



2019 GLOBAL DEFENDER

A GUIDE TO USASMDC/ARSTRAT

U.S. Army Space and Missile Defense
Command/Army Forces Strategic Command





Commander's Message

Lt. Gen. James H. Dickinson

The 2019 *Global Defender* highlights the strategic missions of U.S. Space and Missile Defense Command/Army Forces Strategic Command and the Joint Functional Component Command for Integrated Missile Defense.

From trained and ready space and missile defense forces, to pioneering doctrine and concepts, to innovative research and development, these stories spanning the commands' broad portfolios showcase a selection of the many readiness and modernization efforts we undertake every day, ensuring the U.S. Army and joint forces maintain a technical overmatch and lethality advantage.

USASMDC/ARSTRAT leads the Army's science and technology development portfolios in directed energy, hypersonic weapon development, and space system demonstrations, in close collaboration with three of the eight Army Futures Command Cross-Functional Teams: Air and Missile Defense; Army Network and Assured Positioning, Navigation, and Timing; and Long Range Precision Fires. These technology efforts will deliver critical capabilities to provide a decisive advantage in Multi-Domain Operations and realize the Army Vision for 2028.

After more than two years in command, I have seen countless examples of how our strength lies in both commands' agile and adaptive space and missile defense workforce – a team of more than 3,000 highly trained and skilled Soldiers, Sailors, Airmen, Marines, and Civilians who stand vigilant 24/7/365, protecting the joint warfighter and defending the homeland. Together, their hard work, ingenuity, and perseverance enable us to overcome any challenge.

As you read the publication, consider the forces and their families who sacrifice daily for this great Nation to protect our freedoms. Above all, we remain unwavering in our commitment to them.

Through the *Global Defender* we'll celebrate the successes and share the stories of those who are shaping the future of space and missile defense.

Secure the High Ground! Vigilant for the World!



"With the Army in the midst of the largest modernization effort since the end of the Vietnam War, the demand for space, missile defense, and high altitude capabilities continues to grow."

BY THE NUMBERS

11
23

A global command with personnel assigned in time zones at worldwide locations

4

Joint Tactical Ground Stations delivering theater missile warning

5

Wideband SATCOM Operations Centers

2.2

million Force Tracking reports distributed daily

700

operational forces deployed worldwide

4

Regional SATCOM Support Centers

11,756

Army personnel trained annually

200

space and missile defense courses

5

Forward-Based Mode Batteries

2

active duty Army Astronauts;

1

Army Astronaut candidate

2,800

dedicated SMDC/ARSTRAT employees worldwide

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

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THE 2019 GLOBAL DEFENDER: A Guide to SMDC/ARSTRAT

COMMAND STAFF

LTG James H. Dickinson
Commanding General

CSM Finis A. Dodson
Command Sergeant Major

James B. Johnson Jr.
Deputy to the Commander

BG Tim C. Lawson
*Deputy Commanding
General for Operations*

COL Joseph McCallion
Chief of Staff

EDITORIAL STAFF

Lira Frye
Director of Public Affairs

Carrie David Campbell
Command Information/Editor

Jason Cutshaw, *Contributor*

Ronald Bailey, *Contributor*

Melissa Bullard, *Contributor*

Cecil Longino, *Contributor*

Dottie White, *Contributor*

Staff Sgt. Zachary Sheely, *Contributor*

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/Army Forces Strategic Command. The editorial content of this publication is the responsibility of the SMDC/ARSTRAT Public Affairs Office.

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

On front cover

From left; U.S. Army astronaut; Space and Missile Defense School training; SMDC/ARSTRAT shoulder sleeve insignias; Ronald Reagan Ballistic Missile Defense Site Command Center; Black Dagger/Boosted Zombie Target.

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USASMDC/ARSTRAT

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command provides a number of space, missile defense and high altitude capabilities to the Army, joint force and its partners. Joint Tactical Ground Stations, shown here, are one of these capabilities. (Photo by Carrie David Campbell)



CSM Finis A. Dodson,
Command Sergeant
Major

“Often operating from austere locations thousands of miles from the flagpole, USASMDC/ARSTRAT’s mission-focused noncommissioned officers and enlisted Soldiers demonstrate unique technical expertise. Proving their leadership abilities, they constantly maintain the highest levels of readiness.”

One synchronized USASMDC/ARSTRAT team develops and provides leading-edge space, missile defense, and high altitude forces and capabilities for the Warfighter and for the Army – wherever and whenever required.

Throughout a year of change within the Department of Defense, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command remained focused on providing space, missile defense and high altitude capabilities so combatant commanders can fight and win today.

The Army’s senior air and missile defender, Lt. Gen. James H. Dickinson, spent his second full year at the helm, leading the command’s roughly 2,800 Soldiers and Department of the Army civilians as they performed missions in 23 different locations in 11 time zones around the world.

As the lead for Army space and missile defense efforts and one of 10 Army Service Component Commands, SMDC/ARSTRAT oversees operational space and missile defense missions around the globe. From trained and ready space and missile defense forces to innovative doctrine and concept to research and development, SMDC/ARSTRAT never slows.

Leading Army high energy laser science and technology development, SMDC/ARSTRAT has been extensively experimenting with vehicle-mounted lasers in counter-unmanned aerial vehicle applications. The Mobile Experimental High Energy Laser, a Stryker equipped with a 10-kW laser, has successfully engaged targets including fixed and rotary wing UAVs during multiple Maneuver Fires Integration Experiments at Fort Sill, Oklahoma, and at the Joint Warfighter Assessment in Germany. At both MFI-18 and JWA 18.1, the MEHEL was operated by Soldiers.

In May, the command initiated a Multi-Mission High Energy Laser effort that will put a 50-kW laser on a Stryker and inform requirements for Mobile Short-Range Air Defense, or

M-SHORAD. Another effort has a High Energy Laser Mobile Test Truck outfitted with a 50-kW laser, as a step toward a High Energy Laser Tactical Vehicle Demonstrator, which will have a rugged, mobile tactical platform.

The positive results do not end there. The SMDC Technical Center’s Kestrel Eye, a small, low-cost, visible-imagery satellite prototype designed to provide near real-time images to the tactical-level ground Soldier, received its first images from space. Kestrel Eye proved the concept of using microsatellites to provide a visible imaging capability that is directly tasked by and responsive to the Soldier.

With increased Department of Defense interest in hypersonic technology development, the Army began the establishment of an Army Hypersonic Project Office. The office will oversee development of a common hypersonic glide body for use by each of the services as well as development of an Army long-range hypersonic weapon.

Shifting from research and development to operations, in October 2018, the 100th Missile Defense Brigade, a one-of-a-kind, multi-component unit operating the nation’s ground-based midcourse defense system, celebrated its 15th anniversary. Their critical, no-fail mission, protects the homeland against a ballistic missile launch.

In December, Army astronaut Lt. Col. Anne McClain, along with crewmates David Saint-Jacques of the Canadian Space Agency and Oleg Kononenko of the Russian Space Agency Roscosmos, launched from the Baikonur Cosmodrome in Kazakhstan for a six-month rotation on the International Space Station as a flight engineer for Expedition 58/59.

SMDC/ARSTRAT provides support to NASA with an Army astronaut detachment assigned to the Johnson Space Center in Houston, Texas. The detachment currently has two astronauts, Col. Andrew Morgan and McClain, and one astronaut candidate, Lt. Col. Frank Rubio. Morgan is slated to launch to the ISS during summer 2019.

Whether providing research and development or operations, the many and varied professionals at SMDC/ARSTRAT work toward supporting the command’s priorities, which are to:

- Protect the homeland;
- Provide combat-ready forces and capabilities;
- Plan and conduct synchronized global operations;
- Prepare or adopt leap-ahead concepts and technologies;
- Preserve and account for the nation’s critical resources; and
- Promote and foster a positive command climate

As the nation’s adversaries continue to develop military capabilities, the demand for space and missile defense increases. In the coming year, the command’s agile, adaptive, and ready space and missile defense workforce of service members and civilians will continue to perform the critical strategic missions that support the Soldier and the joint force every day.



James B. Johnson Jr.,
Deputy To The
Commander

“What we do every day is essential to America’s defense. Our dedicated workforce ensures America’s military advantage now and in the future. Our people are our greatest asset, and together we consistently overcome any challenges to accomplishing our mission.”



BG Tim C. Lawson,
Deputy Commanding
General for Operations

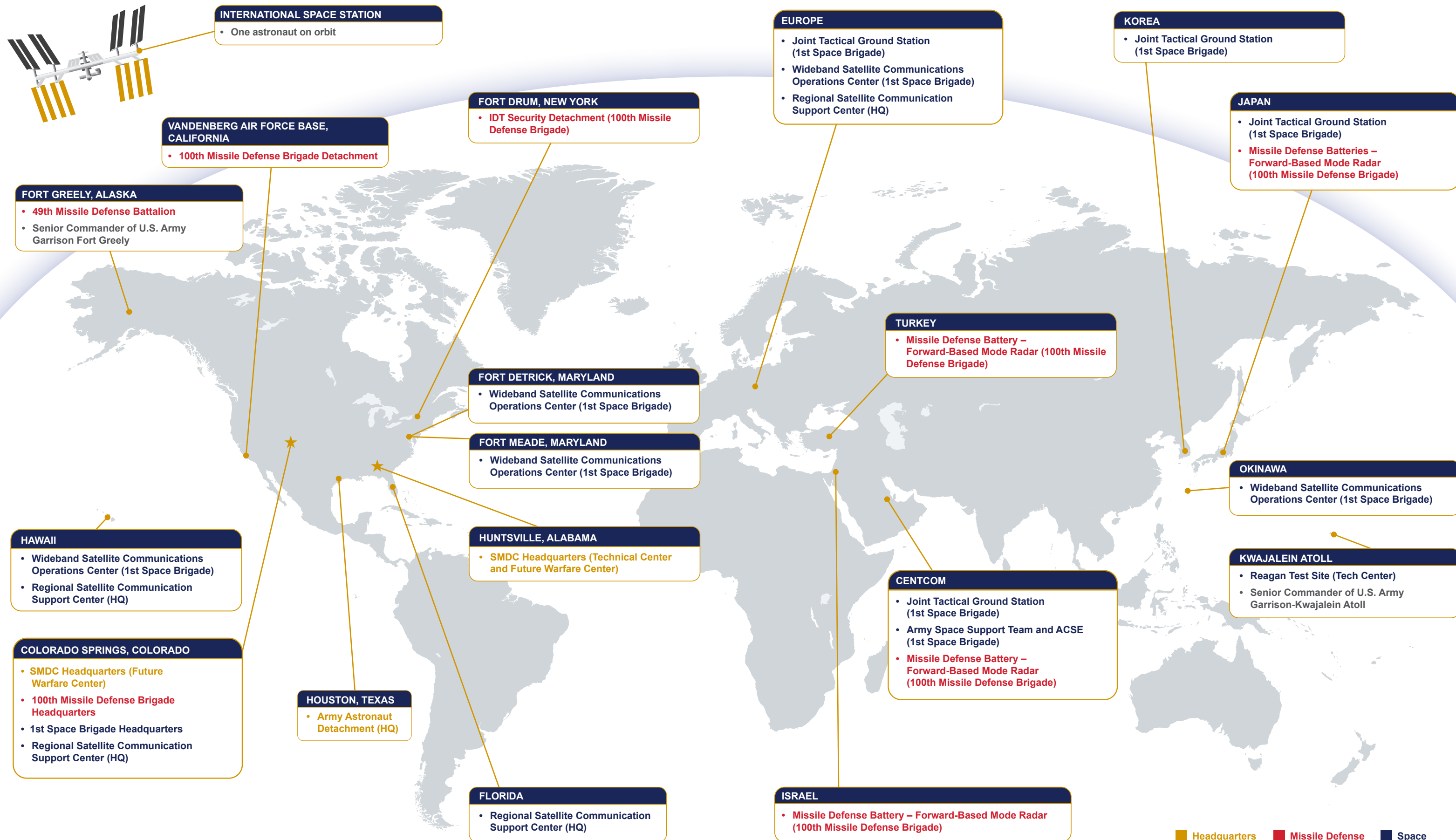
“Small in terms of numbers, but big in terms of capability, our highly skilled space and missile defense forces perform critical, no-fail missions 24/7, around the globe. They are always ready to answer the nation’s call.”



USASMDC/ARSTRAT

A globally responsive command

2,800 DEDICATED EMPLOYEES WORLDWIDE WITH MORE THAN 700 OPERATIONAL FORCES FORWARD STATIONED OR DEPLOYED



Unified team provides superior capabilities to the Army, joint forces and allies

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command is the Army's force modernization proponent and operational integrator for global space, missile defense and high altitude capabilities.

SMDC/ARSTRAT 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 SMDC/ARSTRAT across 11 time zones and 23 dispersed locations is a commitment to defending the nation and its allies.

Along with the command's Technical Center and Future Warfare Center, there are two major subordinate military



Soldiers from Company E, 53rd Signal Battalion, pose in front of one of their radomes at the Wideband Satellite Communications Operations Center in Okinawa, Japan. (Photo by Carrie David Campbell).

elements, the 100th Missile Defense Brigade (Ground-based Midcourse Defense) and the 1st Space Brigade.

The missile defense brigade operates the ground-based midcourse defense system and functions as the missile defense component of the missile defense enterprise of the command. The GMD mission is conducted in support of U.S. Northern Command, and manned by Army National Guard and active-component Soldiers in Colorado and Army National Guard Soldiers in Alaska and California.

Operating under the brigade are Soldiers of the 49th Missile Defense Battalion. These Soldiers not only operate the GMD system but provide security for the Missile Defense Complex at Fort Greely, Alaska.

Leading the command in space operations is the 1st Space Brigade. The brigade consists of the 1st Space Battalion, 2nd Space Battalion and 53rd Signal Battalion, as well as the 117th Space Battalion under a direct support relationship.

The 1st Space Brigade conducts continuous space force enhancement, space support, and space control operations in support of combatant commanders, enabling and shaping decisive operations.

The Technical Center manages science, technology, research and development. Further, it conducts test programs for space, integrated air and missile defense, directed energy, hypersonics 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 that meet today's requirements and addresses future needs enabling warfighter effectiveness in the core competencies of directed



Soldiers of the 49th Missile Defense Battalion man the ground-based interceptor at Fort Greely, Alaska. (U.S. Army photo)

energy, space, high altitude systems, cyberspace and missile defense.

The SMDC ARSTRAT Technical Center successfully completed the first hypersonic boost glide test in 2011 and supported the Navy's successful hypersonic test in 2017. The Army Hypersonic Project Office is standing up in 2019 at Redstone Arsenal. It will be responsible for producing a common hypersonic glide body, or C-HGB. The services and MDA will adapt the C-HGB to meet their specific requirements. The office will also oversee the development of the Army's long-range hypersonic weapon, or LRHW.

The Future Warfare Center 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.

It develops and integrates innovative doctrine, concepts, and capabilities; trains and educates agile, adaptive,

and ready Soldiers and leaders; executes life-cycle management for FA40 Army space operations officers; develops the Army space cadre; and enables informed decision making through studies, analysis, modeling and simulation within the capabilities of Army and joint space, missile defense and high altitude.

SMDC/ARSTRAT is also the Army proponent for the Army astronaut program. Army astronauts help the Army define its requirements for the space program and enhance the Army's use of space capabilities.

The SMDC/ARSTRAT commanding general also has several other responsibilities: He serves as the senior commander of both Fort Greely, Alaska, 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 to enable unit readiness; he is the Army's Air and Missile Defense Enterprise Integrator; and he serves as the commander of U.S. Strategic Command's Joint Functional Component Command for Integrated Missile Defense.



100th Missile Defense Brigade



COL Christopher M. Williams
Commander



CSM Jeffery F. Coker
Command Sergeant Major

PURPOSE

The 100th Missile Defense Brigade operates the ground-based midcourse defense system and functions as a component of the missile defense enterprise of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. It is a role they have fulfilled for more than 15 years. The GMD mission is the ultimate defense of the homeland, conducted in support of U.S. Northern Command and manned by U.S. Army National Guard and active-component Soldiers in Colorado, Alaska and California. The 100th Missile Defense Brigade is tasked with conducting a presidentially directed national security mission to defend the United States against the threat of intercontinental ballistic missile attack.

The brigade is headquartered in Colorado Springs, Colorado. The team includes brigade staff, Headquarters and Headquarters Battery, and five Missile Defense Element crews serving at Schriever Air Force Base, Colorado. The 49th Missile Defense Battalion, the brigade's major subordinate element is located at Fort Greely, Alaska.

Missile Defense Element crews from the 100th Missile Defense Brigade man and control the GMD system 24/7/365. They are responsible for the strategic-level execution of the GMD mission to protect the homeland. These five-Soldier crews provide both operational and tactical recommendations to the commander of USNORTHCOM while synchronizing operations and conducting fire distribution.

IMPACT

Missile Defense Element

Soldiers of the 100th Missile Defense Brigade are part of a unique multi-component organization. The brigade headquarters consist mainly of full-time active guard and reserve Colorado Army National Guardsmen. The unit also includes a small contingent of active-component Army Soldiers. Although it is a National Guard organization, all of its Soldiers are full-time active duty, Title 10 or Title 32.

To perform their national security mission, all 100th Missile Defense Brigade Army National Guard Soldiers, to include the 49th Missile Defense Battalion, operate in a dual status. This allows them to automatically transition between Title 10 federal active-duty and Title 32 National Guard status. The brigade and battalion commanders are uniquely authorized by the president to simultaneously command Soldiers in both statuses.

A small contingent of California Army National Guard Soldiers operates at Vandenberg Air Force Base, California, performing liaison and asset management of the ground-based interceptors located there. There is also a detachment of Soldiers and Department of the Army civilians located at Fort Drum, New York. This detachment is responsible for the security of the In-Flight Interceptor Communications System Data Terminal. The brigade also maintains a relationship with AN/TPY-2 missile defense batteries located in U.S. Pacific Command, U.S. European Command and U.S. Central Command, conducting synchronized global operations in support of the GMD mission.

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

Training

To be gunnery-table certified to operate the GMD Fire Control System, a Soldier is required to complete the seven-week GMD Fire Control Qualification Course at Schriever Air Force Base. The Soldier will then undergo position and crew training directly with their newly assigned crew and will then be gunnery-table certified with the crew by the SMDC/ARSTRAT Operational Readiness Evaluation team. This entire process of certification may take anywhere from three to six months to complete, depending on the Soldier's previous qualifications and school availability dates.

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

System

The GMD system utilizes leap-ahead concepts and technologies through a spiral development acquisition process. The tip of the spear for the GMD system is its ground-based interceptor with an Exoatmospheric Kill Vehicle. Once the ground-based interceptor is outside the atmosphere, the boost vehicle releases the Exoatmospheric Kill Vehicle on an intercept trajectory toward a hostile missile's warhead.

From release, the EKV seeks out the target using multicolor sensors, a cutting-edge onboard computer and a series of rocket boosters used for independent course

correction in space. The EKV homes 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; Cobra Dane, upgraded early warning radars; AN/TPY-2, transportable X-band radars; Aegis weapon system radar 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 Exoatmospheric Kill Vehicle.



Sgt. Brandon Barnes, a team leader with Company A, 49th Missile Defense Battalion, scans the landscape of Fort Greely, Alaska, from a Humvee turret Aug. 21, 2018, during exercise Guardian Watch 18. (Photo by Army National Guard Staff Sgt. Zachary Sheely)

49th Missile Defense Battalion

PURPOSE

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



Sgt. Bethany Hendren, communications operator of a missile defense crew, 49th Missile Defense Battalion, monitors her screens at the Fire Direction Readiness Center at Fort Greely, Alaska, Sept. 26, 2018. (Photo by Army National Guard Staff Sgt. Zachary Sheely)

IMPACT

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

Fire Direction Center crews from the 49th Missile Defense Battalion operate the GMD system 24/7/365 in conjunction with 100th Missile Defense Brigade personnel at Schriever Air Force Base, Colorado. They are responsible for the tactical-level execution of the GMD mission to protect the homeland – that is to say that they “fight the current fight.” These five-Soldier crews provide tactical recommendations to the commander of U.S. Northern Command while synchronizing and coordinating activities on the Missile Defense Complex, or MDC.

The 49th Missile Defense Battalion’s Alpha Company is a one-of-a-kind military police company and is the only MP company in the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. The Soldiers of Alpha Company conduct 24/7/365 site security operations at the MDC. The MDC is a national defense critical site and is the location 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, Alpha Company Soldiers also support the U.S. Army Cold Region Test Center by testing the latest cold weather gear and other equipment.

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

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



49th Missile Defense Battalion tests its METL



Soldiers of the 100th Missile Defense Brigade and the 49th Missile Defense Battalion conduct an 84-hour exercise that tests the battalion on 28 tasks and many performance measures within its two missions at Fort Greely, Alaska, Aug. 20-24, 2018. (Photo by Army National Guard Staff Sgt. Zachary Sheely)

The 100th Missile Defense Brigade conducted Guardian Watch 18, Aug. 20-24, 2018 at Fort Greely, Alaska. It is an 84-hour exercise that tests the battalion on 28 tasks and many performance measures within its two missions: defending the United States from intercontinental ballistic missile attack and critical site security of the Missile Defense Complex at Fort Greely.

“It makes me proud to see their success,” said 1st Lt. Jarrod Cuthbertson, missile defense operations research and development, 100th Missile Defense Brigade. “I was honored to be a part of the planning and execution of this evaluation so I could see the amount of training and dedication all the Soldiers have put into accomplishing this mission.”

Cuthbertson said this was the largest external evaluation the brigade has ever planned and included the validation of military police readiness and medical response, as well as personnel and supply coordination. It also was the pilot for an upcoming program to train, certify and validate missile defense crews through new Table 12 requirements, which will take crews to the next level of readiness. In these tables, crews will be certified to conduct the ground-based midcourse defense mission in increasingly challenging conditions.

Twenty-four external evaluators from the brigade, and Colorado and Alaska national guards served as observer/controllers and exercise supervisors. Sixteen military police Soldiers from the 193rd Military Police Battalion, Colorado Army National Guard, and 297th Military Police Battalion, Alaska Army National Guard, role-played opposing forces, waging a series of mock attacks on the Missile Defense Complex to test the response of the military police who defend and secure the complex.

The attack scenarios proved challenging, but Sgt. Luis Gutierrez, a team leader with Company A, said the Soldiers were prepared to respond.

“The best way to describe this exercise would be ‘dynamic chaos,’” said Gutierrez. “It was complex; it was hard. There were so many (opposing forces) at the same time, which made it feel real. This boosted our confidence and our readiness.”

Ever mindful of their critical role in missile defense, the 49th Missile Defense Battalion also practiced its actions in the event of a ground-based interceptor launch. The tactics, techniques and procedures exercised as part of the post-launch actions included not only the battalion, but also involved Fort Greely garrison and materiel developers for a cohesive response.



1st Space Brigade



COL Eric D. Little
Commander



CSM Robert Bell
Command Sergeant
Major

PURPOSE

The 1st Space Brigade conducts space operations to deliver decisive combat power in support of the Army and joint warfighting communities. Headquartered in Colorado Springs, Colorado, the brigade supports joint forces and their critical dependence on space capabilities and products through the unique mission sets of its subordinate battalions and associated unit battalion.

IMPACT

The 1st Space Brigade supports warfighters around the world through the activities of three subordinate battalions and one associated unit relationship. The subordinate battalions include the 53rd Signal Battalion (Satellite Control), which originally stood up in 1995 as the 1st Satellite Control Battalion; the 1st Space Battalion, which stood up in 1999; and the 2nd Space Battalion, which stood up in 2017. The brigade itself was 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.

Today, the 53rd Signal Battalion provides wideband payload control, transmission control and defensive control for the Wideband Global SATCOM and legacy Defense Satellite Communication System constellations. The battalion consists of a Headquarters and Headquarters Company and five Wideband SATCOM Operations Centers. Global coverage is provided by two WSOCs in Maryland, and one each in Germany, Japan and Hawaii.

The 1st Space Battalion consists of a Headquarters and Headquarters Company;

1st Space Company with four Joint Tactical Ground Stations in Europe, Korea, Japan and the U.S. Central Command area of operation; 2nd Space Company with six Army Space Support Teams; and 4th Space Company with six space control detachments.

The 2nd Space Battalion consists of a Headquarters and Headquarters Company; 3rd and 5th Space Companies with five ARSSTs each; and 8th Space Company with three space control detachments. Both space battalions integrate and synchronize space technical operations and support. They also react to assigned contingency activities in support of Army, joint and combined forces, and civil authorities.

The brigade has an associated unit relationship with the Colorado Army National Guard's 117th Space Battalion, which stood up in September 2001. The 117th Space Battalion currently has 12 ARSSTs in the 217th and 1158th Space Companies.

Currently, 25 percent of the brigade's forces are globally dispersed at stations in 19 locations in nine countries and 10 time zones. This includes locations throughout U.S. Northern Command, U.S. European Command, U.S. Indo-Pacific Command and U.S. Central Command areas of responsibility. Significantly, 60 percent of the brigade's strength execute 24/7/365 missions with the JTAGs, WSOCs and current deployments.

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



Soldiers of the Joint Tactical Ground Station at Osan Air Base, Korea, service antennas in September 2018. (Photo by Carrie David Campbell)

1st Space Battalion

PURPOSE

The 1st Space Battalion's mission is to plan, integrate, synchronize and execute global theater ballistic missile warning, space situational awareness, space and technical operations support, and assigned contingency activities in support of the Army, joint and combined forces, and civil authorities. The 1st Space Battalion was formed in 1999 to provide an operational headquarters for command and control of Army space forces. The battalion is currently based out of Fort Carson, Colorado.

IMPACT

The 1st Space Battalion consists of four companies, each with a specific focus to help achieve its mission. The battalion's Soldiers have deployed to Afghanistan, Iraq, Oman, Kuwait and Bahrain in support of global operations, while maintaining a full-time, forward-based presence in Italy, Korea, Japan and Qatar. The battalion operates 24/7/365 integrating space capabilities into operations across 10 locations globally.

The 1st Space Company has four detachments located in Italy, Qatar, Korea and Japan providing assured 24-hour theater ballistic missile warning and enhanced infrared coverage in support of combatant commanders worldwide.

It was initially designated as Air Defense Artillery detachments after Desert Storm and consisted of five deployable Joint Tactical Ground Station shelters.

The 2nd Space Company has six Army Space Support Teams that provide situational awareness of space capabilities, space assets, space products and the impact of space on operations. When teams deploy, they integrate directly into a staff at the division, corps, joint task force, Marine expeditionary force, theater sustainment command and Army Service Component Command headquarters level. The 2nd Space Company continually supports the war on terrorism and has deployed teams to Iraq, Afghanistan, Qatar and Bahrain. It also maintains two ready Space Support Teams for contingency operations worldwide.

The 4th Space Company consists of six detachments and has deployed numerous times to provide monitoring and resolution of electromagnetic interference and to conduct emergency communications operations. Detachments also provide support to the operations and system diagnostics of U.S. Army Space and Missile Defense Command/Army Forces Strategic Command and Department of Defense-leased space systems



Joint Tactical Ground Station radars are used by Soldiers in four locations worldwide to provide assured 24-hour theater ballistic missile warning. (Photo by Carrie David Campbell)

2nd Space Battalion

PURPOSE

The 2nd Space Battalion, activated Oct. 18, 2017, is based in Colorado Springs, Colorado. Its mission is to plan, integrate, synchronize and execute space situational awareness, space and technical operations support, and assigned contingency activities in support of the Army, joint and combined forces and civil authorities. It is the United States Army Reserve's only space battalion.

IMPACT

The 2nd Space Battalion comprises a Headquarters and Headquarters Company, 3rd Space Company, 5th Space Company and 8th Space Company.

3rd Space Company consists of five Army Space Support Teams that provide situational awareness of space capabilities, space assets, space products and the impact of space on operations. When teams deploy, they integrate directly into a staff at the division, corps, joint task force, Marine expeditionary force, theater sustainment command and Army Service Component Command headquarters level. 3rd Space Company continually supports the war on terrorism and has deployed teams to Iraq, Afghanistan and Qatar.

5th Space Company consists of five Army Space Support Teams that provide situational awareness of space capabilities, space assets, space products and the impact of space on operations. When teams deploy, they integrate directly into a staff at the division, corps, joint task force, Marine expeditionary force, theater sustainment command and ASCC headquarters level. 5th Space Company continually supports the war on terrorism and has deployed teams to Iraq and Afghanistan.

8th Space Company consists of three Space Situational Awareness detachments and deploys globally to provide monitoring and resolution of electromagnetic interference;

supports operation and system diagnostics of U.S. Army Space and Missile Defense Command/Army Forces Strategic Command and Department of Defense-leased space systems; and conducts emergency communications operations when directed. 8th Space Company continually supports the war on terrorism and routinely deploys detachments and crews to the U.S. Central Command area of responsibility.

The 3rd Space Company, 5th Space Company and 8th Space Company are all part of the U.S. Army Reserve's Ready Force X.



Many of the Soldiers of the 2nd Space Battalion earn the Space Badge since most of its billets are space-related. (Courtesy photo)

117th Space Battalion

PURPOSE

The Colorado Army National Guard’s 117th Space Battalion provides a global presence encompassing its primary mission area, space force enhancement.

The 117th Space Battalion performs the difficult task of training the citizen-Soldiers assigned to the unit. This allows their service members to develop as ordinary citizens working in various occupations throughout Colorado and the United States.

The battalion also contributes significantly toward the sustainable readiness of the 1st Space Brigade.

IMPACT

The battalion’s composition includes two space companies, the 217th and 1158th. Each Space Company mans, trains and equips six Army Space Support Teams.

During the Iraq and Afghanistan conflicts, the 117th Space Battalion provided multiple ARSSTs to combatant commanders. In 2018, the 117th Space Battalion qualified three ARSST teams in preparation for global support to exercises and deployments.

In its ongoing support to exercises and missions, the 117th Space Battalion provided support for Key Resolve; Warfighter 18-5 in Camp Atterbury, Indiana; Warfighter 19-1 in Camp Atterbury; and will be supporting Warfighter 19-5 in Fort Indiantown Gap, Pennsylvania, during fiscal year 2019.

These exercises provide critical space-based technical results and training for numerous units. In 2018, the battalion deployed three ARSSTs for real-world missions, and will deploy two more in 2019. The battalion is currently supporting an enduring mission in Kuwait while simultaneously providing support to Operation Freedom’s Sentinel in Afghanistan.

Twelve years after its creation, the 117th Space Battalion remains a unique hallmark of global military operations. The battalion continues to support the Department of Defense, allies and mission partners as the United States deters aggression and is a stabilizing force in the world today. The battalion will continue the advancement of space for the warfighter far into the future.



Maj. Benjamin Eastep, team leader of Army Space Support Team 21, 117th Space Battalion, Colorado Army National Guard, directs team-level training with Staff Sgt. Alexis Madrigal and Sgt. Bruce Conrad in preparation for their upcoming deployment to the U.S. Central Command area of responsibility. Army Space Support Teams provide essential space imagery and intelligence products, analysis and advice to division operations domestically and in support of contingency operations worldwide. (Photo by Army National Guard Staff Sgt. Zachary Sheely)

53rd Signal Battalion

PURPOSE

The 53rd Signal Battalion (Satellite Control) is the oldest operational battalion in the 1st Space Brigade. It is the only unit in the Department of Defense that conducts payload and transmission control of both the Defense Satellite Communications System and the Wideband Global Satellite communication constellations.

The battalion’s management of these constellations provides assured communications connectivity for mission-critical subscribers ranging from the president of the United States, DOD, interagency and international partners all engaged in conducting global operations.

Soldiers of this globally dispersed battalion accomplish their vital missions from Wideband Satellite Communications Operations Centers located at Fort Detrick and Fort Meade, Maryland; Landstuhl, Germany; Wahiawa, Hawaii; Fort Buckner, Okinawa; and SATCON headquarters at Peterson Air Force Base, Colorado.

IMPACT

The 53rd Signal Battalion supported Operation Inherent Resolve, Operation Freedom’s Sentinel, Operation

Resolute Support and more than 75 exercises and operations for U.S. Northern Command, U.S. Africa Command, U.S. Central Command, U.S. European Command, U.S. Southern Command, U.S. Pacific Command and all joint service component commands.

The Soldiers of the 53rd Signal Battalion are uniquely qualified to execute garrison, tactical, strategic and space operations while remaining a crucial enabler for all joint and military operations within the continental U.S. and in support of global operations. The battalion’s SATCON mission set supports joint and military commands that require well-trained Soldiers and precise technical expertise to manage a multitude of communications systems and networks.

The battalion trains and develops the most technically competent Soldiers, tactically sound in their ability to maneuver equipment and conduct operationally based responsibilities to support any mission, anywhere.



A Soldier with Company A, 53rd Signal Battalion, mans equipment at the Wideband Satellite Communications Operations Center at Fort Detrick, Maryland, March 2018. (Photo by Carrie David Campbell)



1st Space Brigade ARSST Teams Provide Space Capabilities to Army and Joint Warfighters



Army Space Support Team 4 and the II Marine Expeditionary Force Marine Space Support Team provide capabilities during Exercise Trident Juncture in Norway, Oct. 28-Nov. 8, 2018. (Courtesy photo)

The 1st Space Brigade supports combat operations throughout the globe with Soldiers assigned to or deployed in support of multiple missions dedicated to the integration of space capabilities in support of warfighters.

One of their missions involves Army Space Support Teams, or ARSSTs, that are globally deployed to provide space-based capabilities to the U.S. Army and joint warfighters. The unique skills and capabilities they provide are making ARSSTs a ubiquitous element of major exercises and deployed forces across all combatant commands.

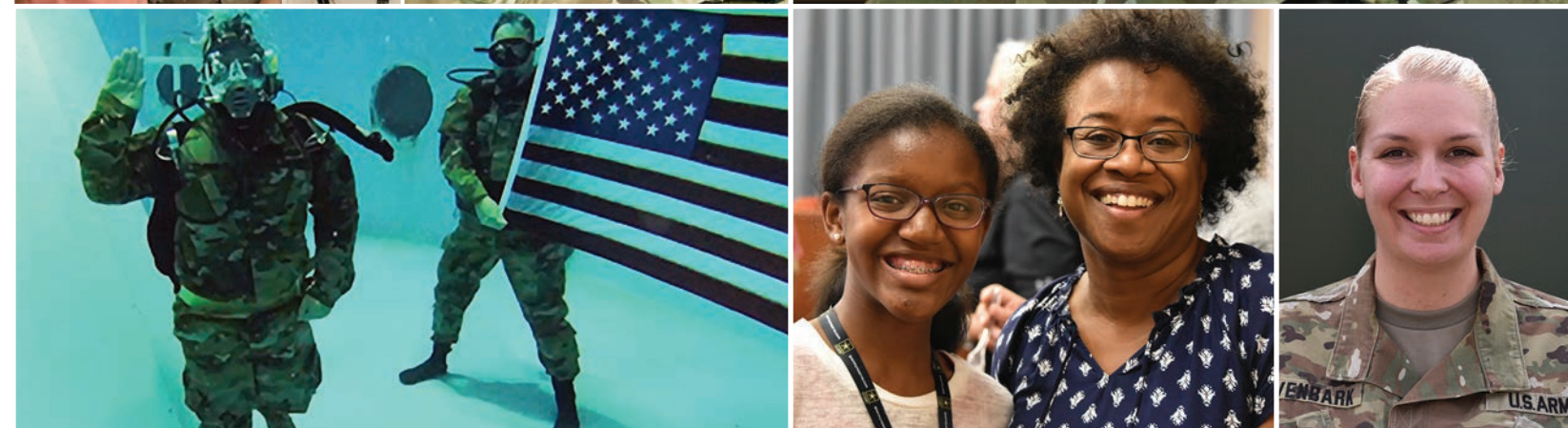
An ARSST is a six-Soldier analysis team, comprising two space operations officers and four enlisted Soldiers from signals intelligence, satellite communications and geospatial engineering fields. Together, the ARSST members provide solutions across all five space mission areas: intelligence, surveillance and reconnaissance; missile warning; environmental monitoring; satellite communications; position, navigation and timing; as well as space situational awareness and space control.

ARSST teams are highly trained in military, civil and commercial space organizations and systems including system architecture, equipment, capabilities, limitations,

software applications, tools and services. This knowledge is essential to be able to integrate space capabilities to the warfighter's mission.

"The highest praise one can garner is imitation," said Maj. Nick Parsai, team leader for ARSST 2, 2nd Space Company. "Based on the performance of our ARSST at Trident Juncture, the U.S. Marine Corps II Marine Expeditionary Force commander is creating a Marine Space Support Team in his formation based on ARSST doctrine. This is a true testament to the effectiveness of ARSSTs to provide space capabilities to tactical and operational commanders."

The 1st, 2nd and 117th Space Battalions deploy globally to execute planning, coordination, integration and synchronization of space support to operations, space situational awareness, and special technical operations/alternative compensatory control measures in support of military and civilian operations. Team members are provided by active-component, Reserve and National Guard units. The multi-component nature of ARSST teams ensures the U.S. Army, the joint force and multinational partners always have ready, capable, and highly skilled space professionals to support them on the battlefield.



THE FACES of SMDC/ARSTRAT





Technical Center



Thomas Webber
Director



COL John Rayburn
Deputy Director

PURPOSE

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center supports the joint warfighter by providing disruptive and critical technologies that meet today's requirements and address future needs, enabling warfighter dominance. 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. As part of the Army Science and Technology enterprise, the Technical Center contributes to the current fight and enables the next generation to prevail in conflicts to come.

The Technical Center consists of the Space and Strategic Systems Directorate, Air and Missile Defense Directorate and the Ronald Reagan Ballistic Missile Defense Test Site located on Kwajalein Atoll in the central Pacific Ocean. The Technical Center impacts the warfighter and joint force in four major areas: directed energy, tactical space technologies, test and evaluation, and hypersonic.

IMPACT

Directed Energy

The Technical Center is the Army lead for high-energy laser technology development. This technology can be effectively employed in a variety of mission areas and offers unique performance attributes that will contribute directly to addressing existing operational capability gaps. High-energy lasers have the potential to be a low-cost, effective complement to kinetic energy to address rocket, artillery and mortar

threats; unmanned aerial systems; and cruise missiles. Additionally, the center is exploring the use of high-power microwave technology for use in interdicting UAS and defeating improvised explosive devices and other improvised threats.

Tactical Space Technologies

As the Army lead for space research, development and engineering, the Technical Center identifies, develops, demonstrates and integrates space technologies in the areas of responsive space and space superiority. To meet Army operational needs, focus areas include persistent beyond line-of-sight communications via small satellites for forces deployed in remote areas; functionally effective resolution imagery via small satellites; ground command and control systems to reduce operator burden; and direct downlink of tactical data feeds.

Test and Evaluation

The Technical Center is an invaluable part of the Army Test and Evaluation Enterprise and provides a suite of low-cost ballistic missile targets for use in developmental and operational air and missile defense testing, transportable and configurable launchers, and test support. The Reagan Test Site provides test support to the Missile Defense Agency, the U.S. Air Force, NASA and others. Additionally, the Reagan Test Site supports the command's space object identification and space surveillance network missions in support of U.S. Strategic Command.

Hypersonic

The SMD/ARSTRAT Technical Center successfully completed the first hypersonic

boost glide test in 2011 and supported the Navy's successful hypersonic test in 2017. With increased Department of Defense interest in hypersonic technology development, the Army began the establishment of an Army Hypersonic Project Office, which is standing up in 2019 at Redstone Arsenal. It will be responsible for producing a common hypersonic glide body, or C-HGB. The services and MDA will adapt the C-HGB to meet their specific requirements. The office will also oversee the development of the Army's long-range hypersonic weapon, or LRHW.

The Technical Center collaborates and synchronizes its efforts across the Army with program executive offices, centers of excellence, combatant commands, other services, industry and academia.

The center's director of Programs and Technology provides oversight, guidance and direction for the Space and Strategic Systems Directorate, Air and Missile Defense Directorate and the Concepts Analysis Laboratory. The CAL provides a hands-on environment for newly hired engineers, scientists and college interns. In addition to the CAL, the Technical Center operates the following lab facilities — the Space Lab; the AeroPhysics Research Facility; and the Laser Lab, all located in Huntsville, Alabama; and the Solid State Laser Testbed, located at White Sands Missile Range, New Mexico.

The Technical Center is geographically distributed in many sites, with its primary offices located at Redstone Arsenal, Alabama. Other locations are the Reagan Test Site located at U.S. Army Garrison-Kwajalein Atoll, Republic of the Marshall Islands, and the Reagan Test Site Operations Center located in Huntsville, Alabama. The

Technical Center also has liaison officers located with the Assistant Secretary of the Army (Acquisition, Logistics and Technology), and with the U.S. Air Force at Kirtland Air Force Base, New Mexico.

It is a lean organization with 136 Department of the Army civilians and seven military personnel and a budget of approximately \$440 million per year, split between about 50 percent each direct funding and reimbursable funding. Budget, personnel, contract and other recurring management activities are coordinated and executed by the Technical Center Business Management Office, which works under the oversight of the deputy director.

On a daily basis, the civilians, Soldiers and contractors of the Technical Center focus on achieving their vision of "Delivering Technologies and Solutions to Enable Warfighter Dominance." This contributes to the command's ability to enable dominant multi-domain combat effects, protect the homeland and support strategic success — wherever and whenever required.

The Technical Center's High Energy Laser Mobile Test Truck is a technology integration and demonstration effort with a solid state laser system, agile beam control system, and supporting subsystems integrated into a large tactical vehicle. (U.S. Army Photo)



Space and Strategic Systems Directorate

PURPOSE

The Space and Strategic Systems Directorate develops, integrates, demonstrates and transitions space and high altitude systems and payloads and strategic systems to provide for current and future Army and joint warfighter capabilities. The systems and payloads are primarily for program executive offices, program managers and joint users.

SSSD consists of four divisions: the Space Superiority Division, the Space Systems Division, the Strategic Systems Division and the Command, Control and Integration Division. The directorate also represents the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center as a voting member on the Department of Space Experiments Review Board.

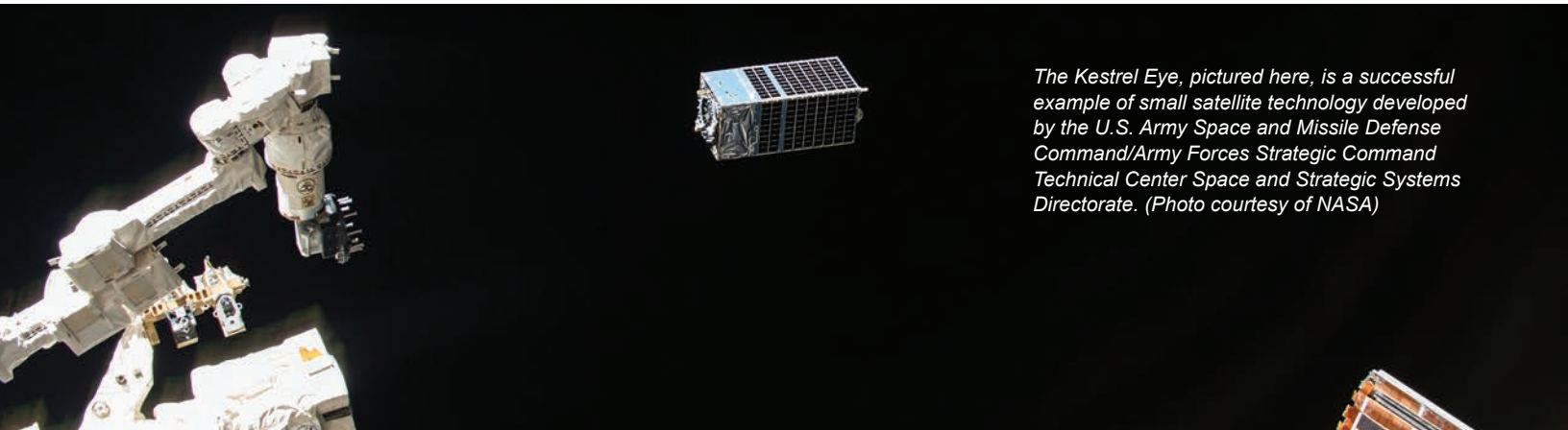
CAPABILITIES

The Space Systems Division and Space Superiority Division researches, identifies, develops, demonstrates, integrates and transitions tactically responsive technologies that are capable of functioning ground-, aerial- and space-based platforms to provide capabilities across the entire spectrum of operations, especially in degraded and denied areas of operation. Missions targeted by these divisions include: tactical communications; intelligence, surveillance and reconnaissance; and navigation warfare. Initiatives currently managed by these divisions include the small satellite Capability Technology Demonstration, the Jacobs Ladder Joint Capability Technology Demonstration, the Army Resilient Global On-the-move Satellite Communications, the Linebacker

effort, and the Army Cost Efficient Spaceflight Research Experiments and Demonstrations.

The Command, Control and Integration Division researches, identifies, develops, demonstrates, integrates and transitions cyberspace and space data exploitation/integration technologies aligned with Army and joint warfighter requirements to enhance operational warfighter capabilities across the entire spectrum of operations. This division develops and initiates structured research, development and acquisition processes for space data exploitation technologies and conducts cyber vulnerability assessments for emerging systems and technologies. Initiatives currently managed by the division include: the Advanced Space Data Exploitation Environment and the Specialized High-performance Expedited Releasability of Learnable Objects for Cross-Domain Knowledge.

The Strategic Systems Division supports the research and development, testing, acquisition and transition of hypersonic systems and related technology for the Army, the Department of Defense Conventional Prompt Strike community and other technology stakeholders. The division directs and conducts subsystem and component design and procurement activities in support of CPS. The Strategic Systems Division is responsible for hypersonic flight test planning and execution, data collection, test architecture development, and post-test data analysis and management. Additional efforts include Space Based Object Release program definition.



The Kestrel Eye, pictured here, is a successful example of small satellite technology developed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center Space and Strategic Systems Directorate. (Photo courtesy of NASA)

Air and Missile Defense Directorate

PURPOSE

The Air and Missile Defense Directorate provides disruptive and critical technologies that meet today's requirements and addresses future needs to enable warfighter dominance in the areas of directed energy, space, cyberspace, hypersonic, and integrated air and missile defense technologies.

In support of those efforts, the AMDD develops, integrates, demonstrates and transitions high-energy lasers, high-power microwave, interceptor and other technologies. It also provides low-cost targets and test execution support to various users to provide for current and future Army and joint warfighter capabilities. The AMDD includes the Office of the Director, the High Energy Laser Division, the Research and Advanced Concepts Division and the Test Execution Support Division.

IMPACT

The Office of the Director provides the vision and direction for the entire directorate. It functions as the Technical Center adviser for directed energy, high-power microwave, and other air and missile defense technology development, program integration and system effectiveness. It provides programmatic guidance, technical review and resource planning and allocation to division chiefs, and advises on matters pertaining to the research and development of integrated air and missile defense technologies, low-cost targets and ground and flight test execution support.



Mobil Expeditionary High Energy Laser is a laser testbed on a Stryker armored fighting vehicle chassis and serves as a platform for research and development. (U.S. Army photo)

The High Energy Laser Division develops, demonstrates, integrates and transitions high-energy laser technologies, components and systems to meet Warfighter needs and leads the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's efforts to chart the future for directed energy of the Army. It conducts advanced high-energy laser weapon technology research and development, evaluation and demonstration for defensive/offensive applications. It also conducts research and development, evaluations and demonstration of high-energy laser weapon system fire control, including detection, tracking, aim point selection, positive beam control, timeline management against multiple targets and effectiveness against targets.

The Research and Advanced Concepts Division develops and applies advanced technologies for integrated air and missile defense-related applications, to include research in weapons component development, integration, performance and life-cycle design in support of the Army, combatant commands and Department of Defense agencies.

The division conducts applied research and development and provides disruptive, innovative, high-risk, high-payoff technologies to enhance the capability and affordability for integrated air and missile defense capabilities and related applications. Also among its functions are the development of high-power electrically based weapons technologies, concepts and demonstrators for integrated air and missile defense and other battlefield applications in support of the Fires Center of Excellence electric-fires capability needs. It also conducts advanced development of technologies and methods to counter improvised explosive devices.

The Test Execution Support Division designs, fabricates and demonstrates a suite of low-cost, threat-representative targets for use in Army and other government agency customer flight test programs. It also provides high-fidelity, threat-representative targets and interceptor mass surrogate sled vehicles in support of live fire test and evaluation as required by Congressional Law, Title 10. It conducts test planning to meet customer requirements and provides accurate budget and schedule projections.

PURPOSE

The Concepts Analysis Laboratory was established in 2004 to provide a hands-on environment for the Technical Center’s newly hired engineers, scientists and college interns.

CAL employees provide support to the following efforts:

- Small satellites – modeling and simulation, ground station development, ground station operations, antenna design, flat-sat testing, propulsion research, and fabrication and testing
- Operation of truth sensor for counter-rocket, artillery and mortar, and counter unmanned aerial system testing at Yuma Proving Ground, Arizona
- Image processing for future laser weapon systems
- Counter unmanned aerial system testing with an impulse radar



Jordan Dupree is the Concepts Analysis Laboratory’s technical lead for the Precision Track and Search Radar, which provides truth data for the counter-rocket, artillery and mortar, and counter-unmanned aerial system testing at Yuma Proving Ground, Arizona. The PTS system is operated by the CAL’s Science, Mathematics and Research for Transformation students/graduates, who also perform all mission planning and data analysis. (U.S. Army photo)

IMPACT

The CAL uses the Department of Defense’s Science, Mathematics and Research for Transformation, or SMART, scholarship program and the Department of Army intern program to hire the best and brightest engineers and scientists from all over the country.

Currently, the CAL has graduates/students from the University of Michigan, Pennsylvania State University, University of Alabama in Huntsville, Georgia Tech, University of Alabama, Auburn University, Tuskegee University, University of Rochester, Utah State University and many others.

The SMART program provides for all of the students’ educational expenses for a bachelor’s or master’s degree or doctorate in one of the science, technology, engineering or mathematics areas. It also includes a stipend, an internship in the CAL during summers and a permanent position when they graduate with their degree.

Graduates are required to work at U.S. Army Space and Missile Defense Command/Army Forces Strategic Command for a period at least equivalent to their SMART scholarship period. The SMART graduates and Department of the Army interns work in the CAL for approximately two years on multiple projects in different Technical Center mission areas to help determine which division is the best fit for the engineer to transition into on a permanent basis.

The CAL facilities include a hardware lab area with lab benches, multiple 3D printers, circuit board mill and pick and place machine, cleanroom, collaborative office area and a large meeting/classroom with media wall.

The lab also has students from the University of Alabama in Huntsville’s Systems Management and Production Center who work up to 20 hours a week while they are pursuing their STEM degree. Several West Point cadets come for three-week internships each summer.

The CAL is also routinely asked to participate in outreach events such as Adventures in Engineering, Bring Your Child to Work Day and career days at area schools to encourage pursuit of degrees in the STEM areas.

PURPOSE

The Ronald Reagan Ballistic Missile Defense Test Site, or RTS, is a vital national asset providing live-fire developmental and operational flight testing of offensive and defensive missile 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 in the U.S. Army Garrison-Kwajalein Atoll, Republic of the Marshall Islands.

IMPACT

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

The cornerstone of the RTS instrumentation capability is a suite of four of the world’s most sophisticated instrumentation-class radar systems, spanning the radio frequency spectrum, enabling RTS to support a broad range of missions. Combining long-range tracking radars able to detect and track multiple objects, as well as satellites in all orbits with high-resolution imaging radars, RTS maintains a highly effective balance of tracking and radar imaging capability.

Strategic and tactical space surveillance operations are also conducted, contributing radar observations to the Department of Defense space surveillance network in support of requirements from the U.S. Strategic Command. In addition to satellite tracking and metric observations as well as surveillance of new space launches, RTS provides the space community with radar

imaging data to support identification of on-orbit satellites. Because of the growing concern about the survivability of U.S. satellites, USSTRATCOM works directly with U.S. Army Space and Missile Defense Command/Army Forces Strategic Command and RTS to maximize availability of range assets to support this critical mission area.

Geographically located in the middle of the Pacific Ocean, the Reagan Test Site personnel provide testing and data collection capabilities not possible anywhere else. The suite of 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 that protect and defend Soldiers and the Homeland while the unmatched sensitivity and range provide unparalleled 24/7 space situational awareness support to protect and defend orbiting U.S. and allied space systems.



The Target Resolution and Discrimination Experiment or TRADEX, radar on Roi-Namur, Republic of the Marshall Islands, is part of the Kiernan Reentry Measurements Site radar suite at the Ronald Reagan Ballistic Missile Defense Test Site. It began operation in 1962. (Photo by Carrie David Campbell)



SMDC gives Zombies extra life



The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center's Test Execution Support Division successfully test-fired its first Black Dagger/Boosted Zombie Target realistic threat ballistic missile target for use in future testing of advanced missile defense systems from McGregor Range at Fort Bliss, Texas, landing in White Sands Missile Range, New Mexico, during a risk reduction flight June 7, 2018. (Photo by Jason Cutshaw)

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center's Black Dagger/Boosted Zombie Target is a realistic threat ballistic missile target for use in future testing of advanced missile defense systems. It launched June 7, 2018, from McGregor Range at Fort Bliss, Texas, and landed in White Sands Missile Range, New Mexico, during a risk reduction flight to test design, performance and launch operations.

Boosted Zombie consists of Pathfinder Zombie, which is a low-cost guided target designed to fly a ballistic flight path and demonstrate defensive protection capability with the addition of a Mark 70 Terrier Missile motor booster. The additional rocket booster more than doubles the range of the Zombie target.

"This two-stage configuration of the Zombie target increases the range available to fly the target, giving us additional capability for our customers to test against," said Kevin Creekmore, SMDC/ARSTRAT Technical Center Test Execution Support Division chief. "The Boosted Zombie Target replicates additional threat missile characteristics, beyond the single stage Zombie target capabilities by providing higher, faster and longer trajectories."

The Zombie target suite includes the 4-meter Sabre Zombie and 6-meter Pathfinder Zombie single stage

configurations, as well as the 6-meter two stage configuration of the Black Dagger/Boosted Zombie target.

"Our goal in starting the Zombie project was to provide end-to-end flight test planning, design, development, integration and test execution, as well as flexible launch platforms and unique low-cost target solutions," he added. "The successful launch of the Boosted Zombie Target will be another step toward this goal. These targets allow SMDC/ARSTRAT customers, like Patriot PAC-3, to conduct cost-effective flight testing for both developmental testing and operational testing."

With the Army and testers of missile defense programs looking to save money on ballistic missile targets, SMDC/ARSTRAT's Zombie suite of low-cost targets looks to cut expenses from the previously used high-end, short-range targets. These savings will allow program managers to stretch their testing budgets and apply funding to where it is needed while reducing the program's overall testing budget.

Boosted Zombie is an alternative to high-cost, high-performance, high-fidelity tactical ballistic missile targets historically used in Patriot PAC-3 and other advanced missile testing. TESD currently projects the full cost of a Boosted Zombie test launch to be approximately \$10 million, including all hardware, launch services and post-launch data analysis.

SMDC/ARSTRAT BY THE NUMBERS

USASMDC/ARSTRAT has a small number of personnel performing **strategically important missions** around the world.

80 Soldiers man four Joint Tactical Ground Stations

220 Soldiers make up five Forward-Based Mode Radar Batteries

150 Soldiers comprise six Space Situational Awareness Teams

300 Soldiers and **60** Department of the Army civilians support five Wideband Satellite Communications Operations Centers

30 Soldiers provide expertise for seven Army Space Support Teams

20 Soldiers and **100** Department of the Army civilians manage four Regional Satellite Communications Support Centers

300 Soldiers support and operate the ground-based midcourse defense system protecting our homeland



Future Warfare Center



Richard De Fatta
Director



COL James Crossley
Deputy Director

PURPOSE

The Future Warfare Center is the U.S. Army's force modernization proponent, responsible for managing Army change to doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy, or DOTMLPF-P, requirements for space, global ballistic missile defense and high altitude capabilities within the Army. It also represents Army equities across the joint community. Within the capabilities of Army and joint space, missile defense and high altitude, the Future Warfare Center 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, the Future Warfare Center executes U.S. Army Training and Doctrine Command-established practices to meet force management responsibilities. This includes performing concept development, capabilities determination and capabilities integration relative to DOTMLPF-P for process change, integration and transition for materiel development. Additionally, the organization executes the Army's institutional training and education for space and global ballistic missile defense mission areas. It is uniquely organized and geographically well-positioned to meet future Army needs.

IMPACT

The Future Warfare Center is the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's architect for future force design. Its unified but geographically dispersed team designs,

builds, modernizes, trains and educates Army space and missile defense forces. It contributes to developing superior space, missile defense and high altitude capabilities that enable multi-domain effects to protect the homeland and support tactical to strategic success whenever and wherever required. It drives change to current force focused on combat-ready forces and capabilities. This effort is balanced with a constant view to the future by preparing or adopting leap-ahead concepts or technology through innovative solutions. Components of the organization include the U.S. Army Space Personnel Development Office, Capability Development and Integration Directorate, the U.S. Army Space and Missile Defense School and several state-of-the-art labs. These organizations support the overall mission through steady accomplishment of operations that include:

- Training Army Soldiers, space cadre and missile defense operators through 200 formal course offerings with more than 11,000 students annually;
- Designing and documenting space and missile defense organizations;
- Performing/participating in wargames, experiments and studies;
- Executing rapid fielding of space equipment to the warfighter;
- Advocating for Army space, missile defense and high altitude capabilities;
- Providing modeling and simulations for Army space and missile technology from concept to fielding and lifecycle management;
- Providing Functional Area 40 life-cycle management and space cadre sustainment, and serves as the single point of contact for all FA40 matters.

The Future Warfare Center has recently accomplished several notable activities;

TRADOC Accreditation: The U.S. Army Space and Missile Defense School maintained their "Institution of Excellence" (100 percent) rating in 2018. This rating covers the period 2017-2019.

Army and Joint Campaign of Learning: Chief of Staff of the Army's title X wargame series Unified Quest including How the Army Fights/Multi-Domain Operations table top exercises; Unified Challenge; Echelons Above Brigade limited objective experiments; Schriever wargame; Enterprise Challenge, Cyber Blitz, SMDC/ARSTRAT's Space in Multi-Domain Operations series; and other joint and service wargames.

Ground-based Midcourse Defense Force Structure Review 2018: Completed with a force design update. Submitted to Department of the Army to mitigate critical gaps. Competing for resourcing in Total Army Analysis upon Headquarters Department of the Army approval.

Actionable Infrared Data Exploitation III: Demonstrated targeting potential for Overhead Persistent Infrared Battlespace Awareness data directly to Advanced Field Artillery Tactical Data Systems. The Fires Center Battle Lab continues to use this capability in experimentation.

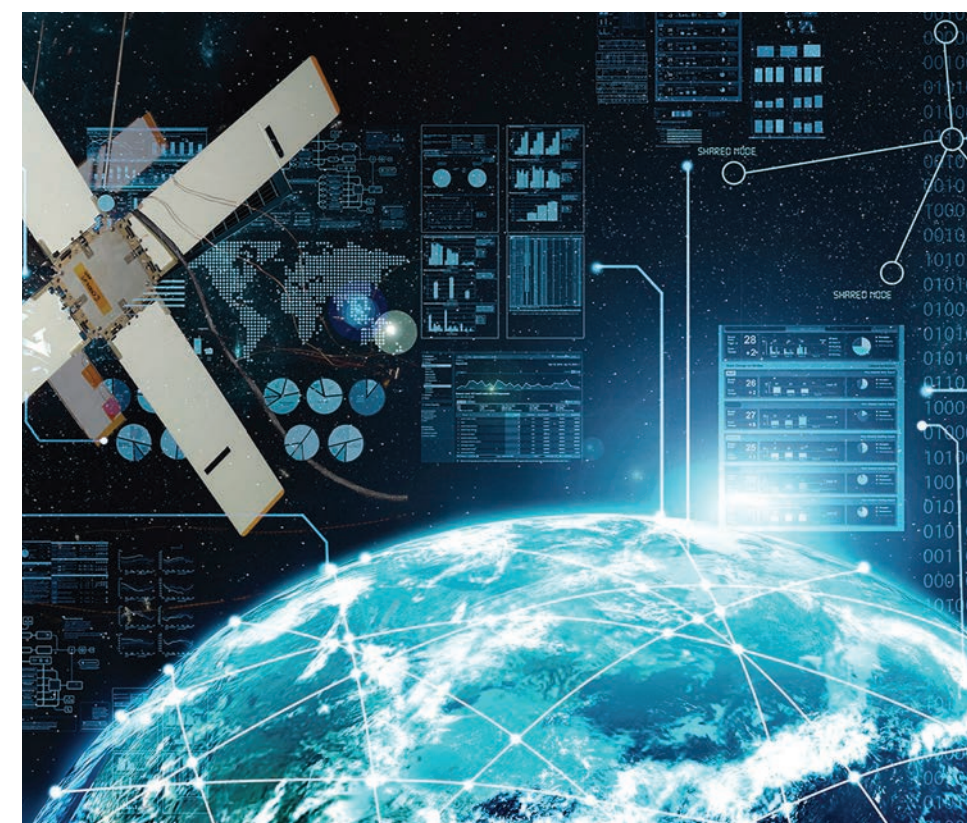
Missile Defense Agency THAAD and Aegis Ballistic Missile Defense Exercises: Successfully participated in European Command Air and Missile Defense Exercise, Joint Live virtual Constructive Events, Astral Knight, European Test Bed, Joint Project Optic Windmill, Resilient Shield, Host Nation Exercise, Steadfast Alliance, and Ulchi Freedom Guardian in 2018.

Army Study and Analysis Campaign Plan: Completed 17 major operational analyses in Fiscal Year 2017; executing 24 in Fiscal Year 2018

Published Army Doctrine: Army Techniques Publications 3-27.5 AN/TPY-2 Forward-based Mode Radar Operations and 3-27.3 Ground-based Midcourse Defense Operations; and FM 3-14 Space Operations were staffed across the Army for publication in 2018.

Army Space Training Strategy – Institutional Line of Effort: Integrated space training and education in more than 58 separate courses across all Army centers of excellence; sustaining more than 20 percent annual growth.

Training and Education: Approximately 11,000 space and GMD Soldiers and civilians trained and educated annually.



The Future Warfare Center contributes to developing superior space, missile defense and high altitude capabilities that enable multi-domain effects to protect the homeland and support tactical to strategic success wherever and whenever required.

PURPOSE

The Future Warfare Center’s Capability Development Integration Directorate is home to the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command’s efforts at concept development; war gaming, experimentation and analysis; and space, high altitude and global missile defense capability development and integration. The CDID consists of the U.S. Army Training and Doctrine Command Capability Managers for Global Ballistic Missile Defense and Space and High Altitude, Concept Development Division and Decision Support Division. The CDID priorities drive delivering or enabling warfighting capabilities to warfighters and establishing and maintaining a robust pipeline to address future threats before they materialize.

IMPACT

The TRADOC Capability Managers for Global Ballistic Missile Defense and Space and High Altitude, or TCM GBMD and TCM SHA, respectively, represent the TRADOC commanding general and report to the commanding general of SMDC/ARSTRAT. The TCM GBMD and TCM SHA serve as the Army’s user representative and centralized manager and integrator for all doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy, or DOTMLPF-P, considerations for global ballistic missile defense, space and high altitude.

The Concept Development Division establishes the conceptual foundation for the Army’s future force



100th Missile Defense Brigade batteries operate the AN/TPY-2, a missile-defense radar that can detect, classify and track ballistic missiles, in several locations around the world. (Photo by Carrie David Campbell)

development and modernization. Working with partners, it conducts concept and technology exploration and assessment; integrates SMDC/ARSTRAT equities in the joint, Army, service and Department of Defense wargames, experimentation and studies; and develops and integrates concepts and future force design. These actions directly contribute to the Army’s concept development and warfighting capabilities determination and integration, informing and driving Army institutional processes such as the Total Army Analysis, program objective memorandums, and strategic portfolio analysis review as well as the emerging Army Futures Command enterprise modernization processes.

The Future Warfare Center CDID conducts and participates in the full range of Army and joint wargames and experiments focusing on the SMDC/ARSTRAT-assigned mission areas of space, high altitude and global ballistic missile defense. The CDID contributes to the development of the Army Operational Concept, Multi-Domain Operations and Echelons Above Corps concepts, the chief of staff of the Army’s multi-domain task force/ intelligence, cyber, electronic warfare, and space initiative along with the Army Functional Concepts, which make up the Army Concept Framework.

The Decision Support Division provides the computational and network resources, cyber vulnerability testing, modeling and simulation, and operational analysis required to support major decisions concerning the acquisition of systems and the development of concept of operations that provide the best joint and Army space, missile defense, high energy laser and high altitude capabilities to current and future warfighters. The division conducts decision support across SMDC/ARSTRAT, Joint Functional Component Command for Integrated Missile Defense and at the Army and joint levels. One such modeling and simulation supported by this division is the Extended Air Defense Simulation, a system-level simulation of air, space and missile warfare. EADSIM provides an integrated tool to support joint and combined force operations and analyses to model the performance and predict the effectiveness of ballistic missiles, surface-to-air missiles, aircraft and cruise missiles in a variety of user-developed scenarios.

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 responsible for coordinating and publishing the Army’s doctrine for space and global ballistic missile defense, as well as assisting the command’s operational units in developing collective space and global ballistic missile defense training tasks. It also instructs and integrates space education at each Army center of excellence and proponent school as part of the Army Space Training Strategy.

IMPACT

The school earned the U.S. Army Training and Doctrine Command’s highest accreditation rating as an Institute of Excellence in 2017. Every three years, TRADOC reviews all aspects of training management and execution to include how the school analyzes, designs, develops, implements and evaluates space and missile defense training and education against the Army Enterprise Accreditation Standards. Additionally, TRADOC recognized several school-developed initiatives as Army best practices.

The current and future missile defense courses include:

- Ground-Based Midcourse Defense Fire Control Qualification Course
- Army GMD Staff Course; GMD Senior Leader Course
- GMD Missile Defense Officer Seminar
- GMD North American Aerospace Defense Command/U.S. Northern Command Command and Control Course
- GMD Master Gunner/Top Gun Program (2019)
- GMD System Trainer Course
- GMD Advanced Operator Course
- AN/TPY-2 Forward-Based Mode Sensor Manager Qualification Course
- Sensor Manager Leader Development Course
- Sensor Manager Executive Seminar
- Command and Control, Battle Management, and Communications Planner Course
- Command and Control, Battle Management, and Communications Executive Seminar
- Engagement Coordination Course

The current and future space institutional training courses include:

- Space Operations Officer Qualification Course
- Space Senior Leader Seminar
- Army Space Cadre Basic Course (Phase 1 and 2)
- Satellite Communication Electromagnetic Interference Fundamentals Course
- Army Space Control Fundamentals Course
- Mobile Integrated Ground Suite Initial Qualification Training
- MIGS Operators Course
- MIGS Command and Control Technician Course
- MIGS Advanced Qualification Training
- Advanced Space Control Systems Courses
- Fundamentals in Space Control Planning
- Space Control Planners Course
- Tactical Space Operations Courses Initial Qualifications Training
- Tactical Space Operations Course Defense Support of Civil Authorities
- Joint Tactical Ground Station Initial Qualification
- JTAGS Leader Development Course



The U.S. Army Space and Missile Defense School provides training and education for nearly 11,000 space and ground-based midcourse defense Soldiers and civilians in 2018. (Photo by Dottie K. White)

Future Warfare Center Laboratories

PURPOSE

The Future Warfare Center operates three major laboratories that support mission accomplishment and provide a test bed for future operations. They are the Simulation Center, or SimCenter, 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/Army Forces Strategic Command's major research and development facilities for space and missile defense research design and analysis of complex missile defense systems with state-of-the-art computational, modeling and simulation resources. The center provides services to the Missile Defense Agency and its program elements, the High Performance Computing Modernization Program and other joint activities. The SimCenter also offers local and remote organizations with large-scale computational assets and access to high-performance Department of Defense networks to meet customer mission requirements. The SimCenter provides the most appropriate hardware, software, network and communications tools and environments for each user program; the engineering services required to acquire and integrate cost- and mission-effective computer architectures for user programs; and a secure, cost-effective computing environment that optimizes resources for analysis tasks common to the SMDC/ARSTRAT community.

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



The Simulation Center is one of the Future Warfare Center's three major labs that support mission accomplishment and provide a test bed for future operations. (Photo by Carrie David Campbell)

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, fixes in the CHIL work exactly the same in the actual systems.

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

Army Space Personnel Development Office

PURPOSE

The Army Space Personnel Development Office executes Functional Area 40, or FA40, space operations officer life-cycle management. It ensures officers' skills, experience and education meet operational requirements and career growth aligns training and education requirements to operational needs and career professional development.

The U.S. Army, the largest user of space-based capabilities in the military, formalized an Army space cadre consisting of officers, enlisted and civilian personnel in 2006. The ASPDO conducts strategic planning, ensuring space cadre billets are identified, created and tracked to support space-related missions. Cadre functions include planning, developing, acquiring, integrating and operating space forces, applications and capabilities. ASPDO manages the processing and awarding of the Space Badge and 3Y, Q4 skill identifiers/additional skill identifiers, and S1A personnel development skill identifiers.

IMPACT

The Army's space cadre, which spans all Army warfighting functions, has documented training and experience in the space domain and conducts daily missions. It is a diverse group with various areas of concentration, including military occupational specialties and occupational series with a common mission to develop, plan, acquire and operate space capabilities to fulfill mission requirements in the five space mission areas of intelligence, surveillance and reconnaissance; missile warning; environmental monitoring; satellite communications; and position, navigation and timing.

As the core of the Army space cadre, FA40s provide in-depth expertise and experience to leverage space-related assets that deliver space capabilities to the warfighter today, as well as develop and integrate space capabilities for the future. ASPDO also manages the Training with Industry and Advanced Civil Schooling programs for FA40s that help develop space officers' experience and skills that augment Army space initiatives.

ASPDO performs FA40 force management to ensure the right skill sets and experience are efficiently applied to Army advantage as well as in consideration of the desired

officer career path. Non-FA40 Soldiers serving in space cadre billets may be identified with an additional skill identifier of 3Y (space cadre) and S1A personnel development skill identifier (home station trainer) and can earn the Space Badge based on their training, education and experience in a cadre billet while serving in their primary military occupational specialty. The Army does not have enlisted, warrant officer or civilian space career fields' equivalent to the FA40 for officers. However, ASPDO tracks space-related Army personnel through coded billets and these cadre members have the opportunity to attend space training courses that support their professional development.



The Army Space Personnel Development Office manages the processing and awarding of the Space Badge, Senior Space Badge and Master Space Badge, shown here. (Photo by Carrie David Campbell)



JTAGS Fields Improved Systems



Soldiers from the Joint Tactical Ground Station at Misawa Air Base, Japan, man their upgraded early missile warning system in September 2018. (Photo by Carrie David Campbell)

The Program Executive Office-Missiles and Space's Joint Tactical Ground Station, or JTAGS, Product Office recently completed the fielding of two operational systems with pre-planned product improvement systems with extensive support from the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Future Warfare Center's U.S. Army Training and Doctrine Command Capability Manager for Space and High Altitude, or TCM SHA.

The JTAGS system, originally fielded in 1995, provides an in-theater missile warning capability directly to combatant commanders with data from space-based overhead persistent infrared sensors. The \$12 million enhancement includes extensive equipment and software upgrades to process the most advanced satellite information feeds while improving Soldier work areas, increasing computational power and data processing functions.

TCM SHA's effort with fielding JTAGSs' improvements focused on critical integration and synchronization of requirements testing, facilities improvements, materiel fielding and enhanced training capabilities.

Fielding began in 2016 with the installation of the Space and Missile Defense School's initial qualification trainer, providing trained operators to deployed units.

Two operational units were fielded in Japan and Qatar in fiscal year 2018 with two additional units scheduled to complete fielding by fiscal year 2020. TCM SHA's support will continue after fielding is completed to ensure issues with doctrine, organization, training, materiel, leadership, personnel, facilities and policy, or DOTMLPFP, are synchronized and integrated among solutions with the Army, materiel developers and combatant commands that rely on JTAGS for missile warning.

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command provides support to NASA with an Army astronaut detachment assigned to the Johnson Space Center in Houston, Texas.

There are currently two astronauts and one astronaut candidate. Col. Andrew Morgan, detachment commander, and Lt. Col. Anne McClain were both selected for the astronaut program in 2013. Lt. Col. Frank Rubio was selected in 2017, joining the detachment as an astronaut candidate that August.

SMDC/ARSTRAT astronauts serve as part of the flight crew for NASA space programs. The command's astronaut detachment provides engineering expertise for human interface with space systems, and provides focus to NASA for Army space operations. Ultimately, astronauts and detachment personnel enhance the Army's ability to dominate the battlefield of the 21st century by using space capabilities with human space operations support.

Army astronauts help the Army define its requirements for the space program and enhance the Army's use of space capabilities. These Soldiers are Army ambassadors to NASA and the public.

Army astronauts bring leadership and technical skills to the job. Soldiers are trained to be flexible, technical, operationally focused and good at working in teams.

The Army has been active in space from when the first U.S. satellite, Explorer 1, rode into orbit on an Army Jupiter-C rocket to the boosters that took early American astronauts into space. By the late 1950s, however, much of that responsibility was transferred elsewhere and was not resurrected until the 1980s when the Army again placed a greater emphasis on space capabilities and systems.

Today, the Army astronaut detachment continues to play key roles in manned and unmanned operational space systems for national space programs. Their role

ensures space support for Army strategic, operational and tactical operations worldwide, develops space awareness throughout the Army, helps to determine requirements for Army space programs and provides operational advocacy for Army space initiatives.

McClain launched aboard the Soyuz MS-11 Dec. 3 to serve on the International Space Station as a flight engineer for Expedition 58 and 59, and Morgan is currently assigned to launch in July 2019 to serve on the International Space Station as a flight engineer for Expedition 60 and 61.

There are 16 retired Army officers who have passed through the detachment. Some of them are still serving NASA as civilians.



The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's astronaut detachment at Johnson Space Center in Houston, Texas, comprises from left: Lt.Col. Frank Rubio, astronaut candidate, and astronauts Lt. Col. Anne McClain and Col. Andrew Morgan. (Photo Courtesy of NASA)

G-6 Satellite Communications Support

PURPOSE

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's G-6 satellite communications, or SATCOM, Directorate executes U.S. Strategic Command's assigned Consolidated SATCOM System Expert, or C-SSE, mission for both the Wideband and Narrowband SATCOM systems. The Wideband C-SSE operationally manages the payloads on the Wideband Global SATCOM, or WGS System; the legacy Defense SATCOM System, or DSCS; and the Global Broadcast Service, which is a broadband service carried over the WGS. The Narrowband C-SSE operationally manages the payloads on two Fleet SATCOM systems, the Ultra High Frequency Follow-On, or UFO systems, and the Mobile User Objective System, or MUOS.

From Peterson Air Force Base, Colorado, the C-SSEs and their 24/7 watch officers support wideband and narrowband military satellite communications for the entire Department of Defense, other U.S. government users and international partners to deliver beyond-line-of-sight communications. The G-6 SATCOM Directorate manages the four Regional SATCOM Support Centers, or RSSCs, and executes the wideband and narrowband SATCOM international partner agreements that the U.S. Department of Defense have with international and coalition partners. The G-6 SATCOM Directorate manages three Memoranda of Understanding valued at \$2.16 billion and 20 other international SATCOM exchange arrangements across 11 International Partners. The SATCOM Directorate's IP team delivers operational management and international agreement expertise to forums for exploratory discussions and negotiations across more than seven SATCOM expansion areas including NATO, arctic SATCOM and medium earth orbit opportunities.

IMPACT

The Wideband Constellation provides flexible and reliable long-haul, high-capacity communications worldwide. Military Wideband SATCOM accounts for 69 percent of all DOD beyond-line-of-sight throughput. Military Narrowband constellation provides critical all-weather tactical links to

forces on the move using highly mobile radios. Field units are demanding more real and near-real time intelligence, warning and battle damage data to support continuously updated and shared situational awareness. SATCOM enables first in and last out communications for hundreds of thousands of warfighters worldwide.

There are four geographically dispersed RSSCs that provide 24/7 SATCOM planning, engineering, and satellite payload management for all DOD SATCOM systems. The RSSCs are located at Wheeler Army Airfield, Hawaii; Peterson Air Force Base, Colorado; MacDill Air Force Base, Florida; and Patch Barracks, Stuttgart, Germany. The RSSCs work with regional SATCOM users planning and authorizing critically required SATCOM connectivity for system user activities across the full range of military operations including diplomatic, humanitarian assistance, disaster relief and scientific missions in zones where the communications infrastructure can be destroyed, degraded or is simply non-existent.



The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's G-6 SATCOM Directorate provides satellite communications capabilities to the entire Department of Defense, other government agencies and international partners. (Courtesy Photo)

Chief Technology Officer

PURPOSE

The chief technology officer serves as the scout for the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's leadership to uncover potentially game-changing concepts and technologies to support the command's missions.

The CTO accomplishes this by focusing outwardly to the science and technology elements of the Army, other services, joint organizations, other government agencies, and industry and academia, looking for the most promising conceptual and technological breakthroughs that support the command's vision and mission.

The CTO is the principal adviser to the commanding general and the deputy for science and technology matters. The CTO provides relevant and accurate near-, mid- and long-term information and planning recommendations on all science and technology matters.

IMPACT

In its primary mission as an important source of technology advice to the commanding general, in 2018 the CTO created a two-way information highway linking the command to military, industrial and academic science and technology worlds.

On the "receive" pathway, by scouring the technological world for promising capabilities, SMDC/ARSTRAT CTO was first to gain access to a promising technology that could bring innovative space launch capability to the command.

In the "transmit" lane, numerous outside entities looking for expertise in providing space support to the ground warfighter turn to the CTO. Examples include: the U.S. Army Training and Doctrine Command G-2's Mad Scientist, the Physics Department at the United States Military Academy, all Redstone Arsenal, Alabama, organizations via the CTO Roundup, and the combatant command science and technology forums. As a result, these and many other organizations are aware of the

Army's space and missile defense needs and are on the lookout for novel ways of meeting them.

The CTO leads the Redstone Arsenal CTO Roundup, a quarterly meeting for the exploration and collaboration of mutual science and technology interests across all organizations on Redstone Arsenal. By gathering the CTOs and senior science and technology officers, the CTO Roundup provides a forum for better situational awareness of science and technology efforts across diverse organizations.

Assessments conducted in 2018 for the commanding general have impacted on improving security of technology testing, identifying information technology needed for SMDC/ARSTRAT's satellite communications mission, and also assisted the Army in assessing the risks of certain technologies needed for near term protection of the force.

As the command's science and technology scout, the CTO will continue to work closely with internal and external organizations to ensure that U.S. warfighters have the game-changing technologies needed to accomplish any mission quickly and return home safely.



Dr. Steve Pierce, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command chief technology officer, discusses cyber resiliency and mission assurance at the 21st annual Space and Missile Defense Symposium at the Von Braun Center, Huntsville, Alabama, Aug. 7, 2018. (Photo by Carrie David Campbell)

DOING BUSINESS WITH THE COMMAND

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

The SMDC/ARSTRAT Office of Small Business Programs ensures small businesses are provided the maximum opportunity to be included in SMDC/ ARSTRAT'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 as it builds a strong industrial base necessary to provide warfighters the defense products and services they need. Achieving the Department of the Army's assigned small business goals 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 source of information for new businesses is the Procurement Technical Assistance Center: <http://www.aptac-us.org>

The following information can be used as a guide to doing business with SMDC/ARSTRAT:

1. Research about SMDC/ARSTRAT before making contact. The command, like many Army activities, maintains its own website: <http://www.smdc.army.mil>. The SMDC/ARSTRAT Small Business Program, found under the Resources tab, contains a Business Opportunity link with forecasting/planning information.

2. Ensure profile information is current and accurate in the System for Award Management <https://sam.gov/portal/SAM/#1> and that registration has not expired. Be mindful of all system alerts, such as providing a notarized letter appointing an authorized entity administrator. Verify all relevant North American Industry Classification System (NAICS) codes, business size/revenue representation and socioeconomic status are correct.
3. Review the business profile in the Small Business Administration Dynamic Small Business Search: http://dsbs.sba.gov/dsbs/search/dsp_dsbs.cfm. Ensure this information is consistent with what is in the System for Award Management. Fields in this database that assist in market research include keywords, capabilities narrative, special equipment/ materials and performance history.
4. Confirm the business website for public access is consistent with information posted in System for Award Management and Dynamic Small Business Search.
5. Prepare to meet with the SMDC/ARSTRAT Small Business Office. Meetings can be held either in person or by phone. Have business capabilities that are in line with SMDC/ARSTRAT requirements ready for discussion. Be prepared with business history, prime and/or subcontractor interests, and any unique capabilities. Ask about current contracting vehicles and how to locate upcoming opportunities.
6. Monitor federal business opportunities. Use the website <https://www.fbo.gov/> to monitor sources sought, request for information, and synopsis for upcoming requirements and solicitations notices. This is the single point of entry for the federal government and should be monitored daily. This website is used to publish other events, such as, industry day briefings, Advance Planning Briefings to Industry and Procurement Technical Assistance Center events.

7. Seek additional assistance in the defense marketplace. Procurement Technical Assistance Centers are located in most states and are partially funded by the Department of Defense to provide small business with information on how to do business with DOD. They provide in-depth counseling on marketing, financial and contracting issues to small business concerns at minimal cost.
8. The Small Business Administration offers assistance through their Small Business Development Centers: <http://www.sba.gov/tools/local-assistance/sbdc>, which can provide aspiring and current small business owners a variety of free business consulting and low-cost training services including: business plan development, manufacturing assistance, financial packaging and lending assistance, exporting and importing support, disaster recovery assistance, procurement and contracting aid, market research help, 8(a) program support and healthcare guidance. Also, get to know the local SBA Procurement Center Representative. He or she can be a valuable resource for staying on top of regulatory updates/changes (such as limitations on subcontracting) and program guidance (such as the SBA All Small Mentor-Protégé Program).
9. Prepare a proposal. Read the solicitation and the performance work statement/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.

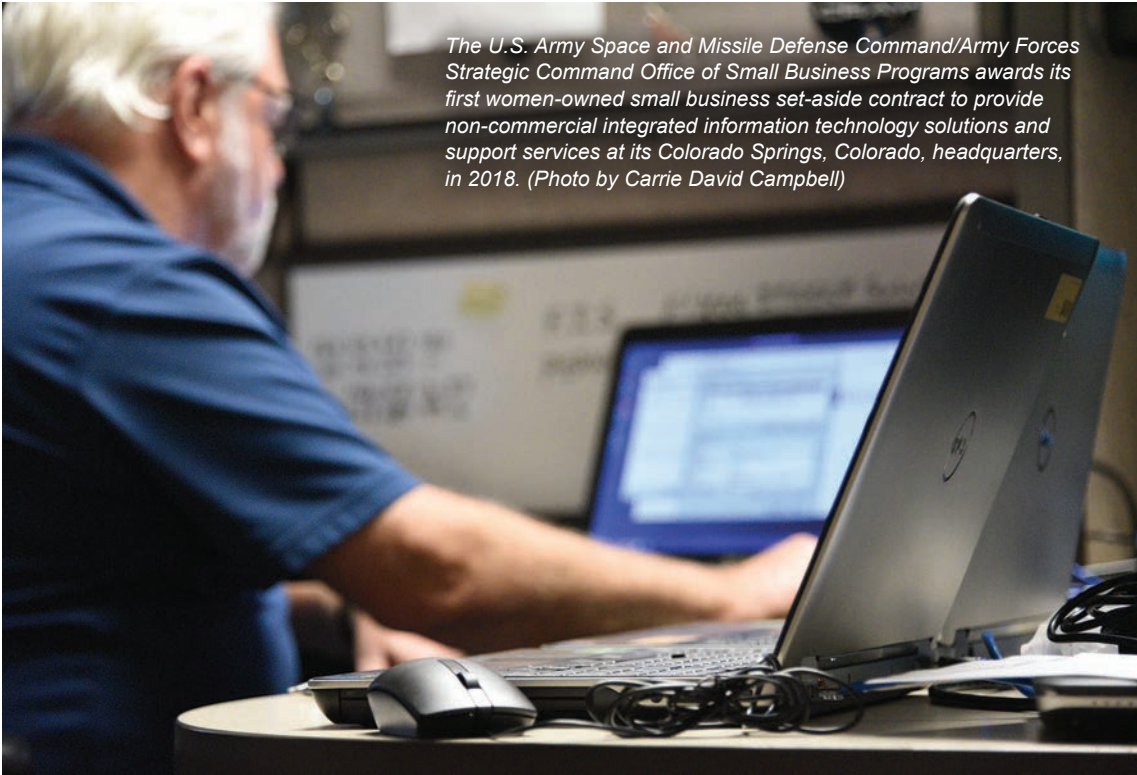
Section M lists the evaluation factors for award. Ensure the submitted proposal meets all of the requirements of the solicitation.

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

For more information contact the USASMDC/ARSTRAT Office of Small Business Programs

ATTN: USASMDC-SB
P.O. Box 1500
Huntsville, AL 35807-3801
Phone: (256) 955-3412
Email: usarmy.redstone.smdc.mbx.small-business-office@mail.mil

ATTN: Directorate C
350 Vandenberg Drive
Peterson Air Force Base, CO 80914-4912
Phone: (719) 554-1969



The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Office of Small Business Programs awards its first women-owned small business set-aside contract to provide non-commercial integrated information technology solutions and support services at its Colorado Springs, Colorado, headquarters, in 2018. (Photo by Carrie David Campbell)



Joint Functional Component Command



COL Raymond Bowyer
Deputy Commander



SMSgt Michael List
Senior Enlisted Advisor

PURPOSE

In addition to his U.S. Army Space and Missile Defense Command/Army Forces Strategic Command service component role, Lt. Gen. James H. Dickinson is also the commander of U.S. Strategic Command's Joint Functional Component Command for Integrated Missile Defense.

JFCC IMD synchronizes planning in support of the USSTRATCOM responsibility as the global missile defense coordinating authority. It conducts global missile defense operations support, advocates for and recommends acceptance of missile defense capabilities, and executes joint and combined global missile defense training and education for the USSTRATCOM commander in support of combatant commands, the services and appropriate U.S. government agencies. These efforts deter adversaries, assure allies and defend U.S. deployed forces, allies and partners against missile attacks.

IMPACT

The command is the recognized subject matter expert across the missile defense enterprise in matters of operational support, policy, strategy, training and education. It anticipates and forcefully advocates for the warfighter's global missile defense requirements through engagement and partnering with the Missile Defense Agency, other governmental agencies, the services, geographic combatant commands, and U.S. allies and partners.

Missile defense is a key part of America's national defense strategy to deter threats; assure allies and partners of its commitment to established security frameworks; and

to defend the homeland, deployed forces, friends and allies. It becomes even more important in an environment in which missile threats continue to proliferate and expand in range and lethality.

As a mission area, global missile defense encompasses missile defense operations, actions and activities that affect more than one geographic combatant commander. This requires synchronization of the affected commands to coordinate effective allocation, deployment and employment of the capabilities necessary to deter, prevent or respond to attacks and to nullify or reduce the effectiveness of a threat.

Given the transregional nature of the threat and the low-density, high-demand nature of missile defense platforms and complex architecture of sensors, shooters, and command and control nodes spanning multiple areas of responsibility, combatant commands designated with responsibility for an adversary problem set must approach missile defense from a global perspective. JFCC IMD provides direct support to these efforts.

The president assigns the USSTRATCOM commander seven missile defense-related responsibilities, which are delegated to JFCC IMD. JFCC IMD translates these delegated responsibilities into lines of effort which include:

- Synchronize global missile defense planning, global force management and missile defense security cooperation activities.
- Conduct global missile defense operations support, to include asset



In the Joint Functional Component Command for Integrated Missile Defense Command Center, team members conduct global missile defense operations support, advocate for and recommend acceptance of missile defense capabilities, and execute joint and combined global missile defense training and education for the U.S. Strategic Command in support of combatant commands, the services and U.S. government agencies. (Courtesy photo)

management, alternate execution authority, federated intelligence support and network monitoring and protection.

- Execute above element joint and combined global missile defense training, exercises and experimentation.
- Advocate for and recommend acceptance of global missile defense capabilities, conduct analysis and assessments of current and future capabilities, and support tests.

A strong partnership with the services and the materiel developers ensure advocacy for future requirements, delivery of tested capabilities and informs decision makers during operational acceptance of those capabilities into the architecture. In partnership with geographic combatant commands, JFCC IMD provides expertise to support

planning, joint and combined training, resource allocation recommendations and asset management. All of these are key in supporting the goal of ensuring U.S. global missile defenses are postured to support U.S. critical defense objectives.

JFCC IMD began operations in January 2005 as one of five original Joint Functional Component Commands. The command includes Army, Navy, Marine Corps and Air Force personnel, as well as U.S. government civilians and contractors. The headquarters is co-located with the Missile Defense Agency in the Missile Defense Integration and Operations Center at Schriever Air 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 execution of the command's assigned responsibilities.



JFCC IMD fosters collaboration and integration between U.S., allies



The 2018 Nimble Titan exercise is a campaign of experimentation that is the premier missile defense, multinational security cooperation activity of the U.S. government that brings together policy and military subject matter experts from allies and partner nations. (Courtesy photo)

As part of U.S. Strategic Command's missile defense responsibilities, the Joint Functional Component Command for Integrated Missile Defense works to increase security cooperation with U.S. allies and partners in the area of missile defense. Prime examples of these efforts include Nimble Titan, a joint education and training, and allied and partner modeling and simulation initiatives.

The Nimble Titan campaign of experimentation is the premier missile defense, multinational security cooperation activity of the U.S. government. It brings together policy and military subject matter experts from U.S. allies and partner nations to explore collaborative missile defense, synchronize policy and military initiatives, and identify potential future concepts to enhance cooperation and interoperability.

Since its origin in 2003 as a U.S.-only ballistic missile defense tactically focused wargame, Nimble Titan has evolved into a USSTRATCOM-sponsored, JFCC IMD-led series of multinational integrated air and missile defense strategic policy-military experiments.

Twenty-eight nations and international organizations from the Indo-Pacific, European, Middle Eastern and North American regions exchange views and insights while experimenting collectively with policy and operational concepts over the course of a two-year campaign to enhance regional defense and strengthen deterrence between participating nations and organizations.

Training and education is a well-established component of U.S. security cooperation efforts. These activities go a

long way toward helping a country develop national missile defense capabilities, enhance their mission readiness or integrate their missile defense efforts with those of the United States in combined regional architectures. Originally established under the Missile Defense Agency in 2005, the Joint Ballistic Missile Defense Training and Education Center has been a component of JFCC IMD since 2013.

The JBTEC conducts integrated air and missile defense training for more than 3,000 students from the combatant commands, U.S. government agencies and allied nations annually.

JFCC IMD, in coordination with U.S. combatant commands, is developing a multi-lateral information-sharing initiative entitled Allied/Partner Modeling & Simulation that uses allied and partner nations' missile defense systems and capabilities to capture data parameters for sensor, interceptor, and command and control platform capabilities to create a multi-national database that will enable collaborative planning and support for medium-fidelity modeling and simulation. The grouping of nations for the initial effort includes the United States, Germany, France, Great Britain, Italy, the Netherlands and Australia.

The desired APMS end state will enable a more comprehensive, collaborative assessment of combined defense plans against common threats. It will also increase operational integration and provide a quantitative plans assessment to inform senior military leaders and representative headquarters staffs on the placement of combined resources and identify attendant risks.



U.S. Army Space and Missile Defense Command/Army Forces Strategic Command

KEY CONTACTS

REDSTONE ARSENAL

USASMDC/ARSTRAT
P.O. Box 1500
Huntsville, AL 35807-3801
Phone: (256) 955-3887

Office of Small Business Programs
ATTN: SMDC-SB
P.O. Box 1500
Huntsville, AL 35807-3801
Phone: (256) 955-3412
Toll Free: (866) 260-8428

PETERSON AIR FORCE BASE

USASMDC/ARSTRAT
350 Vandenberg Drive
Peterson Air Force Base, CO 80914-4912
Phone: (719) 554-1982

Office of Small Business Programs
ATTN: Directorate C
350 Vandenberg Drive
Peterson Air Force Base, CO 80914-4912
Phone: (719) 554-1969

Public Affairs email: usarmy.redstone.smdc.mbx.public-affairs@mail.mil



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