



# 2024 GLOBAL DEFENDER A GUIDE TO USASMDC



### **COMMANDER'S MESSAGE**

LTG SEAN A. GAINEY

### Welcome to the 2024 Global Defender!

As the commanding general of both the U.S. Army Space and Missile Defense Command and the Joint Functional Component Command for Integrated Missile Defense, I am honored to take this opportunity to introduce you to our outstanding team of 2,600 men and women serving in 19 locations worldwide who perform critical roles for the Army and the joint force every day.

USASMDC is a remarkable organization valued by the Army and the combatant commands we support. We have a legacy of exploring, overcoming obstacles, developing future capabilities, protecting the homeland, and equipping warfighters. We believe in and support our team members as evidenced by our ranking for the second year in a row as the best place to work in the Army. These accomplishments are all due to the amazing professionals who drive this organization.

Our vision defines us: ONE TEAM!-that achieves our shared objectives via collaboration, feedback, assessment, and smart adaptation to continue demonstrating value:

- Accomplishing our mission as ONE TEAM of empowered, innovative, and resilient professionals
- 2. Providing trained and ready forces for space, missile defense, and high-altitude missions
- 3. Integrating new and existing space, missile defense, and high-altitude capabilities to create all-domain advantages

The importance of our missions continues to grow. As the Army Service Component Command to U.S. Space Command, U.S. Strategic Command, and U.S. Northern Command for its 24/7/365 ground-based midcourse defense mission, our team provides trained and ready space and missile defense forces and capabilities to the warfighter and nation. We are the Army's force modernization proponent and operational integrator for global space, missile defense and high-altitude capabilities. We build 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.

Our JFCC IMD teammates perform transregional missile defense responsibilities that support U.S. and coalition operations across multiple regions, a function that is essential to the U.S. Space Command's strategic deterrence mission.

The team members of USASMDC and JFCC IMD have critical roles in protecting the homeland and supporting the Army and the joint force. We have a bright future, but we cannot rest on our laurels.

As we continue to work toward our goals and shape the future, the core focus areas outlined below make up a blueprint for mission success.



I am proud to lead these outstanding teams. Thank you for taking the time to get to know and support them.

#### Secure the High Ground! Vigilant for the World!

### 2024 LEADERSHIP



CSM John Foley Command Sergeant Major



Richard De Fatta Deputy to the Commanding General



BG John L. Dawber Deputy Commanding General for Operations



CW5 Wesley "Mark" Dohogn Command Chief Warrant Officer

#### 100<sup>th</sup> Missile Defense Brigade



**COL Dani S. Williams** Commander, 100<sup>th</sup> Missile Defense Brigade



**CSM Jeremy Christensen** Command Sergeant Major, 100<sup>th</sup> Missile Defense Brigade

#### 1<sup>st</sup> Space Brigade



**COL Mark Cobos** Commander, 1<sup>st</sup> Space Brigade



**CSM Maurice Tucker** Command Sergeant Major, 1<sup>st</sup> Space Brigade

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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 #4002







### 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 multidomain 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 2,300 Soldiers and civilians across 13 time zones and 19 worldwide 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 100<sup>th</sup> Missile Defense Brigade (Ground-based Midcourse Defense) and the 1<sup>st</sup> 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. Joshua Slaten and Dr. Charles Madewell, members of the Technical Center quantum research team, review a quantum entanglement setup at the Quantum Engtanglement and Space Research Laboratory on Redstone Arsenal, Alabama, July 14, 2023. (U.S. Army photo by Ronald Bailey)

Operating under the brigade are Soldiers of the 49<sup>th</sup> 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 1<sup>st</sup> Space Brigade. The brigade consists of the 1<sup>st</sup> Space Battalion and 2<sup>nd</sup> Space Battalion, as well as the 117<sup>th</sup> Space Battalion under a direct support relationship.

The 1<sup>st</sup> 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 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.



I<sup>st</sup> Space Brigade's Chief Warrant Officer 2 Robert Wyman, Staff Sgt. Robert Harris and Cpl. Terrence Shatswell conduct crew drills in preparation for the Ranger Regiment raid during the U.S. Army Special Operations Command's capabilities exercise, April 23-27, 2023, at Fort Bragg, North Carolina. (U.S. Army photo)

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. Space Command's Joint Functional Component Command for Integrated Missile Defense.



### **USASMDC** A globally responsive command

### 2,300 DEDICATED EMPLOYEES WORLDWIDE WITH MORE THAN 600 OPERATIONAL FORCES FORWARD STATIONED OR DEPLOYED



# JAPAN • Missile Defense Batteries – Forward-Based Mode Radar (1<sup>st</sup> Space Brigade) **•**... **KWAJALEIN ATOLL** • Reagan Test Site (Technical Center) • Senior Commander of U.S. Army Garrison-Kwajalein Atoll



### ARMY MISSILE DEFENSE EXPLORES NEW INTEGRATED CAPABILITIES

The U.S. Army Space and Missile Defense Command continued its focus as a "People First" organization in 2023 and modernizing and building readiness through missile defeat and Army space operations. The command also worked to integrate its capabilities to influence future multidomain and full-spectrum operations.

Among USASMDC's achievements for the year was the recognition of having the highest employee engagement in the entire U.S. Army according to the Office of Personnel Management's annual Federal Employee Viewpoint Survey. USASMDC's 2023 FEVS Employee Engagement Index was 83%, an increase of 2.8% from 2022. In addition, USASMDC increased its score in all three of the survey's sub-indices, scoring more than 80% in all.

In the Best Places to Work in the Federal Government's May rankings based on 2022 scores, the command tied as the best command to work for in the Army, receiving an overall engagement and satisfaction score of 76.1. It rated higher than any command across all branches of the U.S. military and the command is expected to keep that ranking in 2023.

"(SMDC has) been noted several times as one of the best places to work," said Lt. Gen. Sean A. Gainey, USASMDC commanding general. "It's always about the great people across our force, and this command. (I'm) incredibly excited to be part of the SMDC team."

To continue communicating mission efforts, USASMDC, along with Triad partners U.S. Army Cyber Command and U.S. Army Special Operations Command, gave an update on their joint operations at the Association of U.S. Army Annual Meeting and Exposition in October. The Triad provides the Army the capability and capacity to get after left-of-launch capabilities. USASMDC is using its capabilities, accesses and abilities to do things during pre-crisis operations and providing these capabilities early on. The command is exploring the concept of an exercise aimed at left-of-launch capabilities, which along with traditional Army integrated air and missile defense inform the missile defeat effects coordinator concept.

The 100<sup>th</sup> Missile Defense Brigade celebrated consistency in achieving the mission as it marked its 20<sup>th</sup> anniversary, acknowledging two decades of ground-based missile defense, and the completion of another successful groundbased interceptor launch during a flight test of the nation's Ground-based Midcourse Defense System for the Missile Defense Agency on Dec. 11.

Army astronaut, Col. (Dr.) Frank Rubio, broke the record for the longest stay in space for a U.S. astronaut when he returned to Earth on Sept. 27, 2023, after 371 days on the International Space Station, beating the 2022 record of 355 days set by astronaut Mark Vande Hei, a retired U.S. Army colonel.

The Army's role in and use of space goes beyond supporting Army astronauts to operating in and through space. Though U.S. Space Command and the U.S. Space Force are well-poised to respond to space threats globally, the Army offers space capabilities that support missions unique to the Army–and have done it successfully for a very long time.

Recognizing the importance of space domain effect to Army operations, the Army published a new Space Vision describing the



U.S. Army Spc. Jason Clark, military policeman, Company A, 49<sup>th</sup> Missile Defense Battalion, protects the Missile Defense Complex from mock enemies during exercise Guardian Strike at Fort Greely, Alaska, Aug. 1, 2023. Guardian Strike evaluated military police and battalion staff members in their abilities to react to a variety of scenarios regarding physical safety and security and personnel matters. (U.S. Army National Guard photo by Staff Sgt. Taylor Lakey-Tamacori)

Army's role both as a user and provider of space-related systems and formations.

The Army is now incorporating space and cyberspace domains with traditional land, sea and air to create a multidomain approach being codified in the development of multidomain task forces that are supported by USASMDC that will ensure success in current and future conflicts.

Another effort the command's Army Capability Manager for Space and High Altitude within the Space and Missile Defense Center of Excellence has been at the forefront of is developing a theater strike effects group that will help win on the ground, in space, and everywhere in between.

This theater-level Army space formation is integral for today's battlefield and is poised to be a shining example of what the Army – and USASMDC – does best: integrating right at the intersection between land and space domains.

"Integrating joint space capabilities and employing space interdiction capabilities must become second nature," said Gen. Randy A. George, U.S. Army chief of staff.

USASMDC made changes to its missile defense mission this year, shifting from the concept of

global missile defense to transregional missile defense. Following publication of the 2019 Missile Defense Review, the 2021 Unified Command Plan, and the establishment of U.S. Space Command, USASMDC led efforts to properly assign missile defense responsibilities. Working with the commanders of U.S. Strategic Command, U.S. Space Command, U.S. Northern Command, and the Army chief of staff, USASMDC leadership forged what became known as the "16-Star Memo." This memo led to publication of the April 25, 2023, Unified Command Plan, assigning USSPACECOM responsibility for transregional missile defense.

Another result of the UCP is the shift of combatant command of the 100<sup>th</sup> Missile Defense Brigade from USSTRATCOM to USNORTHCOM.

"This change improves our capacity to defend the homeland by providing unity of command and alignment of authorities to execute the ground-based midcourse defense mission," said Col. Joseph Paladino, commander, 100<sup>th</sup> Missile Defense Brigade. "As a result, USNORTHCOM, USASMDC and the 100<sup>th</sup> Missile Defense Brigade are better aligned to seamlessly integrate across all echelons of command, bringing greater efficiencies to protecting our homeland."



### 100<sup>TH</sup> MISSILE DEFENSE BRIGADE

Missile Defense Element crews from the 100<sup>th</sup> Missile Defense Brigade stand watch, operating the GMD System 24/7/365. These Soldiers are responsible for the strategic-level execution of the GMD mission to protect the homeland.

### **PURPOSE**

The 100<sup>th</sup> 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, New York and California.

The 100<sup>th</sup> 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 two decades, celebrating its 20<sup>th</sup> anniversary on Oct. 16, 2023.

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 100<sup>th</sup> Missile Defense Brigade was assigned administrative and operational control of the 117<sup>th</sup> Space Battalion. The 49<sup>th</sup> Missile

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 49<sup>th</sup> Missile Defense Battalion, Alaska National Guard, and 113<sup>th</sup> Military Police Company, Mississippi National Guard. (U.S. Army National Guard photo by Staff Sgt. Taylor Lakey-Tamacori) Defense Battalion, the brigade's major subordinate element, is located at Fort Greely, Alaska.

Missile Defense Element crews from the 100<sup>th</sup> Missile Defense Brigade stand watch, operating 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 100<sup>th</sup> Missile Defense Brigade are part of a unique multicomponent National Guard organization. The brigade headquarters consists mainly of full-time Colorado National Guard Soldiers. The unit also includes a small contingent of active-component Soldiers.

To perform their national security mission, brigade Soldiers, to include the 49<sup>th</sup> Missile Defense Battalion, automatically transition between Title 10 federal activeduty 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 active-component 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 100<sup>th</sup> 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% 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.

Most recently, the brigade's Soldiers at Vandenberg Space Force Base demonstrated their no-fail mission accomplishment through a successful ground-based interceptor launch during a flight test of the nation's Ground-based Midcourse Defense System for the Missile Defense Agency on Dec. 11.

"Seeing the system operate as designed in an operationally realistic test condition lets us all sleep better knowing that if needed, we are ready and prepared to defend the homeland against enemy threats," said Maj. Skye Robinson, 100<sup>th</sup> Missile Defense Brigade crew director for the test. "Everyone can rest better each night knowing we have a GMD System and crew operators ready to keep them safe."



#### PURPOSE

Soldiers of the 49<sup>th</sup> 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 49<sup>th</sup> 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 100<sup>th</sup> Missile Defense Brigade.

#### **IMPACT**

The 49<sup>th</sup> Missile Defense Battalion's primary two missions are to operate the Fire Direction Center and secure the Missile Defense Complex.

Fire Direction Center crews operate the GMD System 24/7/365 in conjunction with 100<sup>th</sup> 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 – and are always ready, minuteman style, to "fight right now." 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.

Company A, the 49<sup>th</sup> Missile Defense Battalion's military police ground-based interceptor security company,

### 49<sup>™</sup> MISSILE DEFENSE BATTALION

A Soldier of the 49<sup>th</sup> Missile Defense Battalion guards the area during exercise Guardian Watch at Fort Greely, Alaska, Oct. 31, 2022. Exercise Guardian Watch is a brigade capstone training event and command evaluation of the 49<sup>th</sup> Missile Defense Battalion and its subordinate units. (U.S. Army National Guard photo by Staff Sgt. Taylor Lakey-Tamacori)

is a one-of-a-kind MP company and is the only one in the U.S. Army Space and Missile Defense Command. The Soldiers of Company A conduct 24/7/365 site security operations at the MDC, 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, Company A's Soldiers hail from all over the nation, including Puerto Rico, Mississippi and South Carolina. This company is where the entire nation comes together to support the defense of the homeland.

The 49<sup>th</sup> Missile Defense Battalion is manned exclusively by active Guard and Reserve Alaska National guardsmen. All 49<sup>th</sup> 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 Company A.

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### **SMDC** MISSION IMPACT MISSILE DEFENSE BRIGADE 20 YEARS DEFENDING USA

I<sup>st</sup> Lt. Jose A. Montalvo-Recio, Alpha Crew deputy director, 49<sup>th</sup> Missile Defense Battalion, conducts a system validation on the Groundbased Midcourse Defense Fire Control System at the Fire Direction Center at Fort Greely, Alaska. (U.S. Army National Guard)



**S**ince its creation, the Colorado National Guard's 100<sup>th</sup> Missile Defense Brigade protects the nation from missile threats.

Oct. 16, 2023, marked the unit's 20<sup>th</sup> anniversary of ground-based missile defense in Colorado and is a reminder of all the hard work and development of Soldiers over the years toward the mission.

A large part of the brigade's mission revolves around protecting the Missile Defense Complex at Fort Greely, Alaska, from threats like elite military or terrorist groups and, recently, threats from drone attacks. Company A, 49<sup>th</sup> Missile Defense Battalion, along with an augmentation force of military police from the Mississippi National Guard maintain security at the complex 24/7/365.

"We defend 350 million Americans, and we proved that we can do it and do it well. We should be very proud," said Lt. Col. Jorge Lorenzana, commander, 49<sup>th</sup> Missile Defense Battalion.

To fulfill its mission, the 100<sup>th</sup> Missile Defense Brigade participates in and hosts exercises such as Operation Guardian Strike to continually sharpen their skills and stay ready.

The exercise trained and evaluated readiness by simulating drone attacks and surveillance at Fort Greely, July 30-Aug. 2, 2023.

"There are a couple things that are looked at during an exercise like this," said Command Sgt. Maj. Jeremy Christensen, 100<sup>th</sup> Missile Defense Brigade. "Soldier proficiency, what we do out there and then vulnerabilities and assessments for command."

As a capstone for Guardian Strike, the brigade training team conducted an exercise simulating a foreign special operations team disrupting the MDC through drone attacks and special forces.

"They responded well to a complex threat, even at night," said Capt. Garrett Boldry, a force protection officer assigned to the brigade. "The MDC is well protected for all the worst-case scenarios we could throw at it."

On Oct. 1, 2023, the 100<sup>th</sup> Missile Defense Brigade's operational control was transferred from the U.S. Strategic Command to U.S. Northern Command, which has ultimate responsibility for homeland defense. Training is critical to validate all Northern Command units operate well together.

"Multi-echelon training is a key enabler to building competencies and readiness for all units," said Lt. Col. Benjamin Brown, operations officer in charge, 100<sup>th</sup> Missile Defense Brigade. "When a unit utilizes multi-echelon training, the quality of the information provided at all levels increases and builds the efficiency of the exercise for not only the individual Soldier, but the unit as a whole."



## 











ea on Fort Cars

### IST SPACE BRIGADE

ace Battalion, poses for a photo at the training

homas Staples

The brigade prides itself on its diverse multicomponent force comprising Soldiers and civilians from all branches and backgrounds.

### **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 multidomain, high-intensity conflict.

Headquartered in Colorado Springs, Colorado, with a global footprint across 11 locations in nine countries and six time zones, the 1<sup>st</sup> 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 multicomponent force comprising Soldiers and civilians from all branches and backgrounds. The brigade is in constant support of combat operations worldwide with a sizeable portion of its forces globally dispersed and executing 24/7/365 missions. They use their tools, training and experience to integrate space operations during competition, crisis and conflict.

### IMPACT

The 1<sup>st</sup> 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 1<sup>st</sup> Space Battalion, established in 1999, and the 2<sup>nd</sup> Space Battalion, established in 2017. Associated units include five missile defense batteries and the Colorado National Guard's 117<sup>th</sup> Space Battalion.

The 1<sup>st</sup> Space Battalion consists of a Headquarters and Headquarters Company; 2<sup>nd</sup> Space Company with seven space control planning teams; 4<sup>th</sup> and 18<sup>th</sup> Space Companies with space control platoons; and 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> Space Companies (Theater Missile Warning). The Army Joint Tactical Ground Station mission transferred to the U.S. Space Force on Oct. 1, 2023, and 19th, 20th, 21<sup>st</sup> and 22<sup>nd</sup> Space Companies have formally begun inactivating their formations. These Soldiers will continue to augment the Space Force in the JTAGS mission through April 2024, at which point all four companies will complete their inactivation and case their colors after 24 years of exemplary service.

The 2<sup>nd</sup> Space Battalion, a U.S. Army Reserve unit, consists of a The 1<sup>st</sup> Space Brigade constantly provides support to combat operations worldwide, and the capabilities that 1<sup>st</sup> Space Brigade Soldiers and civilians leverage in space translate to mission success across all domains and warfighting functions.

Headquarters and Headquarters Company, and the 3<sup>rd</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 23<sup>rd</sup> Space Companies. These citizen-warriors make up 15 of the brigade's ARSSTs 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 1<sup>st</sup> Space Brigade also supports 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 117<sup>th</sup> Space Battalion, activated in September 2001, currently has 12 ARSSTs in the 217<sup>th</sup> and 1158<sup>th</sup> Space Companies and remains a steady and reliable presence in support of USCENTCOM area of responsibility since its inception. The 1<sup>st</sup> Space



Staff Sgt. Jarrod Rutland, Headquarters and Headquarters Company, <sup>1st</sup> Space Brigade, participates in Sage Eagle, <sup>1st</sup> Special Forces Command's (Airborne) exercise planning team with <sup>3rd</sup> Special Forces Group, at White Sands Missile Range, New Mexico. Sage Eagle, an annual exercise that allows units to practice in realistic terrain, was hosted Jan. 4-Feb. 7, 2023. (U.S. Army photo by Staff Sgt. Thomas Staples)

Brigade constantly provides support to combat operations worldwide, and the capabilities that 1<sup>st</sup> Space Brigade Soldiers and civilians leverage in space translate to mission success across all domains and warfighting functions.

Over the last year, the 1<sup>st</sup> Space Brigade supported more than a dozen Army, joint and multinational 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 multiple bilateral and multilateral exercises, working with the joint force and multinational partners to ensure worldwide readiness and interoperability.



### PURPOSE

The 1<sup>st</sup> Space Battalion, headquartered on Fort Carson, Colorado, plans, integrates, synchronizes, and executes global space and technical operations support, space control planning, and space control in support of the Army, combined, and joint forces.

The battalion generates and provides space combat power for Army and joint forces to conduct multidomain planning and operations. The battalion supports the nation's strategic land power to fight in, from and through space. It provides teams of Soldiers who know how to fight, how to plan, and who are experts in Army space operations. The capabilities provided by the 1<sup>st</sup> Space Battalion play a critical role in the Army's strategy to conduct 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 multidomain 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 nine locations globally.

Headquarters and Headquarters Company supports planning and deployments for all teams and platoons. It ensures the readiness of deploying units and continually plans for multiple, global contingencies.

### **1<sup>ST</sup> SPACE BATTALION**

Spc. Klay Walker, left, and Spc. Alexander Best with the 4<sup>th</sup> Space Company, I<sup>st</sup> Space Battalion, establish expeditionary communications with a 1.2 meter Hawkeye antenna at Fort Carson, Colorado, Sept. 20, 2023. (U.S. Army photo by Dottie White)

2<sup>nd</sup> 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 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.

4<sup>th</sup> and 18<sup>th</sup> 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.

19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> 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. On Oct. 1, 2023, the JTAGs mission transferred to the U.S. Space Force. The companies' inactivation began soon after the transfer and should be complete by April 2024.

### **2ND SPACE BATTALION**

Capt. William Simpson, left, and Staff Sgt. John Holland with the 8<sup>th</sup> Space Company, 2<sup>nd</sup> Space Battalion, set up a Mobile Integrated Ground Suite to conduct training during a battle assembly weekend at the training area near 1<sup>st</sup> Space Brigade headquarters at Fort Carson, Colorado July 13, 2023. (U.S. Army photo)

#### PURPOSE

The 2<sup>nd</sup> Space Battalion, the U.S. Army Reserve's only citizen-Soldier space battalion, is based

at Fort Carson, Colorado, and represents citizen-Soldiers from 35 of the 50 states. As part of the 1<sup>st</sup> Space Brigade, the battalion's mission is to plan, integrate, synchronize and execute space situational awareness, space technical operations support, and assigned contingency activities in support of the Army, joint combined forces, and civil authorities.

#### **IMPACT**

The 2<sup>nd</sup> Space Battalion comprises a Headquarters and Headquarters Company, and the 3<sup>rd</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 23<sup>rd</sup> Space Companies. Every year, 2<sup>nd</sup> 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 2023, 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. 2<sup>nd</sup> Space Battalion also proved



its worth innumerable times while providing global reach-back support for ARSST products to space operations officers in space support elements. Additionally, 2<sup>nd</sup> Space Battalion currently has two ongoing space control missions in USCENTCOM and U.S. Pacific Command.

3<sup>rd</sup>, 5<sup>th</sup> and 6<sup>th</sup> Space Companies each consist of five 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.

8<sup>th</sup> and 23<sup>rd</sup> Space Companies consist of six 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.



#### **PURPOSE**

The 117<sup>th</sup> Space Battalion is the Army National Guard's only space battalion and one of only two Army space support team providers within all components of the U.S. Army. The battalion is located on Fort Carson, Colorado, and is a premier provider of space knowledge to the Army and the Department of Defense. It provides 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 117<sup>th</sup> 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 1<sup>st</sup> Space Brigade.

#### IMPACT

The 117<sup>th</sup> Space Battalion comprises 125 citizen-Soldiers of the Colorado National Guard and is organized into three companies: Headquarters and Headquarters Company, 217<sup>th</sup> Space Company and 1158<sup>th</sup> Space Company. Each space company is organized into six ARSSTs, with two commissioned space operations officers and four enlisted space cadre Soldiers.

### **117<sup>TH</sup> SPACE BATTALION**

Staff Sgt. Nicholas Murdaugh, Headquarters and Headquarters Company, 117<sup>th</sup> Space Battalion, pulls Sgt. Samuel Alfano, 217<sup>th</sup> Space Company, 117<sup>th</sup> Space Battalion, over a wall during a Leader's Reaction Course team building training event at the U.S. Air Force Academy, Sept. 20, 2023. (U.S. Army National Guard photo by Staff Sgt. Kailee Nguyen)

Since 2001, the battalion has mobilized 41 ARSSTs, space support elements, and commercial imagery teams in support of Army and Marine Corps elements in Iraq, Afghanistan, Bahrain and Kuwait. These teams provide critical Army spacebased capabilities awareness and integration to ground combat operations in support of divisionlevel and combatant commanders and staffs.

In addition to the ARSSTs, the battalion provides space professionals to the space support element positions within the 35<sup>th</sup> and 42<sup>nd</sup> Infantry Division's staff elements via long-standing memorandums of agreement between Colorado, Kansas and New York. These Soldiers complete extensive spacerelated training pipelines side by side with their active duty and Army Reserve counterparts. The battalion is under the administrative and operational control of the Colorado National Guard's 100<sup>th</sup> Missile Defense Brigade and receives training/readiness oversight and certification support from 1<sup>st</sup> Space Brigade.

The 117<sup>th</sup> Space Battalion stands out as a uniquely organized resource of the Colorado National Guard and U.S. Army Space and Missile Defense Command, supporting DOD, allies and mission partners from the high ground. The battalion continues to develop and evolve its capabilities as the demand for Army spacebased capabilities continues to grow within conventional and special operations commands.

### **SMDC** MISSION IMPAC1

### SPACE OPERATIONS FEATURED **IN CAPABILITIES EXERCISE**



Staff Sgt. Jarrod Rutland and Capt. Paulina Montgomery, 1<sup>st</sup> Space Brigade, prepare the MRZR vehicle with the SEEKr, a newer small form factor prototype, to support and move tactically for the Ranger Regiment raid during the U.S. Army Special **Operations** Command's Capabilities Exercise, April 23-27, 2023, at Fort Bragg, North Carolina. (U.S. Army photo)

The 1<sup>st</sup> Space Brigade joined cyber and special operations partners – known collectively as the Triad – to demonstrate their unique interoperability, capabilities and Army requirements during the U.S. Army Special Operations Command's Capabilities Exercise, April 23-27, 2023, at Fort Bragg, North Carolina.

The brigade's Soldiers integrated capabilities and space operations into the exercise to show how the Triad supports multidomain and fullspectrum operations and provides the joint force with an enhanced capability to see, sense, stimulate, strike and assess across the spectrum.

"During execution, all partners gained greater planning expertise on mutually supporting capabilities in direct support of operations utilizing multidomain formations and platforms," said Capt. Andrews Weliver, deputy, 1<sup>st</sup> Space Brigade Space Control Branch.

The brigade's five-Soldier crew was split into two teams. The primary crew operated the portable integrated ground suite on the space range providing live effects during the exercise. The secondary crew operated the monitoring and archiving system providing electronic surveillance capabilities, which Capt. Paulina Montgomery, crew officer in charge, 1<sup>st</sup> Space Brigade, said was livestreamed to spectators to show space effects in real time.

Space Soldiers are normally unable to observe the battlefield while providing space support, so the exercise provided a unique experience for them, Montgomery said.

"Soldiers provided real-time space effects in an immersive, multidomain experience," Montgomery said. "These operations enabled space Soldiers to observe all layers of the battle transpiring simultaneously, enhancing their knowledge of how space fits into the bigger picture of multidomain operations."

The participation of Triad partners in these types of exercises was an opportunity to demonstrate how when their capabilities are integrated, they enable effects no single component can deliver by itself.

Through this robust noncombatant evacuation operation scenario, the 1<sup>st</sup> Space Brigade demonstrated to senior leaders how Triad equities work simultaneously, and in harmony, to enable the successful execution of the operation, Weliver said

"Exercises like CAPEX give us unequivocal experience to refine and showcase this effort as we continue to evolve these concepts," Weliver said. "We look forward to additional opportunities to continue to train, integrate and perfect the Triad concepts to tangible effects across the complex battlefield geometry."

# SMDC<sup>BY</sup> NUMBERS A global command with personnel assigned to 13 time zones at 19 worldwide locations

11.049 Army personnel trained annually

2.300dedicated USASMDC employees worldwide

Space Control **Planning Teams** 

600 operational forces deployed worldwide

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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 multidomain combat effects; enhance



### **TECHNICAL CENTER**

The U.S. Army Space and Missile Defense Command 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 with the Army Test and Evaluation <u>Enterprise. (U.S. Army photo</u>) **C** The Technical Center is the Army lead for high energy laser technology development, providing advanced defense capabilities against rocket, artillery and mortar threats; unmanned aerial systems; and cruise missiles to complement kinetic defense solutions. **99** 

### **PURPOSE**

he 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, enabling 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 Director for Engineering and Test also oversees three systems integration labs for directed energy, long-range hypersonic and tactical space systems.

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 warfighter 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, providing advanced defense capabilities against rocket, artillery and mortar threats; unmanned aerial systems; and cruise missiles to complement kinetic defense solutions. Additionally, the Technical Center is exploring high-power microwave effects and advanced technology necessary to defend against a multitude of improvised threats.

### Tactical Space and High Altitude Technologies

As the Army's premier science and technology organization for spaceenabled science and technology, the Technical Center's Space Directorate develops, matures and transitions space-enabled capabilities and high-altitude technology in support of Army and joint warfighter



Christopher Duron, manager, Air and Missile Systems Integration Laboratory, right, and Bradley Bare, a contractor with Hill Technical Solutions/Valkyrie, perform system upgrades for U.S. Army Rapid Capabilities and Critical Technologies Office's Warfighter Exercise System on Dec. 2, 2022. The lab tests and integrates individual missile components and missile sub systems prior to flight tests or system upgrades to reduce risk. (U.S. Army photo by Carrie David Campbell)

multidomain operations. Working with the Army, DOD and industry partners, the Space Directorate focuses on counter surveillance and reconnaissance, Navigation Warfare Electronic Attack, radio frequency sensing, solutions for assured position, navigation and timing/ alternative navigation, and strategic capabilities.

#### **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 supports 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 warfighter training within an independent laboratory infrastructure.

#### Technology Complex

To prepare for the evolving mission requirements with the increased expectation of providing global space, missile defense, high-altitude and hypersonic capabilities, the maturation of the Technology Complex will include an expansion of the existing Directed Energy Systems Integration Laboratory and new laboratory facilities for directed energy, space, hypersonic, and integrated air and missile defense on the west side of Redstone Arsenal adjacent to DESIL and the Aerophysics Research Facility. The Technology Complex is poised to establish workspace for world-class science

and technology research to enable warfighter dominance today and in the future.

#### 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, Alabama; 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 204 Department of the Army civilians, seven military personnel and a budget of approximately \$624 million per year, split between about 60% direct funding and 40% reimbursable funding. Budget, personnel, contract and other recurring management activities are coordinated and executed by the Technical Center's Business Management Directorate.

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."



#### **PURPOSE**

The Test Directorate provides test execution and mission resource support for advanced hypersonic testing 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, threatrepresentative targets for use in Army and other government agency flight test programs. These targets utilize excess Army motors that are near the end of

### **TEST DIRECTORATE**

The Economical Target-2, a ballistic missile target designed to fly a ballistic flight path and demonstrate defensive protection capability, launches from White Sands Missile Range, New Mexico, Sept. 8, 2023, in a test launch. (U.S. Army Photo)

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 tests. The division provides command, control, and communication; 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 mission architecture planning and management, execution document development, mission execution team identification and training, deployment and retrograde support, and post-mission data analysis. Test resource support includes test range requirements definition and selection, capability augmentation, asset identification and schedule deconfliction. link margin analysis, and real-time asset coordination during the mission execution.

### RESEARCH DIRECTORATE

Concepts and Analysis Division interns Noah Strong and Carly Fridlin operate lab equipment in the Concepts and Analysis Laboratory to characterize a radio frequency system and inspect the Smith chart for impedance matching and reflection coefficients. (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 three divisions: the Weapons and Protective Technologies Division, the Multidomain Technology Division and the Concepts and 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 Weapons and Protective Technologies Division and the Multidomain Technology Division provide basic and applied research for key enabling technologies with applications across multiple mission areas. They explore technologies related to reducing size, weight and power; hypersonic weapons; high-power microwave weapons; communications; electrooptical/infrared/radio frequency; sensors; material properties; signatures and more.

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



The divisions operate 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, they develop and refine unique, high-payoff applications and concepts for technologies enabling warfighter dominance.

The Concepts and 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 DOD Science, Mathematics and Research for Transformation program, and other internship programs.

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



### PURPOSE

The Space Directorate provides a customerfocused approach to develop, integrate, demonstrate and transition space-enabled, counter-surveillance and reconnaissance, and high-altitude technologies used in tactical systems that are responsive to user requirements providing current and future 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.

### **IMPACT**

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.

### SPACE DIRECTORATE

Lauren Black, a contractor with Hill Technical Solutions/ Valkyrie, operates the Three Axis Motion Simulator used to test inertial measurement units for missiles at the Air and Missile System Integration Laboratory, Dec. 2, 2022. The lab tests and integrates individual missile components and missile subsystems prior to flight tests or system upgrades to reduce risk. (U.S. Army photo by Carrie David Campbell)

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 multidomain 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 highaltitude 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 multidomain 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 governmentowned 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 multidomain operations.

### SYSTEMS ENGINEERING DIRECTORATE

The Air and Missile Systems Integration Laboratory uses the Three Axis Motion Simulator to test inertial measurement units for missiles, Dec. 2, 2022. The lab tests and integrates individual missile components and missile subsystems prior to flight tests or system upgrades to reduce risk. (U.S. Army photo by Carrie David Campbell)

### 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 Space Systems Integration Lab, the Air and Missile Systems Integration Lab and the Digital Simulation and Analysis Center. The Systems Integration Labs apply subject matter expertise, hardware-in-the-loop, and state-ofthe-art modeling and simulation technologies for research, development, and test and evaluation applications supporting the development of prototype systems to mature technology, reduce risks and lower development and test costs.

Additionally, the Directed Energy Systems Integration Lab hosted its first high-energy laser system in 2023 to characterize beam and tracking performance of a developmental coherent beam combined

laser. The laser system would protect Soldiers from attacking small unmanned aircraft systems.

The Program Integration and Assurance Division, through the horizontal integration of mission assurance, risk management and cybersecurity, instills technical rigor across the Technical Center science and technology portfolio. Mission assurance provides a framework to introduce and execute systems engineering methods within the project 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 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 liaison engineering support to external organizations.



### **PURPOSE**

microwave technology for use in interdicting The Directed Energy Directorate provides and countering unmanned aerial systems. They directed energy technology to enable warfighter develop, integrate, demonstrate and transition dominance in a variety of mission areas. Research high-energy laser and high-power microwave technology and systems to the Rapid Capabilities and development of high-energy laser weapon technologies is conducted to evaluate and and Critical Technologies Office, program executive demonstrate the defensive and offensive application officers, program managers and users to provide of directed energy. Additionally, the director current and future Army and joint warfighter functions as the Technical Center adviser for directed capabilities. Directed energy technologies offer energy science and technology development. unique performance attributes that contribute to addressing existing operational capability gaps.

The directorate includes two divisions: the Directed Energy Technologies Division and the Lethality Division. The Directed Energy Technologies Division designs, The Directed Energy Technologies Division conducts develops and conducts experiments on high-energy basic and applied research and early technology laser technologies, components and systems to development to advance, evaluate, assess and address warfighter needs. The division manages the leverage relevant emerging high-energy laser weapon High Energy Laser Enabling Technologies Lab and technologies. The Lethality Division conducts applied is responsible for developing the next generation research and develops and evaluates high-energy of directed energy scientists and engineers. 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 microwave weapon system effectiveness against to ensure continuity across the Department of Defense. a wide variety of threats. The division manages the

The Lethality Division conducts research, experiments and evaluations of high-energy laser and high-power Solid State Laser Test Bed at White Sands Missile IMPACT Range, New Mexico, and collects data and develops The Directed Energy Directorate supports the Army vulnerability modules for integration into the fire modernization priorities, the Air and Missile Defense control systems, using results from laser/material Cross Functional Team science and technology interaction experiments and effectiveness studies.

### DIRECTED **ENERGY** DIRECTORATE

Members of the U.S. Army Space and Missile Defense Command Technical Center's Distributed Aperture Research integrates multifrequency band 2.4 meter antennas into the transportable distributed aperture system. The transportable system allows for rapid experimentation and processing for distributed aperture research. (U.S. Army photo)

priorities and the Fires Center of Excellence electric fires capability needs. The directorate explores the use of high-power

### RONALD REAGAN BALLISTIC MISSILE DEFENSE TEST SITE

The Ronald Reagan Ballistic Missile Defense Test Site at U.S. Army Garrison-Kwajalein Atoll, Republic of the Marshall Islands, houses many world-class suite instruments including the Advanced Research Project Agency Long-Range Tracking and Instrumentation Radar, pictured. The suite also includes telemetry radio frequency systems, electro-optical systems, command and control systems, flight safety command-destruct systems, mission data networks and communication systems. (U.S. Army photo)

### **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, electrooptical systems, command and control systems, flight safety command-destruct 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, USSPACECOM 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.

### DIRECTED ENERGY PROTOTYPE SYSTEM UNDERGOES TTP DEVELOPMENT

A Soldier from the 4<sup>th</sup> Battalion, 60<sup>th</sup> Air Defense Artillery Regiment, conducts maintenance familiarization during the Directed Energy Maneuver-Short Range Air Defense new equipment training and live fire exercise. As part of the Army's first DE M-SHORAD prototype platoon delivered in September 2023, the unit's Soldiers received user training to learn how to operate and employ high-energy laser systems as well as develop tactics, techniques, and procedures. (U.S. Army photo)

Once a project born out of the U.S. Army Space and Missile Defense Command Technical Center, the Directed Energy Maneuver-Short Range Air Defense, or DE M-SHORAD, is finally undergoing user training with the 4<sup>th</sup> Battalion, 60<sup>th</sup> Air Defense Artillery Regiment, at Fort Sill, Oklahoma.

Four DE M-SHORAD prototype systems, a 50kW high-energy laser that's integrated into a Stryker vehicle, were delivered to the battalion from the U.S. Army Rapid Capabilities and Critical Technologies Office, the first arriving on June 1, 2023, and the last arriving on Sept. 7, 2023. This made the unit the first battalion with directed energy capabilities.

"The directed energy system is self-contained, and you just need extra diesel fuel for the vehicle," said Corry Cox, director of Research and Technology at the USASMDC Technical Center.

The ongoing user training will allow the battalion to learn how to integrate high-energy lasers with kinetic systems and the unit's capabilities, enabling the developers to collect tactics, techniques and procedures from lessons learned.

"This will be the first time that the Army has provided this capability to the user in quantities high enough





to support platoon operations," said Dee Formby, DE M-SHORAD deputy program manager. "The delivery of these systems will allow the user community the opportunity to refine system-level requirements while learning to optimize employment of directed energy capabilities on the modern battlefield through the development of tactics, techniques and procedures at the platoon level."

Formby said they are utilizing Soldier feedback to inform threshold requirements and drive design and technology improvements going forward.

Formby has been with the program since its inception at the Technical Center, which was originally a Technology Maturation Initiative called the Multi-Mission High Energy Laser.

"I am very impressed with how far the technology has come since I started working in directed energy," Formby said. "In 2012, I supported an Analysis of Alternatives, and this system was just a concept at that point. To see it mature to a level where it is now in the hands of Soldiers is really amazing."



### SPACE & MISSILE DEFENSE CENTER OF EXCELLENCE

Capt. Kristin Bruce, space operations officer, G-35 Plans, Analysis and Futures, U.S. Army John F. Kennedy Special Warfare Center and School, briefs cadets during the U.S. Military Academy's Branch Week at West Point, New York, Sept. 5-8, 2023, about the Army Functional Area Transfer program and her experiences as, and the duties and positions of, FA40s. (U.S. Army photo by Jason Cutshaw) 118019

**66** 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. **99** 

### **PURPOSE**

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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 wellpositioned 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 multidomain 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 Office of the Chief of Space and Missile



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

Defense, 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 12,000 students annually; · Designing and documenting future space and missile defense organizations; · Designing, performing and 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.

Timothy F. Bishop was appointed as the new Center of Excellence director in 2023. He began his senior executive service in January 2019. His career includes professional leadership experience in a variety of government acquisition positions involving the development, testing, production, fielding, sustainment, and life-cycle support of major simulation, training and instrumentation systems. Bishop is a graduate of the University of Alabama in Huntsville with a Bachelor of Science in electrical and computer engineering. He holds a Master of Science in strategic studies from the U.S. Army War College in Carlisle, Pennsylvania.

The Space Operations Training Division trained and educated 2,802 Soldiers across 12 courses. The Missile Defense Training Division trained and educated 121 Soldiers across 10 courses. The Army Space Training Division trained and educated 8,923 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 46 Soldiers and staff as part of the U.S. Army Training and Doctrine Command-required staff and faculty training and certification program.



#### **PURPOSE**

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

The CDID conducts space, high altitude and missile defeat concept development, wargaming and experimentation, studies and analysis, and modeling and simulations. Additionally, the CDID develops or adopts leap-ahead concepts and technology, provides requirements determination and life-cycle management, and manages force modernization organizational design. The CDID integrates doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy solutions for multidomain operations. The CDID performs these responsibilities integrated with the U.S. Army Training and Doctrine Command Combined Arms Center and the Army Futures Command, Futures and Concepts Center 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, represent the AFC commanding general and report to the USASMDC commanding general. The ACM SHA is the Army's centralized fielded force integrator for space and high-altitude capabilities and synchronizes all

### CAPABILITY DEVELOPMENT INTEGRATION DIRECTORATE

A launch team member with stratospheric balloon company Urban Sky prepares to launch a balloon capable of carrying imaging, communication or other technologies across long distances during a demonstration competition hosted by the U.S. Army Space and Missile Defense Command's Space and Missile Defense Center of Excellence on Dec. 12, 2023. As the Army proponent for high altitude, the command identifies, demonstrates and assesses high-altitude capabilities in support of the Army's needs and in the context of multidomain operations. (U.S. Army photo by Brooke Nevins)

DOTMLPF-P solutions. The ACM SMD is the Army's user representative and integrator for all DOTMLPF-P considerations for strategic missile defense.

The Concept Development Division establishes the conceptual foundation for emerging and future USAMSDC mission areas. Working with partners, the division conducts concept and technology exploration and assessment; integrates USASMDC force modernization proponency equities in wargames, experimentation and studies; and develops and integrates concepts and future force organizational design. Concept development efforts drive Army institutional decision-making processes such as the Total Army Analysis and program objective memorandums and directly contribute to designing the Army of 2040 and delivering the Army of 2030.

The Decision Support Division provides computational and network resources, cyber vulnerability testing, modeling and simulation, and operational analysis. These activities support the development of the concept of operations, system acquisition decisions and ensure joint and Army warfighters have the best space, missile defense, high-altitude and directed energy capabilities today and in the future.

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.

### SPACE & MISSILE DEFENSE SCHOOL

J.K. Chesney, Army Space Training Division, Space and Missile Defense School, teaches about operating in a denied or degraded space environment to students attending the Signal Basic Officer Leader Course at the Cyber Center of Excellence. (U.S. Army photo)

#### 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, high-altitude and global ballistic missile defense; supports space and missile defense doctrine, organization design, training, materiel development, 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. A key document driving policy updates is the newly published Army Space Vision Supporting Multidomain Operations. The SMD School will ensure the vision is incorporated across the Army and work with COEs and training centers to shape complex training environments.

#### **IMPACT**

The SMD School earned the U.S. Army's highest accreditation rating of fully accredited in February 2023. 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 accreditation review will occur in September 2025.

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. This leads to understanding threats to U.S. space capabilities and how space capabilities enable and enhance Army systems implementing multidomain operations through large-scale combat operations.

Global ballistic missile defense courses include: Ground-Based Midcourse Defense Fire Control Qualification Course; 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; and Command, Control, Battle Management, and Communications Planner Course.

Space courses include: Space Operations Officer Qualification Course; Space Senior Leader Course; Army Space Cadre Basic Course; Army Space Control Fundamentals Course; Army Space Control Planner Course; Mobile Integrated Ground Suite Initial Qualification Training; Tactical Space Operations Course Initial Qualifications Training; and Joint Tactical Ground Station Initial Qualification.

Army-wide space training include: 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; and Army Warfighter exercises.



#### 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.

### AIR & MISSILE DEFENSE INTEGRATION DIVISION

A Terminal High-Altitude Area Defense launcher and Transportable Tactical Command Communications node sits at the ready at Rota International Airport at Rota, Commonwealth of Northern Mariana Islands, March 1, 2022. (U.S. Army photo by Sgt. ]<sup>st</sup> Class David T. Chapman)

### 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 AMDID 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 multidomain 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.

### OFFICE OF THE CHIEF OF SPACE AND MISSILE DEFENSE/SPACE OFFICERS

Sgt. 1st Class Sonia Kiva, Headquarters and Headquarters Company, 117th Space Battalion first sergeant, asks a question during the 2023 FA40 Training Forum at Peterson Space Force Base, Colorado, Aug. 15-17, 2023. (U.S. Army photo by Dottie White)

#### PURPOSE

The Office of the Chief of Space and Missile Defense 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.

OCSMD conducts strategic planning, ensuring FA40 and non-FA40 Army space cadre billets are identified and tracked to support spacerelated missions and functions. Additionally, OCSMD 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 12 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 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.

OCSMD 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. OCSMD 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.

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



#### **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 Department of Defense agencies and their contractors, the Missile Defense Agency, 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 DOD networks to meet customer mission requirements. The SimCenter provides the 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

### CENTER OF EXCELLENCE LABORATORIES

Maj. Daniel L. Ward, an Army capability manager for Space and High Altitude senior user representative, and Decision Support Directorate leads Kevin Gentry (back left), Computational Engineering Branch; Steve Toler (front right), Modeling and Simulation Branch; and Martin Goodman (back right), Studies and Analysis Branch, discuss work in the U.S. Army Space and Missile Defense Command Space and Missile Defense Center of Excellence's Simulation Center at Redstone Arsenal, Alabama, Sept. 19, 2023. (U.S. Army photo by Carrie David Campbell)

against a comprehensive suite of cyberthreats 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" 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 battlemanagement 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.



### ARMY'S JTAGS MISSION TRANSFERS TO SPACE FORCE



The Joint Tactical Ground Station mission, originally under U.S. Army Space and Missile Defense Command's 1<sup>st</sup> Space Brigade, transferred to U.S. Space Force officially on Oct. 1, 2023.

The four JTAGS units located in Italy, Korea, Japan and Qatar monitor, process and disseminate infrared data from satellites to provide missile warning. USASMDC continues to assist in operating the stations, training personnel and crafting requirements during the transition.

"Over the course of the last year or so, the Space Force has been sending their guardians to the U.S. Army Space and Missile Defense School in Colorado Springs and then on to the various forward units," said Mike Nadler, chief of the Space and High Altitude Requirements Branch in the Space and Missile Defense Center of Excellence. "As the guardians come in, the Army has been drawing down the number of Soldiers at those sites. They keep the sites fully manned, but it has been and will continue to be a slow transition to 100% guardian manning." The transition is expected to be completed in April 2024, Nadler said. At that time, the JTAGS will be completely guardian-manned and the Army companies that previously operated them – 19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup>, and 22<sup>nd</sup> Space Companies – will be inactivated.

While the Army no longer operates and controls the JTAGS, it still uses data from the JTAGS for assured missile warning, missile defense and battlespace awareness for multidomain operations, Nadler said.

"The Army still has a vested interest to make sure the Space Force continues to provide the types and kinds of data from the satellites that the Army needs to execute its multidomain operations and missile defense," Nadler said. "The Space Force is operating them, but they have requirements and documents that they have to get through the joint staffing process, and it's that mechanism by which myself and my team continue to ensure the Space Force is not just meeting Space Force requirements, but Army requirements as well across all those mission areas. SMDC has the job to maintain the quality of service."





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### NASA DETACHMENT

A team carries Expedition 69 NASA astronaut U.S. Army Col. Frank Rubio to a medical tent shortly after he and Roscosmos cosmonauts Dmitri Petelin and Sergey Prokopyev landed in their Soyuz MS-23 spacecraft near Zhezkazgan, Kazakhstan, Sept. 27, 2023. The trio logged 371 days in space as members of Expeditions 68-69 aboard the International Space Station. For Rubio, his mission is the longest single spaceflight by a U.S. astronaut in history. (NASA photo by Bill Ingalls)

#### 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, including low-earth orbit spaceflight and deep space exploration initiatives.

There are currently three active duty astronauts: Col. Anne McClain, detachment commander, served aboard the International Space Station, December 2018 – June 2019; Col. Andrew Morgan, commander, U.S. Army Garrison-Kwajalein Atoll, served aboard the ISS, July 2019 – April 2022; and Col. Frank Rubio served aboard the ISS, September 2022 – September 2023. Rubio's 371 days in orbit breaks the 355-day record set in 2022 by astronaut Mark Vande Hei, a retired Army colonel.

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, 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. As members of the Artemis generation, they also provide invaluable



design and operational input to assist with the development of the spacecraft, spacesuits, training programs, and ground support architecture that will land the first woman and next man on the moon as part of the Artemis program.

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. They also support public outreach and education.

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.



#### **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 multidomain operations.

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

### CHIEF TECHNOLOGY OFFICE

The chief technology officer serves as the principal adviser to the commanding general and the deputy to the commanding general for science technology matters. (U.S. Army Graphic)

### 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 forces and cyber.

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. The center orchestrated USASMDC support of the space curriculum, which has more integration across academic departments at the academy than ever before and has more participation from cadets than in previous years.

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 Intelligence Integration Center to develop a strategy and way ahead for incorporating artificial intelligence into USASMDC missions.

They lead the Redstone Arsenal CTO Roundup, leveraging the core competencies that reside at Team Redstone and teaming on efforts that will enable multidomain operations. The 2023 roundup included a topic-based CTO Roundup, where experts from academia, Department of Defense and Army headquarters presented.

### **OFFICE OF SMALL BUSINESS**

#### **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 under-utilized 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 local APEX Accelerators (formerly the Procurement Technical Assistance Centers): www.apexaccelerators.us.

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. Registration and certification are required to be eligible to compete and win prime government contracts. 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://dsbs.sba.gov/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 the Small Business Administration Dynamic Small Business Search https://dsbs.sba.gov/search/dsp\_dsbs.cfm.

Prepare to meet with the USASMDC Small Business Office. Meetings can be either in person, by phone, or virtual. Have business capabilities that are in line with USASMDC requirements ready for discussion. Be prepared with business history, prime or



The U.S. Army Space and Missile Defense Command Technical Center's Directed Energy Systems Integration Lab contracts with Radiance Technologies, Inc., a small business, to support its instrumentation and architecture through a five-year, \$49 million contract. (U.S. Army photo by Carrie David Campbell)

subcontractor interests, and any unique capabilities. Ask about current contracting vehicles and how to locate upcoming opportunities. To schedule a meeting, see our contact information below.

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 APEX Accelerators events.

Seek additional assistance in the defense marketplace. APEX Accelerators 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, who can be a valuable resource for staying on top of regulatory updates/changes, such as limitations on subcontracting, program guidance, and 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-businessoffice@army.mil



# JOINT FUNCTIONAL COMPONENT COMMAND

Jasiel L. Karble

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Former commanding general, Joint Functional Component Command for Integated Missile Defense, Lt. Gen. Daniel Karbler joins team members for a photo at Fort Carson, Colorado, Sept. 27, 2023. (U.S. Army photo)

#### **PURPOSE**

Lt. Gen. Sean Gainey is the commander of U.S. Space 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 USSPACECOM with primary responsibility for transregional 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 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 transregional missile defense planning and operations support. JFCC IMD assesses and recommends acceptance of new missile defense

**C** In coordination with other combatant commands, the services, and as directed, appropriate U.S. government agencies, JFCC IMD conducts transregional missile defense planning and operations support. **99** 

capabilities, and JFCC IMD performs transregional missile defense responsibilities that support U.S. and coalition executes joint and combined missile defense operations across multiple regions. This requires training and education synchronization between affected commands for the USSPACECOM to maximize integration of the capabilities necessary to deter, prevent or respond to attacks commander. and to nullify or reduce the effectiveness of Objectives for these a threat. Combatant commands designated efforts are to deter with responsibility for an adversary problem adversaries, assure allies, set must approach missile defense from a and defend U.S. deployed global perspective given the transregional forces, allies and partners nature of the threat; the low-density, highagainst missile attacks. demand nature of missile defense platforms; and complex architecture of sensors, shooters, JFCC IMD translates and command and control nodes spanning this responsibility into multiple geographic areas of responsibility. JFCC several lines of effort: IMD provides direct support to these efforts.

 Conduct transregional 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 integrated air and missile defense training and education Assess warfighter missile defense needs in support of capability development, testing and fielding

#### **IMPACT**

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> 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 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.



### USSPACECOM RECIEVES TRANSREGIONAL MISSILE DEFENSE MISSION

The Joint Functional Component Command for Integrated Missile Defense is transferring from U.S. Strategic Command to U.S. Space Command.

The move is part of migrating responsibility for transregional missile defense to USSPACECOM from USSTRATCOM as directed by the 2022 Unified Command Plan, April 25, 2023, and the Secretary of Defensesigned Missile Defense Roles Responsibilities and Authorities Implementation Plan. JFCC IMD will complete this transition on Oct. 1, 2024, when all personnel and fiscal responsibility will transfer to USSPACECOM. Until then JFCC IMD has been placed in direct support of USSPACECOM by agreement between the gaining and losing commanders.

"Integration of systems and fighting doctrine is critical to modern warfare," said Gen. James Dickinson, former USSPACECOM commander. "By bringing the three mission areas of missile warning, missile defense and space domain awareness under one command as the Global Sensor Manager, USSPACECOM can more effectively integrate and fuse the sensor data for rapid detection, characterization, tracking and dissemination to ensure theaters can defeat any threat."

Lt. Gen. Daniel L. Karbler, former U.S. Army Space and Missile Defense Command and JFCC IMD commanding general, proposed that USSPACECOM become the missile defeat effects coordinator as part of its missile defense responsibilities.

"With the transfer of the transregional missile defense mission to USSPACECOM and the convergence of space domain awareness, missile defense/missile warning in support of their global sensor management responsibilities, I believe



USSPACECOM is well-positioned to assume the missile defeat effects coordinator role," Karbler said.

JFCC IMD would support this new role for
USSPACECOM ensuring better integration of space,
cyber, special operations forces, and strike effects
(with interagency coordination) by providing:
The presentation of cohesive, mutually supportive solutions to supported combatant commanders
Integrated effects applied across multiple domains to gain/maintain advantage
Leveraging left-of-launch capabilities to mitigate need for costly, difficult hit-to-kill defense
Explore and apply new, novel, active, passive and attack operations across all warfighting domains
Provide centralized visibility, coordination, and repository of information on non-Department of Defense missile defeat activities

"I believe there are synergies to be gained with USSPACECOM serving as the lead for missile defeat effects coordination, articulating required warfighter needs, and developing concepts of employment for incorporation into [combatant command] plans," Karbler said. "Much of this work is being done in my role as commander, JFCC IMD, but it is also integrated into what we're doing at SMDC."



### U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND

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