



# SPACE FORCE 101



UNITED STATES  
SPACE FORCE

# TABLE OF CONTENTS

**1**

Introduction

**2**

Why Space?

**3**

Space Force Facts

**4**

Guardians

**5**

Enlisted &  
Officer Ranks

**6**

Organization

**10**

Locations

**12**

Core Functions

**14**

A Congested &  
Contested Domain

**16**

Orbitology

**17**

History of Military  
in Space

**20**

Seal & Symbol

# INTRODUCTION

**E**stablished on December 20, 2019, the United States Space Force is the sixth military branch in the U.S. Armed Forces. Military and civilian members of the Space Force are called Guardians, a term that traces back to “Guardians of the High Frontier.” This was the command motto of Air Force Space Command, the organization that evolved into what we know today as the U.S. Space Force. The Space Force’s mandate is to organize, train, and equip space forces in order to protect and defend American interests in space and the space capabilities that enable and enhance the lethality and effectiveness of the Joint Force.

**Our modern way of life depends on space.** The economic prosperity of the United States depends on space-based activities. Space technology underpins our society in unseen ways and has become an indispensable engine of economic value. Space enables commercial activity related to long-range communications, such as satellite television and space-based internet on commercial airlines, safe transportation, daily navigation through the Global Positioning Service (GPS), financial network security, weather monitoring, and agricultural planning. Collectively, these space-enabled applications account for hundreds of billions of dollars in the U.S. economy.

**American national security depends on space.** The modern U.S. military has been designed around assured access to space capabilities. Military forces on land, in the air, and at sea rely on space capabilities for global communication, command and control of nuclear forces, navigation around the world, precision targeting and attack, missile defense, and persistent battlespace awareness. Without space, the American military would have to take more risks with their own and others’ lives.

**However, America’s interests in space are at greater risk than ever before.** Over the last two decades, adversaries and competitors have fielded an increasingly sophisticated arsenal of weapons that can attack space-based and space-enabled platforms. These threats are both in outer space itself, as well as on Earth in the air, on the sea, or on land. Threats to space systems pose a tremendous risk to the prosperity and security of not only our military, but the safety of the American people.

**Guardians build, operate, and protect space systems that provide world-wide connectivity and security, enabling the American way of life.** Missions such as the GPS and satellite communications (SATCOM) provide access and networks for information to freely flow. Guardians also defend the homeland and our ability to use space systems through missions such as missile warning, space domain awareness, and orbital and electronic warfare. ▲

# WHY SPACE?

**T**here's no such thing as a day without space. From the GPS on cars and phones, to modern telecommunications, finance, agriculture, and more, space technology has completely permeated the modern way of life. Whether through use of satellites for services, derived technologies, or scientific research, everyone has benefitted from space.

## A GROWING INDUSTRY

Just as the Navy maintains freedom of the seas, the Space Force maintains freedom of space for U.S. activities, both governmental and commercial. Commercial industry is booming, with industries such as low-cost launch, satellite internet, telecommunications, imagery, and even space tourism. In 2024, the "space economy" was valued at \$546 billion. With the space domain providing a new engine to the global economy, safe and reliable access to space will impact everyone.

## INNOVATION AND SCIENCE

Space technology has likely woven its way into your everyday life more than you think. Many of the products and tools we use routinely find their origins in space. A few examples are cell phone cameras, solar panels, memory foam, cordless vacuums and power tools, global food safety standards, grooved roadways to reduce accidents, wireless headphones, air purifiers, baby formula, laptops, and much more.

## NAVIGATION

In 2022, a poll identified 93% of American drivers are dependent on GPS to navigate. GPS satellites are operated by the Space Force and instantly triangulate position to give users their pinpoint location anywhere on Earth. This technology has gone on to underpin entire industries including transportation, finance, security, safety, and much more. Without GPS, ATM transactions, self-driving cars, automated agricultural equipment, and many ocean-based operations would come to a screeching halt. Space Force Guardians keep the existing GPS satellite constellation running smoothly and teams of engineers are building the next generation of GPS technology.

## COMMUNICATION

Have you ever used the WIFI while flying on a commercial aircraft? Or perhaps you subscribe to or use satellite radio or TV for constant connection. Every day space is making it easier to connect with friends and family, conduct business, dial 911 in an emergency, and connect to the internet in under-developed or rural areas. The Space Force works with commercial industry to protect those satellites and American's access to them. ▲



# SPACE FORCE FACTS



**ESTABLISHED:**  
December 20, 2019



**HEADQUARTERS:**  
Pentagon,  
Washington, DC



**MISSION STATEMENT:**  
Secure our Nation's  
interests in, from,  
and to space.



**MOTTO:**  
*Semper Supra,*  
which is Latin for  
"Always Above."



## CORE VALUES:

### CHARACTER:

High moral character and ethical standards are the foundation of our Guardians' personal and professional lives.

### CONNECTION:

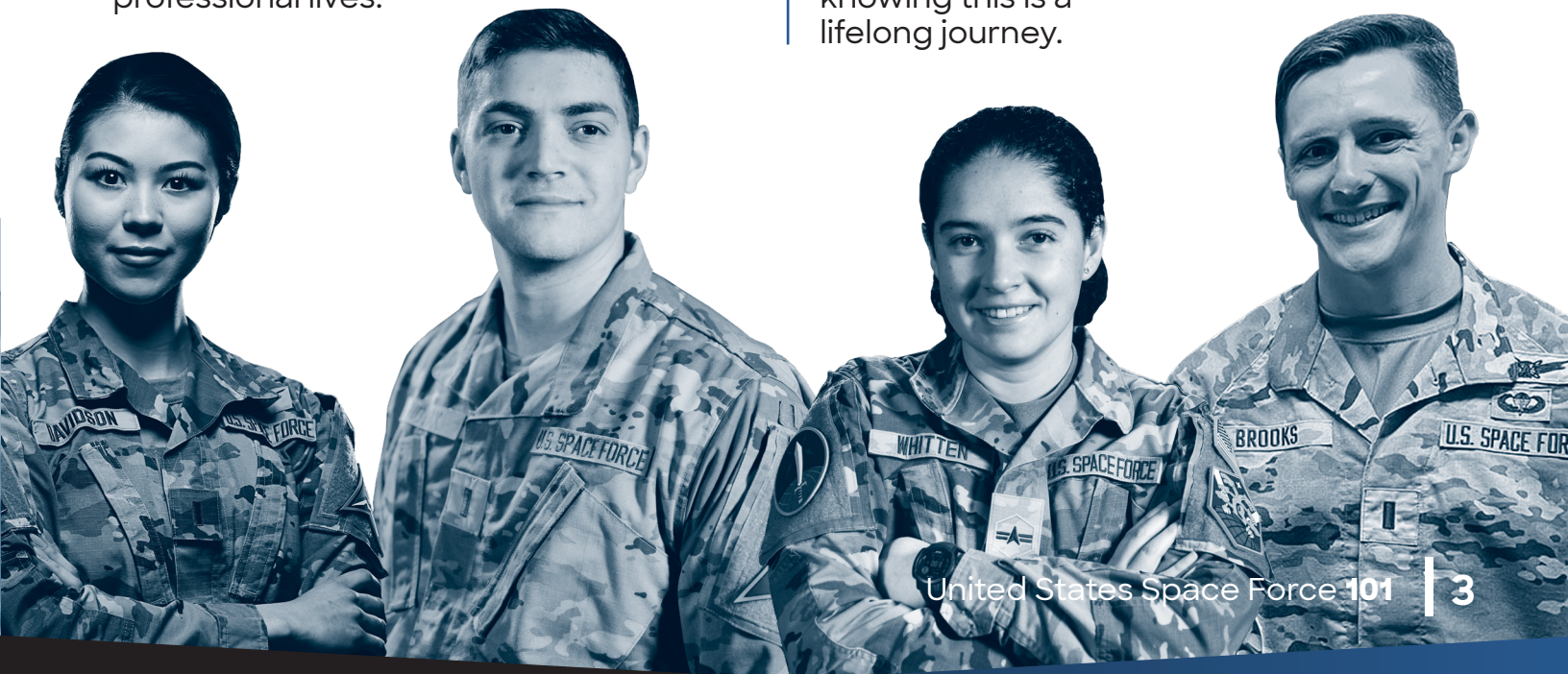
Guardians are connected by a common purpose greater than themselves.

### COMMITMENT:

Guardians are committed to the pursuit of mastery of themselves, their profession, and their domain, knowing this is a lifelong journey.

### COURAGE:

Guardians do what needs to be done and say what needs to be said because it is right.



# GUARDIANS



Our Guardians have highly diverse and skilled backgrounds.



**T**he Space Force was designed from its inception to be lean and agile. As such, the service has a relatively low number of personnel compared to other military services. Our Guardians, which include officer, enlisted, and civilian personnel, have highly diverse and skilled backgrounds. Upon its founding, the Space Force accepted members from all military services and is currently comprised of former Army, Air Force, Navy, and Marine Corps personnel, as well as new

Guardians who commissioned directly into the Space Force. There are five professional disciplines for Guardians: acquisition, cyberspace operations, engineering, intelligence, and space operations. To stay lean and agile, the Space Force relies on the U.S. Air Force for mission support functions such as civil engineering, base support, security forces, IT, medical, and other critical services needed to operate. ▲

# ENLISTED & OFFICER RANKS

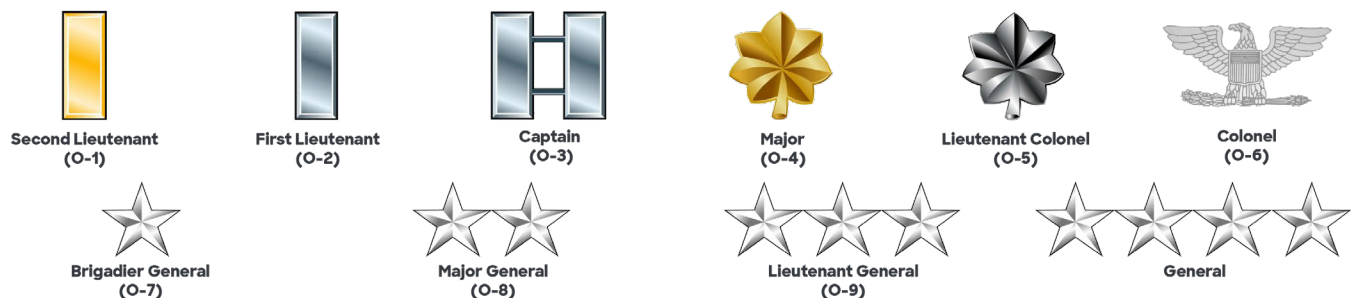
## ENLISTED RANKS



The six-sided border of the insignia represents and honors the U.S. Space Force’s heritage as the sixth U.S. military service. The Space Force specialist stripes represent ‘terra firma’, or a solid foundation of skills upon which the Space Force, represented by the Delta, is built. For non-commissioned officers (E5-6), the chevrons honor the traditional enlisted insignias across the Space Force’s sister services. The globe and orbit represents the totality of the

Space Force. Senior noncommissioned officers add orbital chevrons atop the globe and orbit insignia. These chevrons represent the three major orbits around our Earth that the Space Force operates in: LEO, MEO, and GEO. The Delta is placed at the uppermost orbit to signify these senior leaders’ higher level of responsibility. Finally, the Chief Master Sergeant of the U.S. Space Force’s rank insignia adds additional heritage through the pair of stars and braid.

## OFFICER RANKS



U.S. Space Force officer ranks honor and mirror the military tradition of the U.S. Air Force, U.S. Army, and U.S. Marine Corps. Company grade officers, O1-3, are distinguished through a series of gold and silver bars. Field grade

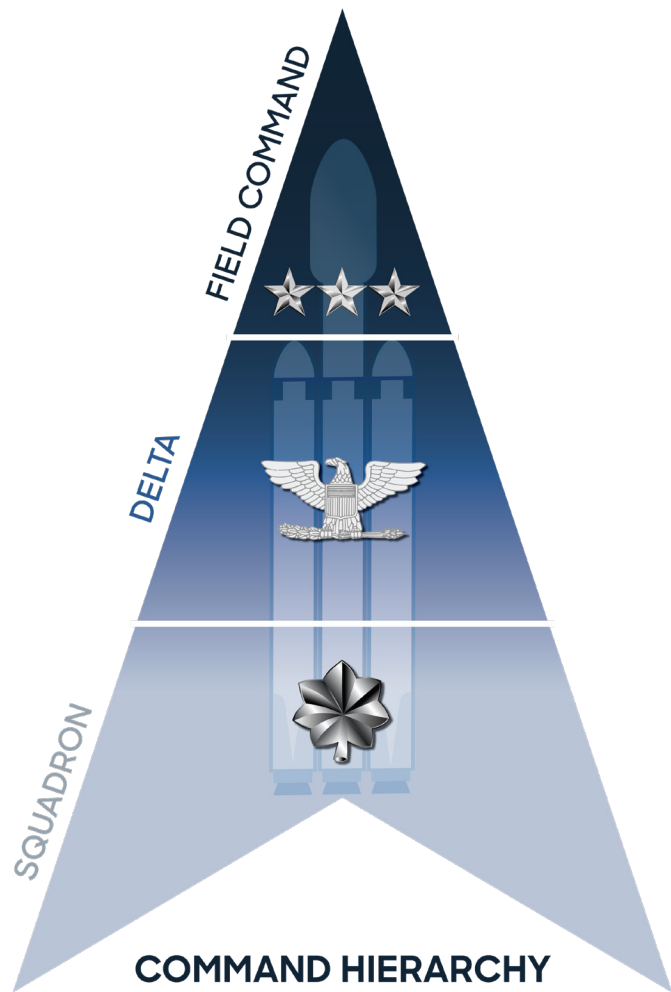
officers, O4-6, are distinguished by a gold or silver oak leaf, or the traditional Colonel silver eagle which is a representation of the eagle on the United States’ Great Seal. Finally, general officers, O7-10, wear a collection of silver stars depending on rank. ▲

# ORGANIZATION

The Space Force is organized into a headquarters staff that provides leadership and guidance for the force; field commands that are responsible for organizing, training, and equipping thousands of Guardians around the world; deltas that support field commands and are specialized by mission area; and squadrons, which specialize in acquisition, cyberspace operations, engineering, intelligence, and space operations.

At the headquarters level, the Space Force is led by the Chief of Space Operations, a four-star general who reports to the Secretary of the Air Force and provides military advice to civilian leadership of the U.S. Department of Defense and White House. Alongside our sister service, the U.S. Air Force, the two services (Space Force and Air Force) combine to form the Department of the Air Force - much like the Marine Corps and Navy combine to form the Department of the Navy.

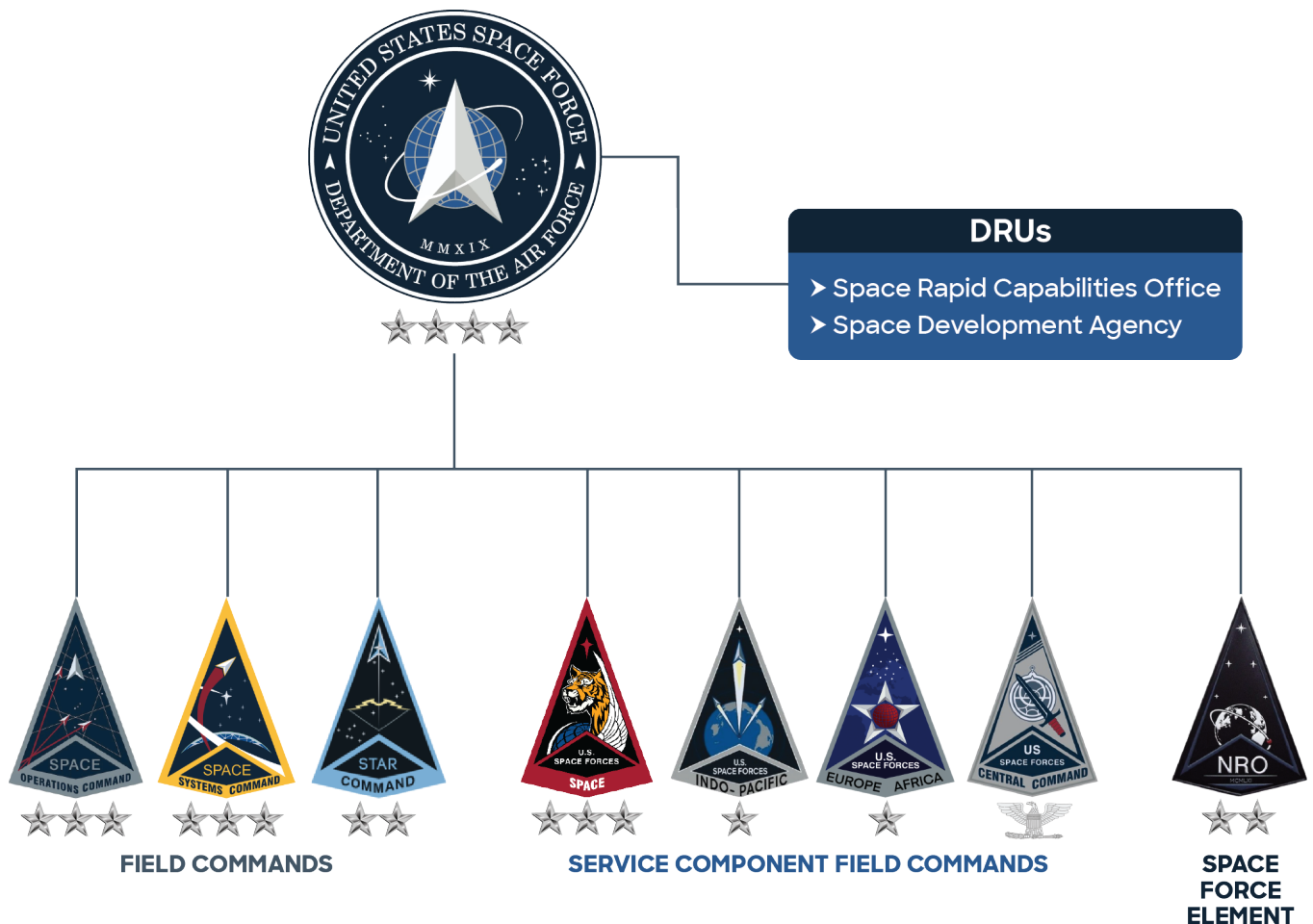
The Space Force also has several direct reporting units (DRUs) that pursue advanced science, technology, intelligence, research, and engineering work to support space operations. These DRUs are the Space Development Agen-



cy (SDA) and the Space Rapid Capabilities Office (SpRCO). These hubs of innovation and intelligence work with the rest of the Space Force to provide new ideas or deep knowledge about highly specialized issues.







### FIELD COMMANDS

The U.S. Space Force’s three Field Commands (FLDCOMs) are purpose-built for specific activities, aligning to the various institutional responsibilities to organize, train, and equip Guardians.

**Space Operations Command (SpOC)** – Generates, presents, and sustains space warfighting capability for Combatant Commanders.

**Space Systems Command (SSC)** – Develops, acquires, equips, fields, and sustains lethal and resilient space capabilities.

**Space Training and Readiness Command (STARCOM)** – Increases Guardians’ readiness to prevail in competition and conflict through education, training, doctrine, and test.

## **SERVICE COMPONENT FIELD COMMANDS**

Through component field commands, the U.S. Space Force coordinates and integrates space forces into planning and current operations within geographic and functional combatant commands.

### **Space Forces Central Command (SPACEFOR-CENT)**

- As the U.S. Space Force component to U.S. Central Command (CENTCOM) at MacDill AFB, Florida, SPACEFOR-CENT is responsible for providing and integrating space forces across an area of responsibility that spans 21 countries across Northeast Africa, the Middle East, and to Central and South Asia.

### **Space Forces European and Africa Commands (SPACEFOREUR-AF)**

- The U.S. Space Force component to both U.S. European Command (EUCOM) and U.S.

Africa Command (AFRICOM) is located at Ramstein AB in Germany. EUCOM is responsible for 21 million square miles, including 51 countries and territories across Europe, large portions of Asia, the Middle East, and the Arctic and Atlantic Oceans. AFRICOM is similarly responsible for 53 African states, a land mass of 11.2 million square miles (three-and-a-half times the size of the United States), and nearly 19,000 miles of coastland.

### **Space Forces Indo-Pacific Command (SPACEFOR-INDOPAC)**

- The U.S. Space Force component to U.S. Indo-Pacific Command (INDOPACOM) at Joint Base Pearl Harbor - Hickam, Hawaii is responsible for planning, executing, and integrating military spacepower to the U.S. Armed Forces oldest and largest unified combatant command. INDOPACOM's area of responsibility includes the Asia-Pacific region including 38 nations and over 100 million square miles.





**Space Forces Space Command (SPACE-FOR-SPACE)** – The U.S. Space Force component to U.S. Space Command (SPACECOM) which plans, executes, and integrates military spacepower into multi-domain global operations for all U.S. military operations beginning at the Kármán Line, 62 miles, or 100 km, above mean sea-level.

**The U.S. Space Force Element to the National Reconnaissance Office (NRO)** supports the design, development, launch, and maintenance of America’s intelligence satellites.

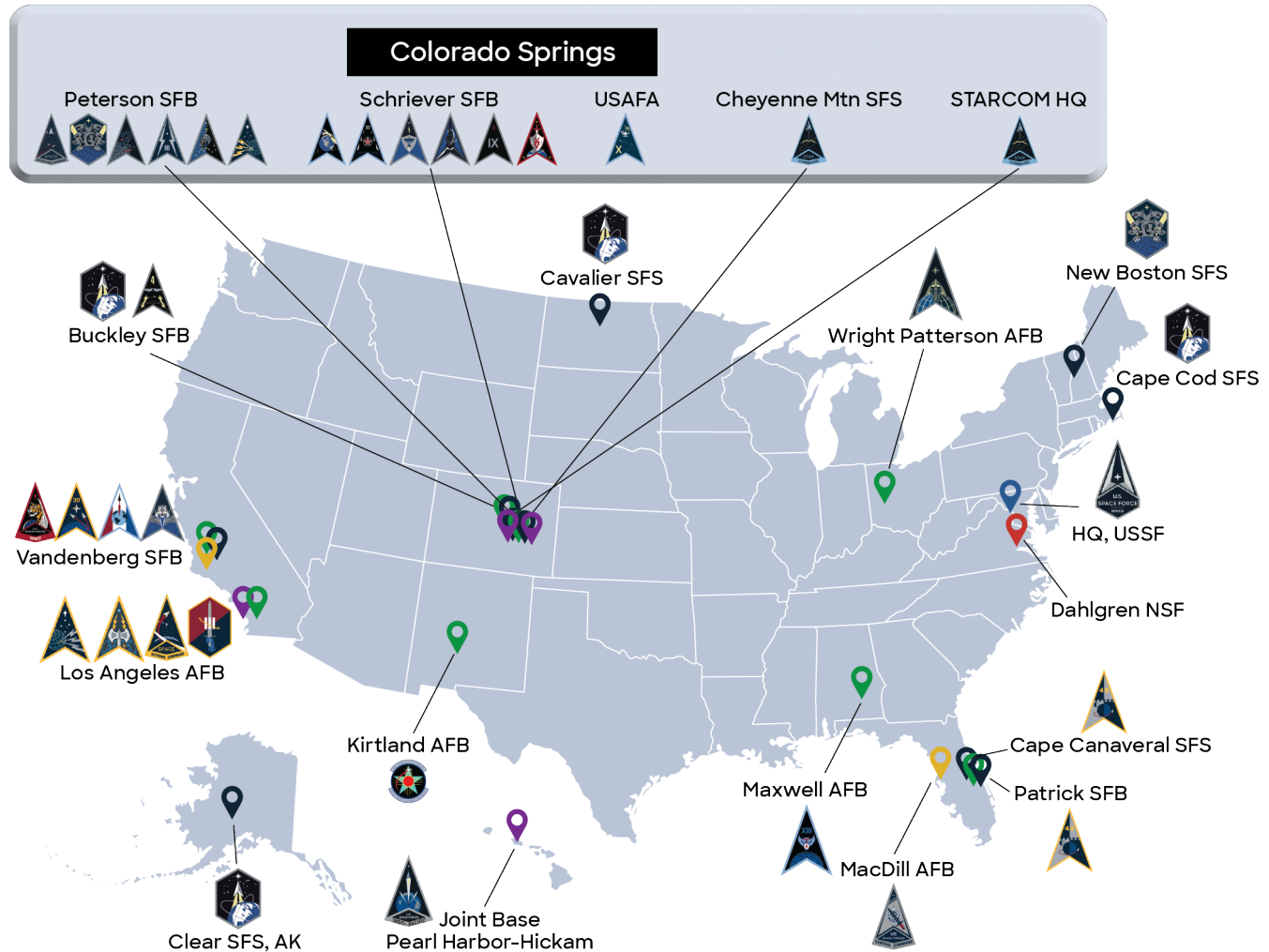
#### **DIRECT REPORTING UNITS**

**The U.S. Space Force’s Direct Reporting Units (DRUs)** are hubs of innovation and intelligence expertise within the Space Force, which provide new ideas or deep knowledge about highly specialized issues:

- **Space Development Agency (SDA)** – Develops, demonstrates, and transitions resilient military space-based sensing, tracking, and data transport capabilities into a proliferated multi-orbit architecture, encompassing government, commercial, and rapid acquisition architectures.
- **Space Rapid Capabilities Office (SpRCO)** – Specializes in the expedited development and rapid production and deployment of space capabilities to fulfill short-term critical needs. ▲

# LOCATIONS

While the Space Force's headquarters are in Washington, D.C., the rest of the service is spread across the United States and abroad. ▲

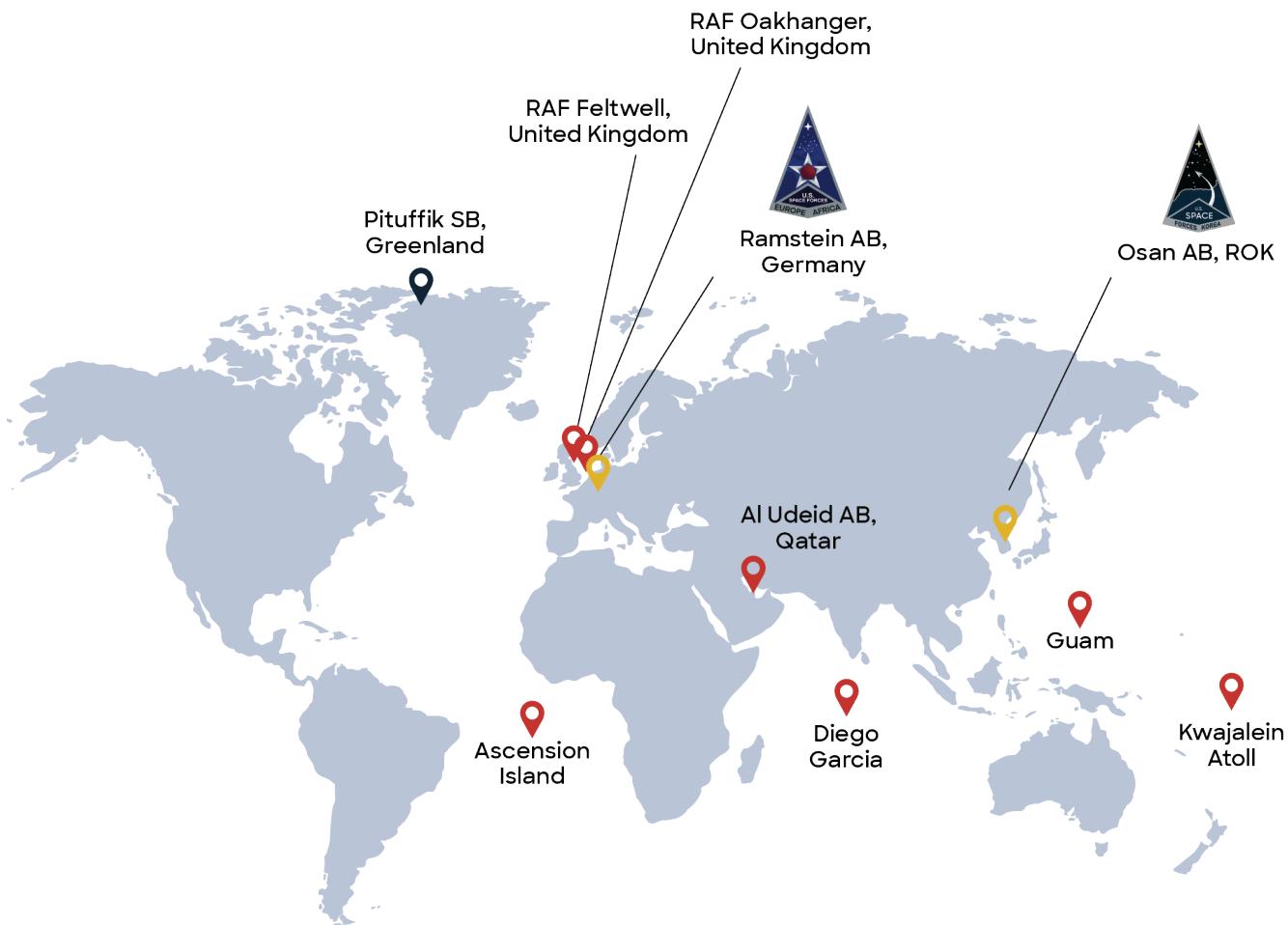


# 46







## BASES AND INSTALLATIONS

# 18

## STATES AND TERRITORIES



**LEGEND**

 U.S. Space Force HQ	 U.S. Space Force Delta HQ / DRU
 U.S. Space Force FLDCOM HQ	 U.S. Space Force Base (SFB) / Station (SFS)
 U.S. Space Force Component FLDCOM HQ	 U.S. Space Force Sites

# 10 MAJOR INTERNATIONAL SITES

# CORE FUNCTIONS



SPACE SUPERIORITY	GLOBAL MISSION OPERATIONS	ASSURED SPACE ACCESS
<p><b>Defend against space and counterspace threats</b></p> <p><b>MISSIONS:</b> Orbital Warfare; Electromagnetic Warfare; and Space Battle Management</p>	<p><b>Integrate joint functions across all domains on a global scale</b></p> <p><b>MISSIONS:</b> Missile Warning; Satellite Communications; and Positioning, Navigation, and Timing</p>	<p><b>Deploy and sustain equipment in space</b></p> <p><b>MISSIONS:</b> Launch; Range Control; Cyber; and Space Domain Awareness</p>

The Space Force’s core functions of Space Superiority, Global Mission Operations, and Assured Space Access align directly to the mission statement to “secure our Nation’s interests in, from, and to space.”

**SPACE SUPERIORITY** defends against space and counterspace threats. To protect satellites in space or protect against attacks enabled by adversary satellites, the Space Force needs to establish control of the domain. This means that at a time and place of our choosing, the United States must be able to assure continued use of satellites and deny our adversaries use of their satellites or space-enabled capabilities in order to protect the Nation.

Missions that support space superiority include orbital warfare, electromagnetic warfare, and space battle management.

**GLOBAL MISSION OPERATIONS** integrates joint functions across all domains on a global scale. Through space, the U.S. military and its allies can see, communicate, and navigate. Global mission oper-

ations also protect American forces on Earth through early warning of incoming missiles and other types of attacks. The Space Force ensures global mission operations to allow the Joint Force to defend the air, land, and sea.

Missions that support global mission operations include missile warning, satellite communications, and positioning, navigation, and timing (PNT).

**ASSURED SPACE ACCESS** ensures that the Space Force can deploy and sustain equipment in outer space. This includes the most visible part of space operations, rocket launches, as well as some of the most invisible operations like controlling and steering satellites out of the way of oncoming space debris to avoid collision. Assured access to space means that the Space Force will be able to continue launching and conducting space operations 24/7.

Missions supporting space access include launch, range, and space domain awareness. ▲

# A CONGESTED & CONTESTED DOMAIN

Objects that are in orbit around the Earth can move at tremendous speeds. For example, in LEO, a satellite may move upwards of 17,000 miles per hour, which allows it to make one complete orbit around the Earth every 90 minutes. At such speeds, collisions with small objects can have huge impacts. A fleck of paint or screw as small as 1 centimeter in diameter can damage or destroy a satellite.

Each year, the number of objects in space grows as new nations and companies launch satellites into orbit.

The resulting congestion threatens the flight safety of satellites. Compounding this challenge is the increasing number

of space debris from dead, inactive, or broken satellites on orbit. Guardians are tasked with tracking, cataloging, and reporting on objects in space, keeping tabs on objects that vary from the size of a school bus down to about 10 centimeters. This totals to around 25,000 pieces of large debris in Earth orbit.

Not only is space more congested than ever before, but it is also competitive and contested. Counterspace weapons that can target and attack U.S. space capabilities continue to grow in number and sophistication. The proliferation of these weapons, by adversaries and non-state actors alike, is making space an increasingly dangerous place for civil, commercial, and military spacecraft to operate. Guardians are responsible for monitoring potential threats and defending U.S. space capabilities in danger. ▲

*Satellites not drawn to scale.*





## SPACE THREATS TO U.S. FORCES

China is the **PACING CHALLENGE**, improving space capabilities to **TRACK** and **TARGET** U.S. military forces. Russia remains an **ACUTE THREAT**.

-  Modernizing infrastructure with capable satellites at scale that are a definite threat
-  Aging infrastructure with some capable satellites in limited numbers; still an acute threat
-  **2015:** Creation of PLA Strategic Support Force
-  **2015:** Space units integrated into Aerospace Forces
-  **2020:** Completion of BeiDou PNT Constellation
-  **2021:** Fractional Orbital Hypersonic Vehicle Test
-  **2022:** 62 Launches putting over 200 satellites into orbit, of which over 100 were intelligence platforms
-  **2024:** Elevates military space capabilities under the PLA Aerospace Force

## COUNTERSPACE THREATS TO U.S. SATELLITES

China and Russia are pursuing a wide range of counterspace capabilities to **DENY**, **DEGRADE**, or **DESTROY** U.S. space capabilities.

-  Both have active direct-ascent anti-satellite (ASAT) missiles, are testing orbital ASAT systems, and currently employ lasers, jammers, and cyber capabilities
-  Both consider space a warfighting domain through which to deny U.S. information advantage
-  **2007:** Destructive Anti-Satellite Missile Test
-  **2019:** Orbital ASAT Test/Shadowed U.S. Satellites
-  **2021:** Destructive Anti-Satellite Missile Test
-  **2022:** Orbital Repair System Test/Moved Chinese Satellite to Different Orbit
-  **2024:** Intelligence points to space nuclear weapon development

# ORBITOLOGY

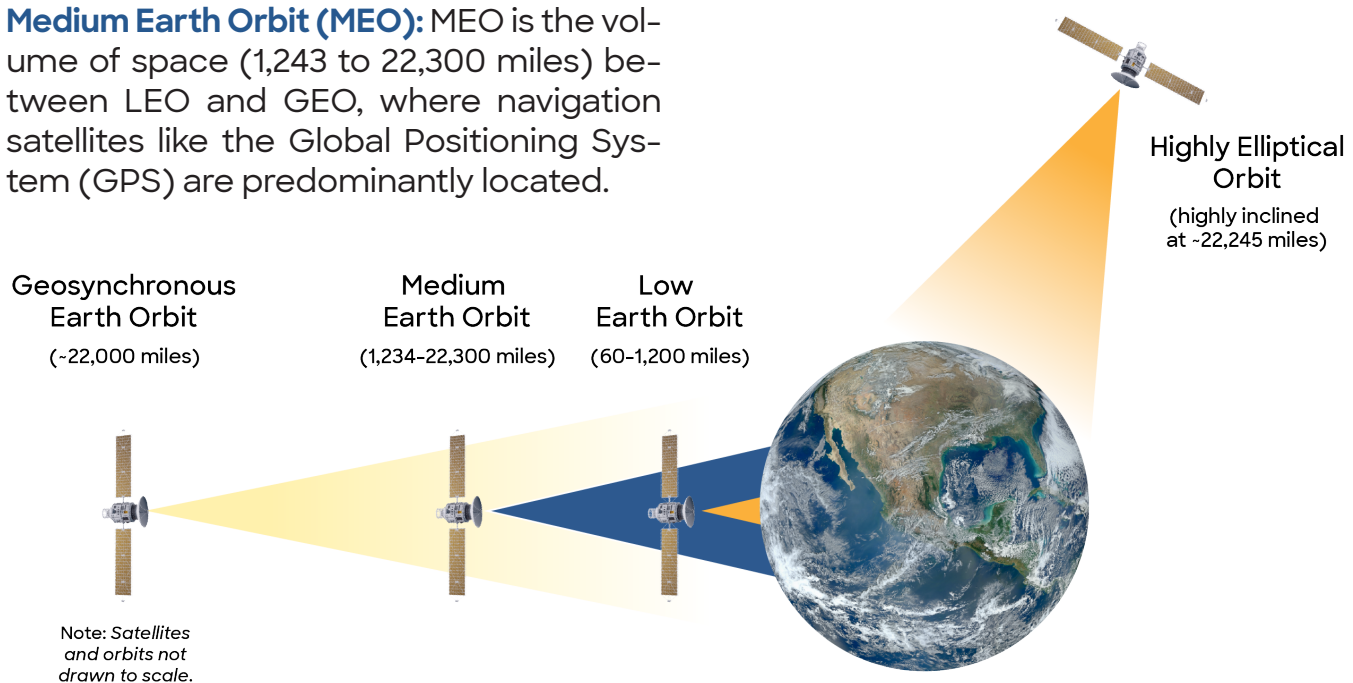
An orbit is a regular, repeating path that an object takes in space, and is only possible thanks to the Earth's gravity. Anything in space is in an orbit - satellites, planets, and asteroids are all in orbit. Near the Earth, there are four popular orbits that are commonly used by the Space Force.

**Low Earth Orbit (LEO):** As its name implies, LEO is the orbit closest to the Earth, and it starts at about 60 miles above the Earth's surface extending out to about 1,200 miles. Satellites in this orbit are relatively close to the Earth but also have a limited field of view. Because they are so close to the surface, they can observe in more detail, but this low altitude also limits their vantage point compared to higher orbit satellites. Missions conducted from LEO include intelligence, surveillance, and reconnaissance; low-latency communications; and space-to-space surveillance.

**Medium Earth Orbit (MEO):** MEO is the volume of space (1,243 to 22,300 miles) between LEO and GEO, where navigation satellites like the Global Positioning System (GPS) are predominantly located.

**Geosynchronous Earth Orbit (GEO):** Approximately 22,000 miles above the Earth's surface and located in line with the Earth's equator, satellites in this orbital regime rotate around the Earth at nearly the same rate that the Earth rotates on its axis. This means GEO satellites stay in a fixed location in the sky relative to users on the Earth. This is why GEO is ideal for missions that require predictability and persistent communications with Earth, to include weather satellites, high-bandwidth communications, and missile warning.

**Highly Elliptical Orbit (HEO):** This type of orbit is highly inclined relative to the Earth's equator. This means that the satellite spends most of its orbit over one general location on the Earth's surface, usually near over the North or South Poles. These orbits allow the Space Force to enable satellite communications in the most remote areas of our world. ▲



# HISTORY OF THE MILITARY IN SPACE

**W**hile many Americans learn about the Space Race of the Cold War and the Apollo Era in schools, the military involvement in space both pre-dates these events and underpins both. The history of U.S. military space operations can be traced back to the birth of the Air Force in 1947, during the post-World War II era. Following World War II, General Henry “Hap” Arnold – then commander of Army

Air Forces – tasked General Bernard Schriever to integrate and liaise with the scientific community to advance critical technologies that could be instrumental to the Air Force in the next global conflict. From the late 1950s on, the Department of Defense focused on developing space capabilities to support national military objectives, such as weather, surveillance and reconnaissance, communications, and navigation. On January 31st, 1958, the first U.S. satellite was launched and put on orbit, Explorer 1. Explorer 1 was designed, built, and operated by the Jet Propulsion Laboratory. Launched by the U.S. Army

CORONA program recovery of Discovery 14 capsule



## “ Space capabilities came to play a significant role in supporting military operations and humanitarian relief operations.

Ballistic Missile Agency on a Jupiter C rocket, Explorer 1's primary scientific instrument was a cosmic ray detector designed to measure the radiation environment in Earth orbit. Two years later, on August 18, 1960, the National Reconnaissance Office (NRO), United States' intelligence agency responsible for overhead intelligence, surveillance, and reconnaissance, launched its first successful CORONA Mission. CORONA was a space program which took images of the Soviet Union's territory from space and returned canisters of film to be analyzed. The first

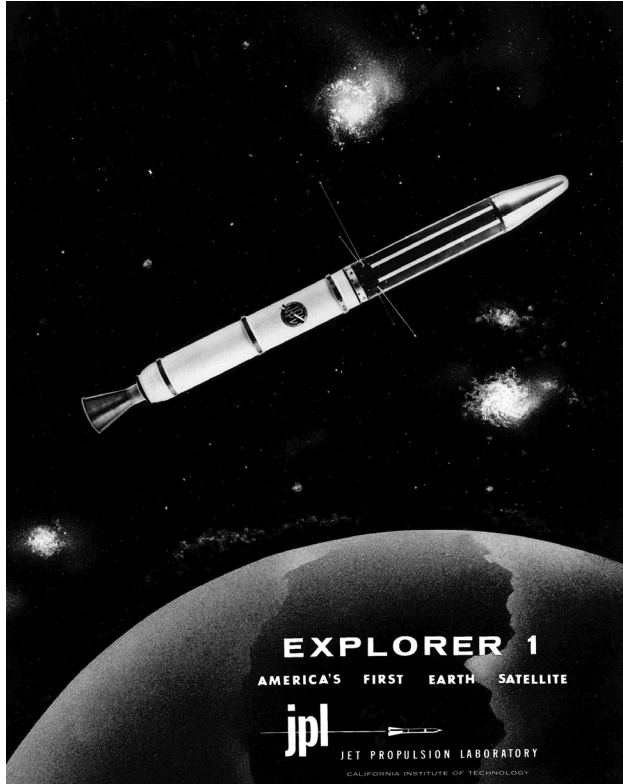
cannister return contained 3,000 feet of film, imaging 1.65 million square miles of the Soviet Union. The NRO continued the CORONA program for the next twelve years and conducted 145 missions.

At the same time, the Air Force also supported the famed NASA Mercury, Gemini, and Apollo missions. By the mid-1970s, the U.S. Air Force managed the preponderance of space systems for the Defense Department, but these were still organizationally fragmented. By 1982 it became evident that the Air Force needed an organization solely dedicated to space. Thus, Air Force Space Command was activated within the Air Force on September 1, 1982, to execute space operations. Air Force Space Command existed until the activation of the Space Force in 2019.



The seal of the Air Force Space Command, activated on September 1, 1982.

As space capabilities matured, they proved their value during the 1990-1991 Gulf War in Operation DESERT SHIELD and DESERT STORM. This was the first time that space capabilities were leveraged to their fullest extent in support of American forces through the use of the Global Positioning Service (GPS) and satellite communications. Later, DESERT STORM also became known as “the first space war.” Over the ensuing decades, space capabilities came to play a significant role in support-



Artist's rendering of EXPLORER 1

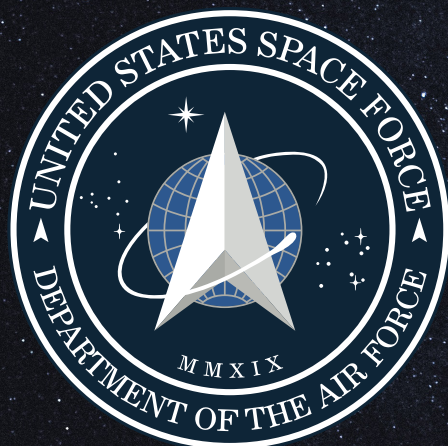
ing military operations and humanitarian relief operations. The integration and reliance on space capabilities only continued to grow after the devastating attacks on September 11, 2001. Advancements in space capabilities, coupled with deep integration across the U.S. military, were critical to the Global War on Terror. It was during these operations that adversaries realized the benefits gleaned from space, as well as the incredible reliance the United States put on space capabilities. Throughout the 2000s, Russian and Chinese space and counterspace capabilities began to increase, as the space domain itself became more congested and contested. As these competitors increased their capabilities in space, it be-

came clear that space was no longer a benign environment, and the U.S. military could no longer count on freedom of operations in space.

In 2018, an idea that had been debated in academic and policy communities since 2001 was finally considered at the highest echelons of government: Did the United States need its own military service for space? Through a bipartisan effort in Congress, sentiments to create a dedicated service for space capabilities and professionals gained momentum. In June 2018, President Donald J. Trump directed the Department of Defense to begin planning for such a force. On December 20, 2019, he signed the Fiscal Year 2020 National Defense Authorization Act, which called for the creation of a new military service focused on space operations. The United States Space Force was born. ***Leaders across the United States government realized that today and in the future, space is a domain where wars will be won or lost.***

The Space Force was established to protect the Joint Force in space and from adversarial space and counterspace capabilities. Guardians also secure space superiority for the nation, which ensures that the United States always has access to the benefits of outer space for security, commerce, and exploration. ▲

# SEAL & SYMBOL



**A**pproved shortly after the establishment of the U.S. Space Force, the colors, symbolism, and design of both the seal and delta symbols harken back to the history of space within the Department of Defense.

The Space Force Delta Symbol's origin reflects the letter delta from the Greek alphabet. The delta's evolution is traced from those ancient beginnings to the 20th century space race where it was core to the "rocket equation" which makes space launch possible.

$$\Delta v = v_e \ln \frac{m_0}{m_f}$$

Scan the QR code below to learn more about the history of the Delta symbol. ▲



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In the long haul, our safety as a nation may depend upon our achieving “space superiority.” Several decades from now, the important battles may not be sea battles or air battles, but space battles, and we should be spending a certain fraction of our national resources to ensure that we do not lag in obtaining space supremacy.

**Major General Bernard Schriever**

1957 Commander, Western Development Division  
Air Research and Development Command



UNITED STATES  
SPACE FORCE