd, 5th, 6th, and 8th Space Companies. Every year, 2nd Space Battalion units deploy in support of operations in the U.S. Central Command area of operation and participate in numerous Army and joint exercises.

In 2022, the battalion's Army Space Support Teams provided continual support to U.S. Army Europe and Africa in support of space integration to joint land operations. This support took the form of participation in multiple exercises alongside

multicomponent forces and international partners. 2nd Space Battalion also proved its worth innumerable times while providing reach-back support for ARSST products to space operations officers in space support elements globally. In addition to ongoing space control missions in U.S. Central Command, 2nd Space Battalion also has an ARSST serving in Germany to support the USAREUR-AF headquarters.

The 3rd, 5th, and 6th Space Companies each consist of six ARSSTs attached to staff elements at the division, corps, and theater Army levels to provide situational awareness of space capabilities, space assets, space products and the impact of space on operations.

8th Space Company consists of five deployable Space Control Detachments that provide monitoring and resolution of electromagnetic interference. Using Mobile Integrated Ground Suite capabilities, these detachments ensure space situational awareness while maintaining space and information superiority. These detachments have the ability to conduct emergency communications operations when directed.

117TH SPACE BATTALION

Purpose

The 117th Space Battalion is the Army National Guard's only space battalion. The battalion is located on Fort Carson, Colorado, and is a premier provider of space knowledge to the Army and the Department of Defense. They provide direct space support to the warfighter through space planning expertise, capabilities, products, and space domain awareness for supported maneuver units both overseas and within the U.S.

The 117th Space Battalion trains and equips the citizen-Soldiers of the Colorado National Guard assigned to the unit. This allows their service members to serve their state and nation concurrently as ordinary citizens who work throughout Colorado and the United States while simultaneously providing significant contributions toward the sustainable readiness of the 1st Space Brigade.

Impact

The battalion's composition includes three companies: Headquarters Company, the 217th Space Company and the 1158th Space Company. Each space company mans, trains, and equips six Army Space Support Teams. The Headquarters Company contains two Space Support Element Teams and one space operations officer, who are tasked with supporting the 42nd and 35th Infantry Divisions as part of an agreement between Colorado, Kansas and New York.

ARSSTs deploy and integrate with DOD units to provide direct space support to Army brigades and higher echelons, special operations forces, and Marine Expeditionary Forces. They provide supported commanders and staff with space



Soldiers from Army Space Support Team 22 with the 1158th Space Company, 117th Space Battalion, 1st Space Brigade, conduct a Table VIII certification at the 117th Readiness Facility on Fort Carson, Colorado, Nov. 4, 2022. From left are: Spc. Andy Hernandez-Solorio, Spc. Ryan Jenkins, Capt. Adam Smiley, Maj. Christopher Kremer, and Staff Sgt. Donovan Olson. (U.S. Army photo)

domain situational understanding, which is used to shape current and future operations. Space Support Element Teams are part of the division or corps staff, while space operations officers provide space support to field artillery brigades.

Since 2001, the battalion has mobilized and deployed more than 30 ARSSTs, Commercial Imagery Teams, and other task-organized elements to provide space support in the U.S. Central Command theater. In its ongoing support to exercises, the 117th Space Battalion has provided support to multiple warfighter and Tier 1 exercises that provide critical space-based technical results and training for numerous units.

The 117th Space Battalion remains a unique hallmark of the U.S. Army Space and Missile Defense Command and the Colorado National Guard. The battalion continues to support DOD, allies, and mission partners from the high ground as the United States deters aggression and is a stabilizing force in the world today. The battalion will continue the advancement of space capabilities for the warfighter far into the future.

CAMPAIGN TESTS BRIGADE'S INTEGRATION

Sgt. Deamonte Galloway, left, Sgt. Nick Gavira, and Staff Sgt. Ronald Gilbert, 2nd Space Company, 1st Space Battalion, analyze a satellite's movement as part of their roles on Army Space Control Planning Team 1 at Fort Carson, Colorado. SCPTs were among 1st Space Brigade assets that participated in Project Convergence 2022. (U.S. Army photo)



Soldiers of the U.S. Army Space and Missile Defense Command's 1st Space Brigade led Army space efforts during Project Convergence 2022 with space capabilities and the ability to integrate with warfighting partners.

Project Convergence is a flagship for modernization learning, experimentation and demonstration campaign. The Army led its first large-scale Project Convergence experiment in 2020 and has continued to grow the scope, scale and complexity of the event annually.

This year, the 1st Space Brigade filled a vital role in the event by demonstrating the concept of "close space support" in a tangible way to warfighters in the maneuver, special operations and cyber realms.

"We pride ourselves on being the Army's sole deployable multi-component space brigade and take our responsibility very seriously to push the envelope on employing space effects at the tactical level," said Col. Donald K. Brooks, 1st Space Brigade commander. "What our Soldiers achieved during PC22 was incredible, but this is just the starting point. The future of Army space and the

entire joint force is in good hands with all the young 'space warriors' who made history this month and will continue to shape the future of space."

During the exercise, 1st Space Brigade Soldiers helped to integrate cutting-edge space effects into joint force experimentation with the endstate of improving battlefield situational awareness, connecting sensors with shooters, and accelerating the decision-making timeline.

Capt. William A. Heida, 1st Space Brigade Space Control Branch deputy chief, said the brigade's Soldiers filled various roles during the event including serving as test crew, space control planners, forward support element, as well as various other positions.

"PC22 afforded our Soldiers the chance to integrate over-the-horizon space effects at the tactical edge in conjunction with layered experimental kinetic and non-kinetic effects," Heida said. "This posed a unique opportunity for our Soldiers to test equipment in new ways and increase future operational effectiveness by developing innovative solutions to better integrate our systems into the battlefield of today, and plan for the fight of the future."

SMDC BY THE NUMBERS

A **global command** with personnel assigned to **13 time zones** at **19 worldwide locations**



The mission of USASMDC is complex: develop and provide current and future global space, missile defense and high altitude capabilities to the Army, joint force, our allies and partners to enable multi-domain combat effects; enhance deterrence, assurance and detection of strategic attacks; and protect the nation.



TECHNICAL CENTER OVERVIEW



An unarmed Minuteman III intercontinental ballistic missile launches on Feb. 23, 2021, from Vandenberg Space Force Base, California, during Air Force Global Strike Command's operational test and impacts in a pre-established target zone roughly 4,200 miles away near the U.S. Army Space and Missile Defense Command's Ronald Reagan Ballistic Missile Defense Test Site on Kwajalein Atoll in the Republic of the Marshall Islands. RTS is a range and test facility located 2,300 miles southwest of Hawaii. (U.S. Space Force photo by Brittany E. N. Murphy)



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The Technical Center contributes to warfighters’ success in four major areas: directed energy, tactical responsive space and high altitude, test and evaluation, and hypersonic and strategic weapons.

Purpose

The U.S. Army Space and Missile Defense Command Technical Center supports the joint warfighter by providing science, technology, and test and evaluation expertise to enable warfighter dominance. As part of the Army Science and Technology enterprise, the Technical Center contributes to operational readiness that enables the uniformed services to prevail in conflicts. The Technical Center focuses on the following essential tasks: executing science and technology, research and development, and test and evaluation; managing and operating the Ronald Reagan Ballistic Missile Defense Test Site; and conducting space operations and space domain awareness.

The Director for Research and Technology executes science and technology, and research and development through three subordinate directorates – Space, Directed Energy, and Research. The Director for Engineering and Test serves as the center’s chief engineer, and manages systems engineering and test execution through two subordinate directorates – Systems Engineering and Test. The RTS Directorate manages the RTS located on Kwajalein Atoll in the central Pacific Ocean, which is part of the Department of Defense Major Range and Test Facility Base.

The Technical Center contributes to warfighters’ success in four major areas: directed energy, tactical responsive space and high altitude, test and evaluation, and hypersonic and strategic weapons.

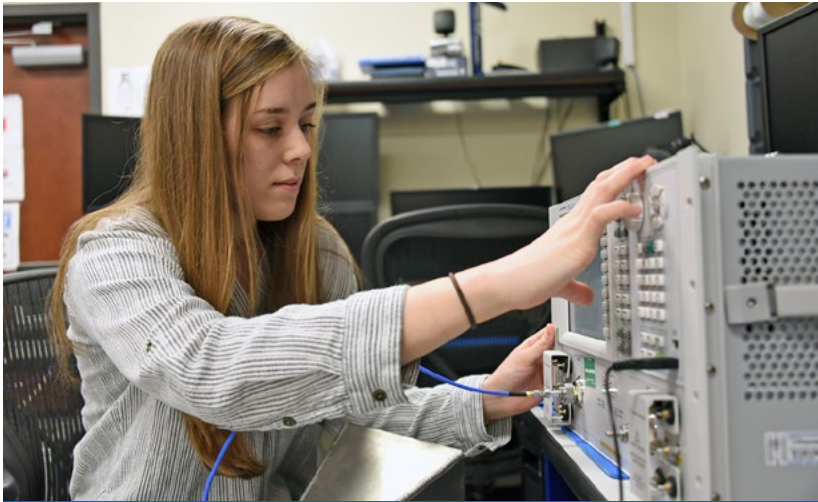
Impact

Directed Energy

The Technical Center is the Army lead for high energy laser technology development. High energy lasers complement kinetic energy in addressing rocket, artillery and mortar threats; unmanned aerial systems; and cruise missiles. Additionally, the Technical Center is exploring high-power microwave technology for use in interdicting a multitude of improvised threats and to maintain warfighter dominance.

Tactical Space and High Altitude Technologies

As the Army lead for space and high altitude research, development, and engineering, the Technical Center identifies, develops, demonstrates and integrates technologies in the areas of responsive space



Anne Wolf, a general engineer at the U.S. Army Space and Missile Defense Command Technical Center's Concepts Analysis Laboratory, works with a horn antenna and Pulsed Network Analyzer. Wolf joined the command through the Science Mathematics and Research for Transformation Defense Scholarship Program. (U.S. Army photo by Carrie David Campbell)

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As the Army lead for space and high altitude research, development and engineering, the Technical Center identifies, develops, demonstrates and integrates technologies in the areas of responsive space and space superiority and high altitude.

warfighter training within an independent laboratory infrastructure.

and space superiority and high altitude. Working with Army, defense and industry partners, the Technical Center focuses on persistent beyond line-of-sight communications for forces in remote areas; functionally effective resolution imagery; solutions for assured position, navigation and timing; ground command and control systems; and direct downlink of tactical data feeds.

Test and Evaluation

In the Army Test and Evaluation Enterprise, the Technical Center supports developmental and operational air and missile defense testing with a suite of low-cost ballistic missile targets, transportable and configurable launchers, and test execution and evaluation. The RTS provides test support to the Missile Defense Agency, the U.S. Air Force, NASA and other defense partners.

Hypersonic and Strategic Weapons

Since completing the nation's first successful hypersonic weapon test in 2011, the Technical Center continues to support hypersonic testing for the Army, Navy and Air Force by conducting test planning and design, mission execution and post-flight analysis. The Technical Center continues to develop the capability for rapid systems development and fielding through integration and interoperability testing, sensor and command and control design, flight test analysis, verification/validation, and

Technology Complex

The maturation of the Technology Complex, which will include laboratory facilities for directed energy, space, hypersonic, and integrated air and missile defense, continues on Redstone Arsenal, Alabama.

Where We Work

Although the Technical Center's primary location is Redstone Arsenal, the center is geographically distributed in many sites. Other locations are the Reagan Test Site located at U.S. Army Garrison-Kwajalein Atoll in the Republic of the Marshall Islands; the Reagan Test Site Operations Center located in Huntsville; and the Solid State Laser Testbed located at White Sands Missile Range, New Mexico.

An Agile, Innovative Organization

The Technical Center is a lean organization with 190 Department of the Army civilians and seven military personnel and a budget of approximately \$575 million per year, split between about 45 percent direct funding and 55 percent reimbursable funding. Budget, personnel, contract and other recurring management activities are coordinated and executed by the Technical Center's Business Management Office.

The civilians, Soldiers and contractors of the Technical Center focus on achieving their vision of "Innovating and Transforming the Future Army through Revolutionary Research, Development, Test and Evaluation."

TEST DIRECTORATE

Purpose

The Test Directorate provides test execution and mission resource support for advanced hypersonic as well as target development and testing execution for missile defense. This support includes test planning and resource definition needed to provide comprehensive and operationally realistic scenarios to test the effectiveness of advanced warfighter capability.

The Test Directorate consists of two divisions: the Targets Division, and the Mission Execution and Test Resources Division. The directorate represents the command as a member of the Targets Reliance Panel and at other Army and Department of Defense test and evaluation forums, as directed.

Impact

The Targets Division designs, fabricates and demonstrates a suite of low-cost, threat-representative targets for use in Army and other government agency flight test programs. These targets utilize excess Army motors that are near the end of their operational life, but can be repurposed for flight testing. To reduce development time and cost, the targets use state-of-the-art, proven flight-qualified components. The Targets Division also provides high-fidelity, threat-representative targets and interceptor mass surrogate sled vehicles to support live fire test and evaluation as required by law and provides data and analysis to support the director of Operational Test and Evaluation.

The Mission Execution and Test Resources Division develops and executes plans for data collection, execution, and training for large-scale flight



A Black Dagger low-cost target launches from Fort Wingate, New Mexico, March 12, 2022, during a mission supporting Integrated Fires Mission Command as part of Program Executive Office for Missiles and Space. The U.S. Army Space and Missile Defense Command Technical Center's Black Dagger consists of a Mark 70 Terrier first stage and a M124 second stage. Black Dagger is designed to fly a short-range ballistic missile flight path and is built as a ballistic missile target capable of threat-matching for use in advanced missile defense systems testing. (U.S. Army photo)

tests. The division provides command, control, and communication and manages sensors, communications, telemetry, and data collection assets for execution of flight tests, and is responsible for test architecture design and risk management.

Mission execution support includes execution analysis, document development, mission execution team identification and training, deployment and retrograde actions, and quick-look and post-mission data analysis and reporting. Test resource support includes test range requirements definition and selection, capability augmentation, asset identification and asset schedule de-confliction.

RESEARCH DIRECTORATE

Concepts Analysis Laboratory employees Connor Mackey, Anne Wolf, Justin Dunaway, Ricky Acosta and Kevin Johnson support experimental validations of next generation satellite communications research at the Technical Center's Aerophysics Research Facility on Redstone Arsenal, Alabama, in November 2019. (U.S. Army photo)



Purpose

The Research Directorate performs in-house basic and early applied research for key enabling technologies with applications across space, integrated air and missile defense, directed energy, strategic weapons and related areas.

The Research Directorate consists of two divisions: the Space and Integrated Air and Missile Defense Technologies Division, and the Concepts Analysis Division. The directorate collaborates across government, industry and academia on innovative research opportunities and also represents the Technical Center as a member of communities of interest, and at other Army and Department of Defense science and technology forums, as directed.

Impact

The Space and Integrated Air and Missile Defense Technologies Division provides basic and applied research for key enabling technologies with applications across multiple mission areas. It explores technologies related to reducing size, weight and power; communications; electro-optical/infrared/radio frequency; sensors; material properties; signatures and more.

The division also manages the Small Business Innovation Research program for the command as well as Rapid Innovation Fund opportunities.

The division operates key research laboratories, such as the Aerophysics and Impact Mechanics Laboratory, which enables both experimental analysis, and modeling and simulations supporting aerospace, photonics, quantum, high-power microwave and space research. Through this, the Space and Integrated Air and Missile Defense Technologies Division develops and refines unique, high-payoff applications and concepts for technologies enabling warfighter dominance.

The Concepts Analysis Division performs research exploration; advances new technologies; performs simulation and analysis on conceptual systems and emerging technologies; and develops future science and technology leaders and workforce hired through the Department of Defense Science, Mathematics and Research for Transformation program, and other internship programs.

The division operates the Concepts Analysis Laboratory, which includes a hardware lab area with laboratory benches, 3D printers, a circuit board mill and pick-and-place machine, cleanroom, satellite software-in-the-loop and hardware-in-the-loop testbed, collaborative office area and a classroom for collaboration and multi-screen display and interaction. With its unique mission and facilities, the laboratory is a must-visit location for high-profile visitors to include military leaders from across the DOD.

SPACE DIRECTORATE



Lonestar, a technology demonstrator, provides space-based situational awareness directly into the hands of the tactical warfighter. When in orbit, its purpose is to warn commanders about interference with assured position, navigation and timing systems on the battlefield and to characterize the signals environment in a contested area so Army forces can continue to operate in a space-contested environment. (U.S. Army graphic)

Purpose

The Space Directorate provides a customer-focused approach to develop, integrate, demonstrate and transition space and high altitude tactical systems responsive to user requirements providing current and future relevant warfighter capabilities.

The Space Directorate consists of four divisions: Space Technologies Division; Space Applications Division; Command, Control, Communication and Integration Division; and the Strategic Capability Division. The directorate also represents the U.S. Army Space and Missile Defense Command Technical Center as a voting member on the Department of Defense Space Experiments Review Board.

Capabilities

The Space Technologies Division evaluates and matures applicable evolving technologies for relevant space and high altitude platforms, sensors and technologies for tactical warfighter applications. The Position, Navigation, and Timing Resiliency Laboratory is a world-class science and technology center committed to developing and assessing innovative technologies, techniques and simulation to advance the competitive technological advantage in this rapidly evolving battlespace. The lab can

detect, test, characterize and evaluate mitigation techniques that environmental and manmade effects have on assured position, navigation and timing resiliency.

The Space Applications Division demonstrates, integrates, prototypes and transitions relevant space and high altitude technologies aligned with tactical warfighter capability requirements to improve ground force capabilities across joint multi-domain operations. Recent initiatives within this division include demonstrating a small satellite payload capability during

a joint military utility assessment event, and launching and beginning the assessment of another satellite capability to support the tactical ground warfighter.

The Command, Control, Communication and Integration Division provides research and development of ground-based enablers, novel concepts and cyber capabilities for space and high altitude data exploitation and integration. The division identifies, develops, demonstrates, integrates and transitions cyberspace, space and high altitude data exploitation, and integration technologies to enhance operational capabilities across joint multi-domain operations. The division provides an operational Payload Demonstration Laboratory, which is a space satellite ground station capability available to support government space payloads to demonstrate advanced capabilities. The lab offers a government-owned and -operated ground station for research and development vice using industry proprietary systems.

The Strategic Capability Division provides customers with dependable, unique space- and ground-based technologies to enable warfighter superiority and support tactical warfighter capability requirements across joint multi-domain operations.

SYSTEMS ENGINEERING DIRECTORATE

Purpose

The Systems Engineering Directorate was created under the Director for Engineering and Test as part of a Technical Center reorganization in June 2020. The directorate was given the mission to manage and execute systems engineering efforts on behalf of the Technical Center chief engineer. The directorate consists of two divisions: the Systems Integration Division and the Program Integration and Assurance Division.

Impact

The Systems Integration Division provides a virtual and distributed environment for the integration, demonstration and spiral development of technology demonstrations to fielded weapons systems in space, integrated air and missile defense, directed energy, hypersonic and related technologies. The division comprises the Directed Energy Systems Integration Lab, the Small Satellite Systems Integration Lab, the Air and Missile Systems Integration Lab and the Digital Simulation and Analysis Center. The Systems Integration Labs apply state-of-the-art modeling and simulation technologies for research, development, and test and evaluation applications supporting the development of prototype systems and programs of record across the Department of Defense to mature technology, reduce risks and lower developmental and testing costs.

Additionally, the Air and Missile Systems Integration Lab hosts one of the most advanced testing facilities for internal measurement units in the country to validate system performance under stressing 3 degrees and 6 degrees of freedom conditions.

The Program Integration and Assurance Division, through the horizontal integration of mission assurance and cybersecurity, instills technical rigor across the Technical Center science and technology



The Directed Energy Systems Integration Lab is a 5,400-square-foot facility designed to provide the Army with a consolidated capability to support a full end-to-end directed energy system, from software simulation, to subcomponent system testing, subsystem testing and full system verification and validation testing. The lab, dedicated Aug. 8, 2022, is located on Redstone Arsenal, Alabama. (U.S. Army photo by Carrie David Campbell)

portfolio. Mission assurance provides a framework to introduce and execute systems engineering methods within the program management aspect of each science and technology effort, and delivers guidance in the development of a tailored risk management plan commensurate with each program's technical maturity, budget and schedule. Cybersecurity integrates risk management framework to obtain the proper accreditation and authorization for each Technical Center system, while managing information system-related security risks. Additionally, software assurance integrates Department of Defense best practices to perform static code analysis on binary executables and source code with a focus on code quality and risk vulnerability. Appointed by the Joint Federated Assurance Center, the Technical Center is one of seven software assurance service providers within the Army.

The Program Integration and Assurance Division also manages technology transfer, intellectual property, data rights, patents, science and technology metrics, cooperative research and development agreements, and educational partnerships. They also provide the support structure for employees matrixed to external organizations.

DIRECTED ENERGY DIRECTORATE



The Technical Center tests and evaluates the Affordable Laser Weapon Module for use in countering small unmanned aircraft systems in August 2022. (U.S. Army photo)

Purpose

The Directed Energy Directorate provides directed energy technology to enable warfighter dominance in a variety of mission areas. Research and development of high energy laser weapon technologies is conducted to evaluate and demonstrate the defensive and offensive application of directed energy. Additionally, the director functions as the Technical Center adviser for directed energy science and technology development.

The directorate includes two divisions: the Directed Energy Technologies Division and the Lethality Division. The Directed Energy Technologies Division conducts basic and applied research and early technology development to advance, evaluate, assess and leverage relevant emerging high energy laser weapon technologies. The Lethality Division conducts applied research and develops and evaluates high energy laser and high-power microwave weapon system effectiveness against targets of interest to the Army. It also interfaces with other government agencies for lethality and propagation data collection and analysis to ensure continuity across the Department of Defense.

Impact

The Directed Energy Directorate supports the Army modernization priorities, the Air and Missile Defense Cross Functional Team science and technology priorities and the Fires Center of Excellence electric

fires capability needs. The directorate explores the use of high-power microwave technology for use in interdicting and countering unmanned aerial systems. They develop, integrate, demonstrate and transition high energy laser and high-power microwave technology and systems to the Rapid Capabilities and Critical Technologies Office, program executive officers, program managers and users to provide current and future Army and joint warfighter capabilities. Directed energy technologies offer unique performance attributes that contribute to addressing existing operational capability gaps.

The Directed Energy Technologies Division designs, develops and conducts experiments on high energy laser technologies, components and systems to address warfighter needs. The division manages the High Energy Laser Enabling Technologies Lab and is responsible for developing the next generation of directed energy scientists and engineers.

The Lethality Division conducts research, experiments and evaluations of high energy laser and high-power microwave weapon system effectiveness against a wide variety of threats. The division manages the Solid State Laser Test Bed at White Sands Missile Range, New Mexico, and collects data and develops vulnerability modules for integration into the fire control systems, using results from laser/material interaction experiments and effectiveness studies.

RONALD REAGAN BALLISTIC MISSILE DEFENSE TEST SITE



Vanessa L. Kacer, principal engineer, Ronald Reagan Ballistic Missile Defense Test Site Operations Center in Huntsville, Alabama, ensures the Huntsville Mission Control Center is properly configured to support its next mission. (U.S. Army photo by Carrie David Campbell)

Purpose

The Ronald Reagan Ballistic Missile Defense Test Site is a vital national asset providing live-fire developmental and operational flight testing of offensive and defensive missile systems, hypersonic systems and space systems; equatorial satellite launch capability; space object tracking and characterization; and atmospheric science research. The unique range and test facility is located 2,300 miles west-southwest of Hawaii on U.S. Army Garrison-Kwajalein Atoll, Republic of the Marshall Islands.

Impact

RTS maintains, operates, improves and modernizes a diverse, world-class instrumentation suite, including radar, telemetry radio frequency systems, electro-optical systems, command and control systems, flight safety command-destroy systems, mission data networks and communication systems. The range and key instrumentation systems can be operated remotely from the RTS Operations Center in Huntsville, Alabama.

The cornerstone of the RTS instrumentation capability is a suite of four of the world's most sophisticated radar systems, spanning the radio frequency spectrum, enabling support of a broad range of missions. Combining long-range tracking radars able to detect objects in all orbits with high-resolution

imaging radars, RTS maintains a highly effective balance of tracking and radar imaging capability.

RTS provides strategic and tactical space surveillance support to U.S. Space Command, tracking satellites in all orbits and providing first visibility of new foreign launches from Europe and Asia. In addition, RTS provides unique capabilities to the Space Surveillance Network, such as wideband radar imagery and space object identification data, which is used to identify orbital payloads. Because of the growing concern about U.S. satellite survivability, U.S. Space Command works directly with the U.S. Army Space and Missile Defense Command and RTS to maximize availability of range assets to support this critical mission area.

Geographically located in the middle of the Pacific Ocean, RTS provides unique testing and data collection capabilities. The instrumentation managed and operated at RTS provides weapon system developers accurate data to continue refinement of the world's most accurate strategic and tactical offensive and defensive missile systems to protect and defend Soldiers and the homeland. The unmatched sensitivity and range provide unparalleled space domain awareness support to protect and defend orbiting U.S. and allied space systems.

INTEGRATION LABS OFFER CUSTOMERS UNIQUE FACILITIES

The Directed Energy Systems Integration Lab and Air and Missile Systems Integration Lab officially opened on Aug. 8, 2022, to the Redstone Arsenal community during a ribbon cutting and dedication ceremony hosted by the U.S. Army Space and Missile Defense Command Technical Center's Technology Complex.

The unique facilities are government-owned, government-operated integration labs that government customers, industry and academia can use, said Nicole Olbricht, USASMD Technical Center's Systems Integration Division chief.

"It's a little bit different from having integration being done at a contractor facility because usually that's for components or specific efforts," Olbricht said. "But in the government facilities, we can go end-to-end and work with other government groups to establish and facilitate the integration efforts."

DESIL provides the Army with a consolidated capability to support a full end-to-end directed energy system, possesses an integrated system characterization and testing environment with specialized safety systems, specialized directed energy characterization technology, and a distributed network for sharing information.

Since their opening, DESIL and AMSIL have reached initial operating capability, with DESIL completing construction of a 400-meter directed energy range, Olbricht said.

"We're very excited to be able to have the capability co-located in that integration facility," Olbricht said about the range.



U.S. Army Space and Missile Defense Command's Richard P. De Fatta, deputy to the commander; Nicole Olbricht, Technical Center Systems Integration Division chief; Lt. Gen. Daniel L. Karbler, commanding general; and Michael Krause, Technical Center acting director, cut the ribbon at the dedication ceremony for the opening of the Air and Missile Systems Integration Lab on Aug. 8, 2022, at Redstone Arsenal, Alabama. (U.S. Army photo by Ronald Bailey)

AMSIL is designed to enable the rapid development and fielding of future weapon systems through integration and interoperability testing, sensor and command and control design, pre- and post-flight test analysis as well as verification and validation within an accredited environment.

AMSIL has a lab environment, infrastructure and model development capabilities for system integration and interoperability testing, pre- and post-flight test analysis, and wargaming training for air and missile systems. The facility features a high-bay work area with open workspaces to promote collaboration and conference rooms, as well as specialized computational and networking capabilities.

Being able to now have operational systems integration labs is fantastic, Olbricht said.

"Not everybody gets to see a whole program or system go from concept to actually being used and, in this facility, we're actually getting to see that," Olbricht said. "That's a great accomplishment to be able to do that. The team truly has worked hard from the beginning all the way till the end. The ribbon cutting was a celebration of that."



SPACE AND MISSILE DEFENSE CENTER OF EXCELLENCE



U.S. Army Space and Missile Defense School students execute a band swap on a Tactical Multi-Band Antenna Trailer Subsystem during Mobile Integrated Ground Suite Initial Qualification Training in Colorado Springs in May 2020. Pictured from left are 1st Space Battalion, 1st Space Brigade Soldiers Spc. Philip Sechow, Pfc. Jarod Milliman, Spc. David Sheek and Sgt. Elizabeth Hughes. (U.S. Army photo by Dottie White)



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Within the capabilities of Army and joint space, missile defense and high altitude, the Space and Missile Defense Center of Excellence trains and educates agile, adaptive and ready Soldiers and leaders; executes life-cycle management for U.S. Army space operations officers; develops the Army space cadre; and enables informed decision-making.

Purpose

The Space and Missile Defense Center of Excellence was established in August 2019 from the U.S. Army Space and Missile Defense Command's former Future Warfare Center. This change in organizational structure, design and designation creates a functional alignment with authority equivalent to other Army proponent organizations and U.S. Army Training and Doctrine Command centers of excellence.

The Space and Missile Defense Center of Excellence is the Army's force modernization proponent, responsible for managing Army change to doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy requirements for space, strategic missile defense and high altitude capabilities.

It represents Army equities across the joint community. Within the capabilities of Army and joint space, missile defense and high altitude, the Space and Missile Defense Center of Excellence trains and educates agile, adaptive and ready Soldiers and leaders; executes life-cycle management for U.S. Army space operations officers; develops the Army space cadre; and enables informed decision-making.

To carry out its mission, it executes TRADOC-established practices

to meet force management responsibilities. This includes performing concept development and capabilities determination and integration relative to DOTMLPF-P for materiel development. Additionally, the organization executes the Army's institutional training and education for space and global ballistic missile defense mission areas. It is uniquely organized and geographically well-positioned to meet future Army needs.

Impact

The Space and Missile Defense Center of Excellence is USASMDC's architect for future force design. Its specialized and geographically dispersed team designs, builds, modernizes, trains and educates Army space and missile defense forces. The center contributes to developing superior space, missile defense, and high altitude capabilities that enable multi-



Gen. James Dickinson, commander, U.S. Space Command, presents during the Army Space Development Office's Functional Area 40 Forum. Nearly 200 of the U.S. Army's space professionals participated in the annual event. (U.S. Army photo)

The Space and Missile Defense Center of Excellence's 2022 accomplishments include:

Concept for space and high altitude 2028: Submitted concept for approval to Army Futures Command that describes Army space and high-altitude capabilities and requirements in 2028–2040. This concept guides USASMDC and other proponent capability development and

domain effects to protect the homeland and support tactical-to-strategic success whenever and wherever required.

It is laser-focused on delivering combat-ready forces and capabilities – today and in the future. Through critical analysis of the future operating environment, it prepares and adapts leap-ahead concepts and technologies to provide innovative and effective solutions to the warfighter.

Components include the U.S. Army Space Personnel Development Office, Capability Development and Integration Directorate, the U.S. Army Space and Missile Defense School and the Air and Missile Defense Integration Division. These organizations support the overall mission through steady accomplishment of operations that include:

- Training Army Soldiers, space cadre and missile defense operators through 112 formal course offerings with more than 17,000 students annually;
- Designing and documenting future space and missile defense organizations;
- Designing/performing/executing wargames, experiments and studies;
- Advocating for Army space, missile defense and high-altitude capabilities;
- Providing modeling and simulations for Army space, missile defense and cyber technologies from concept to fielding and life-cycle management;
- Providing Functional Area 40 life-cycle management and space cadre sustainment, and serving as the single point of contact for all Army space personnel matters.

modernization across the Army by providing a common framework for Army space and high-altitude force modernization. The concept correctly characterizes evolving variations in the future operational environment and holistically describes the Army space and high-altitude capabilities required to conduct multi-domain operations.

Simulation Center proposal: Developed and prepared a proposal to the Department of Defense High Performance Computing Modernization Dedicated HPC Project Investment competition for investment defined as two-to-four-year mission-critical projects requiring small-scale laboratory or test center on-site HPC systems-targeting unique requirements. The DoD HPCMP board evaluated, selected and approved the USASMDC's proposal to acquire a \$5 million supercomputer equivalent to the system configuration proposed.

Training Soldiers: The Space Operations Training Division trained and educated 2,644 Soldiers across 12 courses. The Missile Defense Training Division trained and educated 374 Soldiers across 10 courses. The Army Space Training Division trained and educated 8,806 Soldiers across the Army including support to combat training center rotations and warfighter exercises for 19 Basic Combat Training, eight divisions and two corps. The Institutional Training Division trained and educated 98 Soldiers and staff as part of the U.S. Army Training and Doctrine Command-required staff and faculty training and certification program.

CAPABILITY DEVELOPMENT INTEGRATION DIRECTORATE



U.S. Army Training and Doctrine Command Capability Manager for Space and High Altitude serves as the capability developer for the 1st Space Brigade's Joint Tactical Ground Station units theater missile warning system as part of the U.S. Army Space and Missile Defense Command's force modernization proponentcy for space. (U.S. Army photo by Carrie David Campbell)

Purpose

The Space and Missile Defense Center of Excellence Capability Development and Integration Directorate conducts concept-to-capability development in support of force modernization efforts for current and emerging mission areas for the U.S. Army Space and Missile Defense Command, approved by U.S. Space Command, U.S. Strategic Command, U.S. Northern Command and the Department of the Army.

The CDID also conducts wargaming, experimentation, studies and analysis; develops or adopts leap-ahead concepts and technology; and integrates doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy solutions for multi-domain operations. It performs these responsibilities in support of Army Futures Command and as part of the Army Modernization Enterprise.

Impact

The Army Capability Managers for Space and High Altitude and Strategic Missile Defense, or ACM SHA and ACM SMD, respectively, represent the U.S. Army Futures Command commanding general and report to the USASMDC commanding general. The ACM SHA serves as the Army's centralized fielded force integrator for space and high altitude operation and coordinates and synchronizes all DOTMLF-P solutions to provide space- and high altitude-required capabilities. The ACM SMD serves as the Army's user representative and

centralized manager and integrator for all DOTMLPF-P considerations for strategic missile defense, and Army applications of the Command, Control, Battle Management and Communications System.

The Concept Development Division establishes the conceptual foundation for the command's future force development and force modernization and focuses on the USASMDC-assigned mission areas of space, high altitude and global ballistic missile defense. Working with partners, the division conducts concept and technology exploration and assessment; integrates

USASMDC force modernization proponentcy equities in wargames, experimentation and studies; and develops and integrates concepts and future force organizational design. This concept-to-capability development, warfighting capabilities determination, and DOTMLPF-P development and integration drives Army institutional decision-making processes such as the Total Army Analysis and program objective memorandums. These directly contribute to the 2030 Army Modernization Enterprise's operationalization of a multi-domain operations-capable and-ready force in 2040.

The Decision Support Division provides the computational and network resources, cyber vulnerability testing, modeling and simulation, and operational analysis required to support major decisions concerning the acquisition of systems and the development of concept of operations that provide the best joint and Army space, missile defense, high energy laser and high-altitude capabilities to current and future warfighters.

The CDID Integration and Synchronization Cell facilitates the integration of DOTMLPF-P solutions across space, high altitude and strategic missile defense mission areas to meet current and future force requirements. It also develops the Space and Missile Defense Center of Excellence requirement memorandum to identify needed capabilities and technologies required to mitigate gaps and support mission areas.

SPACE AND MISSILE DEFENSE SCHOOL

Purpose

The U.S. Army Space and Missile Defense School executes the Army's institutional training and education for space and global ballistic missile defense mission areas. The school is also responsible for coordinating and publishing the Army's doctrine for space and global ballistic missile defense; supports space and missile defense doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy initiatives; and instructs and integrates space education at Army centers of excellence, proponent schools, and operational unit training as part of the Army Space Training Strategy.

Impact

The school earned the U.S. Army's highest accreditation rating of fully accredited in February 2020. Every three years the U.S. Army Training and Doctrine Command Quality Assurance Office, the lead agent for Army accreditation, reviews all aspects of training management and execution to include how the school analyzes, designs, develops, implements, and evaluates space and global ballistic missile defense training and education against the Army Enterprise Accreditation Standards. The next triennial accreditation began in October 2022.

The Army Space Training Division within the SMD School provides denied, degraded and disrupted space operational environment training across the Army through institutional and operational training venues. These activities educate leaders and Soldiers at all levels to integrate space capabilities throughout the operations process to understand threats to U.S. space capabilities and how space capabilities enable and enhance Army systems implementing multi-domain operations through large-scale combat operations.

Global ballistic missile defense courses include:

- Ground-Based Midcourse Defense Fire Control Qualification Course



Robbi Stanton, Army Space Training Division, Space and Missile Defense School, talks with Soldiers at the National Training Center about operating in a denied or degraded space environment. (U.S. Army photo)

- AN/TPY-2 Forward-Based Mode Sensor Manager Qualification Course; Leader Development Course
- GMD North American Aerospace Defense Command/U.S. Northern Command and Control Course; GMD Leader Development Course; GMD System Trainer Course; Army GMD Staff Course; GMD Missile Defense Officer Course
- Command, Control, Battle Management, and Communications Planner Course

Space institutional training courses include:

- Space Operations Officer Qualification Course; Space Senior Leader Course
- Army Space Cadre Basic Course, Phase 1 and 2
- Army Space Control Fundamentals Course
- Army Space Control Planner Course
- Mobile Integrated Ground Suite Initial Qualification Training
- Tactical Space Operations Course Initial Qualifications Training
- Joint Tactical Ground Station Initial Qualification

Army-wide space training includes:

- Army Professional Military Education – Noncommissioned Officer Academy, Basic Officer Leader Course, Captain's Career Course, Intermediate Level Education for the Command and General Staff College, Pre-Command Course
- Home Station Training; Combat Training Centers; Mission Command Training Program; Army Warfighter exercises

AIR & MISSILE DEFENSE INTEGRATION DIVISION

A U.S. Army Terminal High Altitude Area Defense launching station sits at the ready in Israel, March 4, 2019. (U.S. Air Force photo by Staff Sgt. Cory D. Payne)



Purpose

The Space and Missile Defense Center of Excellence Air and Missile Defense Integration Division is responsible for supporting the U.S. Army Space and Missile Defense Command commanding general in his role as the Army's AMD Enterprise Integrator.

The AMD Enterprise Integrator integrates and synchronizes the Army AMD mission at the senior leader level, aligning the Army AMD Enterprise with joint and Army current and future requirements and provides oversight and direction to the implementation of a holistic Army AMD strategy. This strategy includes force planning requirements, capability and materiel development, and acquisition and life-cycle management. These efforts support consistent strategic communication messaging themes among stakeholders who organize, develop, maintain, sustain, train, and employ Army AMD assets globally.

Impact

The AMD strategic environment continues to evolve in terms of threats, operational demands, strategic guidance, and fiscal realities, and it is one of the top five modernization priorities for the chief of staff

of the Army. As such, the CSA routinely requests the USASMDC commanding general's opinion and recommendations on Army AMD operational and modernization initiatives to shape the direction of critical AMD capabilities.

The AMD Integration is part of the Space and Missile Defense Center of Excellence to increase the synchronization and synergy with the Army AMD enterprise.

AMD forces must be ready to deploy, fight, and win decisively anywhere. To balance today's operational requirements, the division led efforts to develop and publish AMD 2028. This is a comprehensive strategy articulating the Army's vision to provide combatant commanders with "a flexible, agile and integrated AMD force capable of executing multi-domain operations and defending the homeland, regional, joint and coalition forces, and critical assets in support of unified land operations."

The division provides a comprehensive analytical perspective to keep the commanding general informed on Army AMD equities so he can make better recommendations to senior Army leaders.

ARMY SPACE PERSONNEL DEVELOPMENT OFFICE/SPACE OFFICERS



Capt. Byron Zajdel, Army Space Support Team, 6th Space Company, talks with cadets at the U.S. Military Academy at West Point's Branch Week, Sept. 6-9, 2022, about the Assured Functional Area Transfer program for FA40s. (U.S. Army photo by Jason Cutshaw)

the space domain to provide timely, relevant and feasible options to staff and commanders for targeting, fires, collection, operation, and sustainment of the force.

FA40s provide in-depth expertise and experience to leverage space-related assets that deliver space capabilities to the warfighter today and develop and integrate space capabilities for the future.

Purpose

The Army Space Personnel Development Office executes the life-cycle management functions of Functional Area 40 space operations; ensures officers' knowledge, skills, behaviors, experience, and education meet operational requirements; and ensures career growth aligns training and education requirements to operational needs and career professional development.

ASPDO conducts strategic planning, ensuring FA40 and non-FA40 Army space cadre billets are identified and tracked to support space-related missions and functions. Additionally, ASPDO manages the processing and awarding of the Space Badge and 3Y, Q4 skill identifiers and additional skill identifiers, and S1A personnel development skill identifier, and manages allocations for attendance to the Space Operations Officer Qualification Course, Space 200, and Space 300.

Impact

FA40s and non-FA40 Army space cadre have documented training and experience in the space domain and conduct daily missions in the eight codified joint space capabilities in support of all Army warfighting functions.

FA40s are the Army's subject matter experts on movement and maneuver in, through, and using

ASPDO manages the Training with Industry and Advanced Civil Schooling programs for FA40s that help develop space officers' experience and skills that augment Army space initiatives. ASPDO also performs FA40 force management to ensure the Army has FA40s with the right skill sets and expertise, recruitment procedures with the Voluntary Incentive Transfer Program for personnel wanting to become space operators, and communication for consideration of an officer's desired career path.

ASPDO is piloting two Talent Management Task Force initiatives for the Army. First is the Assured Functional Area Transfer initiative. This program gives 10-20 U.S. Military Academy and ROTC cadets with space-oriented science, technology, engineering and mathematics degrees the opportunity to "branch detail" to FA40. The second initiative is the direct commissioning program, which allows for the direct commissioning of individuals from the civil sector up to the grade of colonel based on constructive credit. These talent initiatives allow FA40 to continue to acquire the necessary talent to maintain a human capital advantage.

In the future, ASPDO will play a key role in efforts to establish an Army space branch and, once established, execute the life-cycle management functions for all three cohorts (officer, warrant officer and enlisted).

CENTER OF EXCELLENCE LABORATORIES

Purpose

The Space and Missile Defense Center of Excellence operates three major laboratories that support mission accomplishment and provide a test bed for future operations. They are the Simulation Center, the Cyber Hardening Integration Lab and the Joint Air Defense Operations Center Developmental Laboratory.

Impact

The SimCenter serves as one of the U.S. Army Space and Missile Defense Command's major research and development facilities for space and missile defense research, design and analysis of complex missile defense systems with state-of-the-art computational, modeling and simulation resources. The center provides services to the Missile Defense Agency and its program elements, the High Performance Computing Modernization Program and other joint activities. The SimCenter also offers local and remote organizations large-scale computational assets and access to high-performance Department of Defense networks to meet customer mission requirements. The SimCenter provides the most appropriate hardware, software, network and communications tools, and environments for each user program; the engineering services required to acquire and integrate cost- and mission-effective computer architectures for user programs; and a secure, cost-effective computing environment that optimizes resources for analysis tasks common to the USASMDC community.

The CHIL provides an environment in which systems can be replicated in a secure enclave and assessed against a comprehensive suite of cyber threats to determine mission resiliency against such threats. The CHIL team can determine if vulnerabilities exist; how those vulnerabilities impact a system's mission; and what can be done to mitigate, or even negate, the impact. Accordingly, the process provides for solutions to vulnerabilities before they ever show up in the "real"

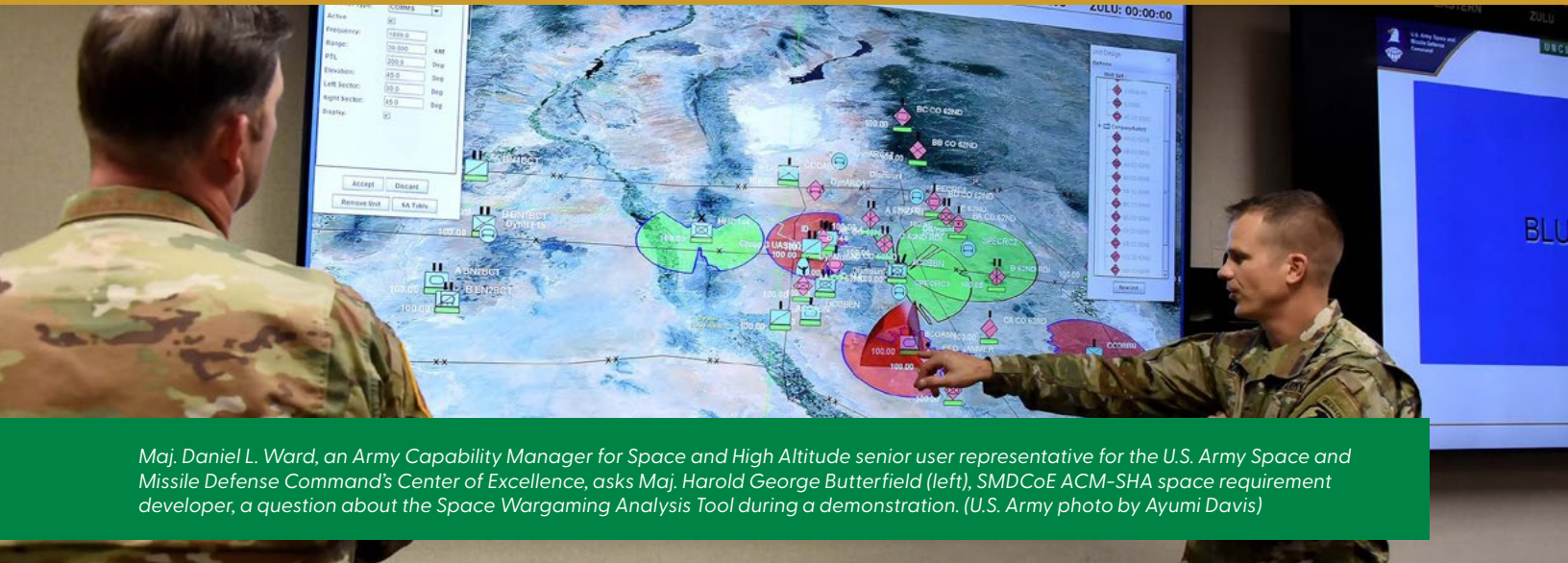


Maura Mulligan, general engineer, Concepts Analysis Division, and Chris Paulson, contractor, Space and Integrated Air and Missile Defense Division, work in the lab in the Space and Missile Defense Command's Simulation Center, at Redstone Arsenal, Alabama, Nov. 29, 2022. (U.S. Army photo by Carrie David Campbell)

system. Although systems under assessment in the CHIL are operating in a virtual environment, the system components are not virtual but replicated hardware versions of the operational systems. As such, they are mirror images and respond exactly the same. This has the advantage over simulations, in that vulnerabilities in the assessments are the same as would happen in the operational systems, and, most importantly, solutions in the CHIL work exactly the same in the actual systems.

The JADOC Developmental Laboratory provides a live-test environment for the battle-management systems employed by the National Capital Region Integrated Air Defense System. The purpose is to enable effective integration of U.S. Army ground-based air defense capabilities into the North American Aerospace Defense Command air sovereignty systems that control the air defense of the homeland mission. The lab communications systems enable connectivity with distributed test assets across the continental U.S. so that Army and Air Force system program offices can assess the capabilities of all new systems or component upgrades to operate effectively as a systems of systems.

SWAT SHOWS IMPORTANCE OF SPACE IN WARGAMING



Maj. Daniel L. Ward, an Army Capability Manager for Space and High Altitude senior user representative for the U.S. Army Space and Missile Defense Command's Center of Excellence, asks Maj. Harold George Butterfield (left), SMDCoE ACM-SHA space requirement developer, a question about the Space Wargaming Analysis Tool during a demonstration. (U.S. Army photo by Ayumi Davis)

The U.S. Army Space and Missile Defense Command's Space and Missile Defense Center of Excellence oversaw the development and delivery of the first version Space Wargaming Analysis Tool in 2022.

SWAT is a digital method for mapping in wargames, also known as map exercises. It reduces notional exercise actions such as "white carding," in which a card is handed to a Soldier or unit to indicate a problem, and dice rolls to decide battle outcomes, said Steve Toler, chief, models and simulations division, SMDCoE.

"We're trying to get away from that analog method into a digital format where you're actually modeling a battle on a 3D map," Toler said. "We're developing a tool that will account for what types of weapons are in each unit, how effective they are, their ranges and putting some more rigor into deciding what happens in that interaction rather than just a dice roll."

SWAT will allow space and high-altitude equities to be included in map exercises and wargames across the Army to inform critical decisions.

"[SWAT] has the potential to have far-reaching effects both within SMDC and our space professionals being

able to explain and demonstrate the importance of space, but it's also going to be able to help decision-makers across the Army," said Toler.

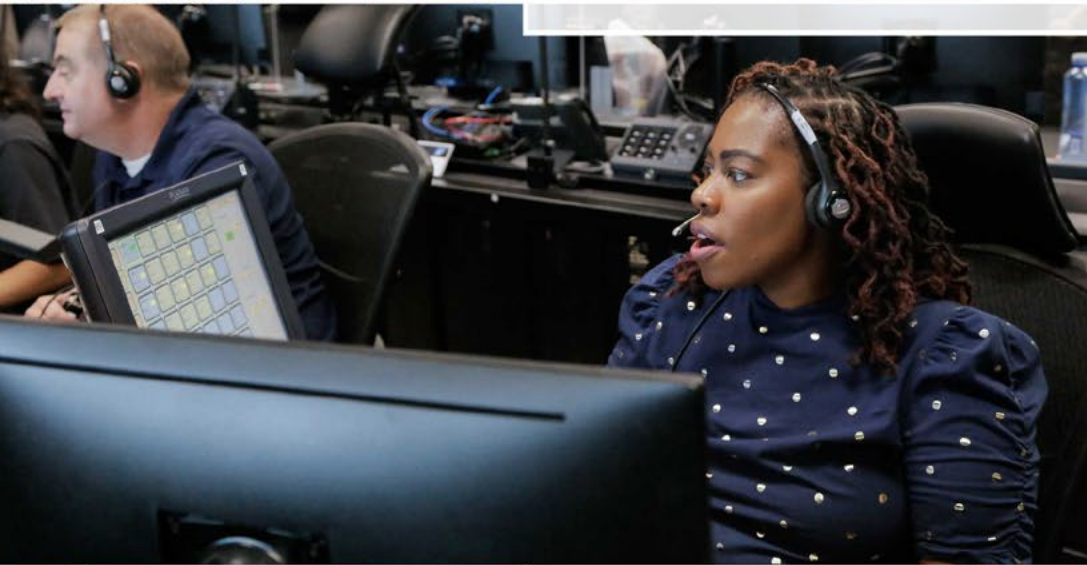
The SMDCoE demonstrated SWAT at the Interservice/Industry Training, Simulation and Education Conference, as well as the Space and Missile Defense Symposium. The Maneuver Battle Lab also beta-tested the tool in their Division Cavalry series of exercises. The lab was very excited and is already planning to use it in other events, Toler said.

Toler said they're close to producing a version of SWAT with satellite communications; intelligence, surveillance and reconnaissance; and positioning, navigation and timing.

"With this tool, we're designing it to be run on a laptop – just a commercial, off-the-shelf laptop," Toler said. "So, it will be able to be used at all different echelons within the Army. You aren't going to need a high-performance computing center to run this. Somebody at a division headquarters or a battalion headquarters could run SWAT to support their military decision making processes."



THE FACES of USASMDC



NASA DETACHMENT



Army Astronaut Lt. Col. (Dr.) Frank Rubio successfully launches from the Baikonur Cosmodrome, Kazakhstan, aboard a Soyuz MS-22 spacecraft, Sept. 21, 2022, for a six-month mission on the International Space Station. (NASA photo)

Purpose

The U.S. Army Space and Missile Defense Command NASA Detachment provides support to NASA with Army astronauts and space operations officers detailed to the Johnson Space Center in Houston, Texas. They deliver expertise and leadership to NASA's human space flight programs, low-earth orbit spaceflight and deep space exploration initiatives.

There are currently three active duty astronauts and one Army Reserve astronaut: Col. Andrew Morgan, detachment commander, served aboard the International Space Station, July 2019 – April 2022;

Lt. Col. Anne McClain served aboard the ISS, December 2018 – June 2019; Lt. Col. Frank Rubio launched to the ISS, Sept. 21, 2022, and is expected to return to Earth in March 2023; and Maj. Kate Rubins, who commissioned into the Army Reserve, Nov. 2, 2021, served aboard the ISS, July – October 2016 and October 2020 – April 2021.

As their primary responsibility, USASMDC astronauts serve as flight crew on NASA space missions providing engineering expertise for the exploration of space and space-based research. Their training includes flying as T-38 crew members, learning the Russian language, and maintaining proficiency in robotics, spacewalks, and ISS emergency procedures. While on-orbit, they fly and maintain the ISS as well as perform research in technology development, Earth science, biology, and more.

Each astronaut is assigned additional duties that can include providing technical expertise in spacecraft design and habitability, functioning as members of the flight control team in the Mission Control Center, or leading people and training events in the astronaut corps.

In addition to the active duty Army astronauts, two Army space operations officers are assigned to the detachment as assistant program managers.

Assistant program managers can fulfill a wide range of roles such as members of the Mission Control Center's flight control team, leading missions to coordinate the launch and recovery of astronauts, and serving on teams designing future spacecraft with government and commercial space partners.

Since the Army's first astronaut was selected for the 1978 astronaut class, 18 Army astronauts and one payload specialist have served in the detachment. Several retired Army astronauts continue to serve as astronauts, flight directors, and in other NASA leadership positions.

CHIEF TECHNOLOGY OFFICE

Purpose

The chief technology officer and his staff serve as the scouts for the U.S. Army Space and Missile Defense Command's leadership to uncover potentially game-changing innovations, concepts and technologies to support the command's missions and enable multi-domain operations.

The CTO, as the principal adviser to the commanding general and the deputy to the commander for science and technology matters, provides timely and relevant near-, mid- and long-term information, planning and resourcing recommendations on science and technology matters.

The CTO accomplishes this by focusing outwardly to the science and technology elements of the Army, other services, combatant commands, joint organizations, other government agencies, industry, and academia, looking for the most promising conceptual and technological breakthroughs. The CTO also identifies previously infeasible concepts and technologies that are now feasible due to the improvement of enabling technologies.

In addition to maintaining awareness of the latest scientific and technological advances from U.S. and ally organizations, the CTO is the primary investigator within the command, gaining insight and awareness of adversary and potential adversary science and technology efforts.

With this view toward the future, the CTO provides guidance and oversight of the command's support to the U.S. Military Academy at West Point, New York.

Impact

The CTO's efforts saw a string of successes that centered on the command's key areas of interest, including the New Triad: space, special operations



Space and High-Altitude Research Center director, Lt. Col. Craig Boucher, recognizes the top graduates in the West Point Army Space Cadre Basic Course and presents them with a SHARC token. (Courtesy photo)

forces and cyber, while managing telework and return to on-site work requirements.

CTO coordinated the transition of the Space and Missile Defense Research and Analysis Center at West Point to the Space and High Altitude Research Center. Along with the name change and revitalized mission and vision, USASMDC support of the space curriculum and the Space and Missile Defense Research and Analysis Center has never been more integrated across more academic departments at the academy.

They represented the command at numerous external science, technology, and innovation organizations, including: U.S. Army Futures Command Science and Technology community of interest sessions; U.S. Army Training and Doctrine Command Mad Scientist program; and National Reconnaissance Office Joint Space Team meetings.

CTO proactively worked with the Army Artificial Integration Center to develop a strategy and way ahead for incorporating artificial intelligence into USASMDC missions.

They continued to lead the Redstone Arsenal CTO Roundup, leveraging the core competencies that reside at Team Redstone and teaming on efforts that will enable multi-domain operations.

OFFICE OF SMALL BUSINESS

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Support of the small business program is good for the nation and helps build a strong industrial base necessary to provide warfighters the defense products and services they need.

Doing business with the command

The U.S. Army Space and Missile Defense Command has a robust Small Business Program utilizing small businesses of all types in its acquisitions that include small business, small disadvantaged business, service-disabled veteran-owned small business, women-owned small business, and historically underutilized business zone small business concerns.

The USASMDC Office of Small Business Programs ensures small businesses are provided the maximum opportunity to be included in USASMDC's complex procurements in the areas of space, missile defense, directed energy, hypersonic, high altitude, cyber and other related research and development technologies. Support of the small business program is good for the nation and helps build a strong industrial base necessary to provide warfighters the defense products and services they need. Supporting the Department of the Army's commitment to small business is a team effort throughout the command.

Doing business with the federal government

A newly formed business can access the Small Business Administration and various U.S. Army websites for information about the basic requirements that must be in place before competing for government contracts. Another valuable resource for new and existing small businesses is the Procurement Technical Assistance Centers: www.aptac-us.org.

The following information can be used as a guide to doing business with USASMDC:

Research USASMDC before making contact. The command, like many Army activities, maintains its own

website: www.smdc.army.mil. Information for the USASMDC Small Business Program can be found under the Resources tab. Additionally, the command's Virtual Industry Exchange Forecast Industry Report containing the most recent forecasting information on upcoming USASMDC opportunities can be found under the same Resources tab.

Ensure Entity Registration information is current and accurate in the System for Award Management <https://sam.gov> and verify registration has not expired. Verify all relevant North American Industry Classification System, commonly referred to as NAICS, codes; business size/revenue representation; and socioeconomic status are correct.

Review the business profile in the Small Business Administration Dynamic Small Business Search: https://web.sba.gov/pro-net/search/dsp_dsbs.cfm. Ensure this information is consistent with what is in the System for Award Management <https://sam.gov>. Fields in this database that assist in market research include keywords, capabilities narrative, special equipment/materials and performance history. This information is particularly helpful in identifying potential sources for set-aside considerations.

Confirm the business website for public access is accessible and consistent with information posted in System for Award Management <https://sam.gov> and Dynamic Small Business Search https://web.sba.gov/pro-net/search/dsp_dsbs.cfm.

Prepare to meet with the USASMDC Small Business Office. Meetings can be either in person (subject to current conditions) or by phone. Have business capabilities that are in line with USASMDC requirements ready for discussion. Be prepared with



Fort Greely, Alaska, contracts with Wolf Creek, an Alaskan Native Corporation small disadvantaged business, to provide the installation Ballistic Missile Defense Mission Support Service. The total award for fiscal year 2022 was just under \$23 million. (U.S. Army photo)

business history, prime or subcontractor interests, and any unique capabilities. Ask about current contracting vehicles and how to locate upcoming opportunities.

Monitor federal business opportunities. Use the website <https://sam.gov/content/opportunities> to monitor sources sought, request for information, and synopsis for upcoming requirements and solicitations notices. This is the single point of entry for the federal government and should be monitored daily. This website is used to publish other events, such as industry day briefings, Advance Planning Briefings to Industry and Procurement Technical Assistance Centers events.

Seek additional assistance in the defense marketplace. Procurement Technical Assistance Centers: www.aptac-us.org are located in most states and are partially funded by the Department of Defense to provide small businesses with information on how to do business with DOD. They provide in-depth training and counseling on marketing, financial and contracting issues to small business concerns at minimal cost.

The Small Business Administration offers assistance through their Small Business Development Centers, www.sba.gov/tools/local-assistance/sbdc, which can provide aspiring and current small business owners a variety of free business consulting and low-cost training services including: business plan development,

manufacturing assistance, financial packaging and lending assistance, exporting and importing support, disaster recovery assistance, procurement and contracting aid, market research help, 8(a) program support and healthcare guidance. Also, get to know the local SBA Procurement Center representative. He or she can be a valuable resource for staying on top of regulatory updates/changes, such as limitations on subcontracting, and program guidance, such as the SBA All Small Mentor-Protégé Program.

Prepare a proposal. Read the solicitation and the performance statement of work carefully. Pay particular attention to sections L and M of the solicitation. Section L provides instructions, conditions and notices to offerors or respondents. Section M lists the evaluation factors for award. Ensure the submitted proposal meets all of the requirements of the solicitation.

Lastly, win a contract...PERFORM...and earn excellent experience.

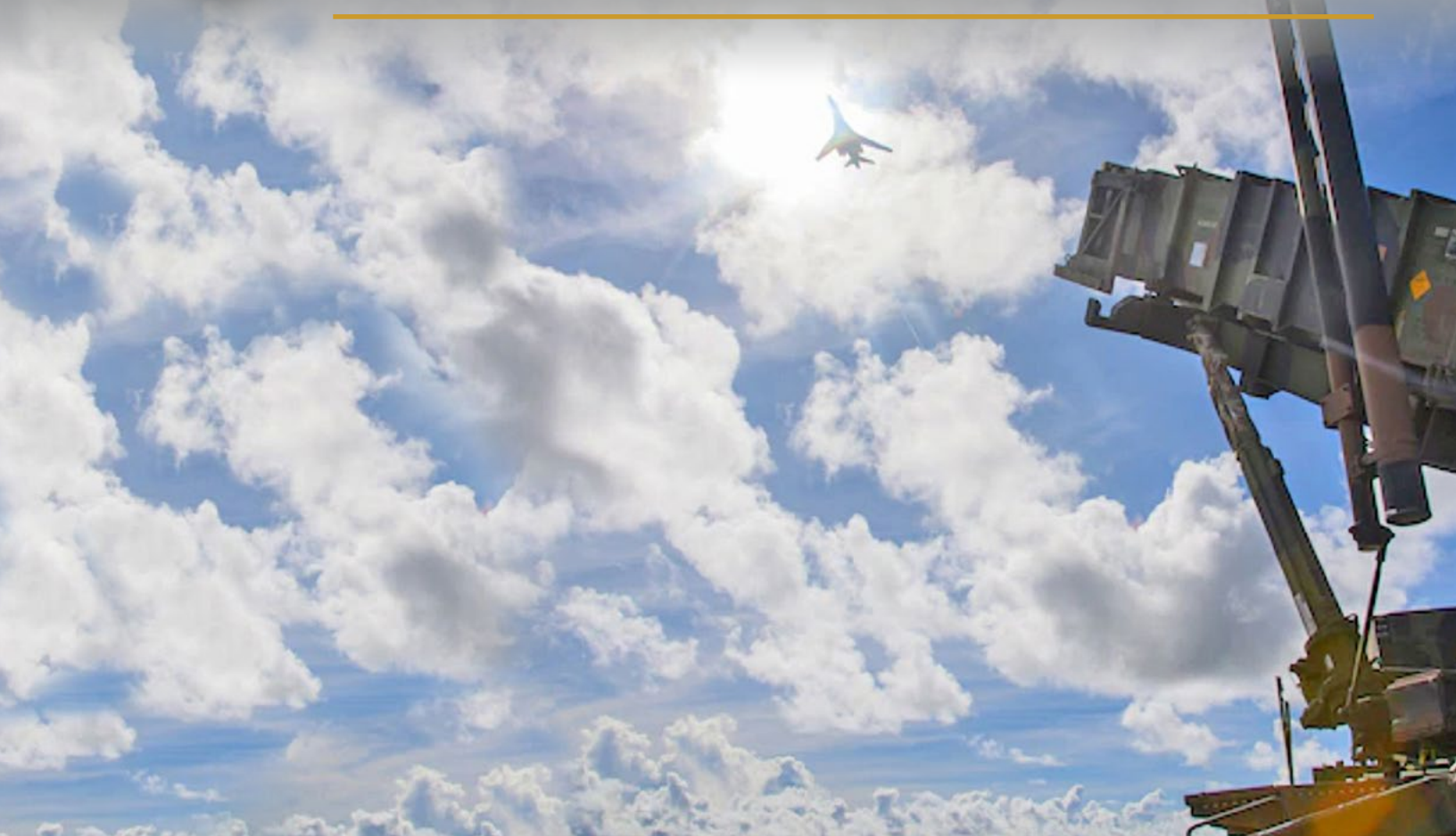
For more information, contact the USASMDC Office of Small Business Programs

ATTN: SMDC-SB P.O. Box 1500 Huntsville, AL 35807-3801
Phone: (256) 955-3412

Email: usarmy.redstone.smdc.mbx.small-business-office@army.mil



JOINT FUNCTIONAL COMPONENT COMMAND FOR INTEGRATED MISSILE DEFENSE



A B-1 bomber flies over a Patriot launcher in Palau as part of exercise Pacific Dragon. Missile defense integrates with other strategic capabilities as a key component to maintaining broader deterrence. (Courtesy photo)

Purpose

Lt. Gen. Daniel Karbler is the commander of U.S. Strategic Command's Joint Functional Component Command for Integrated Missile Defense, in addition to his role as the commander of U.S. Army Space and Missile Defense Command and the Army's service component commander to U.S. Strategic Command and U.S. Space Command.

The president has assigned USSTRATCOM with primary responsibility for global missile defense; operational-level responsibilities have been delegated to JFCC IMD.

JFCC IMD began operations in January 2005 and includes Army, Navy, Marine Corps, Space Force

and Air Force personnel, as well as U.S. government civilians and contractors. The headquarters is located at the Missile Defense Agency's Missile Defense Integration and Operations Center at Schriever Space Force Base, Colorado. The command's location allows JFCC IMD to leverage MDA's existing infrastructure and ensures a strong partnership with the materiel

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In coordination with other combatant commands, the services, and as directed, appropriate U.S. government agencies, JFCC IMD conducts trans-regional missile defense planning and operations support.

developer in the execution of its assigned responsibilities.

In coordination with other combatant commands, the services, and as directed, appropriate U.S. government agencies, JFCC IMD conducts trans-regional missile defense planning and operations support. JFCC IMD assesses and recommends acceptance of new missile defense capabilities, and executes joint and combined missile defense training and education for the USSTRATCOM commander.

Objectives for these efforts are to deter adversaries, assure allies and defend U.S. deployed forces, allies and partners against missile attacks.

JFCC IMD translates this responsibility into several lines of effort:

- Conduct global missile defense planning and security cooperation activities.
- Conduct missile defense operations support, cyber operations/security, and provide intelligence community coordinated intelligence.
- Execute joint and combined global missile defense training and education.
- Assess warfighter missile defense needs in support of capability development, testing and fielding.

Impact

Missile defense is a key part of America's ability to deter threats; assure allies and partners of its commitment to established security frameworks; and to defend the homeland, deployed forces, friends, and

allies. Missile defense becomes even more important in an environment in which missile threats from both state and non-state actors continue to proliferate and expand in scope, scale and complexity.

JFCC IMD performs trans-regional missile defense responsibilities that support U.S. and coalition operations across multiple regions. This requires synchronization between affected commands to maximize integration of the capabilities necessary to deter, prevent or respond to attacks and to nullify or reduce the effectiveness of a threat. Combatant commands designated with responsibility for an adversary problem set must approach missile defense from a global perspective given the trans-regional nature of the threat; the low-density, high-demand nature of missile defense platforms; and complex architecture of sensors, shooters, and command and control nodes spanning multiple geographic areas of responsibility. JFCC IMD provides direct support to these efforts.

JFCC IMD is the subject matter expert that synchronizes missile defense functions to support combatant command plans and operations, capability assessment, and missile defense training and exercises, enhancing the resilience and effectiveness of the joint and combined missile defense force.

A strong partnership with the services and the materiel developers ensures a warfighter voice in development, testing and delivery of new capabilities and informs decision-makers during operational acceptance of those capabilities into the enterprise. In partnership with combatant commands, JFCC IMD provides expertise to support planning, joint and combined training, and asset management. All of these key functions are essential to ensure U.S. missile defenses are postured to support national defense objectives.

FURTHERING THE INTEGRATION OF SPACE, MISSILE DEFENSE

The synergies that exist between the missile defense and space missions as well as U.S. Space Command's role as the global sensor manager, help to foster closer operational relationships. The Joint Functional Component Command for Integrated Missile Defense's recent accomplishments have facilitated increased integration between the two mission sets.

The JFCC IMD Plans Directorate worked tirelessly with joint force stakeholders to clearly document the roles, responsibilities and authorities associated with the missile defense mission and the implications of migrating it to USSPACECOM. Facilitating this change accelerated progress toward achieving the vision of "any sensor, best shooter, any mission."

The Operations Directorate collaborated with USSPACECOM to chart a path toward integrating missile defense sensors into space missions such as space domain awareness. JFCC IMD's support included analysis on topics to include testing, policy, authorities, asset management coordination and exercise support.

The Joint Ballistic Missile Defense Training and Education Center of Excellence, a component of JFCC IMD, collaboratively developed the first-ever worldwide deployable training kit. The training kit, running four different missile warning displays, allows students to simultaneously train with multiple space-based systems while studying missile defense topics.

The Communications Directorate hosted the cross-Combatant Command Ballistic Missile Defense System Satellite Users Group to explore prioritizing demand for the limited satellite communications resources.

"With several CCMDs in attendance along with engineers, planners, and other subject matter experts, we addressed issues that have been interfering



with operations over the past year," said Jonathon Dimauro, joint interface control officer/Ballistic Missile Defense System satellite communications planner, J-6 Communications Directorate, JFCC IMD.

The Intelligence Directorate developed and is beta-testing intelligence news feeds on classified networks to various stakeholders in the space and missile defense community. Each news feed is tailored and curated to the specific intelligence needs of each stakeholder, including USSPACECOM.

"Our news feeds deliver the right intelligence to the right stakeholder at the right time - this is a game changer" for space and missile defenders, explained Jared Reese, JFCC IMD J-25 Division chief and the project manager behind the initiative.

JFCC IMD's Future Concepts, Test and Analysis Directorate produced the 2022 Warfighter Air & Missile Defense Threat List in coordination with USSPACECOM. Released in August 2022 in coordination with several participating combatant commands, including USSPACECOM, this list reflects the increasingly complex integrated air and missile defense environment.

JFCC IMD continues to lead the way in leveraging the links between the space and missile defense worlds, driving the integration needed to keep pace with advancing threats.



U.S. Army Space and Missile Defense Command

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