U.S. SPACE FORCE COMMERCIAL SPACE STRATEGY

Accelerating the Purposeful Pursuit of Hybrid Space Architectures

UNITED STATES
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FOREWORD

The nation and the world have seen a renaissance in space with unprecedented innovation emerging in commercial and allied space systems in the past decade. Unfortunately, this renaissance has been accompanied by the emergence of strategic competitors who have been and are fielding threats against all space capabilities (National Security, allied, commercial, and civil).

In this increasingly congested and contested space domain, we must seize the opportunity to capitalize on significant innovative commercial space solutions. As outlined in the National Defense Strategy (NDS), we must tap into the spirit of American entrepreneurship, innovation, and vibrant competitive markets to be successful and sustain our competitive advantage across the spectrum of conflict in this era of Great Power Competition.

As Secretary of Defense Austin states in the DoD Commercial Space Integration Strategy, "Integrating commercial solutions, as opposed to merely augmenting existing government systems, will require a shift in approach within the Department." Therefore, the Space Force will pivot to a new model for integrating commercial space solutions. We will focus on stronger partnerships with commercial partners and allied nations. The hybrid space architectures we field will integrate Department of Defense, commercial, and allied space systems into more resilient, redundant, and combat-effective capabilities. This will create a more diverse, proliferated, and distributed space architecture, enhancing integrated deterrence through increased resilience while enabling the continued growth of a vibrant American space sector.

The U.S. Space Force Commercial Space Strategy guides the integration of commercial space solutions to deliver technological innovations that supplement or supplant existing government capabilities. When feasible and cost effective, we will integrate commercial space solutions into existing doctrine, strategy, concepts, force designs, acquisitions, and operations.

We will leverage American industrial strength to counter threats to our advantages in space; we owe it to American forces putting their lives on the line, to American businesses developing solutions to outpace the adversary, and to the American taxpayers expecting us to get the most out of their dollar. Semper Supra!

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Executive Summary

The threats the United States faces from its strategic competitors have grown substantially. At the same time, the environment is being shaped by a rapidly growing commercial space sector, which is cultivating an ecosystem of innovation and reducing barriers to entry to deliver new, operationally relevant capabilities. This has extraordinary implications for global security and stability.

The United States Space Force (USSF) will be more resilient and capable if it combines organic capabilities with the capabilities from other providers. Therefore, the USSF will integrate a mix of organic, allied, and commercial space solutions into hybrid architectures where the nation's space capabilities truly are greater than the sum of the parts.

The USSF will leverage the commercial sector's innovative capabilities, scalable production, and rapid technology refresh rates to enhance the resilience of national security space architectures, strengthen deterrence, and support Combatant Commander objectives in times of peace, competition, crisis, conflict, and post-conflict.

This strategy is in direct support of U.S. national policy and strategy, including the Department of Defense (DoD) Commercial Space Integration Strategy (2024), United States Novel Space Sector Authorization and Supervision Framework (2023), National Security Strategy (2022), National Defense Strategy (2022), National Military Strategy (2022), United States Space Priorities Framework (2021), and the National Space Policy (2020).

Implementing the USSF Commercial Space Strategy (CSS) will increase the competitive advantage of the United States and its partners by leveraging the operational capability and capacity of the commercial sector and compelling changes in the capability development process. The legacy space enterprise believed it could best manage risk by the government owning and operating most of the U.S. military's space capabilities. As the Secretary of Defense has indicated, that mindset is no longer valid.

While recognizing Congress's direction that *the military may not rely solely on commercial systems for certain operational requirements* (2022 National Defense Authorization Act, Sec.1607), wherever possible, the USSF will leverage the use of commercial space solutions and integrate them into its architectures and force offerings to ensure the Joint Force maintains an advantage over strategic competitors.

The DoD provides **four guiding principles** that this strategy will employ in pursuit of commercial space solutions (as described in the 2024 DoD Commercial Space Integration Strategy (CSIS)):

> **1. <u>Balance</u>** – The USSF will appropriately balance government and commercial solutions while avoiding overreliance on any single provider or solution.
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> **2. <u>Interoperability</u>** – Military standards and procedures should strengthen interoperability between government and commercial solutions without stifling commercial sector innovation, speed, or scale; commercial standards and interfaces for future purpose-built systems will be adopted to facilitate integration when appropriate.
>
> **3. <u>Resilience</u>** – Integration will strengthen resilience by increasing the number of commercial providers, diversifying supply chains, and expanding the variety and number of solutions used. Selected commercial solutions must be resilient themselves, particularly against cyber threats.

4. <u>Responsible Conduct</u> – Use of solution is legally and ethically compliant and consistent with international norms and standards and the DoD Tenets of Responsible Behavior in Space.

These principles will guide and influence the USSF's decision-making whenever it considers using commercial space solutions.

The USSF will implement this strategy through the following lines of effort (LOEs):

LOE #1 – Collaborative Transparency
LOE #2 – Operational and Technical Integration
LOE #3 – Risk Management
LOE #4 – Secure the Future

These LOEs align with the 2024 DoD CSIS key priorities and will be further examined in the main body of this strategy.

Strategic Environment and Commercial Sector Context

The United States is currently in an era of Great Power Competition. The threats that the United States faces from its strategic competitors have grown substantially in number and intensity. As highlighted in the 2024 Annual Threat Assessment of the U.S. Intelligence Community, both the People's Republic of China (PRC) and the Russian Federation have fielded reversible and non-kinetic means against the space systems of the United States and its allies and partners, as well as deployed kinetic counterspace capabilities that can target U.S. space systems in all orbital regimes. Russia's attack against Ukraine has illustrated its preparedness to employ counterspace capabilities as well as its willingness to attack commercial space systems. At the same time, as the PRC's and Russia's space and counterspace capabilities mature, both have established separate space forces and are integrating the use of space capabilities into their military planning and exercises.

Against this backdrop, the USSF must create a strategic advantage and support the operational objectives of Joint Force commanders. The 2022 National Defense Strategy directs that the DoD "will increase collaboration with the private sector in priority areas, especially with the commercial space industry, leveraging its technological advancements and entrepreneurial spirit to enable new capabilities." Furthermore, the 2024 DoD CSIS aligns Department-wide integration of commercial space solutions and the USSF CSS lays out a strategy for leveraging commercial capacity to improve the resiliency and lethality of the Nation's space capabilities.

The strategic space environment remains driven, in part, by national security and civil needs. However, mature and emerging commercial space solutions offer opportunities for the USSF to explore new avenues for meeting its requirements. The commercial sector in the United States is now developing solutions that were previously only pursued by the government, such as proliferated commercial low Earth orbit capabilities and on-orbit servicing, assembly, and manufacturing. U.S. launch providers also continue to innovate and improve access to and return from space. Most, if not all, of these commercial space solutions are available as services with agile timelines from contracting to execution truly operating at the "speed of need."

Moreover, the United States enjoys many other benefits from organizations of all sizes in the commercial sector – from reduced costs made possible by current and emerging private space

actors to job creation in areas including manufacturing, transportation, logistics, agriculture, finance, communications, and cyber.

Beyond these direct benefits, this ecosystem of innovation provides opportunities for the United States' Allies and partners to further cooperate with the U.S. space sector at a time when strategic competitors actively seek to leverage their capabilities by courting the international community. U.S. national interests are furthered when the U.S. space sector thrives and when the United States is the country of choice for international space investment.

The Space Force and the Nation become stronger through the effective integration of commercial space solutions during times of peace, competition, crisis, conflict, and post-conflict. The USSF must act with forethought on how best to integrate commercial space solutions, putting in place controls that address its anticipated surge requirements and other wartime capabilities throughout the competition continuum. For example, when the U.S. government requires priority access to space capacity and to augment owned systems, the Commercial Augmentation Space Reserve (CASR) is a framework allowing the USSF to accomplish the necessary transition throughout this continuum by entering into pre-negotiated contractual agreements which would be activated in times of crisis or conflict.

Additionally, organizations like the USSF Joint Commercial Operations cell (JCO) strengthen continuity with Allies, partners, academia, and the commercial sector. The JCO was established as a consortium of commercial companies synergistically operating together with Allies to actively monitor the space environment and solve pressing space problems in support of the space superiority mission. The JCO continues to seek diverse participants to support established and emerging missions including Surveillance, Reconnaissance, and Tracking (SRT); Non-Earth Imaging (NEI); Cooperative Jamming and Electro-Magnetic Interference (EMI); Data Exploitation and Enhanced Processing (DEEP); Positioning, Navigation, and Timing (PNT); and Space-based Radio Frequency (RF).

Purpose and Scope

Central Theme

The United States Space Force will take full advantage of the speed, innovation, and capabilities offered by the commercial sector to create strategic advantage and support Combatant Commander objectives in times of peace, competition, crisis, conflict, and post-conflict.

This strategy details how the Department of the Air Force and USSF will execute its responsibilities related to the 2024 DoD CSIS. It serves to frame that Service-level activities needed to increase U.S. competitive advantage by integrating commercial space solutions to support Joint and Combined operations. It directs Guardians to implement the four LOEs to optimize commercial integration and provides a demand signal to the commercial sector on where their capabilities are needed most to create structures that enable robust engagements.

Purpose. The purpose of this strategy is to complement OSD’s effort to maximize the benefits of integrating commercial space solutions to increase U.S. competitive advantage and support

Joint and Combined operations. It outlines our new mindset and approach, describes proposal evaluation criteria, prioritizes missions where commercial space is desired, and defines key terms to enhance collaboration across stakeholder segments. Furthermore, it directs and empowers Guardians to implement the goals and actions described in this strategy in alignment with USSF guidance and policy while informing the commercial sector, and U.S. Allies and partners.

Scope. This strategy reimagines existing organize, train, and equip functions and ongoing practical efforts to incorporate commercial space solutions, goods, services, and activities more fully. It focuses on mission areas and functions along space, link, and ground segments that are considered commercially supportable.

Audience. The primary audiences for this strategy are USSF Guardians and the commercial sector. However, this strategy is also meant to inform our sister services, U.S. Allies and partners, the U.S. Executive Branch, and the U.S. Congress.

Consideration Criteria. In concert with DoD policy and guidelines, the following four criteria will inform USSF decision-making related to the utilization of commercial space solutions:

- **Operational Utility** – Does the capability, good, service, or activity provide a capability or requirement needed, in part or in whole, for USSF operations in support of a Joint or Combined campaign?
- **Feasibility** – Is the cost to acquire and exploit the capability, good, service, or activity of sufficient value and at a cost level that the USSF is prepared to resource?
- **Resilience by Design** – Does the capability, good, service, or activity contribute to resilience and secure an enduring competitive advantage?
- **Speed to Fielding** – Does the timeline to effective use of the capability, good, service, or activity provide an advantage in enabling operations or counteracting a threat?

Opportunities for Industry

The USSF will work with commercial sector partners to better integrate commercial space solutions into the national security space architecture. This strategy highlights mission areas, priorities, and approach to commercial integration to provide a demand signal where commercial space solutions best fit.

For the purposes of this strategy, mission areas considered for commercial support will be subdivided into Space Domain Awareness (SDA); Satellite Communications (SATCOM); Space Access, Mobility, and Logistics (SAML); Intelligence, Surveillance, and Reconnaissance (ISR) – hereafter referred to as Tactical, Surveillance, Reconnaissance, and Tracking (TacSRT); Space-based Environmental Monitoring (SBEM); Cyberspace Operations; Command and Control (C2); and Positioning, Navigation, and Timing (PNT). Additionally, the USSF will seek hybrid solutions for Space Mission Enablers, those functions that span multiple missions and are fundamental to conducting space operations. Although the USSF also performs missile warning, combat power projection, electromagnetic warfare, and nuclear detonation (NUDET) detection, the USSF is not currently seeking commercial support for these missions.

These missions are detailed within LOE #2. **The USSF's priority missions for new commercial integration are TacSRT; SBEM; PNT; and SAML; as well as the continued integration of commercial space solutions into mature missions like SATCOM, Launch, and SDA.** These priorities are the demand signal to industry of the USSF's commitment to "buying what we can." Even in mission areas where certain activities have been traditionally performed by the government, commercial space solutions can and will be considered to support and augment government capabilities.

The USSF understands barriers to entry traditionally preventing some companies and solutions from being integrated into operations. The USSF will update processes to ease that integration as much as possible. The USSF recognizes that in some mission areas, it can rapidly buy mature commercial space solutions that have a broad customer base, while in other mission areas, the government will serve, at least temporarily, as an anchor customer. Supporting a broad industry base, while separate from operationally urgent needs, will be accounted for in the Service's future funding requests to ensure competitive advantage.

Because the USSF requires cross-cutting capabilities and services such as decision support software and tools, rapid prototyping, artificial intelligence, data management, ground support, and modeling and simulation, small and large companies alike have significant opportunities to partner with the service. Many companies that are not traditionally considered part of the space sector can provide some or all these valuable cross-cutting capabilities. The USSF seeks a variety of goods, services, and activities that support and integrate into a multifaceted hybrid space architecture. These hybrid space architectures required in force designs will better integrate commercial space solutions, allowing the commercial sector to support the USSF to meet partial or full mission needs.

To improve commercial integration efforts, the USSF requires greater situational awareness of commercial space solutions. Guardians will build institutional processes to balance missions, needs, and opportunities for commercial integration with that situational awareness in mind. The USSF will conduct future industry engagements to improve transparency of investment intentions and enhance two-way communication regarding commercial integration. Guardians will continue to partner with the commercial sector, to improve integration efforts and further accelerate U.S. competitive advantage.

Desired End States

Each USSF Field Command (FLDCOM) and Direct Reporting Unit (DRU) will use the CSS to guide integrated activities. Tasks will be performed by USSF Headquarters Staff, a FLDCOM, a DRU, or a U.S. Air Force-supporting organization (by request) to improve operational or institutional activities for integrating commercial space solutions. The USSF will also integrate the requirements of other Military Services into its commercial space utilization plans. Goals are the known, measured, and scoped achievements indicating progress toward the end states detailed below. Each organization will implement the USSF CSS per the direction of its commanders and directors.

Force Offering. The commercial sector and commercial space solutions will be included in Space Force-provided capabilities to meet Combatant Command needs as part of a hybrid architecture for increased capacity and capability.

Transparency. Guardians, at all levels, understand current commercial efforts across their mission areas, along with the commercial sector awareness to understand the full range of potential capabilities across these mission areas.

Culture. Guardians are commercial-minded and include the commercial sector as a part of the USSF operational culture consistent with the Department of the Air Force's longstanding commitment to ethical conduct in working with the commercial sector. The USSF culture must also move towards a "buy" and "exploit" model and away from a primary "build" model to the maximum extent possible and appropriate.

Resourcing. Current funding levels and annual budgeting requests must evolve to achieve the desired end states. As hybrid architectures are integrated into USSF force designs, budgets will be realigned and reprioritized to fully support their fielding. Likewise, as the CSS matures, the USSF will make any necessary organizational adjustments to fully leverage the operational benefits gained by hybrid architectures.

Integration. The USSF ensures proper and timely integration of commercial space solutions into its day-to-day operations, supporting a range of mission areas. This includes incorporating the commercial sector in wargames, exercises, and training, as well as overcoming internal structural and cultural barriers related to a historic overreliance on exquisite government systems.

Collaboration. The USSF continually engages with Allies, partners, industry, national leaders, regional leaders, and global commercial sector stakeholders, and leads space engagement activities where appropriate.

Approach

The USSF will maximize the potential benefits of integrating commercial space solutions by pursuing the four key LOE's. Each LOE has specific goals and immediate actions to enable commercial integration in USSF space architectures.

LOE #1 – Collaborative Transparency

Description: The USSF will actively seek commercial space solutions to increase integrated deterrence by fielding of diverse, resilient, proliferated satellite constellations, and distributed space architectures. Building partnerships and collaborating with the commercial sector will enable the sustainable expansion and integration of commercial space solutions across the spectrum of conflict. The USSF will enhance its competitive advantage by developing a comprehensive understanding of the commercial sector's innovative culture, shorter development timelines, and a burgeoning array of commercial space solutions to the greatest extent practicable.

This LOE emphasizes that the success of this strategy relies on effective engagement and persistent collaboration across the DoD, U.S. government interagency, commercial sector, Allies, and partners to secure necessary, enduring resources and support from both domestic and foreign sources.

Outreach with industry associations, think tanks, and academia will be a continual effort, so the implementation of this strategy can be best informed by emerging technologies and changing policy trends.

Immediate Goal: The USSF will enhance its awareness of commercial space solutions to understand market trends, recognize and mitigate undue barriers to collaboration, and identify capabilities the USSF should integrate into space architectures.

As part of the Force Design process, the USSF will identify requirements that can, should, and will be met by commercial space solutions within each mission area. Where Force Designs are still in progress, Program Executive Officers (PEOs), in concert with the Commercial Space Office (COMSO), are encouraged to work with operations, testing, and training to identify commercial opportunities that can meet existing requirements.

The USSF will also leverage existing and emerging opportunities to integrate Guardians into the commercial sector to exchange best practices, identify creative solutions to operational problems, and build a mutual understanding of evolving mission requirements and possibilities.

Office of Primary Responsibility: The Chief Strategy and Resourcing Officer (CSRO), with support from the COMSO, will serve as the Office of Primary Responsibility (OPR) for LOE #1. In coordination with DAF stakeholders, the CSRO will develop regional and national relationships to gain support and resources to further integrate commercial space solutions. Detailed tasks for LOE #1 will be captured in a subsequent planning order (PLANORD).

LOE #2 – Operational and Technical Integration

Description: The USSF will operationally integrate commercial space solutions into a hybrid space architecture. This LOE includes developing the policies, processes, and procedures that allow the commercial sector to integrate data and hardware with the USSF and will require unity of effort between USSF and the Joint Force when conducting missions involving employment of hybrid architectures.

USSF mission areas considered suitable for commercial integration are detailed below. Those higher on the list indicate missions where 1) commercial space solutions currently exist, but could be increased, and 2) the USSF is actively seeking integration of those capabilities across the Joint Force and will continue to look for greater partnering opportunities. Those areas lower on the list may still provide emerging opportunities while preserving critical and inherently governmental functions.

Note: *Italicized text identifies the capabilities, at a minimum, the USSF will look to the commercial sector to support (domestic, regional, and global).*

1. Satellite Communications (SATCOM)
SATCOM includes the operation of spacecraft constellations that support beyond-line-of-sight communications critical to establishing C2, data transport, and reach back for the worldwide Joint Force. The availability of global SATCOM is critical to the posture and mission

effectiveness of modern warfighting for the United States and its allies. *The USSF seeks capabilities from the commercial sector that increase and/or improve data transport speed, capacity, agility, flexibility, reliability, and/or resiliency and incorporate emerging technologies for the Joint Force to maintain competitive endurance. The USSF will prioritize capabilities that can easily integrate into a federated system of systems (e.g., seek system agnostic, multiband, multi-orbit, machine-to-machine automation, etc.). The USSF will look to improve resilience through the integration of proliferated commercial networks into hybrid architectures and offset future investments in government owned capabilities.*

2. Space Domain Awareness (SDA)

SDA is the timely, relevant, and actionable understanding of the operational environment that allows military forces to plan, integrate, execute, and assess space operations. SDA is achieved via the fusion of status and planned activities of U.S., Allied, and third-party space systems; an understanding of the space physical environment; knowledge of potential adversary systems or activities; and insight into an adversary's intent or likely response to an event. SDA enables the USSF to detect, characterize, locate, maintain custody of, and track adversary capabilities to maintain space superiority and the effective management of U.S. and allied space assets. Today, the USSF conducts significant testing, experimentation, and operational support to the Joint Force with the commercial sector. *The USSF seeks capabilities from the commercial sector that can contribute to the holistic generation of SDA.*

3. Space Access, Mobility, and Logistics (SAML)

SAML supports Joint space operations sustainment through spacelift, force reconstitution, maintenance, and logistics of space assets. Spacelift includes space launch services or capabilities, launch vehicle multi-mission manifesting, launch facilities, spaceport infrastructure, launch command and control, and spacecraft processing facilities. Commercial launch services are fully integrated into USSF space access requirements and the USSF recognizes it may be the anchor customer, at least temporarily, in some areas of the space mobility and logistics market. The United States enjoys a robust and resilient space launch capability with the support of USSF installation, infrastructure, and support services provided to industry. *The capabilities the USSF seeks from the commercial sector are launch services, flexible launch options, in-space servicing, and tactically responsive space capabilities that the Service can test, experiment with, and integrate into future missions. These capabilities will build on the National Security Space Launch program, interoperability baseline with Allies and partners, and provide sustainability as part of the USSF force generation process (SPAFORGEN) to the Joint commands.*

4. Tactical Surveillance, Reconnaissance, and Tracking (TacSRT)

TacSRT is an activity that synchronizes and integrates the planning and operation of sensors and assets, and the processing, exploitation, and dissemination systems in direct support of operations. This is not intelligence in the formal sense but rather it is space-enabled operational information about adversary military force capability, composition, and disposition, as well as positional and inertial data that is relevant to the planning, decision-making, and operations in every domain. TacSRT is conducted by the USSF to obtain information and insights not available in the absence of TacSRT activities, enable military planning and battle management to establish and reinforce precedents and norms of military behavior, and support rescue and humanitarian efforts. Functions of targeting, tracking, adversary capability estimation, warning, and assessment require timely and comprehensive collection via TacSRT, as well as data analytic services and robust communications pathways to meet Joint Force requirements. *The USSF*

seeks broad surveillance services, planning products, data, transmission and fusion, and analytic capabilities from the commercial sector that can aid in the development and optimization of TacSRT functions in support of services and Combatant Commander objectives. As it pursues those services, the USSF will continue to partner with the Intelligence Community to leverage existing capabilities where appropriate to ensure there is not duplicative effort.

5. Space-based Environmental Monitoring (SBEM)

Environmental monitoring includes sensing, characterizing, and exploiting the natural environment. Terrestrial environmental monitoring fuses data and observations from multiple phenomenology sensors fielded across the land, maritime, air, and space domains and provides information, support, and warnings to Joint Forces throughout the world with meteorological and oceanographic information affecting operations across all domains. Characterization of natural phenomena in the space environment uses terrestrial and space-based sensors to identify environmental threats to systems and operations within the space domain. Detection of space environmental events and impacts is critical to protecting spacecraft and operations for the United States and its Allies and partners. *The USSF seeks environmental monitoring capabilities from the commercial sector to characterize both terrestrial (via space-based sensing) and space environments (via both terrestrial and space-based sensing) to improve the resilience of terrestrial and space environmental monitoring architectures; inform Joint warfighter operational planners and decision makers; and improve the resilience of military systems to deliver warfighting effects and avoid operational surprises.*

6. Cyberspace Operations

Space operations are heavily reliant on and integrated with cyberspace operations. Space Force operations project combat power through the cyber domain, creating offensive or defensive space operational effects to achieve commander objectives. USSF cyberspace forces support these objectives through the conduct of defensive cyberspace operations and DoD information network operations. Cyberspace operations also include operational actions taken to secure, configure, operate, extend, maintain, and sustain a space system's integrity, creating and preserving the confidentiality, integrity, and availability of the space system's data. Cybersecurity is the responsibility of both the USSF and its commercial partners. Cybersecurity is a foundational requirement for any commercial provider to be considered for USSF integration. To ensure cyber risks are appropriately accounted for, each provider will be evaluated against the National Security Agency, the National Institute of Standards and Technology, and the Defense Information Systems Agency standards. *The USSF seeks capabilities from the commercial sector that can provide levels of mission assurance across all segments (ground, link, and space). Moreover, the USSF seeks capabilities that further enable its digital force, including making data visible, accessible, understandable, linked, trustworthy, interoperable, and secure. This requires bold changes and technology development consistent with the DoD Zero Trust Framework and DoD Data, Analytics, and AI Adoption Strategy. The USSF seeks enduring partnerships and capabilities to enable a future of improved awareness and protection of the cyberspace domain with Allies and partners.*

7. Command and Control (C2)

To meet the intent of mission command, the C2 of military space forces must overcome the global and remote nature of space operations in a way that systematically provides tactical forces with the SDA required to recognize, coordinate, and exploit fleeting battlespace opportunities

and prevent decision paralysis. The Space Force philosophy of C2 must support the way the Joint Force intends to fight. *The USSF seeks capabilities from the commercial sector that increase C2 capacity and capability. The USSF will prioritize capabilities with dynamic technology (i.e. multi-band). These types of capabilities allow for delivery of resilient data management, decision support tools, planning support, and secure global communications to the Joint Force to avoid operational surprise and deny adversarial first-mover advantages.*

8. Positioning, Navigation, and Timing (PNT)

Space-based PNT is a global, multi-use capability that is essential to executing the Joint functions of C2, movement, maneuver, and fires in a military campaign. It is crucial in its support to U.S. and Allied diplomatic, informational, military, and economic objectives. PNT systems, in combination with user equipment, provide the Joint Force with precise four-dimensional positioning capability, navigation options, and a highly accurate time reference. *The USSF seeks PNT capabilities from the commercial sector to enable operational resilience across the Joint Force and our Allies and partners. The USSF will test and evaluate these capabilities to inform on operational utilization across the spectrum of conflict.*

Space Mission Enablers

Space Mission Enablers include capabilities that are not associated with a particular mission area but can support one or more of those mission areas. These capabilities are fundamental to conducting routine and complex space operations. The USSF requires cross-cutting capabilities and services such as constellation management; standard user interfaces for satellite Telemetry, Tracking, and Commanding; decision support software and tools; rapid prototyping; artificial intelligence; data management; ground support; common operating pictures that integrate multiple streams of data; modeling and simulation; etc. Companies of all sizes – including those not traditionally involved in providing commercial space solutions – have significant opportunities to partner with the USSF to provide some or all these valuable cross-cutting capabilities.

Immediate Goals: For mission areas where the USSF has determined relevance for commercial integration, all USSF units will be able to operate within a framework and secure the tools necessary to fully integrate commercial space solutions. Those organizations directly integrating the commercial sector operationally will have situational awareness of the marketplace and be able to validate commercial goods, services, or activities through training and collaboration with the affected operational units where necessary. For each relevant mission, the USSF will ensure that there is a process to flexibly select commercial vendors to meet Joint Force operational needs.

Operational units utilizing commercial space solutions will have situational awareness of the commercial sector in a manner that enables due diligence and improves integration. Institutional integration of commercial space solutions requires ongoing analysis and updates to doctrine, operational concepts, organizational constructs, training, material acquisition, leadership education, personnel structures, facilities, and policies. Specifically, future USSF Force Design and Planning, Programming, Budgeting, and Execution (PPBE) processes will include more commercial space solutions. Funding will be allocated based on the strategic importance and urgency of missions within the USSF and priority will be given to mission areas critical for enhancing national security. This prioritization aligns with the USSF's overarching objective of maintaining space superiority and protecting U.S. interests in the space domain.

The Space Force must also aggressively pursue commercial space solutions that enhance its Operational Test and Training Infrastructure to improve purpose-built and residual use test and training capabilities to strengthen the USSF's readiness generation activities. This effort may include commercial test and training services, such as virtual or synthetic orbital ranges populated with red and blue forces, to meet desired test and training objectives for operational systems.

Office of Primary Responsibility: The Service Acquisition Executive for Space Systems and Programs (SAF/SQ) and CSRO, with support from the PEOs, will serve as the OPRs for LOE #2. SAF/SQ and CSRO, in coordination with DAF stakeholders, will clarify and/or develop operational organizations, pathways, and/or processes to improve operational and technical integration of commercial capabilities and services across all mission areas. This includes clarification on roles, responsibilities, and resourcing of commercially focused organizations within Space Operations Command , Space Systems Command (SSC), Space Warfighting Analysis Center, Space Rapid Capabilities Office, Space Development Agency, and Component Field Commands. Detailed tasks for LOE #2 will be captured in a subsequent PLANORD.

LOE #3 – Risk Management

Description: The integration of commercial space solutions into the USSF architecture is not without risk. Companies that choose to employ solutions in support of military operations must accept the inherent risk of doing so and take actions to protect their capabilities to ensure availability when needed, including in wartime. The USSF will aid commercial companies to identify these risks and provide actionable, timely data to aid in risk mitigation.

Immediate Goals: The USSF must establish a process to share threat information with commercial companies that permits the timely dissemination of actionable threat data, thus reducing risk to the commercial systems. Information sharing will include SDA and cybersecurity threat information at multiple classification levels. The USSF will work with the DoD to mitigate barriers including overclassification, clearance processes, and cleared facility access to establish scalable procedures for unclassified communications with the commercial space sector.

Office of Primary Responsibility: The CSRO will serve as the OPR for LOE #3. The CSRO, in coordination with DAF stakeholders, will develop a means to share threat information more broadly and fully with the commercial sector, and identify barriers to sharing data and work with the appropriate organizations to lower classification where appropriate. Detailed tasks for LOE #3 will be captured in a subsequent PLANORD.

LOE #4 – Secure the Future

Description: The USSF will continue to seek out emerging technologies in the commercial space sector that have the potential to support the Joint and Combined Force today and in the future. The USSF will enhance its competitive advantage by utilizing the commercial sector's innovative culture, shorter development timelines, and burgeoning array of space goods, services, and activities to the greatest extent practicable. In this effort, the USSF will prioritize Science and Technology efforts that are tailored to the operational environment and optimized for fielding capabilities on operationally-relevant timelines.

Immediate Goals: The USSF must establish a process to look across commercial offerings, to include traditional and non-traditional space sector, to identify the cross-cutting capabilities and services that can satisfy operational requirements. Additionally, the USSF will continue to foster and encourage growth of the industrial base through partnerships with organizations like SpaceWERX, AFWERX, DIU, etc.

Office of Primary Responsibility: SSC will serve as OPR for LOE #4. SSC, in coordination with DAF stakeholders, will increase awareness of commercial solutions that satisfy requirements with Allies and partners and increase awareness of USSF mission needs across those same stakeholders. SSC will also support and amplify DoD and interagency efforts for the export of commercial space solutions, including those developed by small- and medium-sized entities, for use in international markers, consistent with U.S. export controls and national security objectives. Detailed tasks for LOE #4 will be captured in a subsequent PLANORD.

Closing

The USSF believes the cost and challenges of undertaking this strategy pale in comparison to risks of maintaining the status quo and is committed to development of hybrid space capabilities that integrate DoD, commercial, and Allied capabilities. Guardians are committed to the expansion of industry partnerships to increase resiliency and improve support to the Joint Force. In space, multiple stakeholders are simultaneously operating in the same environment, subject to the same threats, and dependent upon one another in the accomplishment of respective missions. It is imperative that the USSF maximizes the integration of the disparate space capabilities on the ground and on-orbit, and fully leverages innovation in the commercial sector through the "*exploit what we have, buy what we can, and build what we must*" approach to acquiring and fielding space capabilities.

TERMS AND DEFINITIONS

capabilities. The technology used by the military across the spectrum of conflict.

combat power projection. The projection of combat power, as space combat power, includes offensive and defensive military force (fires and protection) in, from, or to the space domain (including navigation warfare). (SDP 3-0)

command and control (C2). The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. (Joint Publication 3-0; SDP 3-0)

commercial. Pursuant to the 2020 National Space Policy, refers to capabilities, goods, services, or activities provided by private sector enterprises that bear a reasonable portion of the investment risk and responsibility for the activity, operate in accordance with typical market-based incentives for controlling cost and optimizing return on investment, and have the legal capacity to offer those goods or services to existing or potential non-governmental customers. *The terms commercial product* and *commercial service* are defined according to the Federal Acquisition Regulation (FAR), Part 2.

Commercial Augmentation Space Reserve (CASR). A framework designed to ensure that the USSF can leverage the capabilities of the commercial sector to enhance the resilience, capacity, and effectiveness of its national security space architecture. It is flexible and adaptable to evolving technologies, operational requirements, and commercial offerings.

commercial integration. The incorporation of commercial solutions into U.S. defense planning, operations, missions, and architectures. (DOD CSIS)

commercial sector. Individuals, companies, and organizations that produce solutions for commercial markets, that bear a significant portion of the investment risk and responsibility, that operate in accordance with commercial market incentives for controlling costs and optimizing return on investment, and that have the legal capacity to offer those solutions. (DOD CSIS)

commercially supported. Denotes that the USSF has determined that task controls and task performance of a mission, activity, or operation can be executed, in whole or part, by a commercial sector entity. Such an execution must not compromise the responsibilities and decision-making required for any government task, regardless of task controls and task performance. The USSF default position—subject to national security interests and applicable law, including 10 U.S.C. § 2461, Public Law 105-270, and the 2022 National Defense Authorization Act—is to pursue commercial space solutions to fill current or emerging operational requirements.

Relevance for the USSF: An understanding of inherently governmental functions informs those missions and functions that can be ultimately commercially supported. Clarity by the USSF on commercially supported criteria enables industry to consider the future integration of emerging commercial goods, services, and activities. Commercially supported functions help rapidly

deliver capabilities to the Joint Force and enhance U.S. competitive advantage. The USSF's use of commercial space solutions as part of a diverse, proliferated, and distributed space architecture increases resilience and reduces an adversary's incentives for attack, including any perceived first-mover advantage.

commercial space solution. Space systems, capabilities, or services offered by the commercial sector.

constellation. In space operations, a system of spacecraft acts in concert to perform a specific mission. (JP 3-14; Approved for incorporation into the DoD Dictionary)

cyberspace operations. Due to the distributed nature of space operations, all space operations are simultaneously cyber operations and electromagnetic spectrum operations. Space Force cyber operations project combat power through the cyberspace domain, creating offensive or defensive space operations effects (fires and protection). (SDP 3-0)

defensive space operations. Actions taken to preserve friendly freedom of action in space. (JP 3-14; Approved for inclusion in the DoD Dictionary)

disaggregation. Separating dissimilar capabilities into distinct platforms or payloads, such as separating tactical and strategic communications. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

distribution. Using multiple nodes, to perform the same mission or functions to ensure no individual satellite or ground node is fundamental to the success of that mission. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

diversification. Leveraging alternative means to contribute to the same mission in multiple ways, using different platforms, different orbits, or systems and capabilities of civil, commercial, or international partners. An example would be the U.S. Joint Force leveraging both government and commercial satellite communications systems. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

electromagnetic warfare. Electromagnetic warfare is military actions involving the use of electromagnetic and directed energy to control the EMS or to attack the adversary (fires and protection). Electromagnetic warfare consists of three distinct divisions: electromagnetic attack, electromagnetic support, and electromagnetic protection. (SDP 3-0; Joint Publication 3-85, Joint Electromagnetic Spectrum Operations)

environmental monitoring. Includes sensing, characterizing, and exploiting the natural environment (intelligence and information). (SDP 3-0)

force design. Force Design accounts for all aspects of the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTmLPF-P) analysis and is the mechanism by which we conceptualize the *force we need (objective force)*. Looking five to fifteen years into the future, Force Design leverages mission analyses, wargames,

experimentation, and exercises to inform new requirements, architectures, and operational concepts.

The output of the Force Design process is an Objective Force – the capabilities, capacity, and force structure that we think is required for Guardians to accomplish their roles and missions in the forecasted operational environment. The Objective Force is an aspirational point of departure for resourcing, but fiscal realities often constrain the force we buy. The difference between the *force we need* and the *force we buy (programmed force)* represents operational risk. (CSO Notice to Guardians #21)

force development. Force Development mitigates operational risk by adapting processes, equipment, and thinking to account for projected operational challenges. It does this through talent management, education, training, tactics development, test and evaluation, acquisition, and resourcing. Force Development minimizes the risk that emerges from never having exactly what we think we need to address current and future requirements, and it serves to enhance and optimize the *force we field*. (CSO Notice to Guardians #21)

force employment. Force Employment involves the planning, force management, and decision-making required to fulfill military objectives with the Fielded Force. Put simply, Force Employment is what we do today with what we have now. This includes the day-to-day tactical missions Guardians conduct under the operational control of a Space Force Service Component commander, operational-level planning, and strategic-level decision-making that occurs under the combatant commanders' authority. (CSO Notice to Guardians #21)

force generation. Force Generation activities build, sustain, and reconstitute force elements capable of conducting prompt and sustained operations. Force Generation transforms the *force we field* into the *force we present* to the combatant commanders. (CSO Notice to Guardians #21)

hybrid space architecture. Combining national security, civil, commercial, or international space and terrestrial hardware and software which are highly interoperable and integrated to ensure flexible and effective operations.

inherently governmental functions. As defined in Section 5 of the Federal Activities Inventory Reform Act, Public Law 105–270, are functions that are so intimately related to the public interest as to require performance by Federal Government employees.
missile warning. Includes terrestrial and space-based sensors providing time-critical event processing and releasing data for decision-maker notification throughout the world (intelligence, information, and protection). (SDP 3-0)

navigation warfare. Actions that maintain friendly use of positioning, navigation, and timing information while denying the same to an adversary. Also called NAVWAR. (JP 3-14; Approved for incorporation into the DoD Dictionary)

nuclear detonation (NUDET) detection. Space-based NUDET detection systems provide a worldwide, highly survivable capability to detect, locate, and report nuclear detonations in the

Earth's atmosphere, near space, or deep space in near-real time (intelligence and information). (SDP 3-0)

offensive space operations. Actions taken to deny an adversary freedom of action in space. (JP 3-14; Approved for inclusion in the DoD Dictionary)

positioning, navigation, and timing (PNT). Space-based PNT is a global, multi-use service that is essential to executing the Joint functions of C2, movement and maneuver, and fires in a military campaign, and crucial in its support to United States and allied diplomatic, informational, military, and economic objectives. (SDP 3-0)

proliferated. The deployment of large numbers of the same platform, payload, or systems of the same types to perform the same mission. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

protection. Active and passive measures to ensure space systems can provide a service in support of any operating environment or condition, such as onboard jam protection and nuclear hardening. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

reconstitution. Plans or operations to bring new assets online (e.g., launching replacement satellites or activating new ground stations) to replenish lost or diminished functions to an acceptable level for a particular mission, operation, or contingency after an attack or catastrophic event. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

resilience. The ability of an architecture to support the functions necessary for mission success with higher probability, shorter periods of reduced capability, and across a wider range of scenarios, conditions, and threats, despite hostile action or adverse conditions. (Space Domain Mission Assurance: A Resilience Taxonomy, 2015)

satellite communications (SATCOM). Includes the operation of spacecraft constellations that support beyond-line-of-sight communications critical to establishing command and control and reach back for the worldwide Joint Force (information). The availability of global SATCOM is critical to the posture and mission effectiveness of modern warfighting for the United States and its allies.

space access, mobility, and logistics (SAML). SAML supports Joint space operations sustainment through spacelift, force reconstitution, maintenance of a force of space operations personnel, and support to human space flight. Spacelift includes space launch services or capabilities, launch vehicle multi-mission manifesting, launch facilities, spaceport infrastructure, launch command and control, and spacecraft processing facilities.

space domain. The area above the altitude where atmospheric effects on airborne objects become negligible. (JP 3-14; Approved for incorporation into the DoD Dictionary)

space domain awareness (SDA). SDA is the timely, relevant, and actionable understanding of the operational environment that allows military forces to plan, integrate, execute, and assess

space operations. SDA is achieved via the fusion of status and planned activities of U.S., allied, and third-party space systems; an understanding of the space physical environment, including knowledge of potential adversary systems or activities; and insight into an adversary's intent or likely response to an event. SDA enables the USSF to detect, characterize, locate, maintain custody of, and track adversary capabilities to maintain space superiority and the effective management of U.S. and allied space assets.

space forces. The space and terrestrial systems, equipment, facilities, organizations, and personnel, or combination thereof, necessary to conduct space operations. (DoD Dictionary; JP 3-14)

space operations. The employment of space forces in, to, or from space to achieve objectives. (JP 3-14; Approved for inclusion in the DoD Dictionary)

space situational awareness. The requisite foundational, current, and predictive knowledge and characterization of space orbital objects and the space domain. (JP 3-14; Approved for incorporation into the DoD Dictionary)

space superiority. The degree of control in the space domain of one force over another that permits freedom of access and action without prohibitive interference. (JP 3-14; Approved for incorporation into the DoD Dictionary)

spacelift. Primarily supported by enabling capabilities, delivers payloads (spacecraft or other materials) into space and, in some cases, enables the safe reentry and recovery of launch vehicles. (JP 3-14)

surveillance, reconnaissance, and tracking (SRT). SRT is an activity that synchronizes and integrates the planning and operation of sensors and assets, and the processing, exploitation, and dissemination systems in direct support of both intelligence and operations. Space-enabled SRT provides information about adversary military force capability, composition, disposition, and intent, as well as positional and inertial data that is relevant to the planning, decision making, and operations in every domain.