United States Government Accountability Office

Report to Congressional Committees

July 2025

SPACE OPERATIONS

DOD Is Pursuing Efforts to Collaborate with Allies and Partners but Needs to Address Key Challenges

GAO-25-108043

GAO Highlights

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DOD Is Pursuing Efforts to Collaborate with Allies and Partners but Needs to Address Key Challenges

GAO-25-108043 July 2025

A report to congressional committees.

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What GAO Found

The Department of Defense (DOD) uses various mechanisms and agreements to collaborate with allies and partners on space operations and other activities.

GAO found that DOD is increasing its efforts to integrate allies and partners into space operations and activities by establishing goals, but it faces persistent challenges that impede greater collaboration. DOD has acknowledged these challenges, but has not set specific milestones for implementing goals to integrate allies and partners into space operations. Establishing such milestones—and implementing them—is important given DOD's strategic priority of working with allies and partners on space operations.

U.S. Space Operations and Activities with Select Allies and Partners

	Australia	Canada	France	Japan	Norway	United Kingdom
Combined operations (OOD)[a]	Yes	Yes	Yes	No	No	Yes
Data sharing agreements[b]	Yes	Yes	Yes	Yes	Yes	Yes
Personnel Exchanges[c]	Yes	Yes	Yes	Yes	No	Yes

[a]Operation Olympic Defender (OOD) is a multinational named U.S. Space Command operation to jointly strengthen defenses and deter aggression in space.
[b]U.S. Space Command has space situational awareness data sharing agreements with 33 partner countries to share data gathered by U.S. and partner countries' sensors.
[c]U.S. Space Command and Space Force have personnel exchange agreements for exchange and liaison officers with multiple countries to foster relationships and facilitate information sharing.

Source: GAO analysis of Department of Defense information. | GAO-25-108043

Further, DOD has several organizations that have overlapping roles and responsibilities for space-related security cooperation. This has resulted in ally and partner confusion and missed opportunities for coordination. For example, several foreign government officials said that finding the appropriate DOD contact with whom to coordinate is difficult. DOD has not issued guidance clarifying roles and responsibilities to inform these interactions internally and with allies and partners. Without such guidance, DOD organizations may continue to pursue space-related security cooperation activities outside established channels, leading to confusion and inefficiencies.

Lastly, GAO found that Space Force has not identified, analyzed, or responded to the risk of not filling positions within its service components, including space-related planning, information sharing, and security cooperation positions. Without doing this, Space Force risks undermining its goal of increasing collaboration with allies and partners.

This is a public version of a classified report that GAO issued in March 2025. Information that DOD deemed classified has been omitted.

Why GAO Did This Study

DOD recognizes that space capabilities are fundamental to all military operations. DOD also must cooperate with allies and partners on space operations if it is to deter and, if necessary, prevail in a high-end conflict.

Senate Report 118-58 accompanying a bill for the National Defense Authorization Act for Fiscal Year 2024 included a provision for GAO to review DOD's efforts to integrate allies and partners into space operations and activities. This report assesses, among other things, the extent to which DOD has integrated allies and partners into space operations and activities, defined roles and responsibilities for space-related security cooperation, and assessed personnel needs for engaging in space-related security cooperation.

To conduct this review, GAO reviewed space-related DOD guidance documents, and interviewed DOD and U.S. embassy officials. GAO also interviewed foreign government officials from six partner nations.

What GAO Recommends

GAO is making three recommendations, including that DOD set milestones for implementing its goals for integrating allies and partners into space operations, identify, analyze, and respond to risks of understaffing positions within Space Force service components, and issue guidance for space-related security cooperation roles and responsibilities. DOD concurred with two recommendations and did not concur with the third. GAO continues to believe that all of the recommendations should be implemented, as discussed in the report.

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Abbreviations

AUKUS	Australia-United Kingdom-United States
CSpO	Combined Space Operations
DOD	Department of Defense
FDO	Foreign Disclosure Officer
NATO	North Atlantic Treaty Organization
NSSI	National Security Space Institute
STARCOM	Space Training and Readiness Command
USAFRICOM	U.S. Africa Command
USCENTCOM	U.S. Central Command
USEUCOM	U.S. European Command
USINDOPACOM	U.S. Indo-Pacific Command
USSPACECOM	U.S. Space Command

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Congressional Committees

The Department of Defense (DOD) recognizes that space capabilities are fundamental to all military operations and that DOD must cooperate with allies and partners on space operations if it is to deter and, if necessary, prevail in a high-end conflict. In June 2020, DOD issued its *Defense Space Strategy*, which articulated the department's strategic approach for ensuring space superiority by 2030.[1] The strategy recognizes that cooperation with allies and partners is critical to DOD's ability to achieve its stated goals in the space domain, particularly in the 5-year window following the strategy's issuance. It notes that enhancing partnerships will support efforts to counter threats and manage risk during the time it takes for the United States to develop and field the capabilities needed to prepare for a future conflict in space. Almost 5 years after the strategy's issuance, the department continues to emphasize the importance of working with its allies and partners in the space domain to increase capacity, resilience, deterrence, and capability but recognizes that, to date, cooperation with allies in the space domain remains limited.

Senate Report 118-58 accompanying a bill for the National Defense Authorization Act for Fiscal Year 2024 includes a provision for us to review DOD's efforts to integrate allies and partners into space operations and other activities.[2] This report (1) describes how DOD collaborates with allies and partners on space operations and other activities (e.g., exercises, education, and information sharing); and assesses the extent to which DOD has (2) integrated allies and partners into planning for and conducting space operations and other activities and (3) defined roles

[1]DOD, *Defense Space Strategy* (June 2020).

[2]S. Rep. No. 118-58, at 292-93 (2023).

and responsibilities and assessed personnel needed for engaging in space-related security cooperation.[3]

This report is a public version of our March 2025 report.[4] DOD deemed some of the information as classified, which must be protected from public disclosure. Therefore, this report omits classified information relating to operational planning guidance; challenges related to integrating allies and partners into planning for combined space operations; and information related to specific partner space capabilities. Although the information provided in this report is more limited, the report addresses the same objectives as the classified report, uses the same methodology, and includes the same unclassified recommendations. This report excludes one recommendation that DOD deemed classified.

To address these objectives, we reviewed relevant DOD strategy and guidance documents, including the 2020 *Defense Space Strategy*, *2022 National Defense Strategy*, Department of the Air Force *2023 International Engagement Plan*, 2023 *Space Strategic Review Implementation Guidance*, and Joint Chiefs of Staff guidance on planning and multinational operations. We also interviewed officials from the Joint Staff, Office of the Secretary of Defense, U.S. Africa Command (USAFRICOM), U.S. Central Command (USCENTCOM), U.S. European Command (USEUCOM), U.S. Indo-Pacific Command (USINDOPACOM), and U.S. Space Command (USSPACECOM). We also interviewed officials from each of the military services. Finally, we interviewed and collected information from officials from Australia, Canada, France, Japan, Norway, the United Kingdom, and the North Atlantic Treaty

[3]Section 301 of title 10, U.S. Code, defines the term "security cooperation programs and activities of the Department of Defense" as any program, activity (including exercises), or interaction of DOD with the security establishment of a foreign country to achieve a purpose as follows: (1) To build and develop allied and friendly security capabilities for self-defense and multinational operations. (2) To provide the armed services with access to the foreign country during peacetime or a contingency operation. (3) To build relationships that promote specific United States security interests. 10 U.S.C. § 301. For purposes of this report, we use section 301's definition of security cooperation programs and activities.

[4]GAO, *Space Operations: DOD Is Pursuing Efforts to Collaborate with Allies and Partners but Needs to Address Key Challenges*, GAO-25-107071C (Washington, D.C.: Mar. 27, 2025). (SECRET//NOFORN)

Organization (NATO).[5] We asked these officials to review the information they provided for this report and approve the content for public release. Additional details on the report's methodology are in appendix I.

We conducted this performance audit from September 2023 to March 2025 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We subsequently prepared this unclassified version of the report for public release from January 2025 to April 2025. We provided the report to DOD for security review in April 2025 and received approval to publicly release this product in June 2025. We prepared the public product to be published in July 2025. This public version was also prepared in accordance with these standards.

Background

Key Department of Defense Organizations

Multiple organizations within DOD play a role in the department's efforts to coordinate with allies and partners on space operations and activities. Table 1 provides additional information on the roles and responsibilities of select DOD organizations.

Table 1: DOD Organizations with Select Space-Related Coordination Responsibilities

Under Secretary of Defense (Policy)[a]	**Assistant Secretary of Defense (Space Policy):** Analyzes, develops, coordinates, and oversees implementation of U.S. government and Department of Defense (DOD) policy and guidance for DOD activities in space. This includes formulating DOD policy and guidance on space-related international agreements and space cooperation with foreign defense departments, ministries, and governments.
	Defense Security Cooperation Agency: Provides DOD-wide guidance for the execution of DOD security cooperation programs and supports DOD components on the planning and execution of security cooperation.[b]
Chairman of the Joint Chiefs of Staff	Provides advice on global integration of space capabilities to combatant commanders and coordinates space matters in conjunction with appropriate combatant commanders or other officials to promote integration of space activities across DOD.

[5]We selected this list to collect perspectives from multiple countries and one organization with varying degrees of current space capabilities and varying levels of current collaboration with DOD space operations and activities. Although this selection of countries is not generalizable, the experiences of foreign government officials provided insights into the extent to which DOD integrates allies and partners into space operations and activities.

Headquarters, Department of the Air Force	**Secretary of the Air Force, International Affairs:** Strengthens U.S. and global security through partnerships in air, space, and cyberspace by integrating security cooperation activities, advancing partner capabilities and interoperability, and developing international air and space professionals. This includes responsibilities for foreign disclosure, personnel exchanges, education and training, facilitating export policies, negotiating agreements, and foreign military sales for space.
Space Force	**Space Force S5P Global Partnerships Division:** Coordinates with Space Force field commands to design, formulate, and plan Space Force security cooperation strategies and activities. Additionally, distributes Space Force campaign support plans to inform combatant commanders of Space Force priorities and capabilities to inform combatant command regional security cooperation plan development.
	Space Force component Field Commands: Serve as the Space Force's primary interface with the combatant commands for activities including joint space-related training, requirements, system fielding, security cooperation, and host nation coordination.
	Space Operations Command: Generates, presents, and sustains combat ready forces for space operations, intelligence, cyberspace operations, and combat support missions. Space Operations Command operates independently as required or in coordination with other services, allies, and partners.
	Space Systems Command: Delivers new space capabilities, to include developing, acquiring, equipping, fielding, and sustaining those capabilities. Space Systems Command's International Affairs Office facilitates integration, collaboration, and codevelopment of space capabilities with allied nations and coordinates foreign military sales.
	Space Training and Readiness Command: Establishes and executes training, war games, range, test and evaluation, education, and force development activities for identified military, civilian, joint, and international members.
Combatant commands	**All combatant commanders:** Plan for employment of space capabilities within their areas of responsibility that support national security objectives. Additionally combatant commands maintain responsibility for all security cooperation in their assigned area of responsibility.
	Commander, U.S. Space Command: In addition to the responsibilities described above for all combatant commanders, formulates, implements, and conducts space-related activities that support national security objectives; executes space-related responsibilities as assigned in the Unified Command Plan; and synchronizes the posture of space forces and security cooperation activities with other combatant commands and military services. Additionally, the commander has the responsibility to synchronize and deconflict space operations with other combatant commands, military services, U.S. government departments, allies, and partners.
National Guard Bureau	Manages, administers, and determines personnel and resource requirements for the State Partnership Program. The State Partnership Program consists of security cooperation activities funded by DOD occurring between a U.S. state or territory's National Guard personnel and a partner nation that are planned, coordinated, prioritized, and executed to achieve the theater campaign plan objectives of a specific combatant command. This includes space-related security cooperation activities sourced by the seven states that have Air National Guard units with space capabilities.[c]

Source: GAO analysis of DOD information. | GAO-25-108043

Note: Space Force is also standing up Space Futures Command, a new field command that Space Force officials said would also have space-related coordination responsibilities with allies and partners.

[a]Specifically, the Assistant Secretary of Defense (Space Policy) and Defense Security Cooperation Agency carry out these responsibilities under the authority, direction, and control of the Under Secretary of Defense (Policy).

[b]DOD Directive 5132.03, *DOD Policy and Responsibilities Relating to Security Cooperation* (Dec. 29, 2016). During final processing of the classified report on which this product is based, DOD finalized a new version of this DOD directive in January 2025.

[c]The seven states that have Air National Guard units with space capabilities are Alaska, California, Colorado, Florida, Hawaii, New York, and Ohio.

Relevant DOD Strategy and Guidance Documents

DOD emphasizes the importance of coordinating and integrating with allies and partners in all domains, to include the space domain, in multiple unclassified and classified strategy and guidance documents. As summarized in table 2, this includes documents ranging from the 2022 *National Defense Strategy* to strategies both generally discussing strengthening relationships with allies and partners and specifically discussing international space cooperation.

Table 2: Overview of Department of Defense (DOD) Level Strategy Documents Related to Space Cooperation

Strategy document	Key statements
Overarching strategies	
National Defense Strategy (2022)	Early and continuous consideration of allies and partners in deterrence planning, to include collaborative planning with the United States' most capable allies, is imperative.
National Military Strategy (2022)	The Joint Force must identify and remove barriers to genuine partnerships with FIVE EYES partners, North Atlantic Treaty Organization allies, Japan, Republic of Korea, India, and France in key areas, including planning, force and capability development, technology, and industrial collaboration.[a]
Space-specific strategies	
Defense Space Strategy (2020)	The integration of superior space capabilities into and throughout the Joint Force, along with operational integration with allies and partners, is essential for securing U.S. military advantage against peer competitors.
Space Strategic Review Implementation Guidance (2023)	Integrating allies and partners into space operations through interoperable, multinational architecture would help deliver greater resilience and mission assurance, thereby contributing to space as an accessible and secure domain and making it a less attractive target to adversaries.
International Space Cooperation Strategy (2024)	DOD requires a deliberate and disciplined approach to working with allies and partners in order to find efficiencies within the constraints of finite resources to maximize mission effectiveness.

Source: GAO analysis of DOD information. | GAO-25-108043

[a]FIVE EYES partners refers to Australia, Canada, New Zealand, the United Kingdom, and the United States.

DOD has also issued a number of guidance documents—ranging from DOD-wide guidance to service specific guidance—to inform efforts for integrating allies and partners into space operations and other activities as seen in table 3.

Table 3: Overview of Department of Defense (DOD) Guidance Documents Related to Space Cooperation

Guidance document	Key statements
Department of Defense Directive 3100.10, *Space Policy* (2022)(updated in 2024)	It is DOD policy that DOD will strengthen space-related alliances and build new partnerships that provide a durable strategic advantage for the United States and its allies and partners. Further, it is DOD policy that DOD will expand defense collaboration and cooperation with allies and partners that are actively engaging in space security to leverage opportunities in policy, strategy, capabilities, information sharing, and operations.
Joint Publication 3-14, *Joint Space Operations* (2023)	Multinational space operations provide the joint force opportunities to increase interoperability with and extend advantages to allies and partners, demonstrate responsible behavior in space, and reassure allies of U.S. commitments to mutual defense. Partnerships can enhance collective security capabilities and provide a deterrent effect against adversaries from attacking or interfering with friendly space capabilities.
Joint Publication 3-20, *Security Cooperation* (2022) (updated in 2024)	Security cooperation supports space partnerships, leveraging capabilities of allies and partners to provide greater strength, resilience, and flexibility to space operations and complicating adversary decision-making.
Department of the Air Force, *2023 International Engagement Plan* (2023)	The Department of the Air Force is fostering increased space collaboration with U.S. allies and partners. The Department of the Air Force will deliberately engage allies and partners to increase defense collaboration and cooperation, thereby positioning the Air Force to achieve a resilient, secure, stable, and accessible space domain in the face of adversary threats.
U.S. Space Force FY24 *Guidance for Global Partnerships* (2023)	Space Force must prioritize global partnerships that enhance the service's ability to conduct combined operations, complicate adversary decision-making, and enable coalition space forces to counter coercive activities in the short- to mid-term. Longer term, the service must also lay institutional and cultural foundations to assist more nascent partners in achieving their space objectives in line with broader U.S. interests.
U.S. Space Command Campaign Plan (2024)	U.S. Space Command (USSPACECOM) will focus on active engagement with new and current allies and partners; USSPACECOM will work towards promoting unified action and achieving solutions designed to deter, defend against, and when necessary, defeat adversaries; and USSPACECOM and components will strengthen alliances and partnerships and develop space capabilities with allies and partners, among other items.

Source: GAO analysis of DOD information. | GAO-25-108043

Space Mission Areas

DOD defines space operations as the employment of space forces in, to, or from space to achieve objectives.[6] This includes the use of space- and ground-based capabilities to achieve freedom of action in space and counter efforts to interfere with or attack space forces of the United States, allies, or commercial partners.

DOD defines a space mission area as a category of similarly purposed operations, activities, and investments that support joint operations and global campaigns. Table 4 includes descriptions of the space mission areas used by DOD and referred to throughout this report.

[6]Joint Chiefs of Staff, Joint Pub. 3-14, *Joint Space Operations* (Aug. 23, 2023).

Table 4: Descriptions of DOD Space Mission Areas

Command and control		The awareness of operational environments and space forces for military commanders to make data-driven, timely, strategic decisions.
Cyberspace operations		The knowledge to defend the global networks used by space forces to achieve objectives in or through cyberspace—such as securing U.S. cyber capabilities in space, providing assured access to space, and projecting combat power through the cyberspace domain.
Intelligence, surveillance, and reconnaissance		The integration of intelligence data to allow for the timely detection, characterization, and targeting of adversary space capabilities.
Missile warning		The use of ground- and space-based sensors to provide time-critical information—such as launch detection, missile tracking, and reconnaissance data—to mitigate, predict, and track a variety of threats.
Orbital warfare		The knowledge of orbital maneuvers as well as offensive and defensive fires to preserve freedom of access to the domain.
Positioning, navigation, and timing		The use of precise four-dimensional positioning capability, navigation options, and highly accurate time reference.
Satellite communications		The deployment of protected and reliable connectivity to provide communication in support of air, land, sea, and space operations.
Space domain awareness		The knowledge and characterization of space objects and the space environment—including potential adversary systems or activities—to enable space and ground operations.
Space electromagnetic warfare		Defensive operations to identify the location of emitters being used to jam U.S., allied, or partner signals and offensive operations to deceive, disrupt, and degrade adversary satellite signals.

Space launch		The activities necessary to prepare, place, or attempt to place a launch vehicle and its payload, if any, into orbit.

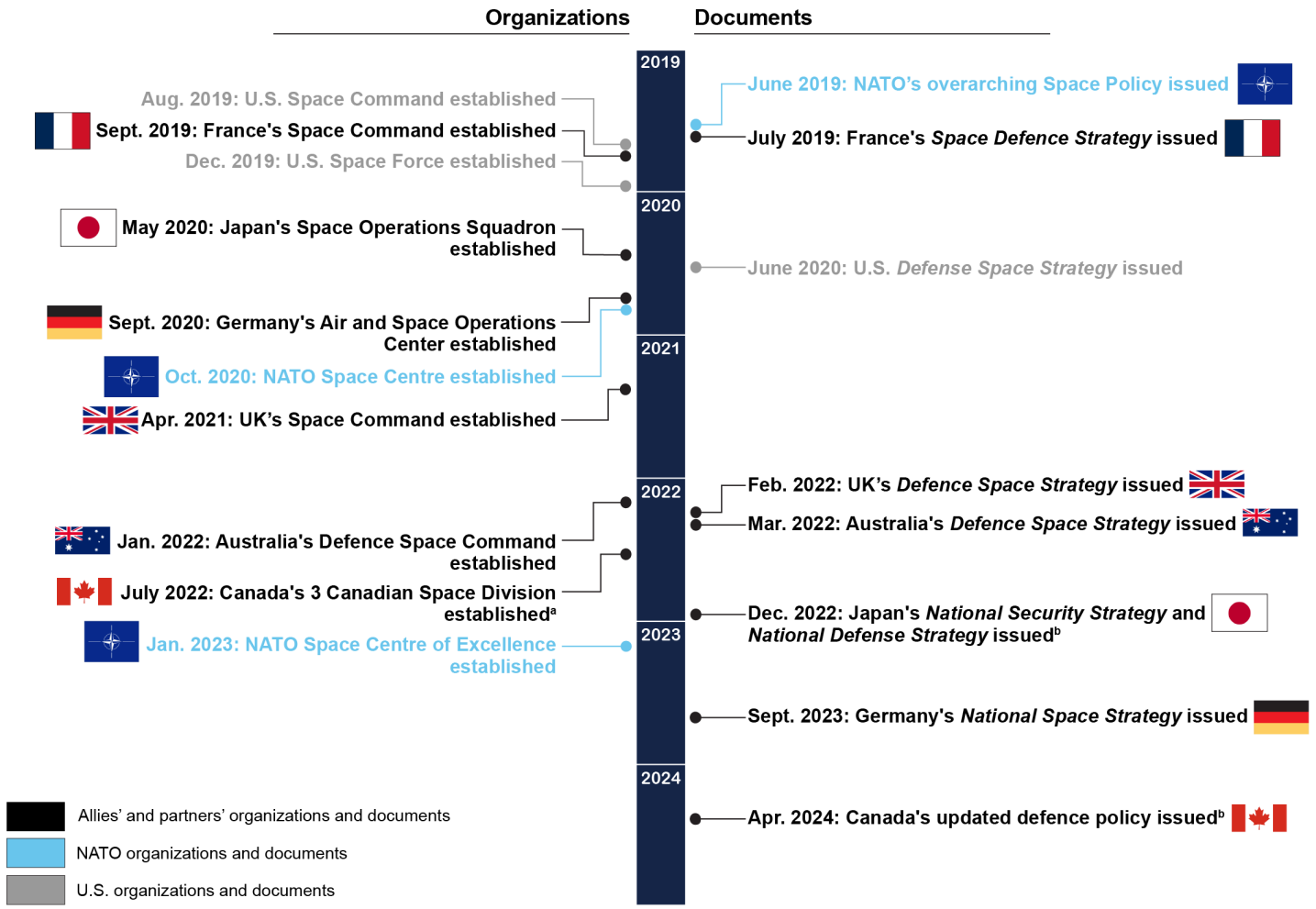
Source: GAO analysis of DOD information. | GAO-25-108043

Note: The Joint Staff and military services use different terms to refer to similar mission areas. GAO derived the mission areas discussed in this report from multiple Department of Defense (DOD) sources, including Joint Chiefs of Staff, Joint Pub. 3-14, *Joint Space Operations* (Aug. 23, 2023); Space Doctrine Publication 3-0, *Operations Doctrine for Space Forces* (July 19, 2023); Space Capstone Publication, *Spacepower Doctrine for Space Forces* (June 2020); Air Force Policy Directive 13-6, *Space Policy* (Dec. 5, 2023); and mission briefs provided by Space Force Space Operations Command.

Allies' and Partners' Military Space Organizations, Strategic Guidance, and Capabilities

Since 2019, several U.S. allies and partners, have established new military space organizations and have published policy and strategic guidance to inform military space investments and operations. NATO has also recognized space as an operational domain, and is pursuing several efforts to better integrate space within its defense planning. NATO is a key forum for allies to share information and coordinate activities on various space-related issues. For more information on NATO's approach to space operations, see appendix VIII. See figure 1 for a timeline documenting select allies' efforts to establish military space organizations and publish policy and strategy documents discussing the role of space in military operations.

Figure 1: Timeline of Select Allies' Efforts to Establish Military Space Organizations and Publish Related Guidance



Source: GAO analysis of Department of Defense and foreign government information. | GAO-25-108043

[a]A component of the Royal Canadian Air Force, 3 Canadian Space Division is the organization responsible for delivering space power effects for the Canadian Armed Forces. Canadian officials told us the organization is Canada's version of Space Command.

[b]In these instances, the documents identified cover more than just the space domain but do include space-related defense policy and guidance.

The United States' allies and partners currently have some space capabilities and are making investments in new space capabilities across multiple space mission areas. Current capabilities generally consist of a limited number of space domain awareness and missile warning sensors as well as satellite communications capabilities. For example, Canada's

capabilities include Sapphire, a dedicated space domain awareness satellite. Additionally, the United Kingdom's capabilities include Skynet, a secure satellite communications constellation dating back to the 1970s. France also operates ground-based space domain awareness sensors, among other space capabilities.

Many of the United States' allies and partners have publicly stated that they are interested in expanding their military space capabilities and have allocated funding to pursue their priorities.[7] Strategic documents and foreign government officials identify priority areas for investment including satellite communications; intelligence, surveillance, and reconnaissance; space domain awareness; and the ability to protect and defend satellites through space control and space electromagnetic warfare. For example, France is developing on-orbit defensive capabilities. See appendixes II-VII for more information about the current space capabilities, future priorities, and U.S. cooperation efforts with Australia, Canada, France, Japan, Norway, and the United Kingdom. Some detailed information within these appendixes on ally and partner capabilities, challenges, and priorities have been omitted because either the partner nation or DOD deemed the information to be classified or sensitive in nature.

DOD Uses Multiple Mechanisms and Agreements to Collaborate with Allies and Partners on Space Operations and Other Activities

[7]Some allies and partners leverage significant cooperation between their military and civilian space sectors. For example, the United Kingdom views space as a vital part of its economy and emphasizes a whole-of-government approach to space. Similarly, Japan's approach to space involves close cooperation between military, civilian, and private organizations to further apply civilian technologies, facilitate investment in technology development, and improve space capabilities for Japan as a whole.

DOD Uses a Range of Mechanisms to Collaborate with Allies and Partners

DOD uses a range of mechanisms to facilitate collaboration with allies and partners on space operations and other activities. DOD uses some of these mechanisms to carry out security cooperation activities under certain authorities.[8] Table 5 provides more information about these different mechanisms.

Table 5: Select Mechanisms DOD Uses to Collaborate with Allies and Partners on Space Operations and Activities

Mechanism	Example
Access agreements	The Department of Defense (DOD) has access agreements with foreign governments that facilitate the placement of U.S.-owned capabilities, including space capabilities on foreign bases. For example, according to a State Department fact sheet, the United States and Norway have a Supplementary Defense Cooperation Agreement that provides the necessary authorities for U.S. forces to access specific Norwegian facilities and conduct defense activities.
Combined operations	U.S. Space Command conducts combined space operations with Australia, Canada, and the United Kingdom from the Combined Space Operations Center at Vandenberg Space Force Base under Operation Olympic Defender.[a] As of 2024, New Zealand, France, and Germany are also members of Operation Olympic Defender.
Data sharing agreements	U.S. Space Command has space situational awareness data sharing agreements with 33 countries.[b] These agreements allow U.S. Space Command to share space situational awareness data gathered from U.S. sensors with partner countries and receive data gathered by the partner countries' sensors. According to DOD officials, while the legal authority is intended to support space flight safety versus military operations, space situational awareness data sharing agreements have proven to be a useful tool to establish cooperation with allies and partners that have not traditionally invested in national security space systems, capabilities, or services.
Exercises	The combatant commands and military services incorporate allies and partners in some of their exercises. U.S. Space Command and Space Force included allies and partners in some space-related exercises, such as Global Sentinel, a U.S. Space Command-led exercise, and some iterations of Space Flag, a Space Force-led exercise.
Foreign military sales and foreign military financing[c]	According to DOD officials, DOD, in collaboration with the State Department, uses foreign military sales and foreign military financing as a means of facilitating allies' and partners' access to space capabilities through the provision of defense articles, services, training and education.

[8]DOD carries out security cooperation activities under various authorities. The Defense Security Cooperation Agency defines security cooperation to include all activities DOD undertakes to encourage and enable international partners to work with the United States to achieve strategic objectives, and includes all DOD interactions with foreign defense and security establishments, including all DOD-administered security assistance programs, that among other things build defense and security relationships. Defense Security Cooperation Agency Manual 5105.38-M, *Electronic Security Assistance Management Manual* (as of December 2024). For example, under chapter 16 of title 10, U.S. Code, DOD may conduct certain security cooperation activities, which may also include exercises and support to operations. Additionally, the Defense Security Cooperation Agency defines security assistance as a group or program, administered under title 22, U.S. Code authorities, by which the United States provides defense articles, military education and training, and other defense-related services in furtherance of national policies or objectives. Security assistance programs are subject to the general direction and continuous oversight of the Secretary of State, but are variously administered by DOD or the Department of State.

Mechanism	Example
Training and education	Allies and partners may participate in space related training and education. This includes courses the Space Force Space Training and Readiness Command provides.
Forums and working groups	According to DOD and foreign officials, DOD leverages discussions and standing forums between U.S. and foreign officials at all levels of the military to share information. This includes the NATO Space Symposium, which focuses on integrating NATO's space capabilities into planning and operations and exploring how to leverage space for collective defense.
Personnel exchanges[d]	U.S. Space Command and Space Force have personnel exchange agreements for both exchange and liaison officers with multiple countries to foster relationships and facilitate information sharing. According to a U.S. Space Command official, as of February 2024, there were seven exchange officers from three countries embedded at U.S. Space Command. The official also said that U.S. Space Command had liaison officer agreements with seven countries at that time.
Use of allies' and partners' capabilities	Space Force has collaborated with other countries to leverage their capabilities in support of Space Force's goals. For example, Space Force collaborated with Japan to place a Space Force space domain awareness capability on a Japanese navigation satellite.
U.S. capabilities partially funded by allies and partners	The Wideband Global Satellite Communications system is a shared capability developed by the United States. Eight countries in addition to the United States provide funding to support acquisition of individual satellites in the constellation and, in return, receive proportional usage rights.
U.S. systems operated by allies and partners in a foreign location	The Ballistic Missile Early Warning Radar located at Royal Air Force Fylingdales in the United Kingdom provides ballistic missile warning and space situational awareness information. It is operated by British personnel.
War games	Schriever Wargame is a Space Force war game examining space and cyberspace through an all-domain, multinational conflict. According to a DOD official, the planning and execution cycle for Schriever is 2 years. The 2025-2027 cycle will be the first time Space Force has conducted the Schriever Wargame with all 10 Combined Space Operations initiative partners.[e]

Source: GAO analysis of DOD information. | GAO-25-108043

[a]Operation Olympic Defender is the named U.S. Space Command operation that establishes the daily framework for combined space operations. It is a multinational effort intended to optimize space operations, improve mission assurance, enhance resilience, and synchronize efforts among members.

[b]The Secretary of Defense may provide space situational awareness services and information to, and obtain space situational awareness data and information from, certain non-U.S. government entities subject to certain limitations. Specifically, the secretary may only take such actions only where the secretary determines that such actions are necessary to meet the national security interests of the U.S. 10 U.S.C. § 2274.

[c]According to DOD doctrine, foreign military sales is a process through which eligible foreign governments and international organizations may purchase defense articles, services, and training from the United States government. Joint Chiefs of Staff, Joint Pub. 3-20, *Security Cooperation* (Sept. 9, 2022) (incorporating change 1, effective July 5, 2024). Foreign military financing is a program that provides financing for eligible United States partner countries to purchase United States defense articles, services and training either through a grant (non-repayable) or direct loans. The State Department determines which countries are eligible for foreign military financing, and DOD implements the program. Defense article is defined as any weapon, weapons system, munitions, aircraft, vessel, boat, or other implement of war; any property, installation, commodity, material, equipment, supply, or goods used for the purposes of furnishing military assistance or making military sales; any machinery, facility, tool, material, supply, or other item necessary for the manufacture, production, processing, storage, repair, servicing, construction, transportation, operation, or use of any other defense article or any component or part of any of the articles listed above, but shall not include merchant vessels, or as defined in the Atomic Energy Act of 1954, as amended, source material, byproduct material, special nuclear material, production facilities, utilization facilities, or atomic weapons or articles involving Restricted Data, 22 U.S.C. §§ 2403(d), 2794(3).

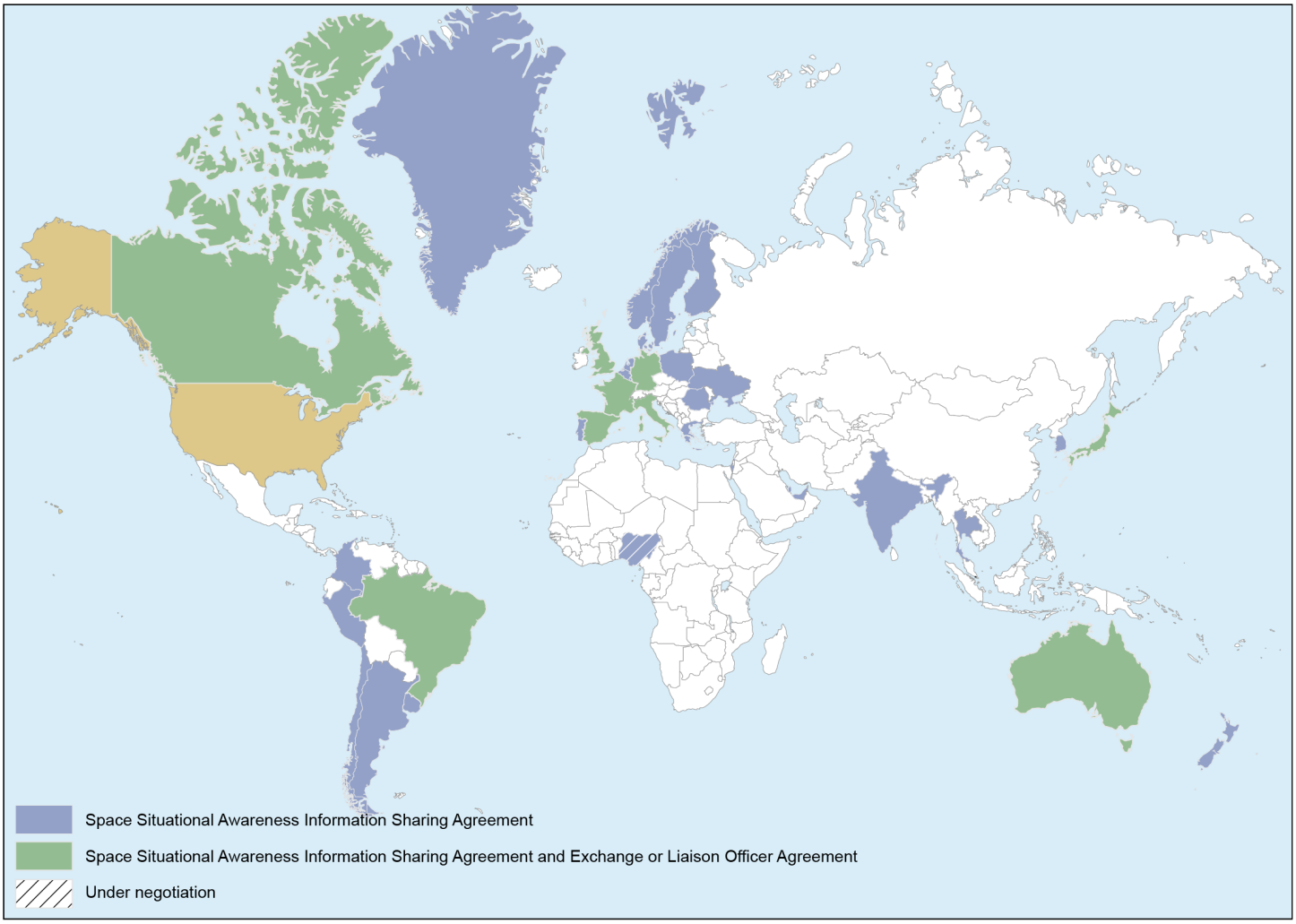
[d]Personnel exchanges include both foreign exchange personnel and foreign liaison officers. Foreign exchange personnel are military or civilian personnel from a foreign defense establishment assigned

to a DOD component, such as USSPACECOM in accordance with a personnel exchange agreement and who perform the duties prescribed by that component. Foreign liaison officers are also military or civilian personnel from a foreign defense establishment who are authorized by their government or an international organization, and certified by a DOD component, to act as an official representative of their government or organization in dealing with DOD components. DOD Directive 5230.20, Visits and Assignments of Foreign Nationals (June 22, 2005).

[e]The Combined Space Operations initiative is a multilateral initiative developed to enhance cooperation, coordination, interoperability, resilience, training, and both national and collective capabilities for military operations in space. Aside from the United States, the participants are Australia, Canada, France, Germany, Italy, Japan, New Zealand, Norway, and the United Kingdom.

Through these and other mechanisms, DOD collaborates with allies and partners around the world on space operations and activities. For example, figure 2 identifies the countries with which the United States has space situational awareness data sharing agreements, personnel exchange agreements, or both.

Figure 2: Map of Countries with Which the U.S. Has Space Situational Awareness Data Sharing Agreements and Personnel Exchange Agreements



Source: GAO analysis of Department of Defense information; Map Resources (map). | GAO-25-108043

Note: Countries with space situational awareness data sharing agreements with the United States include Argentina, Belgium, Chile, Colombia, Denmark, Finland, Greece, India, Israel, Luxembourg, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Qatar, Republic of Korea, Romania, Sweden, Thailand, Ukraine, United Arab Emirates, and Uruguay. Countries with space situational awareness data sharing agreements and exchange or liaison officer agreements with the United States include Australia, Brazil, Canada, France, Germany, Italy, Japan, Spain, and the United Kingdom. The United States is currently negotiating a space situational awareness data sharing agreement with Nigeria.

DOD pursues specific mechanisms based on the United States' relationship with a given ally or partner, as well as the maturity of that

country's space capabilities. In order to facilitate space cooperation, different organizations within DOD have categorized allies and partners based on the country's space capabilities, interest in space-related collaborative efforts, and other factors.[9] For example, USSPACECOM and Space Force officials explained that space situational awareness data sharing agreements and introductory space education courses are helpful as initial mechanisms for engaging with countries the United States does not have an existing relationship with and countries that do not currently have space capabilities. For more information on space education, see appendix IX. The State Partnership Program is another way DOD establishes relationships with other countries, and officials noted it is a particularly helpful means for pursuing space-related coordination with countries that have limited familiarity with the space domain. However, DOD officials told us that there are still challenges to starting space cooperation with newer partners with limited space expertise.

[9]Guidance documents issued by the Office of the Assistant Secretary of Defense (Space Policy), Space Force, and USSPACECOM each categorize countries based on these and other factors. DOD guidance shows that the categorization of countries in each document reflects the priorities of the organization responsible for the guidance, and as a result, variation in the categorization of a given country across the three documents is expected. DOD deemed that the details of this categorization are classified. We therefore excluded that information, including a detailed appendix.

Department of Defense State Partnership Program

The Department of Defense's (DOD) State Partnership Program is designed to foster enduring relationships between partner countries and DOD. The Chief of the National Guard Bureau manages and administers the program, and the combatant commands execute it. The National Guard of the states and territories provide the personnel required to carry out the program. Each participating country is partnered with the National Guard of a specific state, and there are 106 partner countries.

DOD requested $51.2 million for the program in its fiscal year 2025 budget request, up from a $19.9 million request in the prior year. The department notes the funding increase is intended to support the continuous growth of the program, among other costs.

DOD officials told us the State Partnership Program plays an important role in the coordination of space-related efforts with allies and partners, particularly those countries not otherwise working with U.S. Space Command or Space Force. For example, a National Guard official said that Austria communicated their interest in space to the Vermont National Guard, their partner. According to the official, the Vermont National Guard then arranged for space professionals to discuss space capabilities and training opportunities with Austria. In another instance, a National Guard official said that the Alabama National Guard was able to facilitate meetings with Romanian officials to help Romania develop a 5-year plan for developing its space capabilities. Similarly, the New York National Guard facilitated subject matter expert exchanges with Brazil.

Source: GAO analysis of Department of Defense information. (Image) National Guard Bureau. | GAO-25-108043

In instances in which DOD has a well-established relationship with a given country and that country has space capabilities or expertise, DOD may pursue collaboration through advanced education or training opportunities and through combined operations, according to DOD officials and documentation.[10] This may include courses offered by Space Force or invitations to observe USSPACECOM exercises. For example, Space Force officials told us that some of their courses covering advanced space topics are available for FIVE EYES partners (i.e., Australia, Canada, New Zealand, and the United Kingdom). USSPACECOM also includes allies' participation in combined operations as part of Operation Olympic Defender. As discussed in more detail later in the report, New Zealand, France, and Germany became members of Operation Olympic Defender in 2024, joining existing members Australia, Canada, the United Kingdom, and the United States.

[10]Combined operations are operations conducted with two or more allies operating together.

DOD Uses Bilateral and Multilateral Agreements to Facilitate Collaboration with Allies and Partners

DOD uses both bilateral and multilateral agreements to facilitate collaboration with allies and partners on space activities and operations. In addition to space-related agreements, DOD officials said they can leverage broader agreements that are not specific to a particular domain to support these collaboration efforts. Some space-related agreements are bilateral agreements between the United States and one other country, including the space situational awareness data sharing agreements discussed above. The benefits of bilateral agreements include that bilateral agreements are generally easier to establish than multilateral agreements, and individual countries may be more willing to share information with just the United States instead of a broader coalition.

However, bilateral agreements can have limited use in cases where the United States is conducting space operations with multiple countries. DOD officials characterize the use of bilateral agreements as a hub and spoke model, where the United States is the hub and each bilateral agreement is a spoke connecting the United States to another country. This means the United States is connected to its allies and partners, but without similar agreements among all—or a subset—of the countries, these agreements do not enable information sharing among a broader coalition. Space Force officials explained that this can lead to a situation where they are forced to have multiple one-on-one conversations with exchange officers from different countries instead of having a single conversation with everyone present.

DOD also leverages multilateral agreements to facilitate collaboration on space activities and recognizes the importance of these agreements for achieving some of the department's goals. For example, the 2024 *International Space Cooperation Strategy* states that multilateral agreements are especially effective in early stages of development where investment decisions can contribute to higher levels of integration and provide unique opportunities to build coalition interoperability. Key agreements include the Combined Space Operations (CSpO) Initiative and Australia-United Kingdom-United States Initiative (AUKUS).

CSpO Initiative. The United States helped establish CSpO in 2014. The initiative is a partnership of 10 countries, including the United States, although DOD officials stated that the initiative is not a legally binding

agreement.[11] Its stated mission is to generate and improve cooperation, coordination, interoperability opportunities to sustain freedom of action in space, optimize resources, enhance mission assurance and resilience, and deter conflict. The CSpO Initiative's lines of effort include: developing and operating resilient interoperable architectures; enhancing command, control, and communications capabilities among CSpO participants; and sharing intelligence and information.

AUKUS. Australia, the United Kingdom, and the United States established AUKUS in 2021, although DOD officials stated that the initiative is not a legally binding agreement.[12] Under AUKUS Pillar 2, the three countries are pursuing cooperative activities to develop and field advanced capabilities. According to the Air Force, AUKUS accelerated the delivery of the Deep Space Advanced Radar Capability, a ground-based radar with planned sites in each of the three countries.[13] Representatives from the three countries signed the memorandum of understanding for the Deep Space Advanced Radar Capability in September 2023. The first site, located in Australia, is planned to reach initial operational capability in 2026 with the sites in the United Kingdom and United States to follow in 2028 and 2029, respectively.

DOD officials also told us that the department is cooperating with allies and partners on space-related research, development, test, and evaluation. Specifically, one memorandum of understanding with FIVE EYES partners is focused on highly classified efforts. A separate memorandum of agreement currently with 10 nations is focused on responsive space capabilities.

[11]The additional members of the CSpO Initiative are Australia, Canada, France, Germany, Italy, Japan, New Zealand, Norway, and the United Kingdom.

[12]AUKUS Pillar 1 is a joint effort to support Australia's purchase of three to five Virginia class nuclear-powered submarines.

[13]When complete, the Deep Space Advanced Radar Capability is expected to provide worldwide coverage of objects in geosynchronous earth orbit in all weather conditions.

NATO Space Operations Centre

The North Atlantic Treaty Organization (NATO) established the NATO Space Centre in October 2020 and later renamed it the NATO Space Operations Centre. The Centre consists of a multinational team, including U.S. personnel, focused on sharing information about potential threats in the space domain by analyzing data and products member nations provide. This includes imagery, navigation, and early warning data. As of April 2024, NATO officials told us the NATO Space Operations Centre did not receive any direct funding, so the organization relied on publicly available information accessed through the Space Force's unclassified satellite catalog and products member nations provided. The officials added that information available to the NATO Space Operations Centre includes data and tools available through the Joint Commercial Operations cell, a Space Force organization discussed in more detail later in this report.

Source: (Text) GAO analysis of NATO and Department of Defense information. (Image) E. James, U.S. Air Force. | GAO-25-108043

While USSPACECOM, USEUCOM, and USINDOPACOM officials all noted that multilateral agreements facilitate information sharing across a larger cohort of countries, they also noted that each country is typically willing to share less information about their space capabilities and threats to the space domain in a broader multilateral forum versus a bilateral forum. USSPACECOM officials explained that this dynamic makes it important to have both bilateral and multilateral agreements, particularly with key allies and partners.

DOD Is Building Relationships with Allies and Partners but Faces Challenges Integrating Them into Space Operations and Activities

DOD continues to emphasize in strategy documents and public remarks the importance of integrating allies and partners into space operations. However challenges persist, such as those related to classification and systems and data integration. Additionally, although DOD uses exercises to build space-related relationships with allies and partners, it is currently limited in its ability to fully integrate allies and partners into those exercises due to those same classification challenges. Finally, the Space Force components to each combatant command—organizations expected to play a key role in the integration of allies and partners into

space operations and activities—have limited personnel available to fulfill their responsibilities related to planning and information sharing.[14]

DOD Faces Challenges Executing Combined Space Operations with Key Allies

DOD has limited experience conducting combined space operations with allies and partners, and its efforts to do so are subject to a number of challenges. One challenge outside of DOD's control is limited allied space capabilities. As previously mentioned, while allies are making investments into military space capabilities, they currently have limited capabilities to contribute to combined space operations. DOD has also identified persistent challenges related to information sharing that complicate its ability to fully integrate allies into combined space operations, including through Multinational Force Operation Olympic Defender.[15]

Classification Challenges

DOD organizations face challenges related to their ability to share space-related classified information with allies and partners. Specifically, officials from several DOD organizations told us they face challenges with foreign disclosure and release of information in support of combined space operations. For example, senior exchange officers working in support of Operation Olympic Defender told us they are unable to integrate fully with U.S. planning and operations due to limitations on sharing information with foreign officials (e.g., the use of "Not Releasable to Foreign Nationals" or "NOFORN" classification markings). Further, the officials noted that when senior exchange officers are not permitted to see classified information relevant to those positions, they must delegate tasks to their junior U.S. counterparts. According to the senior exchange officers, this means there is—in effect—little difference between their role and the role of liaison officers and, as a result, the system does not maximize the benefits of having exchange officers.

Space Force officials also told us that even though DOD is pushing to share information with allies more widely, they are limited in their ability to share information due to outdated security classification guides. Space Force officials provided an example where they could not follow DOD guidance to make information on certain capabilities releasable to a small group of countries because existing security classification guides for

[14] We also found limitations related to DOD's ability to incorporate allies and partners into planning. DOD determined that the details of those challenges and GAO's related recommendation were classified, and so they are not included in this report.

[15] Operation Olympic Defender is the named USSPACECOM operation that establishes the daily framework for combined space operations. It is a multinational effort intended to optimize space operations, improve mission assurance, enhance resilience, and synchronize efforts among members.

these capabilities had not yet been updated. While Space Force recognizes that security classification guides within its control should be expanded to meet its goals for releasing information to allies, Space Force officials told us that they had not yet been able to do so in this particular case.

Another aspect of this challenge is that DOD leverages information from multiple sources—including intelligence products—to conduct combined space operations. DOD and the intelligence community have different approaches to classification and foreign disclosure. According to USSPACECOM officials, this means that there are often multiple approvals required before space-related information can be shared with allies and partners. Officials also said that intelligence agencies sometimes require additional approval processes before USSPACECOM can distribute information to allies' space operations centers even if the information is marked as releasable to those countries.

DOD is taking steps to mitigate some of the effects these classification challenges have on information sharing with allies and partners. In 2022, the Under Secretary of Defense (Intelligence and Security) issued a memorandum on the appropriate use of the "NOFORN" dissemination control on DOD information, noting that its incorrect application acts as an obstacle to collaboration with U.S. allies and partners.[16] Additionally, senior officials announced in 2023 that DOD is reviewing the classification and disclosure policies of space-related information to overcome these barriers.

Additionally, the 2024 *International Space Cooperation Strategy* notes that DOD will work with the intelligence community to facilitate timely release of information to allies and partners and diminish the need for one-off requests. DOD officials provided us with an example where they were able to successfully collaborate with a U.S. intelligence agency to get blanket approval to share certain types of information with a limited set of allies, thus avoiding delays. However, despite some progress, officials from several DOD organizations and foreign partners told us that classification remains a significant barrier to working with allies and partners on space operations.

[16]Under Secretary of Defense (Intelligence and Security) Memorandum, *Appropriate Use of "Not Releasable for Foreign Nationals" on Department of Defense Information* (Oct. 2, 2022).

Systems and Data Integration Challenges

DOD organizations face challenges related to their ability to integrate space-related systems and data with allies and partners. According to DOD doctrine, multinational operations should include compatible secure and non-secure communications equipment.[17] Further, the 2024 *International Space Cooperation Strategy* states that DOD must have tools and systems to share data and exchange information with mission partners in order to achieve combined operations with space-capable allies and partners, and that timely information sharing is required to support day-to-day space operations through the full spectrum of conflict.

However, DOD and foreign officials stated that incompatible systems between DOD and allies remains a barrier to operational integration.[18] Further, multiple data standards and formats complicate information sharing with allies and partners, according to DOD. Specifically, different military organizations use multiple types of data and systems to develop, process, and analyze information, which often makes it impractical for the United States to use space-related information that allies and partners are ready to share. This report excludes classified examples of system and data integration challenges.

DOD recognizes that the need to share space-related information with allies and partners has historically not been a priority in the development or fielding of systems. According to the 2024 *International Space Cooperation Strategy*, DOD must be able to exchange information—at all classification levels—with mission partners to conduct joint planning and training, support mission execution, and assess exercises and operations in a collaborative domain.

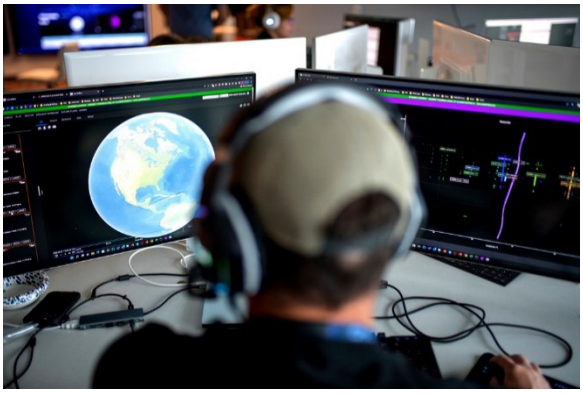
DOD has found a way to overcome some of its classification and data and systems integration challenges through the use of nonclassified commercial data and analytics. Specifically, DOD shares nonclassified space domain awareness information with allies and partners through Space Force's Joint Commercial Operations cell. The Joint Commercial Operations cell provides nonclassified information derived from public research, commercial space domain awareness sensors, and commercial

[17]Joint Chiefs of Staff, Joint Pub. 3-16, *Multinational Operations* (Mar. 1, 2019) (incorporating change 1, effective June 17, 2024).

[18]Communications systems challenges for space operations are not unique to operations with allies and partners. We previously reported that DOD has struggled to upgrade or replace its space command and control systems since 2000, and its current effort, referred to as Space C2, has been subject to persistent delays. For more information, see GAO, *Space Command and Control: Improved Tracking and Reporting Would Clarify Progress amid Persistent Delays*, GAO-23-105920 (Washington, D.C.: June 8, 2023).

analytical tools. Additionally, in 2023, Space Force initiated a pilot program with the Joint Commercial Operations cell to provide combatant commands with annotated commercial surveillance, reconnaissance, and tracking products. According to Space Force officials, U.S. Southern Command was able to use this process to help the Peruvian government with wildfire evacuations. Space Force officials from another organization praised the Joint Commercial Operations cell's ability to quickly share data with allies and partners, but noted that DOD cannot use its data from the cell for operations, as they may not meet DOD data standards.

Joint Commercial Operations Cell



U.S. Space Command established the Joint Commercial Operations cell in 2020 to support the command's protect and defend mission. The Joint Commercial Operations cell provides nonclassified information derived from public research, commercial space domain awareness sensors, and commercial analytical tools. Space Force officials explained that the nonclassified nature of the data used facilitates information sharing with allies and partners in an operationally relevant timeframe that would not otherwise be possible given the classified nature of similar data collected from U.S. government-owned and -operated sensors. Because the Joint Commercial Operations cell use data that are not classified, the data do not need to be cleared by foreign disclosure officers for release to allies and partners.

The Joint Commercial Operations cell has relationships with both the Space Force and U.S. Space Command. Since its inception in Colorado Springs, Colorado, the organization has added multiple operation locations around the world. There are currently three regional cells representing the Americas, Meridian, and Pacific. Across these locations, the Joint Commercial Operations cell operates 24 hours a day, 5 days a week. Space Force officials explained that the service currently does not plan to expand to 24/7 operations. Personnel from each of the host countries help staff the cells. Additionally, New Zealand provides significant training for the Joint Commercial Operations cell. According to Space Force officials, Brazil and the United Kingdom also provide training for their respective regions. The Joint Commercial Operations cell has trained operators representing 18 partner countries and is in the process of onboarding an additional 15 partner countries. Space Force officials told us that the Joint Commercial Operations cell received US$52 million in DOD-programmed funding for the first time in fiscal year 2024. Prior to fiscal year 2024, the program relied on unfunded requirements from multiple organizations to sustain operations, according to Space Force officials.

Space Force officials told us that, while predominately based in the United States, companies from other countries also participate in the Joint Commercial Operations cell. These companies upload their data to the Unified Data Library, which links to the Space Domain Awareness Marketplace. From the marketplace, any user can take advantage of non-traditional data sources.

The Joint Commercial Operations cell is also working to leverage commercial surveillance, reconnaissance, and tracking products. This new effort focuses on supporting combatant commands during near-term, event-driven activities with the aim of providing products that are easy to share with partner countries.

Source: (Text) GAO analysis of Department of Defense (DOD) information. (Image) T. Williams, U.S. Space Force. | GAO-25-108043

DOD has long acknowledged the importance of addressing the barriers that limit cooperation and collaboration with allies and partners in support of combined space operations. Multiple strategy documents, dating back to 2017, have previously identified objectives to address these challenges. Specifically, the:

- *DOD International Space Cooperation Strategy*, issued in 2017, states DOD must leverage allies' and partners' national security-related space capabilities and elevate space partnerships to a central element of joint planning and operations.[19] It also identifies the need to improve information sharing and interoperability. The strategy requires that the appropriate DOD components develop implementation plans that outline the ways and means to meet the strategy's stated goals.
- *Defense Space Strategy*, issued in 2020, establishes lines of effort and specific objectives related to integrating allies and partners into space operations and activities in support of DOD's goal of achieving space superiority by 2030. The strategy indicates that carrying out these objectives includes reviewing releasability guidelines for space-related military information, updating classified networks to incorporate embedded allies and partners, and ensuring that allies and partners have access to shared common data.[20] As we have previously reported, officials from the Office of the Assistant Secretary of Defense (Space Policy) told us that the department considered developing a 2020 Defense Space Strategy implementation plan but in the end abandoned the effort due to limited staffing.[21]
- *Space Strategic Review Implementation Guidance*, issued in 2023, emphasizes the importance of integrating allies and partners in the space domain to expand capacity, resilience, deterrence, and capability.[22] The guidance also identifies discrete tasks intended to address some of the barriers that limit information sharing in support of combined space operations. This guidance is classified, and thus further details about the document cannot be publicly released.

[19]Assistant Secretary of Defense (Homeland Defense and Global Security) Memorandum, *Unclassified International Space Cooperation Strategy* (May 25, 2017).

[20]DOD, *Defense Space Strategy* (June 2020).

[21]GAO, *Space Operations: DOD Efforts to Improve Space Control Shortfalls Underway but Longstanding Challenges Persist*, GAO-22-530C (Washington, D.C.: Nov. 8, 2021).

[22]Excerpt from the *Space Strategic Review Implementation Guidance* (Sept. 21, 2023).

Despite recent efforts to address its challenges related to the classification of space-related information and the integration of systems and data across multinational efforts, DOD still has not established ways to assess progress toward overcoming these persistent barriers. *Standards for Internal Control in the Federal Government* states that, in order to assess progress toward a plan, organizations should set specific and measurable objectives and develop milestones for implementing objectives.[23]

While DOD recognizes the importance of developing implementation plans for its strategies, it has not set specific milestones for implementing its goals for integrating allies and partners into space operations. For example, while the 2024 *International Space Cooperation Strategy* requires that DOD components organize and prioritize opportunities to cooperate with allies and partners according to specified lines of efforts, it does not identify specific milestones to implement the strategy. Establishing such milestones—and a plan to implement them—is particularly important given both DOD's longstanding strategic priority of working with allies and partners on space operations and the department's limited progress in addressing it. Linking these milestones to the 2024 *International Space Cooperation Strategy* could help DOD ensure that its most recent efforts to integrate allies and partners into space operations are positioned for success.

DOD Uses Space-Related Exercises to Build Relationships with Allies and Partners but Limitations Exist

DOD uses exercises to build space-related relationships with allies and partners but is currently limited in its ability to fully integrate them into those exercises. According to the *National Defense Strategy*, allies and partners will improve joint capability with the aid of multilateral exercises and combined planning for shared deterrence challenges, including in space.[24] However, classification challenges—as previously discussed—may limit DOD's ability to include allies and partners in a particular exercise or share information fully during the course of an exercise. For example, Space Force officials told us that they are often unable to share classified planning concepts for exercises with foreign officials, which can make it challenging to meaningfully incorporate allies and partners into an exercise.

[23]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 10, 2014).

[24]DOD, *National Defense Strategy* (2022).

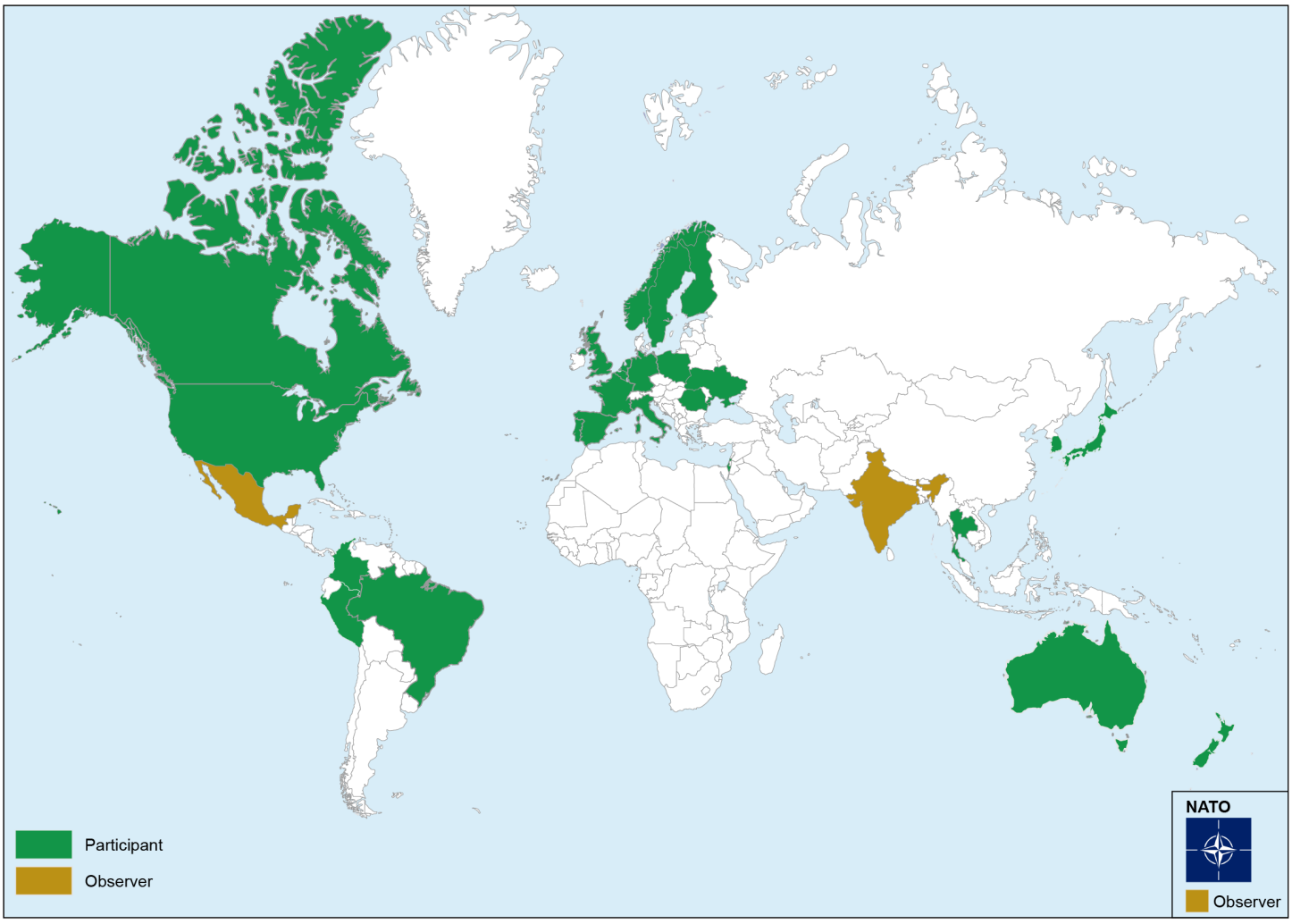
In one example, Space Force officials told us about a recent iteration of Space Flag—a Space Force exercise that was designed to provide space units with advanced training in a congested, contested, and competitive environment.[25] However, because the operational plan used to develop the exercise was not releasable to foreign officials, allies were not included in the exercise despite being included in prior years, according to the officials. In another example, USSPACECOM and USINDOPACOM officials told us that an ally could not fully integrate into an exercise because part of the exercise scenario contained information not releasable to foreign nationals.

Despite these limitations, officials from multiple DOD organizations acknowledged increasing interest from allies and partners in integrating the space domain in military exercises. As a result, DOD is leveraging bilateral and multilateral exercises to (1) build space-related relationships with allies and partners and (2) introduce partners without their own space capabilities to space as an operational domain. Examples include:

- **Global Sentinel.** Established in 2014, Global Sentinel is an annual USSPACECOM event designed to strengthen international partnerships and improve operational collaboration. According to USSPACECOM officials, the exercise's capstone event uses data from the unclassified space catalog, which means that countries can analyze the available data without having their own space capabilities. Further, participation may provide countries a better understanding of how to use space-related data and where they may want to invest resources into space capabilities. Global Sentinel grew from seven participating countries in 2014 to 25 participating countries in 2024, as shown in figure 3.

[25]According to Joint Pub. 3-14, *Space Operations* (Aug. 23, 2023), the space domain is a naturally hazardous environment and is increasingly congested, contested, and competitive. As more countries and companies develop space capabilities, the resulting increase in the number of spacecraft increases the probability of collisions between space objects. Additionally, adversaries seek to develop and deploy space systems to improve their military effectiveness and reduce shared use of other countries' space capabilities. Finally, adversaries are continually seeking strategic and operational advantages and to challenge the U.S. position in the space domain.

Figure 3: Map of Countries That Participated in or Observed Global Sentinel 2024



Source: GAO analysis of Department of Defense information; Map Resources (map). | GAO-25-108043

Note: Countries that participated in Global Sentinel 2024 include Australia, Belgium, Brazil, Canada, Colombia, Finland, France, Germany, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Republic of Korea, Romania, Spain, Sweden, Thailand, Ukraine, the United Kingdom, and the United States. India, Mexico, and the North Atlantic Treaty Organization (NATO) were observers for Global Sentinel 2024.

- **Cobra Gold.** Established in 1982, Cobra Gold is an annual large-scale multinational military exercise co-hosted by USINDOPACOM and the Royal Thai Armed Forces. The most recent iteration, Cobra Gold 2024, brought together 30 countries in an effort to enhance interoperability across multiple domains, including space. Hawaii

National Guard officials told us that the exercise had a scenario that integrated space capabilities, including the use of missile warning, satellite communications, and electromagnetic warfare to counter adversary forces. Additionally, the National Guard officials told us they were able to transport and demonstrate space capabilities for the Royal Thai Armed Forces using commercially available technology. Specifically, they demonstrated how to use a commercially available electromagnetic spectrum awareness system to detect interference on unmanned aerial vehicles operating beyond the line of sight.

- **Vulcan Guard.** Established in 2022, Vulcan Guard is a series of space-focused exercises integrating certain states' National Guard operations and intelligence personnel with U.S. military partners through the State Partnership Program. The National Guard states include allies and partners in Vulcan Guard exercises—including Brazil in 2023 and Romania and Poland in 2024. The latter iteration underscored mission planning with the NATO partners as they develop their own space capabilities amid rising global threats in the domain.

Space Force Components Have Limited Personnel to Support Planning and Information Sharing with Allies and Partners

Over the last 2 years, Space Force established service components to support the combatant commands, but the components have limited personnel to fulfill planning and information sharing requirements.[26] Space Force component staff are responsible for planning, executing, and assessing operations and also conducting exercises in support of their respective combatant commander's strategies and plans.[27] The Space Force components to USCENTCOM and USINDOPACOM both identified the number of personnel needed to fulfill these responsibilities in their respective programming plans, including the personnel needed to conduct planning activities and foreign disclosure officers (FDO) needed to authorize the release of information to allies and partners.[28] The programming plans also state that a key assumption is that Space Force

[26]In November 2022, Space Force established service components to USINDOPACOM and USCENTCOM. In December 2023, Space Force established a combined service component to USEUCOM and USAFRICOM. Space Force has not established a component to support U.S. Southern Command, but DOD officials said there is a team of space personnel embedded in the Air Force component to the command.

[27]Space Force Instruction 13-105, *Space Forces Staff Operations, Readiness, and Structures* (Apr. 12, 2023). During final processing of this report, Space Force published a new version of this Space Force Instruction in June 2025.

[28]Programming plans provide the scope, criteria, timeline, and direction to establish a component to full operational capability.

will provide sufficient resources, including personnel, to execute the plans.

Space Force officials told us they currently have limited personnel within their components to support planning responsibilities. For example, the Space Force component to USINDOPACOM identified a need for dedicated planning personnel, but as of June 2024, officials said the component only had a fraction of the required personnel responsible for planning and those personnel were also assigned other duties. A Space Force official at the USINDOPACOM component explained that the personnel responsible for planning are also responsible for developing familiarity with allied and partner capabilities and facilitating allied and partner participation in the plan development process. However, these activities have not received a lot of attention as officials prioritized the development of their first component support plan. Officials from the Space Force component to USEUCOM and USAFRICOM also emphasized that they have limited personnel available to provide space-related input for USEUCOM and USAFRICOM's campaign plans, so the plans do not heavily feature space equities.[29]

At the same time, the Space Force components also have a limited number of FDOs, which directly affects their ability to share space-related information with allies and partners in support of planning, operations, and exercises. For example, officials from the Space Force component to USCENTCOM told us they do not have their own FDO. As a result, the component relies on FDOs from USCENTCOM that do not have relevant space expertise to approve the release of space-related classified information to allies and partners, which leads to delays and denials of requests out of an abundance of caution. In another example, Space Force officials told us that space-related aspects of a combatant command's annual exercise were limited due to a lack of appropriate personnel to facilitate the disclosure process.

DOD Directive 1100.4 states that DOD components are responsible for ensuring that personnel levels are programmed to optimize readiness and sustainability.[30] We previously found that an organization should conduct workforce planning to understand the resources and capacity, including skills and competencies, required before making organizational changes.

[29]As of October 2024, the Space Force component to USEUCOM and USAFRICOM is working to finalize its programming plan, according to Space Force officials.

[30]DOD Directive 1100.4, *Guidance for Manpower Management* (Feb. 12, 2005).

Strategic workforce planning includes identifying critical skills required to achieve the organization's required current and future goals.[31] Further, *Standards for Internal Control in the Federal Government* emphasizes the importance of identifying, analyzing, and responding to risks that limit an organization's ability to meet its stated objectives. Responding to risks can include accepting, avoiding, reducing, or sharing the identified risk.[32]

Space Force reports that it faces personnel shortfalls that are exacerbated by rapid mission growth without corresponding increases in personnel. While Space Force has identified the number of personnel it needs to fulfill planning and foreign disclosure roles at some of its components to the combatant commands, it has not yet filled those positions or identified and responded to the risk of not doing so. Without optimizing personnel levels for readiness and sustainability or identifying, analyzing, and responding to the risks of not optimizing personnel levels, Space Force risks undermining its goal of increasing collaboration with allies and partners.[33]

[31]GAO, *Government Reorganization: Key Questions to Assess Agency Reform Efforts,* GAO-18-427 (Washington, D.C.: June 13, 2018); and GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning,* GAO-04-39 (Washington, D.C.: Dec. 11, 2003).

[32]*Standards for Internal Control in the Federal Government* defines the risk response as: (1) Acceptance—No action is taken to respond to the risk based on the insignificance of the risk; (2) Avoidance—Action is taken to stop the operational process or the part of the operational process causing the risk; (3) Reduction—Action is taken to reduce the likelihood or magnitude of the risk; and (4) Sharing—Action is taken to transfer or share risks across the entity or with external parties, such as insuring against losses. GAO-14-704G.

[33]GAO has begun a review focused on Space Force's personnel needs. Specifically, Senate Report 118-188 accompanying a bill for the National Defense Authorization Act for Fiscal Year 2025 includes a provision for GAO to assess Space Force's workforce planning. This includes the extent to which the service has taken action to assess, analyze, and identify the appropriate mix of military, civilian, and contractor personnel and analyzed and identified the optimal mix of officer and enlisted service members necessary to accomplish its missions. S. Rep. No. 118-188, at 312 (2024).

DOD Has Not Addressed Overlapping Roles and Responsibilities or Personnel Limitations Affecting Space-Related Security Cooperation

DOD Has Overlapping Roles and Responsibilities for Conducting Space-Related Security Cooperation

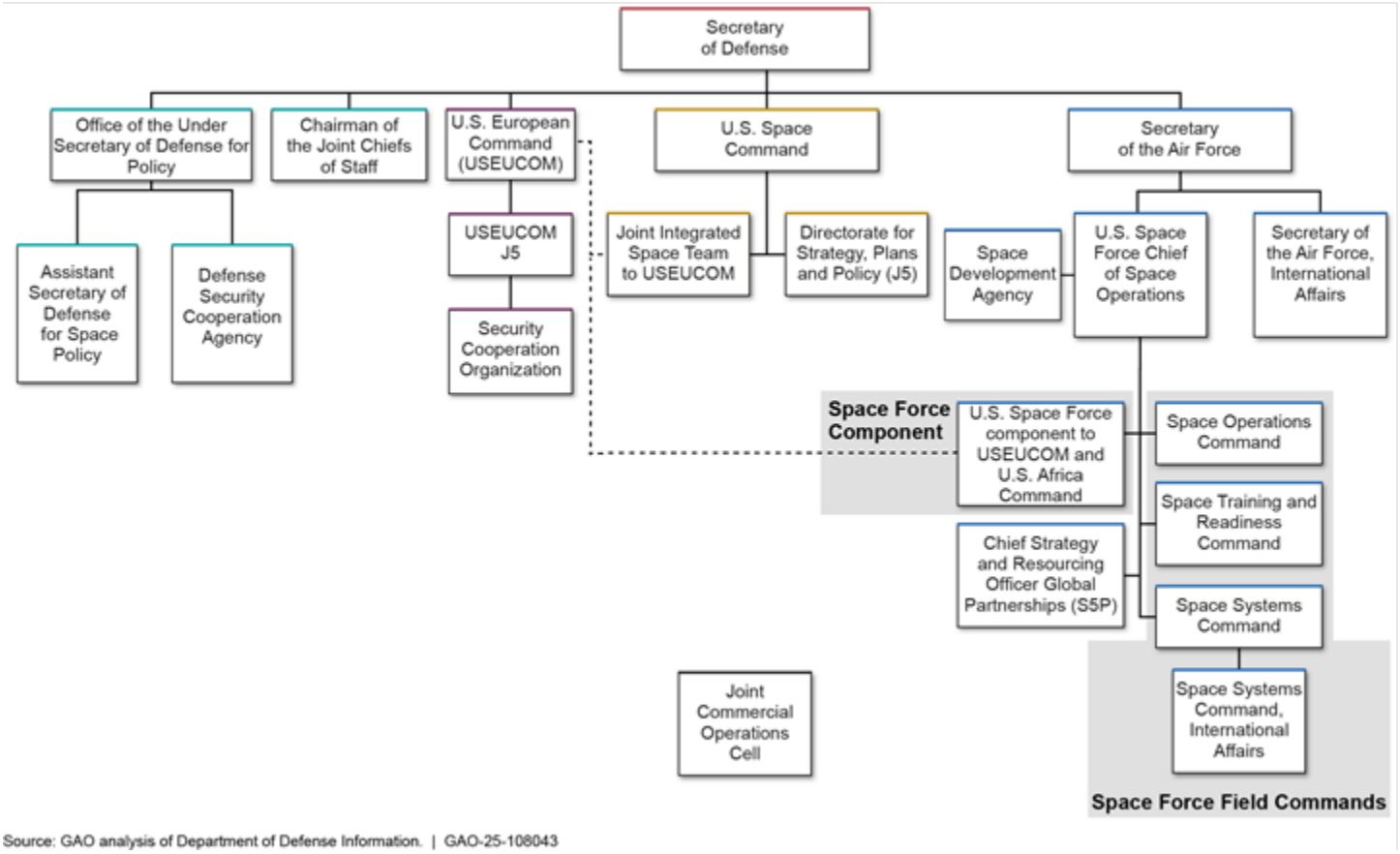
DOD has multiple organizations coordinating on space-related security cooperation with overlapping roles and responsibilities. DOD doctrine states that security cooperation encompasses all DOD interactions with foreign security establishments that build and develop allied and partner security capabilities and capacity for self-defense and multinational operations, provide the armed forces of the United States with access to the foreign country during peacetime or a contingency operation, and build relationships that promote specific U.S. security interests.[34] Further, space-related security cooperation supports space partnerships, leverages capabilities of allies and partners to provide greater strength, resilience, and flexibility to space operations and complicate adversary decision making. According to DOD officials, space-related security cooperation covers a range of activities, including foreign military sales, defense institution capacity building, education, humanitarian assistance, and other items.[35]

[34]Joint Chiefs of Staff, Joint Pub. 3-20, *Security Cooperation* (Sept. 9, 2022) (incorporating change 1, effective July 5, 2024). For an example of a security cooperation activity, section 333 of title 10, U.S. Code authorizes DOD to conduct or support a program or programs to provide training and equipment to the national security forces of one or more foreign countries for the purpose of building the capacity of such forces to conduct certain activities, including military intelligence operations and operations or activities that contribute to an existing international coalition operation that the Secretary of Defense has determined to be in the U.S.'s national interest. 10 U.S.C. § 333.

[35]For example, under section 332 of title 10, U.S. Code, the Secretary of Defense may, with the concurrence of the Secretary of State, assign DOD personnel as advisors to foreign defense institutions or regional organizations with security missions to, among other things, assist such institutions in building core institutional capacity, competencies, and capabilities to manage defense-related processes. 10 U.S.C. § 332.

Due to the large number of DOD organizations that have overlapping roles and responsibilities for space-related security cooperation, allies and partners have difficulty understanding with whom to coordinate. Since the establishment of USSPACECOM and Space Force in 2019, the military space enterprise has significantly expanded, and the number of DOD organizations conducting space-related security cooperation activities has increased as a result. Additionally, foreign government officials highlighted the quantity of U.S. military space organizations as a challenge affecting coordination on space-related activities. For example, officials from several foreign countries told us that since DOD is a large organization with many space stakeholders, it is difficult to understand the division of responsibility between these organizations and to find the appropriate contact. For a given geographic area of responsibility, there can be 10 or more different DOD organizations conducting space-related security cooperation efforts. Figure 4 is a depiction of the organizations across DOD that engage in space-related security cooperation in the USEUCOM area of responsibility.

Figure 4: Organizations Involved in Space-Related Security Cooperation in the USEUCOM Area of Responsibility



Source: GAO analysis of Department of Defense Information. | GAO-25-108043

Note: The Joint Commercial Operations Cell reports directly to the Space Force component supporting U.S. Space Command (not pictured above).

The growth in the number of new DOD space organizations and emphasis on space security cooperation has also led to some confusion related to overlapping roles and responsibilities within DOD. Specifically, Air Force officials said that, in an attempt to improve space security cooperation, USSPACECOM and Space Force have attempted to create additional organizations for conducting space security cooperation or take on responsibilities that existing organizations with security cooperation responsibilities could undertake. In one example, Air Force officials said that Space Systems Command initially wanted to be an implementing

agency for security cooperation activities for the Space Force.[36] However, the officials stated that the Air Force Security Assistance Center already has extensive expertise as an implementing agency and was willing to absorb space-related security cooperation efforts. Recreating that expertise could take many years and could also create confusion for international partners, according to Air Force officials. Space Systems Command officials disputed this characterization. They noted that the command had worked extensively over the past 4 years to learn roles and responsibilities and work with organizations throughout the Department of the Air Force to establish space foreign military sales and increase space cooperation.

The expansion of the military space enterprise and resultant increase of organizations conducting space-related security cooperation activities has also led to DOD organizations not following established processes. For example, according to USEUCOM officials, Space Force coordinated and conducted an activity with a country in USEUCOM's area of responsibility without notifying the command. USEUCOM officials did not find out about the activity occurring in their area of responsibility until the foreign officials informed them. According to DOD guidance, there are established channels through which security cooperation is supposed to be coordinated with the relevant geographic combatant command.[37] Conducting space-related security in USEUCOM's area of responsibility without notifying the command could undermine other USEUCOM security cooperation efforts with that country, lead to the partner being overburdened, and potentially damage relationships, according to USEUCOM officials.

Further, USEUCOM officials told us about additional instances in which roles and responsibilities overlap led to challenges in coordinating priorities for security cooperation activities with allies and partners. Specifically, USEUCOM and USSPACECOM separately plan, direct, approve, and execute security cooperation activities for their areas of responsibility. However, their areas overlap, which has led to

[36]Implementing agencies (sometimes referred to as implementing organizations) are any individuals or component element or combination of elements of a joint force that is carrying out security cooperation activities. Joint Pub. 3-20, *Security Cooperation*. According to Air Force officials, implementing agency is a term that relates to certain subsets of security cooperation, like foreign military sales, and not others. Air Force officials said that the term is sometimes used more loosely throughout DOD.

[37]DOD Directive 5132.03, *DOD Policy and Responsibilities Relating to Security Cooperation* (Dec. 29, 2016).

inefficiencies and missed opportunities for coordination with allies and partners.

DOD has issued guidance to address overlapping roles and responsibilities for security cooperation in other instances, but has not done so for space-related security cooperation. Specifically, like space-related security cooperation, cyberspace security cooperation also balances the priorities of multiple combatant commands (e.g., U.S. Cyber Command for the cyber domain and geographic combatant commands for their respective areas of responsibility). In this case, the Chairman of the Joint Chiefs of Staff issued an instruction on *International Cyberspace Security Cooperation* to delineate roles, responsibilities, and objectives for DOD organizations involved in cyberspace security cooperation.[38] USSPACECOM and USEUCOM officials said it would be useful to have a similar instruction for space security cooperation to delineate roles and responsibilities for these efforts.[39]

In the absence of similar guidance for space, some DOD components have adopted their own mitigation efforts. For example, USSPACECOM officials embedded within USINDOPACOM noted the lack of guidance delineating roles and responsibilities for space security cooperation and explained that they rely on leveraging close personal relationships to mitigate this issue. In another example, a DOD official said that personnel within Space Systems Command, International Affairs and Secretary of the Air Force, International Affairs, leveraged their personal relationships to reconcile overlap in roles and responsibilities for implementing space security cooperation programs. The Secretary of the Air Force, International Affairs, and USSPACECOM, among other DOD components, have also established internal working groups to better organize DOD interactions with allies and partners. Although these and other efforts can help mitigate coordination challenges, they depend on the good will and relationships of those involved at the time and do not alter underlying challenges posed by the overlapping roles and responsibilities.

[38]Chairman of the Joint Chiefs of Staff Instruction 5215.01B, *International Cyberspace Security Cooperation,* (Jan. 6, 2023).

[39]In January 2024, USSPACECOM and USEUCOM issued the *Space Governance Issue White Paper,* which discusses gaps in coordination of space security cooperation operations and activities, as well as guidance that should be updated to address these issues.

DOD Directive 5132.03 states that the Chairman of the Joint Chiefs of Staff has the responsibility to direct, administer, and provide guidance over security cooperation resources and programs for which the Chairman has responsibility, consistent with security cooperation priorities.[40] *Standards for Internal Control in the Federal Government* states that management communicates quality information throughout the entity using established reporting lines.[41] Despite the clear challenges posed by overlapping roles and responsibilities, the Chairman of the Joint Chiefs of Staff has not issued clarifying guidance to inform interactions both between DOD organizations and with allies and partners on space-related security cooperation. Without developing guidance to clarify roles and responsibilities for conducting space-related security cooperation, organizations throughout DOD may continue to face challenges effectively executing security cooperation activities with allies and partners and ensuring that DOD is the partner of choice when it comes to space security cooperation. Allies and partners may also become overburdened and reluctant to coordinate with the United States on space-related security cooperation efforts in the future.

Space Force Components Have Limited Trained Personnel to Conduct Security Cooperation

Space Force established service components to support the combatant commands not only for planning and information sharing requirements (as previously discussed), but also for security cooperation. However, the components have limited trained personnel available to fulfill security cooperation responsibilities. According to DOD doctrine, the combatant command uses resources from and works in concert with service components and others to execute security cooperation activities.[42] Space Force service components engage in security cooperation to increase the capability and capacity of partner nation space security forces and strengthen regional and global stability, among other items. According to Space Force officials, the Space Force plans to use its components to better coordinate with allies and partners, including on space-related security cooperation efforts.

Some of the Space Force components have identified the number of personnel needed to fulfill security cooperation responsibilities in their respective programming plans. For those that have, many of the security

[40]DOD Directive 5132.03, *DOD Policy and Responsibilities Relating to Security Cooperation* (Dec. 29, 2016). During final processing of the classified report on which this product is based, DOD finalized a new version of this DOD directive in January 2025.

[41]GAO-14-704G.

[42]Joint Pub. 3-20, *Security Cooperation*.

cooperation positions needed for the Space Force components are empty or filled by personnel not trained for the mission. For example, officials at the Space Force component to USINDOPACOM told us in June 2024 that the component had two personnel to conduct both planning and security cooperation and their priority was planning. Space Force component to USINDOPACOM officials anticipated gaining two or three more reserve personnel with security cooperation experience in the summer of 2024 to work on security cooperation activities. However, the component's programming plan identified a need for nine dedicated security cooperation personnel.

Also, Space Force component officials to USCENTCOM said that they do not have any trained security cooperation professionals on staff, as of June 2024. Further, according to officials, the component is operating at minimum capacity, including for security cooperation. The Space Force component to USCENTCOM also requested a permanent Chief of Security Cooperation. As of October 2024, the Space Force component to USEUCOM and USAFRICOM has not undergone efforts to identify the number of personnel needed to fulfill their security cooperation responsibilities.

DOD recognizes that appropriate security cooperation training and education is necessary for DOD personnel to perform security cooperation roles effectively. DOD guidance requires its security cooperation professionals to have the training and experience necessary to carry out assigned security cooperation responsibilities.[43] However, according to officials from the Defense Security Cooperation Agency, space professionals—including at the Space Force components—lack training and experience specific to security cooperation. USSPACECOM officials also stated that the existence of Space Force components creates an expectation within the combatant commands that the components will conduct needed space security cooperation. However, they noted the components do not have the personnel and expertise to do so. During an International Space Cooperation Enterprise working group meeting, an official emphasized that rapid growth of organizations within the Space Force has resulted in personnel conducting security cooperation efforts without formal training. Officials said that Space Force needs to ensure a baseline level of education and training for space security cooperation practitioners, especially at the Space Force service

[43]Director, Defense Security Cooperation Agency Memorandum, *Interim Implementation Guidelines for the Department of Defense Security Cooperation Workforce Certification Program 2.0* (Nov. 6, 2023).

components. Further, officials at the Space Force component to USCENTCOM said that they do not have the expertise to conduct security cooperation.

Space Force has leveraged other DOD organizations to help mitigate its security cooperation personnel shortfalls. For example, Space Force personnel work with the USSPACECOM Joint Integrated Space Teams, which are embedded within directorates across certain other combatant commands.[44] According to the Space Force component to USINDOPACOM, the Joint Integrated Space Team at USINDOPACOM supports the component by flagging security cooperation opportunities to act on. Officials at the Joint Integrated Space Team at USINDOPACOM emphasized that their role is to serve as liaison officers, as opposed to action officers, and that the Space Force component to the combatant command has the right of first refusal for any space-related security cooperation.

In another example, the Space Force component to USCENTCOM told us that they plan to leverage Defense Security Cooperation Agency personnel embedded at USCENTCOM to pursue security cooperation opportunities while they navigate the component's personnel shortfalls. Additionally, in April 2024, the Secretary of the Air Force issued guidance establishing the Regional Space Advisor Program to expand cooperation in space with partner nations operating in the space domain.[45] While this may help expand the cadre of Space Force personnel with security cooperation expertise, according to DOD officials, as of November 2024 this program has not been fully stood up yet.

DOD Directive 1100.4 states that DOD components are responsible for ensuring that personnel levels are programmed to optimize readiness and sustainability.[46] Further, we previously found that an organization should conduct workforce planning to understand the resources and capacity, including skills and competencies, required before making organizational changes. Strategic workforce planning includes identifying critical skills

[44]USSPACECOM's Joint Integrated Space Teams were originally named Space-Integrated Planning Elements and were created in 2020. They serve as liaisons between USSPACECOM and the combatant command they are embedded in.

[45]Space Force Instruction 16-116, *Regional Space Advisor Program* (Apr. 11, 2024).

[46]DOD Directive 1100.4, *Guidance for Manpower Management* (Feb. 12, 2005).

required to achieve the organization's required current and future goals.[47] Further, *Standards for Internal Control in the Federal Government* emphasizes the importance of identifying, analyzing, and responding to risks that limit an organization's ability to meet its stated objectives.[48]

While Space Force has identified the number of trained personnel it needs to fulfill security cooperation roles at some of its components to the combatant commands, it has not yet filled those positions or identified and responded to the risk of not doing so. Without optimizing security cooperation personnel levels for readiness and sustainability or identifying, analyzing, and responding to the risk of not filling these positions, the Space Force risks undermining its goal of increasing collaboration with allies and partners.

Conclusions

Collaboration with allies and partners on space operations and activities is a key element of DOD's strategy to mitigate the effects of U.S. space capability shortfalls. DOD has a variety of mechanisms to collaborate with allies and partners, but to date, cooperation with allies in the space domain remains relatively limited.

DOD has grappled for years with many of the challenges that currently affect combined space operations with allies and partners—including the over classification of space-related information and the ability to share information. The department has efforts underway to address some of these challenges, but they are complex and will take time and monitoring to address fully. DOD will also need to navigate guidance limitations and personnel shortfalls within the Space Force components to ensure it is fully prepared to integrate allies and partners into operations and planning efforts. Current allied and partnered space capabilities may be limited, but they are growing. As such, it will be increasingly important that DOD address these challenges, so that it can realize the benefits of space cooperation envisioned in its strategy. This includes addressing issues related to integrating allies and partners into operations, planning efforts, and personnel limitations.

DOD also faces challenges using space-related security cooperation to build and develop relationships with allies and partners. Security cooperation is a helpful tool at the department's disposal, but the sheer number of DOD organizations, many of them new, that are interacting

[47]GAO-18-427; and GAO-04-39.

[48]GAO-14-704G.

with allies and partners on space-related issues can be overwhelming to partners and internal stakeholders alike. It is important the department defines the space-related security cooperation roles and responsibilities of these organizations to reduce confusion and ensure the department does not miss opportunities to engage with allies and partners moving forward. Further, the Space Force components to each combatant command are expected to play a key role in providing space-related security cooperation expertise, but the components are currently understaffed, and the personnel that are available have limited experience with security cooperation. Given the emphasis DOD puts on the role of allies and partners in securing an advantage in the space domain, it is critical that the department address the barriers that currently limit space-related security cooperation efforts.

Recommendations for Executive Action

We made four recommendations in our classified report, including three to the Secretary of Defense and one to the Secretary of the Air Force. Of the four recommendations, DOD designated one of the recommendations related to planning to be classified. We have included the three unclassified recommendations in this report. Specifically:

The Secretary of Defense should ensure that the Assistant Secretary of Defense (Space Policy), in coordination with key stakeholders, sets specific milestones for implementing DOD's goals for integrating allies and partners into space operations as outlined in the *International Space Cooperation Strategy*. (Recommendation 1)

The Secretary of the Air Force should ensure that the Chief of Space Operations programs for appropriate personnel levels within the Space Force components to combatant commands—including positions responsible for security cooperation, planning, and foreign disclosure—to optimize readiness and sustainability or identify, analyze, and respond to the risks of understaffing identified positions within its components to the combatant commands. (Recommendation 2)

The Secretary of Defense should ensure that the Chairman of the Joint Chiefs of Staff issues guidance clarifying the space-related security cooperation roles and responsibilities for the relevant organizations throughout DOD—including Assistant Secretary of Defense (Space Policy), U.S. Space Command, and Space Force. (Recommendation 3)

Agency Comments and Our Evaluation

We provided a draft of the classified version of this report to DOD for review and comment in December 2024. DOD provided written comments on February 18, 2025. In its written comments, DOD concurred with three recommendations and did not concur with one recommendation. DOD also provided technical comments, which we incorporated as appropriate. Of the four recommendations, DOD designated one of the recommendations related to planning to be classified, and it is therefore not discussed in this version of the report. DOD's written comments are summarized below. With the exception of comments that DOD classified SECRET or designated as Controlled Unclassified Information, we have reprinted DOD's comments in appendix X.

DOD concurred with our first recommendation that the Assistant Secretary of Defense (Space Policy), in coordination with key stakeholders, should set specific milestones for implementing DOD's goals for integrating allies and partners into space operations as outlined in the *International Space Cooperation Strategy*.

DOD concurred with our second recommendation that the Space Force should program for appropriate personnel levels within the Space Force components to combatant commands—including positions responsible for security cooperation, planning, and foreign disclosure—to optimize readiness and sustainability or identify, analyze, and respond to the risks of understaffing identified positions within its components to the combatant commands.

DOD did not concur with our third recommendation that the Chairman of the Joint Chiefs of Staff should issue guidance to clarify space-related security cooperation roles and responsibilities for the relevant organizations throughout DOD—including Assistant Secretary of Defense (Space Policy), U.S. Space Command, and Space Force. In its comments, DOD stated that its January 2025 DOD Directive 5132.03, *Security Cooperation*, addresses this recommendation. They recommended we edit this recommendation to state that the Assistant Secretary of Defense (Space Policy), consistent with DOD Directive 5132.03, issue space security cooperation guidance and, as necessary, the Chairman of the Joint Chiefs of Staff shall issue guidance clarifying space-related security cooperation roles and responsibilities.

We did not revise our third recommendation as we believe the suggested revisions would not be sufficient to address our report finding. While the updated DOD Directive 5132.03 does assign the Assistant Secretary of Defense for Space Policy the responsibility to conduct security

cooperation and related tasks, the directive does not clearly outline how DOD components, such as the Space Force, USSPACECOM, and other combatant commands, should conduct security cooperation in the space domain. Without developing specific guidance to clarify roles and responsibilities for conducting space-related security cooperation, DOD may continue to face challenges executing security cooperation efforts with allies and partners. Allies and partners may also continue to face confusion about whom to coordinate with for security cooperation efforts.

As outlined in our report, DOD has issued guidance to clarify roles and responsibilities for conducting security cooperation in other domains. Specifically, the Chairman of the Joint Chiefs of Staff issued an instruction on *International Cyberspace Security Cooperation* to delineate roles, responsibilities, and objectives for DOD organizations involved in cyberspace security cooperation. We believe an instruction similar to this would help DOD to delineate roles, responsibilities, and objectives for DOD organizations involved in space-related security cooperation. Such guidance could assist DOD in overcoming some of the challenges faced in coordinating and conducting space-related security cooperation activities.

We are providing copies of this product to the appropriate congressional committees, the Secretary of Defense, and to the Secretary of the Air Force. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions concerning this report, please contact Alissa H. Czyz at czyza@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix XI.

//SIGNED//

Alissa H. Czyz
Director, Defense Capabilities and Management

List of Committees

The Honorable Roger Wicker
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Mitch McConnell
Chair
The Honorable Christopher Coons
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Mike Rogers
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
United States House of Representatives

The Honorable Ken Calvert
Chairman
The Honorable Betty McCollum
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States House of Representatives

Appendix I: Objectives, Scope, and Methodology

Senate Report 118-58 accompanying a bill for the National Defense Authorization Act for 2024 includes a provision for us to review the Department of Defense's (DOD) efforts to integrate allies and partners into space operations and other activities.[1] This report (1) describes how DOD collaborates with allies and partners on space operations and other activities (e.g., exercises, education, and information sharing); and assesses the extent to which DOD has (2) integrated allies and partners into planning for and conducting space operations and other activities, and (3) defined roles and responsibilities and assessed personnel needed for engaging in space-related security cooperation.

This report is a public version of our March 2025 report.[2] DOD deemed some of the information as classified, which must be protected from public disclosure. Therefore, this report omits classified information relating to operational planning guidance; challenges related to integrating allies and partners into planning for combined space operations; and information related to specific partner space capabilities. Although the information provided in this report is more limited, the report addresses the same objectives as the classified report, uses the same methodology, and includes the same unclassified recommendations. This report excludes one recommendation that DOD deemed classified.

To support our work across all objectives, we obtained information from a combination of interviews and correspondence with DOD officials familiar with the department's efforts to collaborate with allies and partners on space operations and activities. This included officials representing the Office of the Assistant Secretary of Defense (Space Policy), Joint Staff, U.S. Space Command (USSPACECOM), U.S. Africa Command (USAFRICOM), U.S. Central Command (USCENTCOM), U.S. European Command (USEUCOM), U.S. Indo-Pacific Command (USINDOPACOM), and each of the military services. We also met with officials from the Secretary of the Air Force, International Affairs.

Within Space Force, we met with representatives from offices within Space Force Global Partnerships, Space Systems Command, Space Operations Command, and Space Training and Readiness Command. We also met with Space Force components to the combatant commands,

[1]S. Rep. No. 118-58, at 292-93 (2023).

[2]GAO, *Space Operations: DOD Is Pursuing Efforts to Collaborate with Allies and Partners but Needs to Address Key Challenges*, GAO-25-107071C (Washington, D.C.: Mar. 27, 2025). (SECRET//NOFORN)

including the Space Force component to USCENTCOM, Space Force component to USINDOPACOM, and Space Force component to USEUCOM and USAFRICOM.

In addition, we met and corresponded with officials representing Australia, Canada, France, Japan, Norway, the United Kingdom, and the North Atlantic Treaty Organization (NATO). We selected this nongeneralizable sample of countries to collect perspectives from countries with varying degrees of current space capabilities and levels of collaboration with DOD space operation and activities. We also selected countries in the USEUCOM and USINDOPACOM area of responsibility to align with DOD's priorities as outlined in the 2022 *National Defense Strategy*. The perspectives of foreign government officials provided insights into the extent to which DOD integrates allies and partners into space operations and activities. We also reviewed USSPACECOM, Space Force, and Air Force guidance on international partnerships to understand their priorities for collaborating with countries on space operations and activities. We asked these officials to review the information they provided for this report and approve the content for public release.

To address our first objective, we collected and reviewed DOD documentation related to its efforts to collaborate with allies and partners on space operations and activities. This included guidance related to combined space operations; agreements between DOD and allies and partners to facilitate access to space capabilities; documentation of space-related exercises including allies and partners; and documentation related to USSPACECOM's space situational awareness data sharing agreements with allies and partners.

To address our second objective, we reviewed documentation related to planning and conducting combined space operations, as well as planning and conducting space-related military exercises with allies and partners. These documents included DOD strategy and guidance such as the 2022 *National Defense Strategy*, 2024 *International Space Cooperation Strategy*, and Joint Publication 3-16, *Multinational Operations*.[3] In completing this analysis, we interviewed officials to better understand DOD's efforts to integrate allies and partners into space operations and activities and associated challenges. As mentioned above, this included

[3]DOD, *National Defense Strategy* (2022); Joint Chiefs of Staff, Joint Pub. 3-16, *Multinational Operations* (June 17, 2024).

interviews with officials from multiple Space Force organizations, USSPACECOM, other combatant commands, and foreign governments.

We assessed the documentation and efforts described against DOD guidance and *Standards for Internal Control in the Federal Government*.[4] We found that the principle of defining objectives and risk tolerances was significant to this objective, as well as the associated underlying principle that in order to monitor progress toward a plan, organizations should set specific and measurable objectives and identify milestones for implementing objectives.

For both the second and third objectives, we reviewed Space Force service component programming plans that documented personnel needs for planning, foreign disclosure, and conducting space security cooperation. In completing this analysis, we interviewed DOD officials for information on the Space Force service component personnel needed to plan operations and activities, conduct foreign disclosure, and engage in space-related security cooperation. We compared the efforts described in DOD guidance and interviews with officials and determined that the principle of responding to objectives and risks in *Standards for Internal Control in the Federal Government* was significant to this objective, along with the associated underlying principles that management should identify, analyze, and respond to risks that limit an organization's ability to meet its stated objectives. Responding to risks can include accepting, avoiding, reducing, or sharing the identified risk.

To address our third objective, we obtained relevant documentation from DOD and foreign government officials on roles and responsibilities related to conducting space-related security cooperation activities. We reviewed and compared DOD guidance on roles and responsibilities related to security cooperation. In completing this analysis, we interviewed DOD officials knowledgeable of space issues on U.S. roles and responsibilities for conducting security cooperation in space. We also interviewed foreign government officials knowledgeable of space issues. We also found that the principle in *Standards for Internal Control in the Federal Government* which states that management communicates quality information

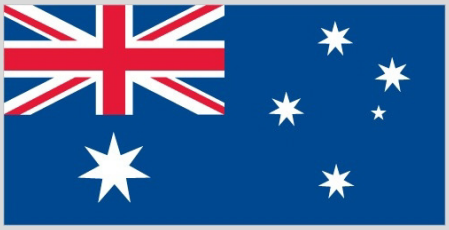
[4] GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 10, 2014).

throughout the entity using established reporting lines was significant to this objective.[5]

Information included in this report is based on information collected from September 2023 to March 2025 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We subsequently prepared this unclassified version of the report for public release from January 2025 to April 2025. We provided the report to DOD for security review in April 2025 and received approval to publicly release this product in June 2025. We prepared the public product to be published in July 2025. This public version was also prepared in accordance with these standards.

[5] GAO-14-704G.

COUNTRY PROFILE: AUSTRALIA



Overview

Source: Map Resources. | GAO-25-108043

Military Space Organizations

In January 2022, the Australian Department of Defence established the Space Command as part of the Royal Australian Air Force to achieve Australia's strategic space ambitions and lead the effort to ensure access to space. Space Command is responsible for the train and prepare functions of space capabilities.

In July 2023, Space Command was consolidated into the Joint Capabilities Group, which is under the command of the Chief of Joint Capabilities. According to an Australian official, the Group includes personnel from the Australian Defence Force, Australian Public Service, and contracted personnel in an integrated service-like organization. The official also said that the Group's Space and Cyber Division manages space capability projects, among other things.

The Australian Space Agency is responsible for developing civil and commercial space policy.

Australia's Military Space Policy and Capabilities

Australia's 2024 *Integrated Investment Program* document states that Australia will provide 9 to 12 billion Australian dollars (US$6.2 to $8.3 billion) to enhance space capabilities over the next 10 years. Australian officials said that while investing in space is a priority, this is one of numerous priority areas.

Policy. In 2024, Australia published its *National Defence Strategy,* which recognizes space as a critical enabler of military operations, supporting communications, targeting, and situational awareness. Australia also published its Space Domain concept, Concept Selene, which explores how to use space capabilities across all elements of national power to seek space advantage over an adversary.

Capabilities. According to its *National Defence Strategy,* Australia will pursue space capabilities that enhance intelligence, surveillance, and reconnaissance; provide resilient communications; and counter emerging space threats. Australia plans to accomplish this through continued investment in enhanced space domain awareness capabilities, like the Deep Space Advanced Radar Capability (a ground-based radar), satellite communications, geospatial intelligence, and space control capabilities.

U.S.-Australia Coordination on Space Operations and Activities

The United States and Australia coordinate on space operations and activities in several ways, including:

- **Combined operations.** Operation Dyurra is the mechanism in which the Australian Defence Force integrates space operations with the United States and other partners as part of Operation Olympic Defender.
- **Exercises.** Australia participates in over 15 space-related exercises with the United States, the largest of which is Talisman Sabre. In this exercise, forces test combined capabilities across all domains, including space.
- **Shared capabilities.** Australia's Joint Capabilities Group and the U.S. Space Force jointly operate space capabilities in Australia, like the C-Band Radar and Space Surveillance Telescope. Australia contributes to missile warnings through the Australia Mission Processer and leads the Joint Commercial Operations Pacific cell.

Challenges to Space Coordination

Australian officials identified classification barriers as one of the challenges in working with the United States on space operations and activities. The officials noted that while Australia's designation as a FIVE EYES partner (Australia, Canada, New Zealand, the United Kingdom, and the United States) helps with information sharing, the United States' use of "Not Releasable to Foreign Nationals" classification markings limits coordination. Officials acknowledged that the United States is working to address classification barriers, but this issue has limited Australian personnel's ability to participate in exercises and their exchange officers' ability to fully support combined operations.

Overview

Source: Map Resources. | GAO-25-108043

Military Space Organizations

The Royal Canadian Air Force's 3 Canadian Space Division is responsible for delivering space power effects in support of Canadian Armed Forces operations, and as such, the Commander of this division is the Canadian Joint force Space Component Commander. Established in 2022, the division is responsible for space domain awareness, space-based support of military operations, defending and protecting military space capabilities, and other space objectives. According to Canadian officials, 3 Canadian Space Division comprises joint forces (Air Force, Army, and Navy) and civilian officials. They told us the organization is Canada's version of Space Command in terms of force employment but also has responsibility for force generation like the U.S. Space Force.

Canadian officials told us that the Air and Space Force Development Program develops space capabilities, while 3 Canadian Space Division determines capability requirements and employs these capabilities once developed. They also noted that Canada leverages space capabilities through the Canadian Space Agency.

COUNTRY PROFILE: CANADA

Canada's Military Space Policy and Capabilities

Canada recently updated its defense policy to include modernization efforts for its space capabilities. According to Canadian officials, Canada expects to spend approximately 22 billion Canadian dollars (US$16.3 billion) in space investments over the next 20 years.

Policy. Canada's defense policy states Canada will invest in and employ its space capabilities. Among other things, the 2024 defense policy update emphasizes Canada's efforts to defend and protect military space capabilities, which Canadian officials reiterated to us.

Capabilities. Canadian officials told us their space priorities include expanding space domain awareness capabilities and an emerging interest in space control and space electromagnetic warfare. Canada's space surveillance satellite, Sapphire, tracks man-made objects orbiting the Earth and contributes to the U.S. Space Surveillance Network. Further, Canada is investing in military space capabilities such as space situational awareness, space-based earth observation and maritime domain awareness, and satellite communications, especially in the Arctic region.

U.S.-Canada Coordination on Space Operations and Activities

The United States and Canada coordinate on space operations and activities in several ways, including:

- **Combined operations.** Canada participates in Operation Olympic Defender. Canada is also an active participant in the Joint Commercial Operations cell.
- **Personnel exchanges.** According to Department of Defense officials, Canada has exchange officers embedded in Space Force and U.S. Space Command, which also has a commitment to send an officer to Canada.
- **Shared capabilities.** Canada's missile warning capability is currently operated entirely through NORAD, a binational command of U.S. and Canadian personnel and assets, according to Canadian officials.

Challenges to Space Coordination

Canadian officials emphasized the high level of cooperation with the United States but identified that some challenges remain. They noted it can be challenging to understand all the nested functions of the U.S. space enterprise. Additionally, officials told us Canadian exchange officers and senior leaders have recently experienced increased barriers accessing information despite overall improvements related to classification. They told us the current hub and spoke model for secure communications limits Canada's ability to contribute to combined space operations, and developing a formal secure space mission network could add resilience to allies' space operations centers by providing backup capabilities. They noted the United States is the only country that could build the infrastructure for such a system, which would likely need to focus on FIVE EYES partners (Australia, Canada, New Zealand, the United Kingdom, and the United States) as a starting point.

COUNTRY PROFILE: FRANCE

Overview

Source: Map Resources. | GAO-25-108043

Military Space Organizations

In 2019, France created the French Space Command, a joint organization. French officials stated that the command contributes to defining France's space defense policy and is responsible for the definition of future military needs and international cooperation and partnerships. It's also responsible for conducting France's military space operations.

The French Space Agency, created in 1961, is responsible for proposing and implementing national space policy under the oversight of the Ministries for Economy and Finance, Higher Education and Research, and the Armed Forces. As a dual space agency, it is involved in both civil and military programs. Further, according to French officials, the Directorate General for International Relations and Strategy reports directly to the Minister of the Armed Forces and is responsible for defining the Ministry's defense policy and international strategy, among other responsibilities.

France's Military Space Policy and Capabilities

Over the last 5 years France has taken steps to advance its military space capabilities. France has committed 6 billion euros (US$6.7 billion) from 2024-2030 to advance its military space goals of improving its space domain awareness capabilities and providing active defense of all orbits of interest. In 2024, France's military space budget was 600 million euros (US$672 million).

Policy. In 2019 France published its *Space Defence Strategy.* This document acknowledges space as a domain of strategic rivalry and potential military confrontation and emphasizes the need for France to be able to both protect and defend its space interests and to strengthen its autonomy in space.

Capabilities. France's space capabilities include ground-based radar, satellite communications, earth observation, electronic intelligence, and positioning, navigation, and timing. The French government has also publicly discussed developing ground and on-orbit active space capabilities, including on-orbit patrolling satellites and surface to space capabilities. France supports launch activities through the European Space Agency and European Spaceport, located in French Guiana.

U.S.-France Coordination on Space Operations and Activities

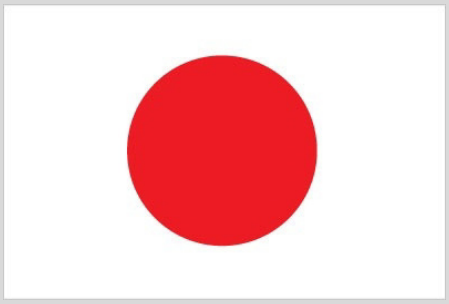
The United States and France coordinate on space operations and activities in several ways, including:

- **Combined operations.** France joined Operation Olympic Defender in October 2024. France also provides the Joint Commercial Operations Meridian cell with personnel.
- **Exercises.** France has participated in U.S. Space Command's Global Sentinel and Schriever Wargames. The United States has also participated in France's ASTERX space exercise, which focused on training French Space Command units in space support to operations and active defense, as well as enhancing cooperation with allies and partners.
- **Education.** According to French officials, in 2024, French personnel were the first non-FIVE EYES participants (Australia, Canada, New Zealand, the United Kingdom, and the United States) in Space Training and Readiness Command's Space 200 course. France also provides space-related education for North Atlantic Treaty Organization (NATO) allies and partners at the NATO Space Centre of Excellence and its Space Defense Academy.

Challenges to Space Coordination

A French official identified information sharing and classification barriers as key challenges limiting space coordination. The official noted that while classification barriers are gradually being addressed, it's still difficult for countries that are not FIVE EYES partners to participate in combined space operations.

COUNTRY PROFILE: JAPAN



Overview

Source: Map Resources. | GAO-25-108043

Defense Space Organizations*

Japan established its first space unit—part of its Air Self-Defense Force—in 2020. According to a Japanese official, the Ministry of Defense is responsible for military space operations including the operation of communication satellites. Japan's Cabinet Office is responsible for planning, designing, and coordinating policies related to space exploitation. The Cabinet Office also oversees the development and operation of Japan's positioning satellite known as the Quasi-Zenith Satellite System.

Japan also has a number of civilian space agencies, including the Japan Aerospace Exploration Agency. According to a Japanese official, civil and military space organizations work closely together and with private industry to meet space objectives despite budget constraints.

**Note:* Japanese officials told us they do not consider Japan's Self-Defense Force to be "military" under its defense principles.

Japan's Defense Space Policy and Capabilities

Since 2020, Japan has published policy documents emphasizing the role of space in national security and is developing a range of space-related capabilities. Japan's fiscal year 2023 defense program and budget allocates approximately 184 billion yen (US$1.3 billion) on reinforcing capabilities in the space domain over a 5-year period.

Policy. Japan has released a series of policy documents outlining its plan for space policy—to include ensuring space security—using a whole-of-government approach. These policies also emphasize economic growth and development through public-private collaborations.

Capabilities. Japan's defense space priorities include enhancing capabilities for intelligence, communications, navigation, maritime domain awareness, and space domain awareness. A Japanese official told us the Ministry of Defense is planning to launch a satellite constellation with the ability to detect and track targets in the next 3 to 4 years. The official also told us that Japan plans to further enhance capability to disrupt some space-related capabilities of opponents.

U.S.-Japan Coordination on Space Operations and Activities

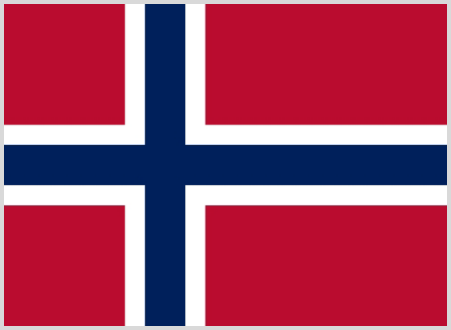
The United States and Japan coordinate on space operations and activities in several ways, including:

- **Personnel exchanges.** According to U.S. Space Command (USSPACECOM) officials, Japan has two liaison officers at USSPACECOM.
- **Use of partner capabilities.** In February 2025, Japan hosted a Space Force space domain awareness capability on a Japanese satellite as part of the Quasi-Zenith Satellite System.

Challenges to Space Coordination

According to a Japanese official, stakeholders in the U.S. space field are numerous and diversified, which at times can make it difficult to identify the best contact. Additionally, the official said that the U.S. government review of what space information it can share with allies is positive and could help overcome some information sharing challenges. The official noted that while Japan believes multilateral engagements like the Combined Space Operations initiative are useful for sharing information and providing a common understanding, they cannot replace bilateral efforts with the United States.

COUNTRY PROFILE: NORWAY



Overview

Source: Map Resources. | GAO-25-108043

Military Space Organizations

The Norwegian Intelligence Service—an organization nested under Norway's Chief of Defense—is responsible for military space activities on behalf of the Norwegian Armed Forces. According to Norwegian officials, the Chief of the Norwegian Intelligence Service is responsible for space-related force generation, and coordinating authority for operations rests with the Norwegian Joint Headquarters. Officials told us that delegated tasks include satellite communications (Cyber Defense Force), positioning, navigation, and timing (Navy), and operations (Joint Force).

Norwegian officials told us that the military space community in Norway fully dedicated to space is relatively small. Officials noted that there are additional individuals that have space included as one part of their broader work portfolio.

Norway's Military Space Policy and Capabilities

Space is a key focus area for the Norwegian Armed Forces. In particular, Norway's geographical location in the Arctic region creates a significant need for satellite communication—especially as commercial services are typically not developed to operate in those areas. As a result, Norway is working through civilian-military collaboration to supplement available space capabilities from international and commercial partners while developing niche capabilities domestically.

Policy. Norwegian officials told us that a 2015 Chief of Defense white paper established space as a separate military domain. Since then, development has centered on three priority areas, including: (1) maritime space-based intelligence, surveillance, and reconnaissance; (2) space domain awareness; and (3) satellite communications in the Arctic region. Officials noted that, more recently, priorities also include supporting multidomain awareness across the spectrum of conflict and enabling assured access to space.

Capabilities. According to Norwegian officials, Norway is working through civilian-military collaboration to establish national launch capability, which will supplement available capacity from international partners and commercial providers. Officials told us that Norway's spaceport and related space launch capabilities are expanding, and they hope to have the first launch in 2025. Although the spaceport is a civilian endeavor, officials noted they are looking to include an area with restricted access to prepare classified military payloads as well. The spaceport, which is favorable for launching small satellites into orbit with a focus on the Arctic region, will be open to allies and partners.

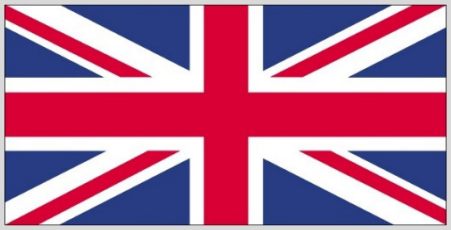
U.S.-Norway Coordination on Space Operations and Activities

The United States and Norway coordinate on space operations and activities in several ways, including:

- **Use of partners' capabilities.** In August 2024, Norwegian commercial satellites hosted two Space Force communication payloads that will provide communications coverage over the Arctic region. This was the first time an international space vehicle hosted an operational Department of Defense payload.
- **Education.** According to Norwegian officials, Space Force is providing education courses to further strengthen space-related education in the Norwegian Armed Forces.

Challenges to Space Coordination

Norwegian officials identified limited challenges to coordination efforts with the United States. Specifically, Norwegian officials told us there are no major challenges related to information sharing. However, Norwegian officials told us that Norway's limited personnel capacity constrains their ability to benefit from available U.S. resources. Officials mentioned there have been discussions about personnel exchanges with the United States, but questions remain about which U.S. organizations and locations would be the best candidates for such an exchange.



Overview

Source: Map Resources. | GAO-25-108043

Military Space Organizations

The responsibility for the UK's military space policy, operations, and capabilities resides in multiple organizations. The UK's National Space Council and Ministry of Defence Space Directorate provide cross-government space policy and strategy.

UK Space Command is tasked to protect and defend UK and allied interests in, from, and to space. The command is staffed by personnel from the Royal Navy, British Army, and Royal Air Force alongside civil servants and contractors. Together with the UK Space Agency, UK Space Command leads the National Space Operations Centre that develops and operates the UK's space surveillance and protection capabilities. The Centre coordinates civil and military space domain awareness capabilities.

UK Strategic Command is responsible for the satellite communications and positioning, navigation, and timing mission areas.

COUNTRY PROFILE: UNITED KINGDOM

United Kingdom's Military Space Policy and Capabilities

The United Kingdom recognizes space as a critical domain for military operations—as well as daily life—and is committed to modernizing and developing its space capabilities. According to UK officials, the United Kingdom allocated over 6.5 billion pounds (US$8.7 billion) in 2022 to pursue its space priorities over a 10-year period.

Policy. The United Kingdom released space strategies in 2021 and 2022 that emphasize the intersection of national security and economic growth. In particular, the *Defence Space Strategy* emphasizes the United Kingdom's need to protect and defend UK interests in and through space.

Capabilities. The United Kingdom launched its first successful Skynet satellite, a military satellite communication capability, in 1974 and continues to invest in this and other space capabilities. According to UK officials, approximately 5 billion pounds (US$6.7 billion) of the 6.5 billion pounds total allocated for space will be used to modernize the Skynet system. The United Kingdom also operates the Fylingdales Upgraded Early Warning Radar system and has a developmental intelligence, surveillance, and reconnaissance satellite program named ISTARI. This program's first satellite was launched in August 2024.

U.S.-UK Coordination on Space Operations and Activities

The United States and United Kingdom coordinate on space operations and activities in several ways, including:

- **Combined operations.** The United Kingdom was the first country to publicly join Operation Olympic Defender and leads a UK-location for the Joint Commercial Operations cell.
- **Personnel exchanges.** A senior UK official is the Space Force Assistant Chief of Space Operations for Future Concepts and Partnerships. According to DOD officials, the United Kingdom has other exchanges with U.S. Space Command and Space Force.

Challenges to Space Coordination

UK officials lauded the United Kingdom's long history of working with the United States but noted some relationship challenges. For example, officials told us the United Kingdom does not have an equivalent to Space Force, which can make identifying points of contact difficult, and limits the UK's ability to support additional personnel exchanges. The officials also identified some system integration challenges.

NATO's Approach to Space Operations

Overview

In 2019, the North Atlantic Treaty Organization (NATO) recognized space as an operational domain and published an overarching Space Policy that lays out the alliance's approach to space. NATO remains a key forum for allies to share information and coordinate activities on various space-related issues. Different space-related organizations within NATO work to support NATO missions, operations, and activities and ensure that allies have relevant space capabilities.

NATO Organizations with Space Equities

Several organizations within NATO have space-related equities, including:

- **Allied Command Transformation.** Established in 2003, Allied Command Transformation is responsible for ensuring NATO's military structure and capabilities remain relevant, capable, and credible in a rapidly changing world. Allied Command Transformation is operationalizing multiple space-related initiatives and assists national and NATO-led efforts to procure space-related assets. Allied Command Transformation is based in Norfolk, Virginia.
- **NATO Space Operations Centre.** Established in 2020, the NATO Space Operations Centre is a multinational team helping to coordinate allied space activities, support NATO activities and operations, and help protect allied space systems. The NATO Space Operations Centre works closely with national space entities to ensure that NATO commanders have access to required space data and services, including imagery, navigation, and missile warning. According to NATO officials, as of April 2024 the NATO Space Operations Centre did not have any direct funding, so it largely relied on public data and products member countries provided, including information from the Joint Commercial Operations cell. The NATO Space Operations Centre is based in Ramstein, Germany.
- **NATO Space Centre of Excellence.** The NATO Space Centre of Excellence, established in 2023, is a NATO-affiliated organization funded by the French government. This Centre seeks to provide a unique expertise on combined joint activities in the space domain by providing knowledge and analysis on space domain awareness, operational space support, and space domain coordination. The NATO Space Centre of Excellence is based in Toulouse, France.

Major Investments in Space Capabilities

Although NATO is not developing its own space capabilities, allies are contributing major investments for capabilities that can be used by the alliance in the future. Efforts include:

- Luxembourg is contributing EUR 6.7 million (US$7.5 million) toward a NATO effort to develop a **Strategic Space Situational Awareness System** at NATO Headquarters. This capability will

NATO Space Policy

NATO's overarching Space Policy states that the alliance's approach to space is focused on, among other things, integrating space into NATO's core tasks, including collective defense, crisis management, and cooperative security. Additionally, the policy states NATO will serve as a forum for political-military consultations and information sharing on relevant deterrence and defense-related space developments.

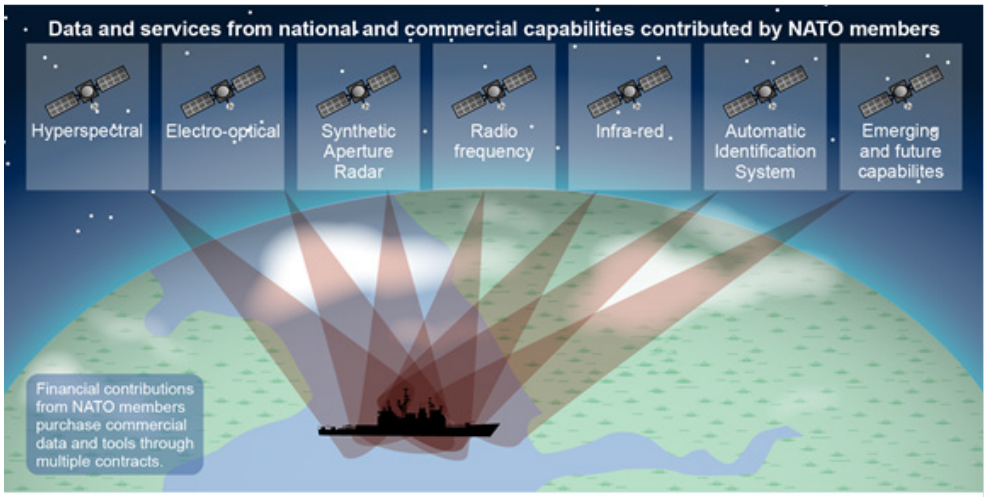
The overarching Space Policy notes that NATO is not aiming to become an autonomous space actor—allies retain full authority and sovereignty over their space capabilities. Instead, NATO will focus on, among other things, ensuring the effective provision of space support and effects, based on voluntary participation, to the alliance's operations, missions, and other activities. The policy states that NATO will facilitate the development of compatibility and interoperability between allies' space services, products, and capabilities.

NATO's overarching Space Policy highlights requirements for allied space support in several space mission areas, including space situational awareness; intelligence, surveillance, and reconnaissance; satellite communications; positioning, navigation, and timing; and missile warning.

allow the alliance to better understand the space environment and space events, and their effects across all domains.

- NATO is investing over EUR 1 billion (US$1.1 billion) to procure **satellite communications services** for the period of 2020-2034. According to NATO documentation, this is the alliance's biggest-ever investment in satellite communications, which is being provided by NATO member countries and will enable more resilient and flexible communications with ships at sea, air assets, and troops across the globe.
- In February 2023, NATO announced plans to establish the **Alliance Persistent Surveillance from Space** initiative to enhance space-based surveillance and intelligence for the alliance. This multiyear initiative aims to connect existing and future allied space assets, including both government-owned and commercial space assets. The initiative is also intended to enhance how NATO collects, processes, exploits, and disseminates intelligence. In July 2024, 17 countries signed a memorandum of understanding to provide national contributions to the initiative over a 5-year period.[1] Luxembourg contributed EUR 16.5 million (US$18.5 million) to lay the groundwork for the initiative.

Figure 5: Plan for North Atlantic Treaty Organization's (NATO) Alliance Persistent Surveillance from Space Initiative.



Source: GAO analysis of NATO information. | GAO-25-108043

[1]The 17 countries are: Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, the Netherlands, Norway, Poland, Romania, Sweden, Turkey, and the United States.

Appendix IX: Overview of Space Training and Education Courses

We gathered information on the Department of Defense's (DOD) space education courses, which are a security cooperation tool through which the DOD engages with allies and partners on space. U.S. Space Training and Readiness Command (STARCOM), a component of the Space Force, is responsible for space-related international training and education and administration of space-related security cooperation training, to include international training.[1] STARCOM and combatant command officials stated that introductory space education courses are often the entry point for developing space-related relationships with new partner nations. A U.S. embassy official said that Italian and Belgian governments relied on National Security Space Institute (NSSI) space courses to train their personnel.

STARCOM provides space education through NSSI, which offers courses ranging from introductory (e.g., Space 100) to advanced courses (e.g., Space 200 and Space 300) for DOD personnel, other U.S. government entities, and allies and partners. NSSI space courses are available to 66 countries and NATO. NSSI provides courses in a variety of ways, including in-residence, distance learning, hybrid, and mobile space education courses. STARCOM officials noted that NSSI's international mobile education, which includes space education courses, is their largest form of engagement with allies.[2] From 2022 to 2024, over 1,082 foreign personnel participated in the international mobile education training.

In 2024, according to STARCOM officials, STARCOM stopped providing these space education courses as it shifted resources to address other Department of the Air Force priorities. The Secretary of the Air Force issued a memorandum on the Air Force's re-optimizing for the great power competition initiative, which directed the Department of the Air Force to conduct a comprehensive look at all aspects of how it organizes, trains, and equips the Air Force and Space Force in order prepare for great power competition.[3] To respond to requirements in this memorandum, STARCOM officials said that the command shifted training and education resources to focus on developing an officer training program and canceled space education courses, which eliminated course

[1]Department of the Air Force Policy Directive 16-1, *Security Cooperation* (May 9, 2023).

[2]NSSI offers a variety of mobile courses in the United States and internationally. NSSI instructors deliver mobile courses at customer locations and facilities to military and civilian personnel.

[3]Secretary of the Air Force Memorandum (Sept. 5, 2023).

capacity and generated concern from allies and partners and Space Force officials, as seen in table 6 below.

Table 6: Timeline of Space Force Changes to Space Education Courses

Date	Action taken
January 2024	The Department of the Air Force developed requirements for the Space Force to increase the number of opportunities for specialized technical education and requested that Space Force develop an officer training course to be set up within existing resources.
March 2024	U.S. Space Training and Readiness Command (STARCOM) issued an order stating that it would cease offering the space education courses altogether and reallocate National Space Security Institute (NSSI) personnel from instructing those courses to develop the Space Force officer training course. NSSI stopped offering Space 100, 200, and 300 courses for allies and partners.
June 2024	Multiple Space Force officials expressed frustration about the unavailability of space courses and said that allies and partners were concerned as well. In June 2024, an official at the Space Force component to U.S. Indo-Pacific Command told us some allies and partners had already expressed frustration about the unavailability of space courses.
June 2024	STARCOM issued another order to allow NSSI to maintain the space education courses while also providing officer training courses.
July 2024	Following this series of events, STARCOM developed the Requirements Management Corporate Process to define authorities, roles and responsibilities, organizations, and process flow to, among other things, better standardize how stakeholder emerging and recognized mission needs are captured, adjudicated, and prioritized, including those related to the space education courses. According to STARCOM officials, this new process is meant to ensure that appropriate resourcing, including personnel, is allocated to support requirements.

Source: GAO analysis of Department of Defense information. | GAO-25-108043

Despite reinstating the space education courses, STARCOM officials stated that limited personnel are available to meet the service's needs and make courses available to allies and partners. For example, according to the officials, limitations on classroom space and lack of instructors are driving down the number of allies and partners participating in the space education courses. In fiscal year 2023, 762 students from 40 nations participated in the NSSI space education courses. As of August 2024, the participants enrolled in courses for fiscal year 2024 dropped to 458 students from 31 nations. According to STARCOM officials, NSSI lost about half of its classroom space capacity to offer Space 200 courses due to conflicting priorities for the command. The officials told us that NSSI is heavily dependent on hiring contractors to teach the space education courses, and that as a result of the uncertainty of the space education courses, some personnel left to take on other contracts.

Further, a STARCOM official also noted that allies and partners had different funding mechanisms and were not able to immediately reenroll in

space education courses. According to the official, due to delays in internal systems, some allies and partners had to wait at least an additional 4 months from when STARCOM reinstated the space education courses to be able to rejoin.

Despite resource and personnel constraints, according to STARCOM officials, STARCOM recognizes that the space education courses are valuable tools to developing relationships with allies and partners and is taking steps to ensure that the courses remain available. STARCOM officials acknowledged that they are still trying to get a better understanding of partner requirements. They also said that for fiscal year 2025, STARCOM expanded the number of seats available to FIVE EYES partners and France for the Space 200 and Space 300 courses.[4]

[4]FIVE EYES partners refer to Australia, Canada, New Zealand, the United Kingdom, and the United States.

Appendix X: Comments from the Department of Defense

[redacted]

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
2600 DEFENSE PENTAGON
WASHINGTON, DC 20301-2600

SPACE POLICY

FEB 18 2025

Ms. Alissa H. Czyz
Deputy Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Ms. Czyz,

(U) Thank you for providing the Government Accountability Office's Final Report, GAO-25-107071C, "Space Operations: DoD is Pursuing Efforts to Collaborate with Allies and Partners but Needs to Address Key Challenges" for Department feedback and review.

(U) On behalf of the Secretary of Defense, attached is DoD's response to the report's recommendations.

(U) The OSD point of contact is Ms. Brittany Parker, brittany.n.parker26.civ@mail.mil, 703-697-3245.

Sincerely,

John Hill
Performing the Duty of Assistant Secretary of Defense Space Policy

Enclosure:
As stated

[redacted]

[redacted]

Recommendation 1: (U) The Secretary of Defense should ensure that the Assistant Secretary of Defense (Space Policy), in coordination with key stakeholders, sets specific milestones for implementing DOD's goals for integrating allies and partners into space operations as outlined in the International Space Cooperation Strategy.

(U) Concur.

[redacted]

Recommendation 3: (U) The Secretary of the Air Force should ensure the Chief of Space Operations programs for appropriate personnel levels with the Space Force components to combatant commands – including positions responsible for security cooperation, planning, and foreign disclosure – to optimize readiness and sustainability or identify, analyze, and respond to the risks of understaffing identified positions within its components to the combatant commands.

(U) Concur.

Recommendation 4: (U) The Secretary of Defense should ensure that the Chairman of the Joint Chiefs of Staff issues guidance clarifying the space-related security cooperation roles and responsibilities for the relevant organizations throughout DOD—including Assistant Secretary of Defense (Space Policy), U.S. Space Command, and Space Force.

(U) Non-concur as written, but concur with modification below. DoDD 5132.03 was published January 16, 2025, and addresses this recommendation.

Recommendation 4: (U) Consistent with Department of Defense Directive 5132.03 *Security Cooperation*, the Assistant Secretary of Defense (Space Policy) issues space security cooperation guidance. As necessary, the Chairman of the Joint Chiefs of Staff shall issue guidance clarifying space-related security cooperation roles and responsibilities within the Joint Force.

[redacted]

Appendix XI: GAO Contact and Staff Acknowledgments

GAO Contact

Alissa H. Czyz, czyza@gao.gov

Staff Acknowledgments

In addition to the individual named above, Nicolaas Cornelisse (Assistant Director), Mollie Todd (Analyst-in-Charge), Adrianne Cline, Kaitlyn Hudson, Carly Gerbig, Katherine Earle, Carter Stevens, Michele Fejfar, Amie Lesser, Jesse Andrews, and Elisebet Lalisan made key contributions to this report.

Related GAO Products

GAO, *Space Command and Control: Improved Tracking and Reporting Would Clarify Progress amid Persistent Delays*, GAO-23-105920. Washington, D.C.: June 8, 2023.

GAO, *Space Situational Awareness: DOD Should Evaluate How It Can Use Commercial Data*, GAO-23-105565. Washington, D.C.: April 24, 2023.

GAO, *Satellite Control Network: Updating Sustainment Plan Would Help Space Force Better Manage Future Efforts*, GAO-23-105505. Washington, D.C.: April 10, 2023.