Space Policy Review and Strategy on Protection of Satellites

This report provides a review of space policy and describes the Department of Defense's approach to protecting and defending space systems and protecting the Joint Force from adversary hostile use of space.

September 2023

Submitted in compliance with the reporting requirements contained in Section 1611 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2022 & Section 1602 of the NDAA for FY 2023.

The estimated cost of this report or study for the Department of Defense is approximately $19,000 for the 2023 Fiscal Year. This includes $0 in expenses and $19,000 in DoD labor.

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Department of Defense (DoD) Report

in response to

Section 1611 of the National Defense Authorization Act (NDAA)

for Fiscal Year (FY) 2022

&

Section 1602 of the NDAA for FY 2023

Section 1611 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2022 provides that the Secretary of Defense (SecDef), in consultation with the Director of National Intelligence (DNI), shall carry out a review of the space policy of the Department of Defense and submit a report on the results of that review to the congressional defense committees; the Committee on Science, Space, and Technology; and the Permanent Select Committee on Intelligence of the House of Representatives; and the Committee on Commerce, Science, and Transportation; and the Select Committee on Intelligence of the Senate.

Section 1602 of the NDAA for FY 2023 provides that the SecDef, in coordination with the DNI, "shall make publicly available a strategy containing the actions that will be taken to defend and protect on-orbit satellites of the Department of Defense and the intelligence community from the capabilities of adversaries to target, degrade, or destroy satellites."

This report serves as response to both requirements and will be made publicly available. Section III, Deterring, Responding to, and Countering Threats to the Space Operations of the United States and its Allies and Partners, serves as the response to Section 1602 of the NDAA for FY 2023.

This report contains a classified annex.

The reporting requirements are as follows:

SECTION 1611 OF THE NDAA FOR FY 2022, SPACE POLICY REVIEW

Section 1611 of the NDAA for FY 2022 provides that the SecDef, in consultation with the DNI, shall carry out a review of the space policy of the Department of Defense, which shall include:

- "[w]ith respect to the five-year period following the date of the review, an assessment of the threat to the space operations of the United States and the allies of the United States"; an "assessment of the national security objectives of the Department relating to space";
- an "evaluation of the policy changes and funding necessary to accomplish such objectives during such five-year period";

- an assessment of the policy of the Department with respect to deterring, responding to, and countering threats to the space operations of the United States and the allies of the United States";
- an "analysis of such policy with respect to normative behaviors in space, including the commercial use of space";
- an "analysis of the extent to which such policy is coordinated with other ongoing policy reviews, including reviews regarding nuclear, missile defense, and cyber operations";
- a "description of the organization and space doctrine of the Department to carry out the space policy of the Department";
- an "assessment of the space systems and architectures to implement such space policy"; and
- "[a]ny other matters the Secretary considers appropriate."

SECTION 1602 OF THE NDAA FOR FY 2023, STRATEGY ON PROTECTION OF SATELLITES

Section 1602 of the NDAA for FY 2023 provides that the Secretary of Defense, in coordination with the Director of National Intelligence, shall make publicly available a strategy containing the actions that will be taken to defend and protect on-orbit satellites of the Department of Defense and the intelligence community from the capabilities of adversaries to target, degrade, or destroy satellites."

I. SECURITY ENVIRONMENT

This section provides an assessment of the threat to the space operations of the United States and the allies of the Unitd States, at present and with respect to the five-year period following the date of this review.

People's Republic of China

The People's Republic of China (PRC), as part of its military reforms, established the People's Liberation Army (PLA) Strategic Support Force in 2015 to approach space as a warfighting domain more effectively. The PRC is also building a space architecture to enhance its ability to fight and win a modern military conflict. The PLA owns and operates roughly half of the world's space-based intelligence, surveillance, and reconnaissance (ISR) satellites. Recent improvements to the PLA's ISR fleet enhance its ability to monitor forces across the globe, including U.S. expeditionary forces, increasing the PLA's ability to conduct long-range strikes against U.S. and allied forces. The PRC likely intends to leverage these advancements to challenge the U.S. military's ability to conduct joint operations in the Indo-Pacific region.

The PRC views counterspace systems as a means to deter and counter outside intervention during a regional conflict. The PLA is developing, testing, and fielding capabilities intended to target U.S. and allied satellites, including electronic warfare to suppress or deceive enemy

equipment, ground-based laser systems that can disrupt, degrade, and damage satellite sensors, offensive cyberwarfare capabilities, and direct-ascent anti-satellite (DA-ASAT) missiles that can target satellites in low Earth orbit (LEO). The PRC has launched multiple experimental satellites to research space maintenance and debris cleanup with advanced capabilities, such as robotic arm technologies that could be used for grappling other satellites. In 2022, the PRC's Shijian-21 satellite moved a derelict satellite to a graveyard orbit above geosynchronous Earth orbit (GEO). The PRC continues to seek new methods to hold U.S. satellites at risk, probably intending to pursue DA-ASAT weapons capable of destroying satellites up to GEO.

As the PRC has developed and fielded these counterspace weapons, it has simultaneously promoted false claims that it will not place weapons in space and, along with Russia, has proposed at the United Nations a draft of a flawed, legally-binding treaty on the non-weaponization of space that is inherently unverifiable and unenforceable.

The Russian Federation

The Russian Federation (Russia) reorganized its military in 2015 to create a separate space force because Russia sees achieving supremacy in space as a decisive factor in winning conflicts. Although Russia has a smaller fleet of satellites than China, Russia operates some of the world's most capable individual ISR satellites for optical imagery, radar imagery, signals intelligence, and missile warning. Russia increasingly integrates space services into its military, though it wants to avoid becoming overly dependent on space for its national defense missions because it views that as a potential vulnerability.

Russia is developing, testing, and fielding a suite of reversible and irreversible counterspace systems to degrade or deny U.S. space-based services as a means of offsetting a perceived U.S. military advantage and deterring the United States from entering a regional conflict. These systems include jamming and cyberspace capabilities, directed energy weapons, on-orbit capabilities, and ground-based DA-ASAT missile capabilities.

In November 2021, Russia tested a DA-ASAT missile against a defunct Russian satellite, which created more than 1,500 pieces of trackable space debris and tens of thousands of pieces of potentially lethal but non-trackable debris. The resulting debris continues to threaten spacecraft of all nations in LEO, astronauts and cosmonauts on the International Space Station, and taikonauts on China's Tiangong space station.[1]

[1] "2022 Challenges to Security in Space: Space Reliance in an Era of Competition and Expansion," Defense Intelligence Agency, March 2022.

II. NATIONAL SECURITY OBJECTIVES OF THE DEPARTMENT RELATING TO SPACE

Space plays a critical role in American security, prosperity, and way of life. Space-based services support the world's financial, information, and communications systems, scientific discoveries, and environmental monitoring. Americans benefit from space-based services every day. Increasingly, national and Department-level guidance and strategy reflect the centrality of space to U.S. national security and to the U.S. economy, as well as the growing threats to the domain.

2022 National Security Strategy

In the 2022 National Security Strategy (NSS), the Administration articulated its goal of a free, open, prosperous, and secure international order. The most serious threat to this order is the PRC, which possesses both the intention and increasingly the economic and military capability to challenge the free and open order, leveraging coercive and other means that seek to overturn longstanding international rules and norms to reshape the international order to favor its authoritarianism. Russia remains an acute threat, as demonstrated by its unlawful and unprovoked further invasion of Ukraine.

The 2022 NSS outlines three lines of effort to protect the free and open international order, in which the United States will:

- Invest in the underlying sources and tools of American power and influence;
- Build the strongest possible coalition of nations to enhance our collective influence to shape the global strategic environment and to solve shared challenges; and
- Modernize and strengthen our military so it is equipped for the era of strategic competition with major powers.

Space plays a direct and indirect role in each of these lines of effort. The 2022 NSS directs the United States to maintain its position as the world's leader in space, from which the nation derives substantial economic benefit, technological innovation, and critical services that are shared broadly with the international community. In cooperation with allies and partners, the United States will lead in strengthening global governance of space activities, which includes developing norms of responsible behaviors, in order to preserve the safety, stability, security, and long-term stability of the domain.

Space has also played a vital role in galvanizing collective action in response to international crises. The Administration made extensive use of space-based intelligence to demonstrate Russia's intent to invade Ukraine in advance of attacks, expose and frustrate false flag operations, and generate a unified response from the international community, which rapidly enacted sanctions and other punitive measures.

The 2022 NSS acknowledges the criticality of space-based services to national and homeland security, necessitating increased resilience of new and existing U.S. space architectures – a modernization objective that is vital to the overall combat credibility of the Joint Force. At the same time, the 2022 NSS directs that the United States act as a responsible steward of the domain and avoid destabilizing arms races.

2022 National Defense Strategy

The DoD's priorities, as articulated in the 2022 National Defense Strategy (NDS), are:

- Defending the homeland, paced to the growing multi-domain threat posed by the PRC;
- Deterring strategic attacks against the United States, its Allies, and partners;
- Deterring aggression – while being prepared to prevail in conflict when necessary – prioritizing the PRC challenge in the Indo-Pacific region, then the Russia challenge in Europe; and
- Building a resilient Joint Force and defense ecosystem.

Each of the four NDS priorities requires and relies on the ability of the United States to operate in space through competition, crisis, and conflict. Space is therefore a key node for integrated deterrence – the cornerstone of the NDS – as deterrence strategies rely on combat credible forces, which are underwritten by space-based capabilities.

U.S. space-based capabilities – including positioning, navigation, and timing, satellite communications, missile warning and missile tracking (MW/MT), and other missions – are critical to overall military effectiveness across all domains and therefore to successful homeland defense, deterrence, and countering aggression. Likewise, the ISR support provided by space capabilities is vital to identifying and exposing aggressive activity, deterring escalation, and catalyzing international responses to crises.

The NDS also highlights the importance of partnering with the commercial sector as part of integrated deterrence efforts. The Department is assessing how to increasingly leverage commercial space services as one element of its broader approach to building resilience, improving performance, and maintaining affordability. Commercial services and providers offer innovative solutions across many mission areas, potentially at lower cost and with more rapid development cycles.

2021 U.S. Space Priorities Framework

The U.S. Space Priorities Framework preceded both the 2022 NSS and NDS and was the Biden Administration's first key document to define national security space objectives for the Department.

The U.S. Space Priorities Framework calls for the United States to:

- Defend its national security interests from the growing scope and scale of space and counterspace threats, including through transitioning to a more resilient national security space posture and strengthening the ability to detect and attribute hostile acts in space.
- Take steps to protect and defend U.S. military forces from space-enabled threats.
- Leverage new commercial space capabilities and services and deepen integration of U.S. national security space capabilities and activities with allies and partners as part of the U.S. national security approach to mission assurance.
- Demonstrate leadership in the responsible use of space and stewardship of the space environment.

2020 Defense Space Strategy

Although the 2020 Defense Space Strategy (DSS) preceded the current NDS, it remains an important element of the Department's policy framework for national security space activities. The 2020 DSS lays out four prioritized lines of effort:

- Build a comprehensive military advantage in space.
- Integrate military space power into national, joint, and combined operations.
- Shape the strategic environment.
- Cooperate with allies, partners, industry, and other U.S. Government departments and agencies.

These four lines of effort continue to guide the Department's national security space initiatives. Space is at the heart of integrating U.S. strategic and conventional capabilities, and U.S. space capabilities are critical to overall military effectiveness across the entire Joint Force. The Department is focused on shifting to a resilient-by-design architecture to assure space support to the Joint Force.

U.S. Space Command (USSPACECOM) is leading integrated planning with other Combatant Commands, allies, and partners; integrating joint and combined space scenarios and training across the Joint Force; and developing joint warfighting requirements to overcome capability gaps across the Military Services.

The Department is shaping the strategic environment to enhance domain stability, reduce the potential for miscalculations, and ensure continued access to the domain for the United States and its allies and partners. In coordination with the Department of State, DoD engages with allies and partners to promote the responsible use of space.

Allies and partners are also key to U.S. mission assurance, and they provide an enduring strength and asymmetric advantage that U.S. competitors cannot match. They are essential to integrated

deterrence strategy, and the United States therefore must be able to share information, integrate, plan, and operate with our most capable allies in the space domain.

The Department is reviewing the classification and disclosure policies of space-related information to overcome barriers to integration with allies and partners, as well as to create benefits across all four lines of effort. Appropriate updating of classification and disclosure policies will allow for increased integration and synchronization across the Joint Force; reduce barriers and costs of duplicative classification; enable more informed policy and budgetary decisions; and facilitate more effective and transparent strategic communications.

III. DETERRING, RESPONDING TO, AND COUNTERING THREATS TO THE SPACE OPERATIONS OF THE UNITED STATES AND ITS ALLIES AND PARTNERS

The Joint Force depends on the availability of space-provided services to execute its missions across the spectrum of competition, crisis, and conflict. U.S. Military Service force structures assume continued access to space-based services. Space provides the U.S. military with indications and warnings of threats or attacks, command and control of forces across the globe, and monitoring of adversary activities. Competitors have seen U.S. military advantages enhanced and enabled by space capabilities for more than three decades. Competitors therefore seek to deny the U.S. ability to leverage space in crisis and conflict and are developing a range of capabilities to do so.

DoD will defend our national security interests from the growing scope and scale of counterspace threats. We will:

- Assure critical space-based missions by accelerating the transition to more resilient architectures and by protecting and defending critical systems against counterspace threats;

- Strengthen the ability to detect and attribute hostile acts in, from, and to space; and

- Protect the Joint Force from adversary hostile uses of space.

To do so, DoD will leverage a breadth of options across all operational domains to deter aggression and, if deterrence fails, to prevail in conflict. As the complexity of the domain grows, DoD must provide the President and SecDef with options to deliver operational and strategic effects to achieve national objectives. DoD will balance the development, testing, and employment of these capabilities with our need to maintain a stable and sustainable space environment.

Mission Assurance by Accelerating the Transition to More Resilient Architectures

The Department is prioritizing resilience as the primary means of denying adversaries the benefits of attack in space and assuring the availability of U.S. space missions in competition, crisis, and conflict. The significance of space-based capabilities to the conduct of modern warfare, together with existing and emerging counterspace threats, demands a DoD space architecture shift, where possible, from dependence on high-value, specialized satellites to resilient-by-design architectures. Prioritizing the ability of space-based services to withstand, fight through, and recover quickly from disruption ensures DoD can continue to support the Joint Force and deny adversaries the information advantage that is critical to success in modern warfare.

DoD can achieve resilience of space-based services through a range of approaches, including disaggregation, distribution, diversification, proliferation, protection, and deception. The Joint Force can employ these approaches individually or in combination for greater effect, dependent on the specific architecture and mission.

- **Disaggregation** separates dissimilar capabilities into distinct platforms or payloads, such as separating tactical and strategic communications.

- **Distribution** uses multiple nodes, working together, to perform the same mission or functions to ensure no individual satellite or ground node is fundamental to the success of that mission.

- **Diversification** leverages 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.

- **Protection** comprises active and passive measures to ensure space systems are able to provide a service in support of any operating environment or condition, such on-board jam protection and nuclear hardening.

- **Proliferation** deploys large numbers of the same platform, payload, or systems of the same types to perform the same mission.

- **Deception** comprises measures taken to confuse or mislead an adversary with respect to the location, capability, operational status, mission type, and/or robustness of a national security system or payload.[2]

The Department is developing strategies, concepts, and tactics necessary to conduct sustained operations in a crisis or conflict and continues development of force designs in key functional

[2] "Space Domain Mission Assurance: A Resilience Taxonomy," Office of the Assistant Secretary of Defense for Homeland Defense & Global Security, September 2015, https://policy.defense.gov/Portals/11/Space%20Policy/ResilienceTaxonomyWhitePaperFinal.pdf?ver=2016-12-27-131828-623.

areas. In accordance with Section 1602(b)(4) of the NDAA for FY 2022, the SecDef designated the Chief of Space Operations (CSO) as the Force Design Architect for Space Systems of the Armed Forces. Under this new construct, the CSO is the singular authority responsible for presenting coordinated recommendations to the SecDef regarding force design options to satisfy the space mission requirements of the entire Joint Force. In this role, the CSO is establishing rigorous analytical processes for space system force designs that pursue resilience from the ground up.

Resilience solutions vary by mission and are refined using high-fidelity modeling and simulation, wargaming, and experimentation that capture current and future Joint Force needs, concepts, threats, technological opportunities, and costing methods to ensure future space capabilities outpace those of our adversaries. Space system force designs account for future modernization plans and for key trade-offs that balance performance to meet warfighting needs, resilience against counterspace threats, and affordability. The transition to resilient architectures – both through new "resilient-by-design" architectures and additive solutions to existing architectures – is underway.

The first capability area to be redeveloped through a resilient-by-design approach is MW/MT. This effort assessed architectures designed to meet future warfighting performance needs, establish resilience against modern military threats, and ensure cost parameters, resulting in recommendations on numbers of satellites and diversifying capabilities across orbital regimes. Ongoing force design studies include: fire control to address long-range threats; tactical ISR to enable forward operations; a space data network to ensure data throughput for decision making and battle management; and protect and defend operations to protect vital infrastructure and space-based capabilities.

Cooperation with like-minded nations also contributes to the resilience of our architectures and to our ability to deter aggression in space by broadening the systems upon which we rely for space operations. The NDS calls on the Department to incorporate allies and partners at every stage of defense planning in all domains – including space. DoD will cooperate with allies and partners to develop and maintain a robust, interoperable space infrastructure to enable joint and combined operations in all domains. We therefore must be able to integrate, plan, and operate with our most capable allies in the space domain.

The Department must continue to remove barriers to collaboration, including classification and disclosure policies, to ensure effective integration of combined space activities. DoD will ensure interoperability with allied and partner systems is considered in all stages of system design, acquisition, procurement, and use.

Mission Assurance by Protecting and Defending Critical Systems Against Counterspace Threats

As in any domain, DoD will protect and defend U.S. national security interests in space. The Department is developing a range of solutions across all domains that counter hostile uses of space and protect and defend U.S. and, as directed, allied, partner, and commercial space capabilities. The Department is focused on protecting the whole space architecture, including ground nodes and networks, in addition to assets on orbit.

Protection includes all measures taken to ensure friendly space systems perform as designed by overcoming attempts to deny or manipulate them and by mitigating environmental hazards, including terrestrial and space weather.[3] Protection measures include electromagnetic spectrum operations, movement and maneuver, and hardening. Cybersecurity also plays a key role in improving the resilience of U.S. space architectures, and hardening networks against hostile cyber operations is a priority effort.

Defensive space operations contribute to deterrence in space – thereby supporting deterrence across all domains – by improving the mission assurance of critical space services that support U.S. national security interests. Operations to protect and defend space systems can consist of all active and passive measures taken to secure friendly space capabilities from attack, interference, or hazards, and can apply to defense of any segment of a space system – space, link, or ground. Active space defense can consist of actions taken to neutralize imminent counterspace threats to friendly space forces and space capabilities. Passive space defense minimizes the effectiveness of on-orbit and terrestrial threats.[4]

Detecting and Attributing Hostile Acts in, from, and to Space

Space domain awareness (SDA) encompasses the effective identification, characterization, and understanding of any factor associated with the space domain that could affect space operations and thereby affect the security, safety, economy, or environment of the Nation.[5] The number of satellites on orbit is rapidly growing. In 2022, space launch providers around the world conducted a record 177 launches, a 31 percent increase from 2021. DoD currently tracks approximately 47,900 objects in space, a 16 percent growth in objects from 2021 to 2022. Of those objects, 7,100 are active payloads, a 37 percent increase from 2021 to 2022. Expended rocket bodies, inactive satellites, and debris further congest the space environment.

The Department must be able to accurately and rapidly detect, track, and characterize space assets and other space objects to safely conduct space operations and to effectively deter, and, if necessary, counter and respond to hostile acts in space. In an increasingly dynamic and congested space domain, SDA requires an integrated sensor system that leverages DoD, other U.S. Government, and international and commercial partner services. Providing space operators with relevant, timely data can help to prevent operational surprise and support efforts to protect and defend space assets.

Protecting the Joint Force from Adversary Hostile Uses of Space

In addition to developing counterspace weapons to threaten U.S. use of space, China is developing and rapidly growing its ability to leverage space to enhance its own combat power to fight and win a modern military conflict. As described in the 2022 NDS, increasingly sophisticated and proliferated space-based ISR networks and improved command and control

[3] Joint Publication 3-14, *Space Operations*, Change 1, October 2020, xii.
[4] Ibid, II-2 – II-3.
[5] Space Doctrine Note, *Operations*, January 2022, p. 15, https://media.defense.gov/2022/Feb/02/2002931717/-1/-1/0/SDN%20OPERATIONS%2025%20JANUARY%202022.PDF, 21.

systems increase the precision and accuracy of missile systems the PRC would employ to deter and counter U.S. forward presence and operations, especially in the Western Pacific.

To preserve U.S. freedom of operations and support deterrence, the United States must be prepared to deny adversaries the ability to utilize space capabilities and services to attack the Joint Force and prevent the United States from advancing critical national security objectives. The Department will leverage a breadth of options across all operational domains to do so.

As potential adversaries increase their use of space-based services to support their combat capability, operations to deny hostile use of space could reduce an adversary's ability to conduct attacks against the United States and its allies and partners. Joint Force space operations could deny an adversary's space and counterspace capabilities and services using a variety of reversible and irreversible means, reducing the effectiveness and lethality of adversary forces across all domains. Operations to deny adversary hostile use of space could originate in any domain and target on-orbit, ground, cyber, and/or link segments to reduce the full spectrum of an adversary's ability to exploit the space domain.[6]

IV. POLICY CHANGES AND FUNDING NECESSARY TO ACCOMPLISH THE DEPARTMENT'S OBJECTIVES

POLICY

National Security Space Strategic Guidance

More than a decade has passed since the shift in the U.S. national security space posture from considering space to be a support function to recognizing space as a distinct operational domain of national military power. This transformation demanded enterprise-wide changes and new guidance to adapt to the evolving strategic environment.

The 2011 National Security Space Strategy established the foundation for the path the national security space community pursued through a decade of increased actors and activity in the domain, and the 2018 National Strategy for Space affirmed the path forward that helped spur reestablishment of the USSPACECOM in August 2019 and establishment of the USSF in December 2019.

The National Space Policy released in December 2020 underscores the U.S. commitment to leading in the responsible and constructive use of space for economic prosperity, scientific achievement, and national security, including defending U.S. and allied and parnter interests in space.

[6] Joint Publication 3-14, *Space Operations*, Change 1, October 2020, II-2; Space Capstone Publication, *Spacepower*, June 2020, https://www.spaceforce.mil/Portals/1/Space%20Capstone%20Publication_10%20Aug%202020.pdf, 36; *Operations*, 15.

Leveraging existing and past national- and Department-level guidance, including the 2021 U.S. Space Priorities Framework objectives captured in section II of this report, the Department has conducted recent policy and funding analysis based on the following ends:

- Maintain the benefits derived by all from space by preserving stability in, access to, and freedom to operate in, from, and through the space domain.

- Deter hostile uses of space that threaten the national security interests of the United States and its allies and partners; if deterrence fails, be prepared to prevail in conflict.

DoD Directive 3100.10 Space Policy

Drawing from national-level guidance, DoD updated and reissued DoD Directive (DoDD) 3100.10, "Space Policy," on August 30, 2022, establishing policy and assigning responsibilities for space-related activities.

In recognition of the role space plays in underpinning multi-domain joint and combined military operations to advance national security, DoDD 3100.10 directs the Department to preserve access to and freedom to operate in the space domain. Preserving access to space means protecting and defending U.S. use of space while ensuring the safety, stability, security, and sustainability of the space domain.

Among the necessary means to ensure a safe, stable, sustainable, and accessible space domain is upholding norms of safe and responsible behavior to reduce the potential for mishaps, miscommunications, and misunderstandings. DoDD 3100.10 includes the SecDef's Tenets of Responsible Behavior in Space, issued in July 2021:

- Operate in, from, to, and through space with due regard to others and in a professional manner.

- Limit the creation of long-lived debris.

- Avoid creating harmful interference.

- Maintain safe separation and safe trajectory.

- Communicate and make notifications to enhance the safety and stability of the domain.

In February 2023, the SecDef approved USSPACECOM's specific behaviors derived from these tenets that provide more guidance to all DoD space operators on more specific ways to operate responsibly in the space domain.

In addition to advancing and promoting responsible behavior in the space domain, ensuring continued space support to the Joint Force necessitates that the Department increase mission assurance through enhanced resilience, in particular for the most vulnerable critical space architectures; conduct operations in, from, and to space; and deliver advanced space capabilities to deter conflict and, if deterrence fails, to counter and defeat aggression.

FUNDING

The DoD FY 2024 budget requests the largest space budget ever of $33.3 billion, reflecting an approximately 13 percent increase in space funding over the FY 2023 budget request as the Department works to increasingly integrate space-based services across the Joint Force and manage growing threats to and from the space domain, consistent with the guidance of the 2022 NDS. The FY 2024 budget request funds capabilities to accomplish the approach laid out in section III of this report to:

- Assure our critical space-based missions;
- Strengthen our ability to detect and attribute hostile acts in, from, and to space; and,
- Protect the U.S. Joint Force from adversary hostile uses of space.

To increase the mission assurance of U.S. national security space, the FY 2024 budget request supports the first resilient-by-design approach to space architectures. The budget request invests $5.0 billion to develop new proliferated resilient MW/MT architectures, including next-generation overhead persistent infrared space capabilities, and associated ground architectures that will track an increased range of threats, including hypersonic and maneuverable weapons. The FY 2024 budget request seeks to enhance the ability to preserve access to space and ensure the Department can continue to provide critical space-based services to the Joint Force in crisis and conflict.

To advance and expand the architectures of space-based sensors that provide indications and warning of threats to space systems, the FY 2024 budget requests $481 million in ground and space-based sensors, deep space radar, and ground-based optical system projects to improve the capability and resilience of DoD SDA. The budget requests an additional $131 million to produce highly accurate, rapidly available detection, tracking, and characterization of space objects, regardless of their origin.

To protect the U.S. Joint Force from adversary hostile uses of space, the FY 2024 budget also prioritizes research, development, test, and evaluation to ensure DoD can sharpen the edge of national security space through future years and meet emerging threats while simultaneously continuing to invest in near-term readiness.

V. NORMATIVE BEHAVIORS IN SPACE

Upholding norms of safe and responsible behavior reduces the potential for mishaps and inadvertent escalation. In collaboration with the Department of State, the Department of Defense is committed to promoting standards and norms that ensure the domain remains secure, stable, and accessible. Steps such as sharing DoD's Tenets of Responsible Behavior in Space contribute to developing a shared understanding among nations of what constitutes safe and responsible behaviors for all military space operators. The Department will continue to demonstrate leadership in both the responsible use of space and stewardship of the space environment.

The existing space legal framework – which includes the four core space treaties, as well as the United Nations Charter – has served the international community and U.S. national interests well over many decades. However, as space activities evolve, the norms, rules, and principles that guide outer space activities must also evolve. Therefore, voluntary, non-legally binding guidelines and standards based on operational best practices can supplement these legal obligations. For example, in April 2022, the United States committed to not conduct destructive, DA-ASAT missile testing. A resolution calling on nations to adopt similar commitments was adopted in the U.N. General Assembly in December 2022 with 155 nations voting in favor. Additionally, to date, 13 states have made similar unilateral pledges not to conduct destructive direct-ascent ASAT missile tests.

All actors in space should commit to responsible behavior to prevent potential mishaps, including commercial entities and operators, many of which are playing an increasing role in national security. For the United States, ensuring safe, responsible commercial activity in space can and should be addressed through national regulatory means.

VI. COORDINATION WITH OTHER POLICY REVIEWS

The portfolio of the Assistant Secretary of Defense for Space Policy (ASD Space Policy) contains the Department's strategic capabilities for integrated deterrence, including nuclear weapons, cyber, and missile defense. Each of these areas are subject to periodic policy review by the Department. Space-based missions are critical to nuclear deterrence and missile defense, providing MW/MT, nuclear detonation detection, and secure strategic communications for nuclear command and control. All analysis of space policies and posture are conducted within the context of this broader portfolio and within the guidance provided by the 2022 NDS.

VII. ORGANIZATION AND SPACE DOCTRINE OF THE DEPARTMENT OF DEFENSE

ORGANIZATION

DoDD 3100.10, updated in August 2022, provides a full compendium of DoD's organization for space, including the Department's intelligence agencies. This report defers to that directive on specific stakeholder roles and responsibilities.

A variety of mechanisms enable collaboration and coordination among space stakeholders across the Department:

Space Acquisition Council

Congress established the Space Acquisition Council (SAC) to oversee, direct, and manage the acquisition and integration of space systems and programs of the Armed Forces to ensure integration across the national security space enterprise. The Assistant Secretary of the Air Force for Space Acquisition and Integration, in addition to other responsibilities, chairs the SAC. Other statutory members of the SAC are the Under Secretary of the Air Force, ASD Space Policy, the Director of the National Reconnaissance Office, the CSO, and the Commander of USSPACECOM.

Space Warfighting Activities Group

ASD Space Policy chairs the Space Warfighting Activities Group, a body of DoD and intelligence community entities that convenes to review upcoming sensitive space activities to ensure a common operating picture and alignment on space warfighting policy and strategy.

Force Design Architect

The CSO, as the Force Design Architect for Space Systems of the Armed Forces, provides capability area designs, including government reference architectures and transition plans to facilitate DoD-wide space development, acquisition, and budget decisions. Associated studies are inclusive of key stakeholders, including: the Joint Staff; Military Departments and Services; Combatant Commands; the Office of the Director, Cost Assessment and Program Evaluation; the Office of the Under Secretary of Defense for Policy; the Office of the Under Secretary of Defense for Research & Engineering; and the Intelligence Community.

Acquisition and Integration

The Assistant Secretary of the Air Force for Space Acquisition and Integration has the statutory responsibility to oversee all architecture and integration with respect to the acquisition of the space systems and programs of the armed forces, including in support of the Chief of Space Operations.

Joint Staff

As for all Military Services and domains, the Joint Staff establishes and approves joint performance requirements for space capabilities that ensure interoperability, where appropriate,

between and among joint military space capabilities, allies, and partners and that are necessary to fulfill performance requirements for any existing or proposed space capability that the Chairman of the Joint Chiefs of Staff determines is needed. In addition to other responsibilities as described in DoDD 3100.10, the Joint Staff identifies new joint military space capabilities based on advances in technology and concepts of operation, and, in coordination with the Combatant Commanders and the Secretaries of the Military Departments, ensures space-related objectives are incorporated in joint force training.

Integrated Acquisition Portfolio Review

Established in May 2021, the Integrated Acquisition Portfolio Review (IAPR) is chaired by the Under Secretary of Defense for Acquisition and Sustainment to enable visibility of risks, dependencies, and opportunities utilizing an integrated, portfolio and systems-based process. This tool identifies interdependencies and critical strengths in order to strengthen synchronization of warfighting concepts, technologies, requirements, and program execution to inform enterprise decisions and enable end-to-end mission capability. The IAPR process ensures space acquisition decisions are assessed at the enterprise level and with an all-domain operations perspective. The IAPRs occur on an annual basis and leverage the work the Joint Staff accomplishes in the complementary Capability Portfolio Management Review process.

DOCTRINE

Joint Space Doctrine

Joint space doctrine primarily takes the form of JP 3-14, Joint Space Operations. JP 3-14 explains the joint space role in planning and operations in addition to providing an understanding of space terminology.

Service Doctrine

Space Service doctrine provides Military Services with approaches to conduct space planning and operations within their respective Military Services. USSF Delta 10 is rapidly developing a comprehensive library of Space Force Service Doctrine. Other Military Services develop and maintain Military Service-level space doctrine, for example: The Air Force's AFDP 3-14 (Counterspace Operations), the Army's FM 3-14 (Army Space Operations), and the Navy's NTTP 3.14 (Navy Space Tactics).

VIII. SPACE SYSTEMS AND ARCHITECTURES TO IMPLEMENT THE DEPARTMENT'S POLICY

To achieve objectives described in this report and to contribute to integrated deterrence in accordance with the 2022 NDS, Commander, USSPACECOM identified five capability priorities:

- **Resilient, Timely Space Command and Control**

  - An increasingly dynamic space environment requires a resilient command and control (C2) architecture to synchronize space effects for operations in the contested space environment and as a critical enabler to terrestrial maneuver forces. Rapid and robust communication among space assets, space operators, and partner combatant commands enables decisive action and is therefore key to deterring and defeating hostile action in space and terrestrially.

- **Integrated Space Fires and Protection Capabilities**

  - DoD must have the infrastructure to deter aggression and protect U.S. space capabilities from attack. Resilience is fundamental, but resilience is not sufficient alone to deter all attacks or assure U.S. space-based services relative to the impact of their loss or degradation. DoD requires joint military space capabilities to protect and defend U.S., and as directed, allied, partner, and commercial space assets and to protect the Joint Force, allies, and partners from adversary hostile uses of space.

- **Modernized, Agile Electronic Warfare Architecture**

  - Denial of adversary freedom of action in the Electromagnetic Spectrum (EMS) requires an integrated and distributed capability to support the EMS Superiority strategy. Disparate, mobile U.S. and partner systems, with minimal reliance on manpower, will ensure architectural resilience and maximize effectiveness against cunning adversaries.

- **Enhanced Battlespace Awareness for Space Warfare**

  - Near-real time, comprehensive understanding of the congested and complex space operational environment requires more accurate, robust, resilient, and timely space domain awareness and operational intelligence data from all interoperable sensors to produce highly accurate, rapidly available detection, tracking, and characterization of space objects, regardless of their origin. Current space domain awareness systems are stovepiped and disaggregated. USSPACECOM, the Missile Defense Agency, and the USSF are partnering to enhance sensor integration into a C2 program.

- **Space Systems Cyber Defense**

  - Effective response to cyber attacks against space and space support mission systems demands a robust ability to detect, track, and defend. USSPACECOM must maintain the ability to provide critical space

capabilities globally in all phases of conflict and therefore requires persistent detection and monitoring of threat activity. USSPACECOM is partnering with Services and Agencies to provide that robust defense and ensure future capability development efforts remain secure.