



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

2018



GLOBAL DEFENDER

A GUIDE TO SMDC/ARSTRAT





Commander's Message

Lt. Gen. James H. Dickinson



“The USASMDC/ARSTRAT and JFCC IMD teams will remain bold and innovative, offering solutions to ensure our Nation’s forces are prepared to fight across multiple domains. We will provide space, missile defense, and high altitude capabilities to deter potential adversaries and defeat them should deterrence fail.”

I am proud to introduce the inaugural edition of our command guide, the *Global Defender*. This publication highlights the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command’s and Joint Functional Component Command for Integrated Missile Defense’s support to the Army, Joint Force, our Allies, and partners.

From trained and ready space and missile defense forces, to innovative doctrine and concepts to research and development, the stories of USASMDC/ARSTRAT and JFCC IMD’s expansive portfolios show how the commands provide space, missile defense, and high altitude capabilities so combatant commanders fight and win today.

After more than a year in command, I know more than ever that the commands’ strengths lie in our agile, adaptive, and ready space and missile defense workforce. These highly trained and skilled Soldiers, Sailors, Airmen, Marines, and civilians, a team of more than 3,000 professionals, execute the mission daily with passion, skill, and dedication. The multi-component team, including National Guard, Active, and Reserve component members, operates from and lives in remote, globally deployed locations while remaining on point to defend the homeland and protect the Joint Force around the world 24/7/365.

Above all, USASMDC/ARSTRAT and JFCC IMD remain unwavering in our commitment to the Soldier and Joint Force. USASMDC/ARSTRAT oversees vital Army space and missile defense elements around the globe, supporting operational and strategic missions, while JFCC IMD synchronizes missile defense planning, conducts ballistic missile defense operations support, and advocates for missile defense capabilities in support of U.S. Strategic Command.

The demand for space, missile defense, and high altitude capabilities continues to grow in response to the complex array of challenges to our Nation from foreign adversaries. The USASMDC/ARSTRAT and JFCC IMD teams will remain bold and innovative, offering solutions to ensure our Nation’s forces are prepared to fight across multiple domains. We will provide space, missile defense, and high altitude capabilities to deter potential adversaries and defeat them should deterrence fail.

Together we are engaged and poised to respond to the needs of today’s forces, to anticipate the future, and to ensure the Army remains the most dominant land power the world has ever known.

Through the *Global Defender*, we will share the stories of our people and of these two great organizations.

Secure the High Ground! Vigilant for the World!

SMDC/ARSTRAT BY THE NUMBERS



A **global** command with personnel assigned in **11** time zones at **23** worldwide locations



1.5

million force tracking reports distributed daily

600  operational forces deployed worldwide

5  Wideband SATCOM Operations Centers

4  Joint Tactical Ground Stations

5  Forward-Based Mode Radar Batteries

 **8,500** Army personnel trained annually

 **200** space and missile defense courses

2 active duty Army Astronauts;

 **1** Army Astronaut candidate

2,800  dedicated SMDC/ARSTRAT employees worldwide

4  Regional SATCOM Support Centers

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.

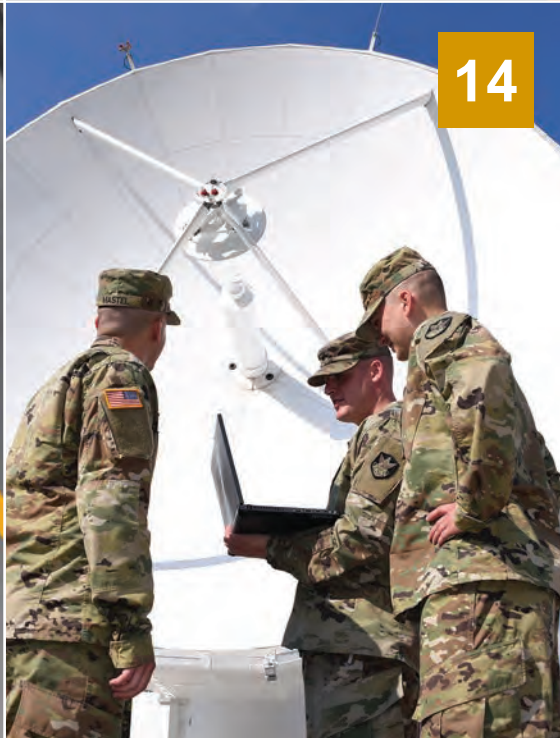


Table of Contents

Protecting and Defending the Homeland	4
Global Assets Map	6
Providing Superior Capabilities	8
100th Missile Defense Brigade.....	10
49th Missile Defense Battalion	12
Mission Impact	13
1st Space Brigade	14
1st and 2nd Space Battalions	16
117th Space Battalion	17
53rd Signal Battalion	18
Mission Impact	19
Technical Center.....	20
Space and Strategic Systems Directorate	22
Air and Missile Defense Directorate	23
Concepts Analysis Laboratory	24
Ronald Reagan Ballistic Missile Defense Test Site	25
Mission Impact	26
Faces of SMDC/ARSTRAT	27
Future Warfare Center.....	28
Capability Development Integration Directorate	30
U.S. Army Space and Missile Defense School and Doctrine Center	31
Future Warfare Center Laboratories	32
Army Space Personnel Development Office	33
Mission Impact	34
Space Cadre by the Numbers	35
SMDC/ARSTRAT Additional Assets.....	36
NASA Detachment	36
G-6 Satellite Communications Support	37
Chief Technology Office	38
Office of Small Business	39
Joint Functional Component Command	40
Mission Impact	42



THE 2018 GLOBAL DEFENDER: A guide to SMDC/ARSTRAT

COMMAND STAFF

LTG James H. Dickinson
Commanding General

CSM Jerome Wiggins
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*

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



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. Wideband Satellite Operations Centers, shown here, are one of these capabilities.

USASMDC/ARSTRAT

Protecting and Defending the Homeland 24/7/365



**CSM Jerome Wiggins,
Command
Sergeant Major**

“Only the finest noncommissioned officers and enlisted Soldiers serve in USASMDC/ARSTRAT. They are capable, resilient and willing to take on the tough tasks. Ensuring the welfare and readiness of the Soldiers and their families are my top priorities.”

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.

From the Cold War to the Gulf War, from the conflict in Vietnam to current conflicts in Iraq and Afghanistan, and from confronting communism to battling terrorism, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command has provided continual protection of the homeland by developing and implementing space and missile defense technologies. Today, the command is the Army’s proponent for space, high altitude and missile defense training and synchronization across the Army and joint force to ensure vital space and missile defense capabilities are ready today while preparing for the future.

SMDC/ARSTRAT commanding general Lt. Gen. James H. Dickinson said his vision for the command is to have, “one synchronized USASMDC/ARSTRAT team (that) 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.”

Today’s complex threats to the U.S. homeland bring attention to the command’s mission more so than in the past 60 years. Since its inception in 1957, the command’s highly trained forces have worked together to develop assets and capabilities to defend the nation 24/7/365 while facilitating access to important resources in space. This mission continues today.

SMDC/ARSTRAT is the Army Service Component Command to the U.S. Strategic Command and provides trained and ready space and missile defense professionals and capabilities throughout the joint force. From its split-based headquarters at Redstone Arsenal, Alabama, and Colorado Springs, Colorado, the command oversees vital Army space and missile defense elements and personnel around the globe.

Focusing on space may seem unusual for an Army that conducts a large part of its mission on the ground, but today more than 70 percent of the Army's key equipment and weapon systems rely on space-based services or capabilities. For this reason, the SMDC/ARSTRAT team operates worldwide satellite communications that are crucial for U.S. and allied operations; educates leadership, trains warriors, advocates concepts, wargames concepts, develops capabilities, and supports U.S. Army astronauts.

"We continue to leverage space capabilities for today's fight and continue to plan and innovate for tomorrow's conflicts," Dickinson said. "Space is critically important as a joint/coalition domain, and it will take a team effort to achieve success to stay ahead of our adversaries."

The command significantly changed and grew throughout its first 60 years. It began with a handful of people in borrowed spaces on Redstone Arsenal. Today, it is a globally dispersed force of approximately 2,800 civilians and service members. Across 11 time zones in 23 locations around the world, the SMDC/ARSTRAT team provides space and missile defense capabilities so combatant commanders can fight and win.

The command is a multi-faceted, multi-component team of two warfighting brigades, the Technical Center and the Future Warfare Center that are globally synchronized to provide space and missile defense capabilities supporting both the U.S. Army and USSTRATCOM. The team uses cutting-edge technology incorporating feedback from the Warfighter to develop critical space and high altitude capabilities. These efforts result in overmatch against the nation's near-peer adversaries to deter, deny and defeat any challenge.

The 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.

"The talented and dedicated Soldiers, civilians and contractors of SMDC have repeatedly demonstrated their commitment to excellence in defense of our great nation," Dickinson said. "They are our most valued asset."



**James B. Johnson Jr.,
Deputy To The
Commander**

"The command's remarkable civilian team is dedicated to our Army and our Soldiers. At the end of the day, my priority is making sure the entire command is laser focused on supporting Warfighters, providing them what they need to fight and win."



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

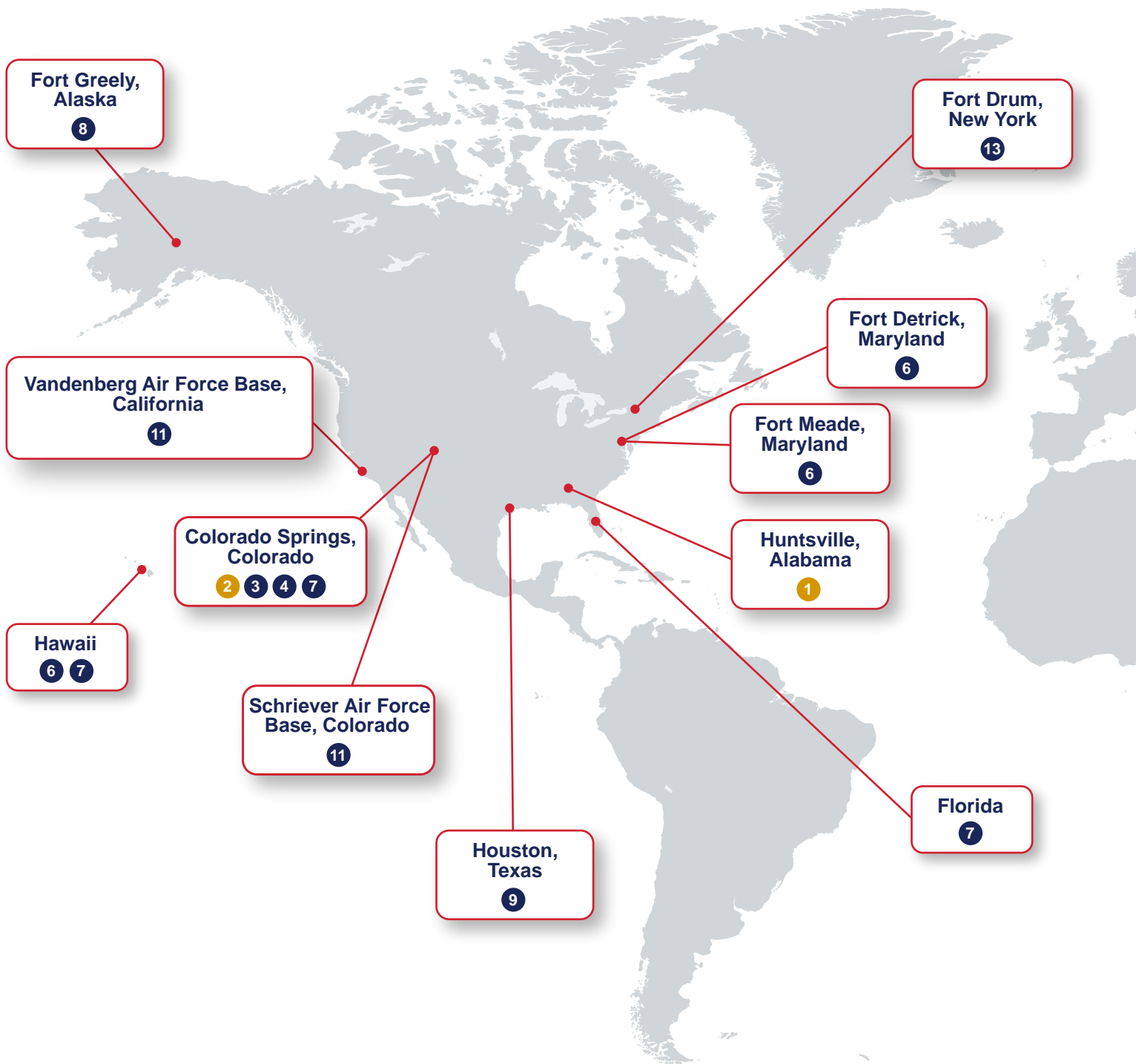
"Our space and missile defense forces perform their mission 24 hours a day, 7 days a week, 365 days a year. They are highly technical, professional warriors who are always ready to answer the nation's call. The demand for their skills continues to grow."



USASMDC/ARSTRAT

A globally responsive command

- 1 SMDC Headquarters (Technical Center and Future Warfare Center)
- 2 SMDC Operations Headquarters (Future Warfare Center)
- 3 1st Space Brigade Headquarters
- 4 100th Missile Defense Brigade Headquarters
- 5 Joint Tactical Ground Station locations (1st Space Brigade)
- 6 Wideband Satellite Communications Operations Centers (1st Space Brigade)
- 7 Regional Satellite Communication Support Centers (HQ)



- ⑧ 49th Missile Defense Battalion and Senior Commander of Fort Greely
- ⑨ Army Astronaut Detachment (HQ)
- ⑩ Reagan Test Site (Tech Center) and Senior Commander of U.S. Army Garrison-Kwajalein Atoll
- ⑪ 100th Missile Defense Brigade Detachment
- ⑫ Army Space Support Team and ACSE (1st Space Brigade)
- ⑬ IDT Security Detachment (100th Missile Defense Brigade)
- ⑭ Missile Defense Batteries – Forward-Based Mode Radar (100th Missile Defense Brigade)



Uniquely Organized, Geographically Well-Positioned, Regionally Aligned

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 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 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,

Soldiers from Company D, 53rd Signal Battalion pose in front of their newly upgraded satellite dish at the Wideband Satellite Communications Operations Center in Wahiawa, Hawaii.





A 49th Missile Defense Battalion Soldier patrols the Missile Defense Complex at Fort Greely, Alaska.

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 address future needs enabling Warfighter effectiveness in the core competencies of directed energy, space, high altitude systems, cyberspace and missile defense.

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 Kevin Kick
Commander



CSM Jeffery 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 a decade. 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, with multiple subordinate AN/TPY-2 radar batteries located overseas. 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. The battalion consists of a Headquarters and Headquarters Battery, five Fire Direction Center crews, and a military police company.

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.

Capabilities

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 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 operate 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 10-14 weeks of military occupational specialty school for the air defense artillery branch. Once branch certified, the Soldier will 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 when ready, the Soldier will 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 examinations or hands-on, practical certification is 90 percent due to the critical no-fail nature of the GMD mission.



Soldiers of the 49th Missile Defense Battalion man the ground-based interceptor at Fort Greely, Alaska.

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 interpreter, a three-stage solid rocket boost vehicle that places its payload, an Exoatmospheric Kill Vehicle, outside the earth's atmosphere. Once outside the atmosphere, the boost vehicle releases the EKV on an intercept trajectory toward a hostile missile's warhead.

From release, the EKV seeks out the target using multi-color 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, upgraded early warning radars COBRA Dane, transportable X-band radars (AN/TPY-2), 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 GBIs and EKVs.

Missile defense crew members man the ground-based midcourse defense system at Fort Greely, Alaska.



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.

Capabilities

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 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 most of the nation’s ground-based interceptors are emplaced. Alpha Company is a one-of-a-kind MP company.

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), in conjunction 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. In fact, the seven-layer, Generation III, Extreme Cold Weather Clothing System in use across the Army today was first worn and tested by the MPs of Alpha Company.

Alpha Company’s National Guard Soldiers hail from all over the nation, including Puerto Rico, New York and South Carolina. Alpha Company epitomizes diversity in support of the mission. 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.

A missile defense crew from the 100th Missile Defense Brigade at Schriever Air Force Base, Colorado, participates in Flight Test Ground-based Interceptor-15.



100th Missile Defense Brigade participates in successful test

On May 30, 2017, the ground-based midcourse defense element of the United States' layered ballistic missile system conducted its first-ever, live-fire test against an intercontinental ballistic missile-class target.

During the test, a threat representative ICBM launched from Kwajalein Atoll in the central Pacific Ocean. The GMD system detected and tracked the missile, then 100th Missile Defense Brigade Soldiers launched an interceptor from Vandenberg Air Force Base, California, successfully destroying the threat's warhead.

The 100th Missile Defense Brigade and 49th Missile Defense Battalion Soldiers who man the GMD system, as a part of the overall ballistic missile defense enterprise, operate fire control nodes at Fort Greely, Alaska, and Schriever Air Force Base, Colorado, defending the skies over the nation 24/7/365.

Ground-based interceptors, controlled by the Soldiers at the nodes, are emplaced at Fort Greely and Vandenberg Air Force Base.

The 100th Missile Defense Brigade (GMD) is a multi-component brigade comprising Army National Guard units from Colorado, California and Alaska, as well as active-component Soldiers who are tasked with the mission of defending the homeland from ICBM attacks.

"There's a saying in the Army that says we've got to have a 'We fight tonight' mentality," said Col. Kevin

Kick, 100th Missile Defense Brigade commander. "Well, for our folks, it's 'We fight now.' We've got to be ready in a minute's notice. We learn from successes and we learn from failures, and the system we have operating in defending our nation right now, I have absolute faith in."

Flight Test Ground-based Interceptor-15 showcased the system's capabilities operated by U.S. Army Space and Missile Defense Command/Army Forces Strategic Command-trained Soldiers.

GBIs are solid-fuel, three-stage rockets tipped with an Exoatmospheric Kill Vehicle that destroys missile warheads by direct impact.

Once a GBI is launched, it boosts the kill vehicle outside of the earth's atmosphere to hit and destroy an enemy ICBM in the midcourse of its flight. This highly technical and precise process has often been compared to hitting a bullet with another bullet.

"I know firsthand that the system works, and we're confident in both the system and the operators, our Soldiers, that man the system every day," said 1st Lt. Alberto Squatrito, a member of the 100th Missile Defense Brigade's Echo Crew, who was part of the crew that successfully intercepted the test missile. "Any day could be the day that we actually use this system. We don't want it to happen necessarily, but we're trained and we're ready, and we're confident that we can do it."



1st Space Brigade



COL Richard Zellmann
Commander



CSM Scott Sutherland
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 Army forces and their critical dependence on space capabilities and products through the unique mission sets of its subordinate battalions and direct support battalion. In addition, it executes global theater ballistic missile warning.

Capabilities

The 1st Space Brigade supports Warfighters around the world through the activities of three subordinate battalions and one direct support 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 October 2017. The brigade itself was activated in 2005 to fill a capability need that became especially important during the previous decade 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 ensuring the Department of Defense wideband satellite constellations. The battalion consists of a Headquarters and Headquarters Company and five Wideband Satellite Communications Operations Centers. These WSOCs are located in Japan, Germany, Hawaii and two in Maryland.

The 1st Space Battalion consists of an HHC, six ARSSTs and six Space Control Awareness detachments. In addition, 1st Space Battalion includes four Joint Tactical Ground Stations that are located in Europe, Korea, U. S. Central Command and Japan. The 2nd Space Battalion consists of an HHC, 10 ARSSTs and three Space Situational Awareness 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 a direct support 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 and is forecasted to grow in the future.

Currently, 25 percent of the brigade's forces are globally dispersed at stations in 17 locations, seven countries and six time zones. This includes locations throughout U.S. Northern Command, U.S. 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 continues to support combat operations throughout the globe. At any given time, Soldiers are deployed in support of multiple missions. Their dedication to the integration of space capabilities across all areas of operations is an invaluable asset to U.S. Warfighters everywhere.



*Wideband Satellite
Communications Operations
Center Soldiers in Landstuhl,
Germany, manage the
payloads and provide critical
communications, navigation and
other space-based capabilities
to Warfighters. The WSOCs are
part of the 1st Space Brigade.*

Joint Tactical Ground Station crews provide early warning of missile launches to deployed U.S. forces worldwide.



1st and 2nd Space Battalions

Purpose

The 1st Space Battalion and 2nd Space Battalion support existing and emerging space capabilities to U.S. forces in addition to in-theater tactical ballistic missile warning. They conduct space control operations in support of the National Command Authority, the United States and allied forces.

1st Space Battalion was formed in 1999 to provide an operational headquarters for command and control of Army space forces. 2nd Space Battalion was stood up in October 2017 and is the first United States Army Reserve space battalion in the history of the U.S. Army.

Capabilities

The 1st Space Battalion has three companies, each with a specific focus, to help achieve its mission. Battalion Soldiers have deployed to Afghanistan, Iraq, Oman, Qatar, Kuwait and Bahrain in support of global operations, while maintaining a full-time, forward-based presence in Germany, Korea and Japan. The battalion works 24/7/365 to provide missile warning.

The 1st Space Company (Theater Missile Warning) has four detachments located in Germany, Qatar, Korea and Japan providing 24-hour theater missile warning 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 (including the Individual Qualification Trainer, located in Colorado Springs).

The 2nd Space Company continually supports the war on terrorism and has deployed teams to Iraq, Afghanistan and Bahrain. It also maintains a ready Space Support Team for contingency operations worldwide.

The 4th Space Company, originally flagged as the 3rd Space Company, consists of seven detachments and has deployed numerous times to the U.S. Central Command area of responsibility to provide space situational awareness to U.S. forces. This company works with special mission partners to conduct operations for U.S. Army Space and Missile Defense Command/Army Forces Strategic Command and U.S. Strategic Command.

The 2nd Space Battalion has three companies, 3rd, 5th and 8th Space Companies. The 3rd and 5th Space Companies support the war on terrorism by deploying Army Space Support Teams and Commercial Imagery Teams. Their 10 ARSSTs have deployed more than 10 times to the U.S. Central Command area of responsibility since 2001 when previously affiliated with the 1st Space Battalion. The 8th Space Company is responsible for providing space situational awareness to U.S. forces. The composition of the company includes three detachments that have supported numerous deployments to the CENTCOM area of responsibility in support of the war on terrorism.

117th Space Battalion

Purpose

The 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.

Capabilities

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

During the Iraq and Afghanistan conflicts, the 117th Space Battalion provided multiple ARSSTs to combatant commanders. In 2017, 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 will provide support for Key Resolve and Ulchi Freedom Guardian 2018 in Korea, and Warfighter 18-5 in Camp Atterbury, Indiana. These exercises provide critical space-based technical results and training for numerous units. In 2018, the battalion will deploy three ARSSTs for real world missions. The battalion will support the 28th Infantry Division as an enduring mission in Kuwait and replace an active-duty ARSST supporting the Special Forces Command.

Eleven 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 looks forward to continuing the advancement of space for the Warfighter far into the future.

Soldiers use mapping software during the multi-state large-scale, natural disaster emergency response exercise Vigilant Guard 2014, hosted by the Kansas National Guard in Salina, Kansas. The Soldiers are a part of Army Space Support Team 30, 117th Space Support Battalion with the Colorado National Guard.



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 ensures continuous communications connectivity for mission critical subscribers ranging from the president of the United States to the Warfighters and national agencies engaged in the war on terrorism.

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, Japan; and SATCON headquarters at Peterson Air Force Base, Colorado.

Capabilities


The 53rd Signal Battalion supported Operations Inherent Resolve, Freedom's Sentinel, 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, and space operations, while remaining a crucial enabler for joint and Army operations within the continental U.S. and in support of overseas contingency operations. The battalion's SATCON mission set supports joint and Army 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.



Wideband Satellite Communications Operations Centers manage the payloads and provide critical communications, navigation and other space-based capabilities to Warfighters.



Soldiers of Company C, 53rd Signal Battalion man the Wideband Satellite Communications Operations Center in Landstuhl, Germany. The primary mission of the WSOC is to provide wideband payload control, transmission control and defensive space control for the Warfighter.



1st Space Brigade supports global operations

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.

More than 70 percent of the Army's equipment and key weapon systems rely on a space-based service or capability.

The brigade, headquartered in Colorado Springs, Colorado, provides trained and ready forces to conduct continuous global space force enhancement, space support, space control and special missions in support of combatant commanders, U.S. government agencies and international partners.

"Space operations are critical to the success of the Army in many ways, from supporting operations through intelligence collection, to providing protection through missile warning to the enabling of communications to the Warfighter," said Lt. Col. Glenn O. Mellor, 53rd Signal Battalion commander. "The 53rd provides and ensures global wideband military satellite communications in a contested, degraded operational environment, contributing to the success of our forces and their mission."

The Army Space Support Teams of 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.

An ARSST is a six-Soldier analysis team, comprising two officers and four enlisted Soldiers, each having a unique space-related skill. The team provides space-based products and services, while simultaneously seeking and applying new tactics, techniques and procedures across all five areas of space support to operations – intelligence, surveillance and reconnaissance; missile warning; environmental monitoring; satellite communications; and positioning, navigation and timing.

"It is these Soldiers' space training and expertise that will enable them to provide commanders space situational awareness, offensive and defensive space control, missile warning, satellite communications, remote sensing, navigation warfare and many other capabilities," said Lt. Col. Erikk Hurtt, 2nd Space Battalion commander. "The capabilities these Soldiers bring to the fight are unmatched by any nation in the world. We will bring these capabilities to bear whenever and wherever the nation calls."



The Technical Center



Thomas Webber
Director



**COL William
"Bill" Geiger**
Deputy Director

Purpose

The Technical Center provides critical technologies to achieve Warfighter dominance, meeting current U.S. Army Space and Missile Defense Command/Army Forces Strategic Command mission requirements and addressing future needs. The center manages science and technology and research and development, in addition to conducting test programs for space, integrated air and missile defense, directed energy, hypersonics and related technologies. As part of the Army Science and Technology enterprise, the Technical Center contributes to today's fight while enabling the next generation to prevail in conflicts to come.

The Technical Center consists of the Space and Strategic Systems Directorate, the Air and Missile Defense Directorate and the Ronald Reagan Ballistic Missile Defense Test Site, or RTS, located on Kwajalein Atoll in the central Pacific Ocean. The Technical Center's primary focus areas are directed energy, tactical space technologies, cyberspace, and test and evaluation.

Capabilities

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 directly contribute to addressing existing operational capability gaps. High-energy lasers have the potential to be a low cost, effective complement to kinetic energy, addressing 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.

Cyberspace

The Technical Center's cyberspace division is pursuing solutions to innovatively protect the transport of data throughout the transmission and receipt cycle of space and high altitude assets. The Technical Center is working to make space and high altitude assets and the end-to-end data transport system as resistant as possible to attack from any source at any point and survivable in any environment.

Test and Evaluation

As an invaluable part of the Army Test and Evaluation Enterprise, the Technical Center 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. RTS provides test support to the Missile Defense Agency, the U.S. Air Force, NASA and others.



Spc. Brandon Sallaway, 2nd Battalion, 12th Field Artillery, 1st Brigade, 4th Infantry Division, points out his Mobile Expeditionary High Energy Laser hits during the Maneuver Fires Integrated Experiment, April 2017 at Fort Sill, Oklahoma.

Additionally, RTS supports the command's space object identification and space surveillance network missions in support of U.S. Strategic Command.

The Technical Center collaborates and synchronizes these and other 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, the Air and Missile Defense Directorate, and the Concepts and Analysis Laboratory. The CAL provides a hands-on environment for newly hired engineers, scientists and college interns.

The center and its divisions are geographically distributed in many sites, with its primary offices located at Redstone Arsenal, Alabama. Other locations are the RTS located at U.S. Army Garrison – Kwajalein Atoll, Republic of the Marshall Islands, and the RTS Distributed 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.

In addition to the CAL, the Technical Center operates the Space Lab and the AeroPhysics Research facility at Redstone Arsenal. Physically, the Laser Lab is located on the University of Alabama in Huntsville campus while the Solid State Laser Testbed is located at White Sands Missile Range, New Mexico.

The Technical Center is a lean organization with only 136 Department of the Army civilians and seven military personnel. Budget, personnel, contract and other recurring management activities are coordinated and executed by the Technical Center Business Management Office 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.

Engineers prepare Kestrel Eye, an electro-optical nanosatellite developed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, for launch to the International Space Station in August 2017.



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 SMDC/ARSTRAT 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 Kestrel Eye Joint 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.

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, hypersonics 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 Directed Energy Division, the Research and Advanced Concepts Division and the Test Execution Support Division.

Capabilities

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.

The **Directed Energy 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 of the Army for directed energy. 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



Mobile Expeditionary High Energy Laser is a laser testbed on a Stryker armored fighting vehicle chassis and serves as a platform for research and development.

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. Thorough risk assessments leveraging existing motor inventories to the maximum extent possible ensure the most affordable target solutions.

Gauge Day and Rebecca Nagurney, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command engineers, right, discuss the Concepts Analysis Laboratory's 3D printer and their path from college to the command during Adventures in Engineering day Nov. 8, 2017. Adventures in Engineering is a day to introduce high school juniors to science, technology, engineering and mathematics career options with the U.S. government.



Concepts Analysis Laboratory

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, propulsion research, fabrication and testing, and flat-sat testing
- Operation of truth sensor for counter-rocket, artillery and mortar, and counter unmanned aerial system testing at Yuma Proving Ground
- Image processing for future laser weapon systems
- Counter unmanned aerial system testing with an impulse radar

Capabilities

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, Auburn University, Tuskegee University, University of Rochester 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 SMDC/ARSTRAT 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 permanently.

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 in the summers.

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.

Ronald Reagan Ballistic Missile Defense Test Site

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.

Capabilities

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.

RTS telemetry tracking systems can receive, process and record flight test data transmitted by test articles in-flight, providing critical information for flight safety decision-making and test mission data analysis. Command-destruct capabilities include ground-based antennas and the Kwajalein Mobile Range Safety System aboard the U.S. Army Vessel Worthy.

RTS optical systems include optical tracking mounts located throughout the atoll. These high-speed mounts host three telescopes and up to five cameras. Current capabilities include visible, wide-field-of-view and medium- and long-wave infrared cameras. RTS has additional ballistic cameras used for re-entry measurements and fixed towers for mounting photo documentation cameras.

Strategic and tactical space surveillance operations are also conducted, contributing radar observations to the space surveillance network in support of requirements from the U.S. Strategic Command. In addition to satellite tracking and metric observations and 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 SMDC/ARSTRAT and RTS to maximize availability of RTS assets to support this critical mission area.

U.S. Army Space and Missile Defense Command/Army Forces Strategic Command employees man their stations at the Reagan Ballistic Missile Test Site Operations Center-Huntsville.





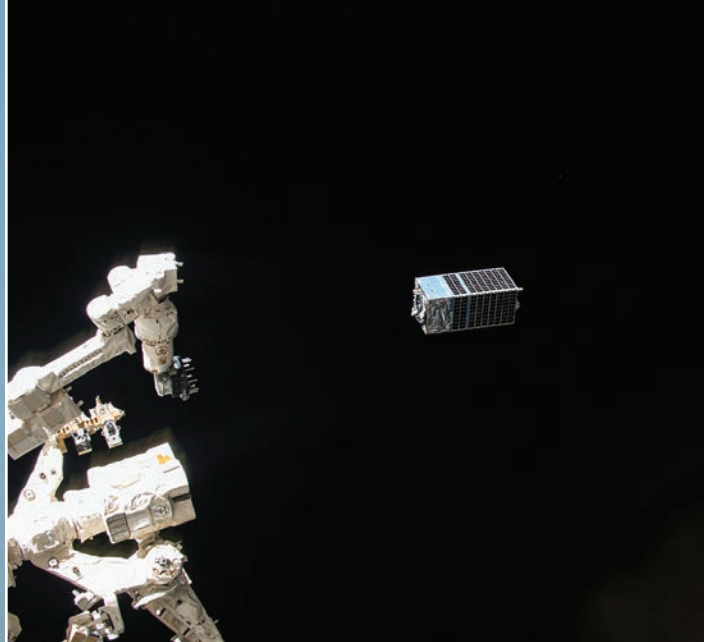
Kestrel Eye launch is success for Technical Center, win for Soldiers

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Technical Center's vision is to deliver technologies and solutions to enable Warfighter dominance on today's battlefield as well as tomorrow's.

In August 2017, the Tech Center witnessed the launching of its Kestrel Eye satellite from Launch Complex 39A at NASA's Kennedy Space Center where it traveled as a payload aboard the SpaceX Falcon 9 from Cape Canaveral, Florida, to the International Space Station. Two months later, the team watched as retired Col. Mark Vande Hei deployed Kestrel Eye from the ISS so that they could check out the satellite and begin a series of demonstrations to check its utility.

Kestrel Eye is a small, low-cost, visible-imagery satellite designed to rapidly provide images to the tactical-level ground Warfighter without the need for time-consuming intermediate processing.

"This is a major milestone for SMDC/ARSTRAT," said Thomas Webber, SMDC/ARSTRAT Technical Center director. "We have every expectation that placing Kestrel Eye into orbit will confirm our premise that an electro-optical microsatellite, tasked directly by the Warfighter, will fill a critical intelligence, surveillance and reconnaissance gap for brigade combat team and below tactical users."



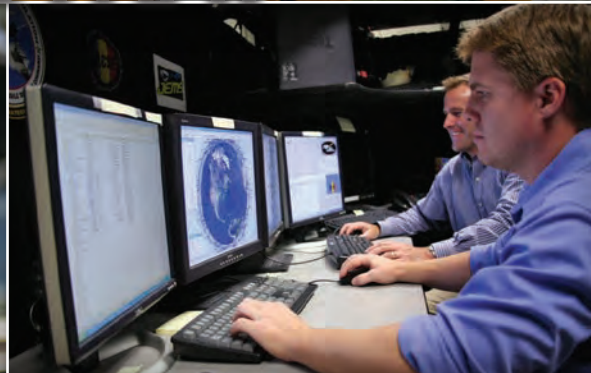
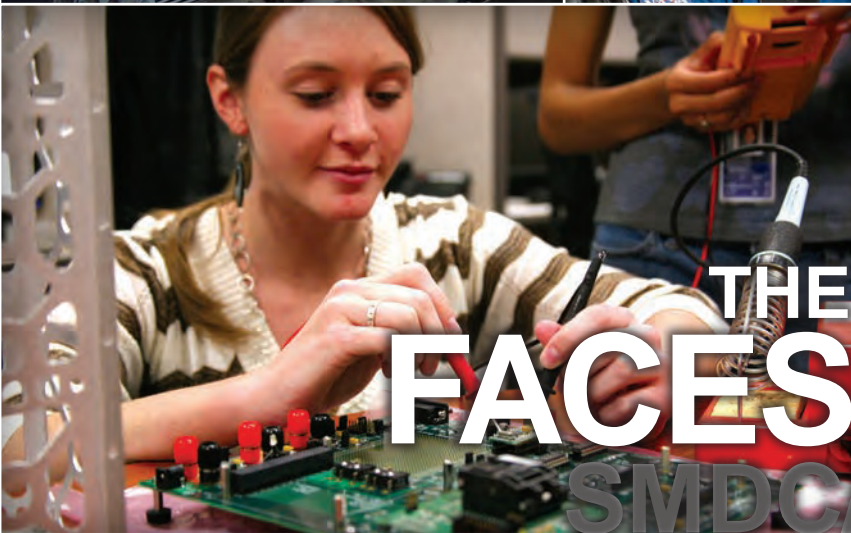
The goal of the Kestrel Eye program is to demonstrate the military utility of providing rapid situational awareness directly to Army brigade combat teams. Kestrel Eye will enhance situational awareness of the brigade combat teams by providing battlefield-access satellite imagery.

Designed to be tactically responsive, Kestrel Eye will provide the ability to task and receive data from the satellite during an overhead pass while also providing a measure of satellite persistence that provides situational awareness and images rapidly to the Warfighter.

The satellite will help Army forces possess capabilities and be prepared to fight across multiple domains. Kestrel Eye is designed to continue American supremacy as rivals innovate and leverage technology.

"This is a game-changing capability for the Army because for the first time commanders in the field will be able to control the entire imagery process from end-to-end, from the tasking of the satellite all the way through to the dissemination of the data to the Soldiers who need it," said John R. London III, SMDC Space and Strategic Systems Directorate chief engineer.

ABOVE LEFT: Kestrel Eye, an electro-optical nanosatellite developed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, launches to the International Space Station as a payload aboard the Space X Falcon 9 from Cape Canaveral, Florida, in August 2017. ABOVE RIGHT: Kestrel Eye deploys from ISS in August 2017.





Future Warfare Center



Richard DeFatta
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.

Capabilities

The Future Warfare Center is SMDC/ARSTRAT'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 Doctrine Center 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 8,500 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 defense;



- Taking technology from concept to fielding and life-cycle management;
- Providing FA40 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 and Doctrine Center achieved their third consecutive “Institution of Excellence” (100 percent rating)

Navigation Warfare: Developed TRADOC-sponsored Army NAVWAR concept white paper to establish a baseline for how the Army will execute the NAVWAR fight

Force 2025 and Beyond Maneuvers’ Campaign of Learning: Unified Quest; Unified Challenge; movement and maneuver quick looks; Echelons Above Brigade limited objective experiments; mission command and intelligence, surveillance and reconnaissance tabletop exercises; Schriever wargame; joint and service wargames

Space Force Structure Review: Completed with Force Design Update and submitted for critical gaps; space force structure increases trending positively in Total Army Analysis

Space Superiority: Established a tactical space superiority program of record with Program Executive Office for Intelligence, Electronic Warfare and Sensors

Actionable Infrared Data Exploitation III: Demonstrated targeting potential for Overhead Persistent Infrared

Battlespace Awareness data directly to Advanced Field Artillery Tactical Data System

Missile Defense Agency THAAD and Aegis Ballistic Missile Defense Exercises: Successfully participated in European Command Air and Missile Defense Exercise, Fleet Synthetic Training – Joint, Central Command Air and Missile Defense Exercise, Global Response Exercise 06, Nimble Fire exercise events and Host Nation Exercise 16

Army Study and Analysis Campaign Plan: Completed 21 major operational analyses in fiscal year 2016; executing 17 in fiscal year 2017

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; FM 3-14 Space Operations revision staffed across Army

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 10 percent annual growth

Training and Education: Approximately 8,500 space and GMD Soldiers and civilians trained and educated annually

Development: Planned and executed the 2017 FA40 Training Forum

ABOVE: 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.

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.



Capability Development Integration Directorate

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, wargaming and analysis, and space, high altitude and global missile defense capability development.

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.

Capabilities

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 is the conceptual foundation for the Army's future force 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 implementation of the Joint Capabilities Integration and Development

System process and the Army's concept development, warfighting capabilities determination and integration. The Army Warfighting Challenges provide the Army's top level required capabilities and intellectual framework, which along with the operational environment and strategic guidance, drive the Army concept development.

The Future Warfare Center 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. Future Warfare Center contributes to the development of the Army Operational Concept, Multi-Domain Battle and Echelons Above Corps concepts along with the Army Functional Concepts, which make up the Army Concept Framework.

The Decision Support Division provides the computational and network resources, 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 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.

U.S. Army Space and Missile Defense School and Doctrine Center

Purpose

The U.S. Army Space and Missile Defense School and Doctrine Center executes the Army's institutional training and education for space and global ballistic missile defense mission areas. The School and Doctrine Center is responsible for coordinating and publishing the Army's doctrine for space and global ballistic missile defense.

The organization develops collective space and global ballistic missile defense training tasks; supports space and missile defense doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy initiatives. It also instructs and integrates space education at each Army center of excellence and proponent school as part of the Army Space Training Strategy.

Capabilities

The School and Doctrine Center recently earned the U.S. Army Training and Doctrine Command's highest accreditation rating as an Institute of Excellence. 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 Course
- GMD North American Aerospace Defense Command/U.S. Northern Command Command and Control 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
- 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
- Satellite Communication Electromagnetic Interference Fundamentals Course
- Electromagnetic Interference Characterization Course
- Army Space Control Fundamentals Course
- Mobile Integrated Ground Suite Initial Qualification Training
- Advanced MIGS Operations
- Advanced Space Control Systems Courses
- Army Space Control Command and Control Course
- Space Control Planners Course
- Tactical Space Operations Courses
- Joint Tactical Ground Station Initial Qualification Training
- JTAGS Leader Development Course



Every three years, the U.S. Army Training and Doctrine Command reviews all aspects of training management and execution to include how the U.S. Army Space and Missile Defense School and Doctrine Center analyzes, designs, develops, implements and evaluates space and missile defense training and education against the Army Enterprise Accreditation Standards. The School recently earned TRADOC's highest accreditation rating as an Institute of Excellence.

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.



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.

Capabilities

The **SimCenter** serves as one of SMDC/ARSTRAT'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 their 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 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 aligns training and education requirements to operational needs and career professional development. It conducts strategic planning, ensuring space cadre billets are identified, created and tracked to support space-related missions.

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. 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 3YQ4 skill identifiers/additional skill identifiers, and S1AM8A personnel development skill identifiers. ASPDO also provides FA40 life-cycle management to ensure officers' skills, experience and education meet operational requirements and career growth.

Capabilities

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. Those areas include space situational awareness, space force enhancement, space support, space control and space force application.

The Army's space cadre has steadily grown to encompass 4,948 billets, which includes 361 active component FA40 space operations officers. 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 career field 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, shown here.



A Soldier receives training with space-enabled equipment provided by the U.S. Army Space and Missile Defense School and Doctrine Center in Colorado Springs, Colorado.



Training helps Soldiers understand space strategy

Virtually every Army operation relies on space capabilities to some degree to enhance the effectiveness of combat forces. Space capabilities enable the Army, at every echelon, to communicate, navigate, target the enemy and protect forces.

Because of the critical role space capabilities play in today's Army, in 2017 the U.S. Army Combined Arms Center directed the U.S. Army Space and Missile Defense School and Doctrine Center – a directorate within the Future Warfare Center – to incorporate a Denied, Degraded, Disrupted Space Operational Environment lesson in all Army professional military education courses.

“Our training mission areas are unique, one-of-a-kind missions – critically important to the command, the Army and the nation,” said Daryl Breitbach, director, U.S. Army Space and Missile Defense School and Doctrine Center, Director of Training. “It’s pretty cool stuff we get to do every day in training and educating with some of the finest Warfighters in support of our nation. This is a highly trained, highly skilled and highly motivated team of instructors and staff that continually strives for excellence in training and education.”

The Denied, Degraded, Disrupted Space Operational Environment lesson at Army Centers of Excellence and proponent schools, educates Soldiers to understand space capabilities; know the threat; prepare and train for operations in a contested space operational environment;

as well as recognize, react, and continue operations when faced with a contested space operational environment.

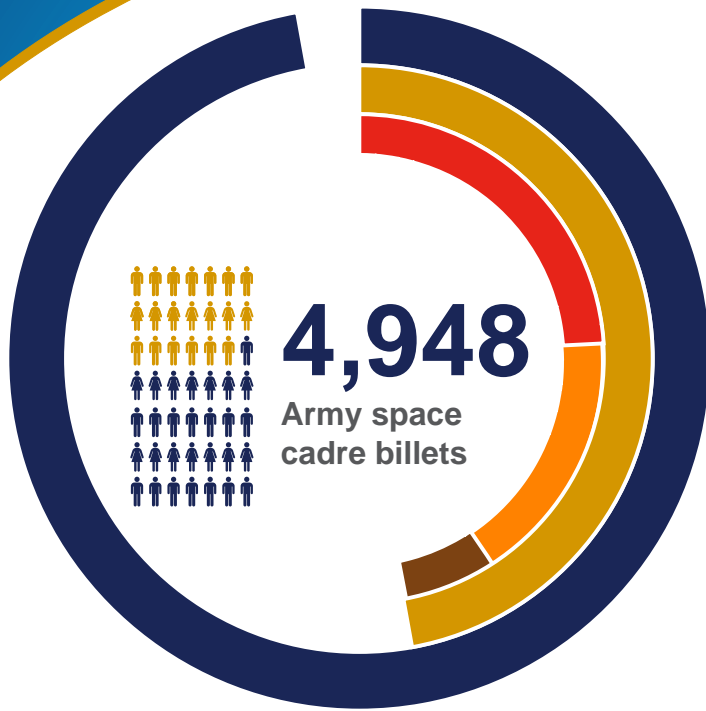
The Army Space Training Strategy, or ASTS, addresses key components of Soldier institutional training and education, at every grade level and echelon, to improve Soldier understanding of how space capabilities enables their equipment, supports their mission, provides protection and enables unified land operations, especially in contested operational environments.

The ASTS integrates, synchronizes and reinforces space education topics and training across existing courses and lessons.

“Today’s Soldiers have increasingly grown up immersed in a communications and network-enabled world,” Breitbach said. “They have the awareness, curiosity and desire to understand how space capabilities enable their missions and provide an operational advantage on the battlefield.”

ASTS education and training across the Army and Department of Defense reached more than 8,500 students in fiscal year 2017 including initial military training courses; professional military education courses such as the Command and General Staff College, officer career courses, pre-command courses, warrant officer and noncommissioned officer courses; as well as functional training at every center of excellence and proponent school.

SPACE CADRE BY THE NUMBERS



44%

Army's space cadre belonging to SMDC/ARSTRAT

1,068

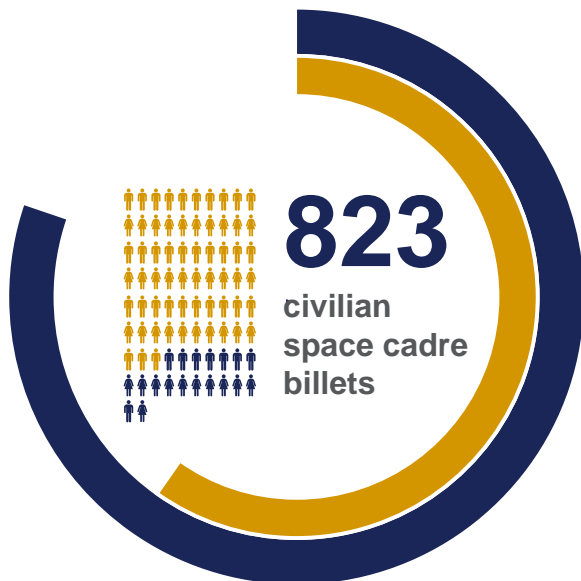
space cadre billets at the 1st Space Brigade

296

space cadre billets at the 100th Missile Defense Battalion

822

space cadre billets at the Headquarters, Future Warfare Center and Technical Center



639 civilian space cadre billets at SMDC/ARSTRAT



361

FA40 active component space operations officer billets in the Army

106 FA40 active component space operations officer billets at SMDC/ARSTRAT

Army astronaut Lt. Col. Andrew Morgan, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command NASA detachment commander, front, trains at Johnson Space Center in Houston, Texas.



NASA Detachment

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. Lt. Col. Andrew Morgan, detachment commander, and Maj. Anne McClain were both selected for the astronaut program in 2013. Maj. Frank Rubio was selected in 2017, joining the detachment as an astronaut candidate in 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.

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

G-6 Satellite Communications Support

Purpose

The G-6 office provides an array of satellite communications, or SATCOM, support for the SMDC/ARSTRAT mission. The command has the role of Wideband Consolidated Satellite Communications System Expert, or C-SSE, which also makes it the SATCOM System Expert for Wideband Global SATCOM, or WGS, and Defense SATCOM System, or DSCS, constellations and systems as well as the Global Broadcast System.

From Peterson Air Force Base, Colorado, the Wideband C-SSE acts as the primary focal point for all operational issues concerning wideband SATCOM globally and provides technical direction to SMDC/ARSTRAT's four Regional SATCOM Support Centers, or RSSCs, the 1st Space Brigade's five Wideband SATCOM Operation Centers, the 4th Space Operations Squadron and program managers for all wideband systems and subsystems.

The Wideband C-SSE manages wideband military satellite communications for the Department of Defense, as well as other U.S. government users and international and coalition partners to deliver beyond-line-of-sight communications.

Capabilities

The Wideband Constellation consists of nine WGS and seven DSCS satellites, which provide flexible and reliable long-haul, high-capacity communications worldwide. Currently, the constellations managed by the Wideband C-SSE account for 69 percent of all DOD beyond-line-of-sight throughput, supporting the ever-increasing bandwidth needs of commanders and Warfighters at all levels.

Field units are demanding more real and near-real time intelligence, warning and battle damage data to support continuously updated and shared situational awareness. The WGS user population is highly diverse in nature and encompasses more than 100 varieties of fixed, transportable and mobile terminals. It also supports thousands of terminals daily enabling communications for hundreds of thousands of Warfighters worldwide.

There are four geographically dispersed RSSCs that provide critically required connectivity to DOD, coalition partners and other U.S. government activities (diplomatic, humanitarian assistance/disaster relief, etc.) in zones where the communications infrastructure can be destroyed, degraded or is simply not present.

Every military operational function – mission command, fire support, logistics, maneuver, intelligence and more – relies on SATCOM to provide beyond-line-of-sight communications capability. The RSSCs provide 24/7 SATCOM planning, engineering and satellite payload management for all DOD SATCOM systems worldwide from RSSC-Pacific, Wheeler Army Airfield, Hawaii; RSSC-West, Peterson Air Force Base, Colorado; RSSC-East, MacDill Air Force Base, Florida; and RSSC-Europe, Patch Barracks, Stuttgart, Germany.

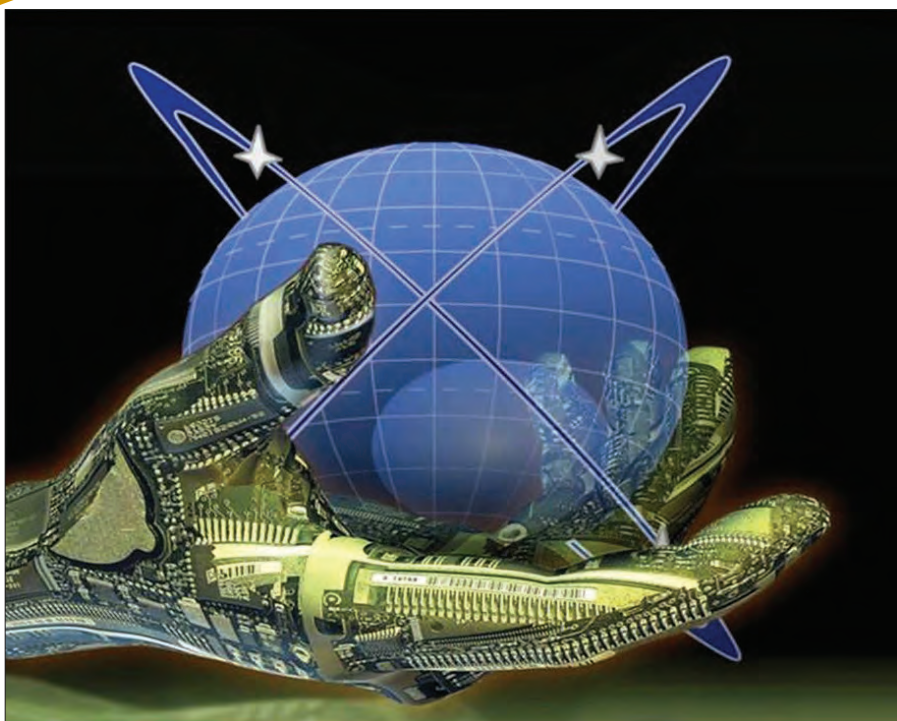
Each RSSC is composed of four core planning cells. Overall management of the RSSCs resides with SMDC/ARSTRAT, which also oversees the Wideband SATCOM planning cell and has consolidated oversight of the Narrowband SATCOM planning cell. The legacy component of the Narrowband SATCOM planning cell is resourced by U.S. Fleet Cyber Command, Commander Tenth Fleet, Naval Network Warfare Command located in Suffolk, Virginia. The protected SATCOM planning cell is resourced by Air Force Space Command's Fourth Space Operations Squadron at Schriever Air Force Base, Colorado. The commercial SATCOM planning cell is supported by contractors and resourced by Defense Information Systems Agency.



The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's G-6 office provides a number of satellite communications capabilities including Regional Satellite Communications Support Centers and serves as the Consolidated Satellite Communication System Expert for Wideband.

The Chief Technology Officer serves as the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command principal adviser for science and technology matters.

Chief Technology Officer



Purpose

The Chief Technology Officer serves as the eyes and ears of SMDC/ARSTRAT'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 to the commander 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.

Capabilities

As an independent internal adviser, the CTO provides unbiased and sound engineering and scientific advice, consultation, assessment and expertise to the command on space, high altitude, ground-based midcourse defense, directed energy, and other command research, development, test and evaluation concepts, architectures, technologies and programs.

As the command's focal point for science and technology, the CTO is the primary point of contact for the Department of Defense and non-DOD CTOs, academia, industry,

science boards and national labs for initiatives involving basic research and conceptual technologies.

This external outreach process is two-fold: first, looking at what technologies these external organizations are currently pursuing; and second, making sure external entities understand SMDC/ARSTRAT's needs. For example, the CTO works with organizations like the Defense Innovation Unit-Experimental to review their science and technology portfolio and ensure that the command's requirements are understood and thereby incorporated in their innovation programs and milestone plans.

The CTO created and 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, Alabama. 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. It also increases the potential for leveraging related science and technology efforts and core competencies, as well as identifying mutually beneficial, cooperative events and efforts.

The CTO is responsible for creating the science and technology strategic vision for the command. Every organization seeking new technologies to solve difficult capability gaps needs to enumerate and prioritize which ones hold the most promise in providing a needed or enabling capability to the Warfighter.

Office of Small Business Programs

Purpose

The Office of Small Business Programs ensures the Small Business Program is implemented appropriately and small businesses are provided the maximum opportunity to be included in U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's complex procurements in the areas of space, missile defense, directed energy, hypersonic, high altitude, cyber and other related research and development technologies.

The OSBP serves as advisory proponent to other serviced activities the command supports contractually in complying with program regulations. SMDC/ARSTRAT 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 OSBP also provides for the Mentor Protégé Program, Small Business Innovation Research and Small Business Technology Transfer programs to ensure consistency with the Small Business Administration program guidance and provide SBIR and STTR policy recommendations.

Capabilities

The OSBP is the advisory proponent to the small business industry through local and national small business advocacy events, symposiums and trade shows with the mission of locating and developing information on the technical capabilities of small business. The office has an open-door policy and routinely meets with interested contractors, providing information on how to do business with the command as well as forecasting information for upcoming opportunities.

SMDC/ARSTRAT's dedicated Army Contracting Command-Redstone develops its acquisition team to include OSBP, program managers, legal, pricing and resource management when a requirement is identified. When able, the team convenes early in the procurement cycle.

OSBP is consulted on all matters pertaining to small businesses throughout the acquisition process, including market research, assessing small business technical capability, acquisition planning/strategy, source selection, contract performance and payment issues. OSBP provides specific language regarding implementation of Small Business Programs ensuring a level playing field and that requirements are not overly restrictive negating competition. The organization provides meaningful comments in the preparation and review of market research reports, acquisition plans/strategies, justifications and approvals, and recommending set-asides for small business competition when appropriate. OSBP is the command focal point that interfaces procurement actions with SBA, the proponent of the Small Business Programs.

OSBP reviews prime contractors' small business subcontracting plans, and assists administrative contracting officers in evaluating, monitoring, reviewing and documenting contract performance to determine compliance with subcontracting plans. The office monitors contract awards to ensure compliance and accuracy relating to small business.

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.



U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Kestrel Eye, a small, low-cost, visible-imagery microsatellite designed to provide near real-time images to the tactical-level ground Soldier, is a small business success story. Kestrel Eye was developed by a small business and its small business subcontractor.



Joint Functional Component Command for Integrated Missile Defense



COL Kevin Ciocca
Deputy Commander



SMSgt Jennifer Hangley
Senior Enlisted Leader

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 United States 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.

Capabilities

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 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 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 and require synchronization among the affected commands to coordinate effective allocation, deployment and employment of the capabilities necessary to deter and prevent attacks, destroy enemy missiles, or nullify or reduce the effectiveness of an enemy attack.

Given the transregional nature of the threat, low-density, high-demand missile defense platforms and an architecture of sensors, shooters and command and control that span multiple areas of responsibility, combatant commands designated with responsibility for adversary problem sets 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 then 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 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.
- The strong partnership with services and the materiel developer ensures advocacy for future requirements and the delivery of tested capabilities and operational acceptance of those capabilities into the architecture. Once available, in partnership with geographic combatant commands, JFCC IMD provides expertise to support planning, joint and combined training, allocation and asset management. All of these are key in supporting the goal of ensuring U.S. global missile defenses are postured to support its critical defense objectives.



Lt. Gen. James H. Dickinson, commanding general of Joint Functional Component Command for Integrated Missile Defense and the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, (above and third from right at top) participates during a JFCC IMD briefing.

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.



Ministries of Foreign Affairs and Defense representatives from 24 nations, NATO, three additional multinational organizations, as well as Department of Defense, Office of Secretary of Defense, Joint Staff, Combatant Commands and Missile Defense Agency, convene quarterly to exchange views and insights and experiment collectively with policy and operational concepts during Nimble Titan, a biennial campaign of experimentation.



Nimble Titan fosters collaboration between U.S., allies

Nimble Titan, a 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 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 evolved in 2006 into a biennial U.S. Strategic Command-sponsored, Joint Functional Component Command for Integrated Missile Defense-led series of multinational, global BMD, strategic policy-military experiments.

The focus shifted in the Nimble Titan 16 campaign to include issues of integrated air and missile defense. Nimble Titan has grown from six nations 12 years ago to 28 nations and international organizations from the Asia-Pacific, European, Middle Eastern and North American regions today.

Today, Ministries of Foreign Affairs and Defense representatives from 24 nations, NATO, three additional multinational organizations, as well as Department of Defense, Office of Secretary of Defense, joint staff, combatant commands and Missile Defense Agency, convene quarterly to exchange views and insights and experiment collectively with policy and operational concepts. The objective is to expand international relationships, enhance regional defense and strengthen deterrence between participating nations and organizations.

Over the course of the past six campaigns, Nimble Titan has realized some real-world impacts and influences on allied and partner missile defense. Over each campaign, there has been a continual growth in national membership and interest, both from missile defense and non-missile defense capable nations, expanding the breadth of expertise and influence, and strengthening relationships.

Experimentation with defense capabilities, regional defense designs, battle management, command and control, deterrence and de-escalation concepts informs future procurement activities, the adoption of multinational battle management procedures and inclusion of Nimble Titan-developed processes and definitions in allies and partner defense strategy and doctrine documents.

Regional partners gleaned insights from other regions and are working together to establish a transregional operational employment framework. NATO used language from Nimble Titan products to develop their missile defense operations and command and control structure. In addition, combatant commands and partner nations replicated the success of Nimble Titan to conduct bilateral, multilateral, regional policy and operational-level events using Nimble Titan objectives, structure and products.

Nimble Titan participants collectively produce practical missile defense concepts and solutions to policy-military challenges that influence real-world missile defense policy.

As the United States, its allies and partners face an increasingly complex missile threat environment, events such as Nimble Titan foster greater confidence in combined missile defenses and provide a means to advance U.S. efforts in collaboration, integration and interoperability, and burden sharing with allies and partners.



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



www.army.mil/smdc

-  www.facebook.com/armysmdc
-  www.twitter.com/armysmdc
-  www.flickr.com/armysmdc
-  www.youtube.com/armysmdc



www.army.mil/smdc

SPACE • MISSILE DEFENSE • HIGH ALTITUDE