December 2021

SPACE COMMAND AND CONTROL

Opportunities Exist to Enhance Annual Reporting

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SPACE COMMAND AND CONTROL

Opportunities Exist to Enhance Annual Reporting

Why GAO Did This Study

The Department of the Air Force has worked for decades to develop improved space command and control systems. A number of prior efforts experienced significant delays and cost increases. The current Space C2 program began in 2018.

The National Defense Authorization Act (NDAA) for Fiscal Year 2020 included a provision for the Department of the Air Force to submit annual status reports on the Space C2 program and for GAO to review them. This report assesses the extent to which (1) the Department of the Air Force's 2020 and 2021 Space C2 annual reports include and address the key elements that Congress outlined; and (2) the annual reports provide effective information for program oversight.

GAO analyzed NDAA requirements and the 2020 and 2021 annual reports, reviewed agency policies and guidance as well as leading practices related to software development, and interviewed officials from the Departments of Defense and the Air Force, and the U.S. Space Force. GAO also met with congressional staff regarding information for oversight.

What GAO Recommends

GAO recommends that the Air Force include in its annual reports: (1) an explanation of significant changes from the previous report and (2) user perspectives on the operational benefits of program efforts. The Department of Defense agreed with the substance of the recommendations and identified steps to address them.

What GAO Found

In recent years, the Department of Defense has recognized that potential adversaries may target its space assets during conflicts to diminish U.S. capabilities. The Space Command and Control (C2) program is the Air Force's latest software-intensive effort to develop a system that gathers data from space- and ground-based sensors and transmits these data to a data repository (see figure). Data are processed to enable commanders to make timely decisions, take action, and counter threats.

Operational Space Command and Control
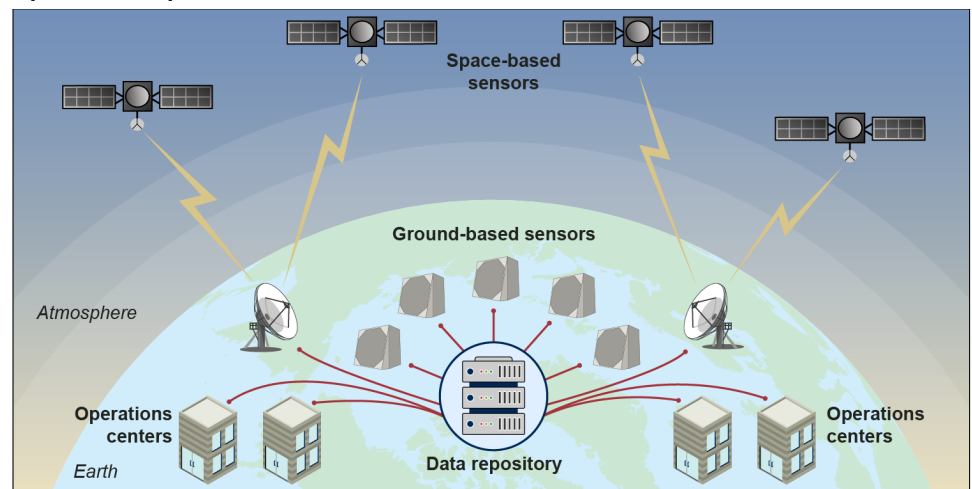
Source: GAO analysis of Department of the Air Force information. | GAO-22-104685

The Air Force's 2020 and 2021 Space C2 annual reports on program status addressed all eight of the required reporting elements outlined in statute, such as a description of changes to program metrics. However, the usefulness of these annual reports for oversight is limited because they lack information needed to provide a more complete picture of the status of the Space C2 program. For example, some short-term priorities for delivering capabilities differ between the two reports, and there is not enough information to determine the reasons for the changes. Given cost, schedule, and performance challenges faced by previous space command and control efforts, program oversight and knowledge-based decision-making would benefit from additional information, such as an explanation of significant changes from one report to the next.

Further, information in the annual reports related to return on investment could be enhanced by documenting user perspectives on the operational benefits associated with program efforts. For example, the 2021 report states that an application that automates radio frequency selection reduced processing time from days to minutes. However, including user perspectives on associated operational benefits of program efforts—such as organizational efficiencies or additional warfighting capabilities—would provide important information for understanding program value, enhance program oversight, and inform future investment decisions.

—————————————— **United States Government Accountability Office**

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Congressional Committees

For decades, the Department of Defense (DOD) has pursued efforts to modernize and improve space command and control capabilities to help mitigate risks to U.S. space assets, such as adversary attacks and avoiding potential collisions with space debris. In recent years, DOD has recognized that potential adversaries may target DOD space assets during conflicts in order to diminish U.S. capabilities, such as those enabled through the global positioning system network. Space command and control is the ability for military commanders to make timely, strategic decisions, take tactical actions to meet mission goals, and counter threats to U.S. space assets. In October 2019, we reported that, despite promising starts and some capabilities delivered, the Department of the Air Force's efforts over the prior 3 decades to improve space command and control capabilities have ended significantly over budget and schedule and with key capabilities undelivered.[1]

Enacted in December 2019, the National Defense Authorization Act for Fiscal Year 2020 established the U.S. Space Force as the sixth branch of the U.S. military, within the Department of the Air Force.[2] The Space Force is tasked with consolidating leadership, planning, and managing DOD space programs, including DOD's latest effort to improve space command and control capabilities—the Space Command and Control (C2) program. Space C2 is a software-intensive program that plans to deliver deferred requirements from past programs as well as develop and field new advanced capabilities through Agile software development. This approach, which is relatively new to DOD, integrates planning, design, development, and testing to deliver capabilities to users early and often. Given the cost to acquire, field, and operate space systems, DOD intends to spend about $17 billion on space programs in fiscal year 2022. With the increasing threats these systems face, the United States' ability to predict attacks and avoid collisions continues to grow in importance.

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[1]GAO, *Space Command and Control: Comprehensive Planning and Oversight Could Help DOD Acquire Critical Capabilities and Address Challenges*, GAO-20-146 (Washington, D.C.: Oct. 30, 2019).

[2]National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92, §§ 951-961, (2019) (codified at 10 U.S.C. § 9081).

Section 1613 of the NDAA for Fiscal Year 2020 included a provision for the Secretary of the Air Force to submit annual status reports to the Congressional Defense Committees containing several key reporting elements on the Space C2 program over a period of 5 years, and for GAO to review them.[3] The Secretary of the Air Force submitted the initial annual report in August 2020 (we refer to this as the 2020 annual report). The report discusses the strategy for providing Space C2 mission capability, fiscal year 2020 short-term objectives, and fiscal year 2019 progress, among other things. In February 2021, the Secretary of the Air Force submitted the second annual report (we refer to this as the 2021 annual report), which discusses the strategy for providing Space C2 mission capability, fiscal year 2021 short-term objectives, and fiscal year 2020 progress, among other things. The 2020 and 2021 annual reports captured the scope of work in the fiscal years 2021 and 2022 budget requests, respectively.

This report assesses the extent to which (1) the Department of the Air Force's 2020 and 2021 Space C2 program annual reports include and address the key elements outlined in the NDAA for Fiscal Year 2020; and (2) the annual reports provide effective information for program oversight.

To determine the extent to which the Space C2 annual reports include and address the key elements outlined in the NDAA for Fiscal Year 2020, we analyzed the 2020 and 2021 reports against the key elements. The NDAA requires the annual reports to include the following eight reporting elements:

- A description of any modification to the metrics established by the Secretary in the acquisition strategy for the program.

- The short-term objectives for the subsequent fiscal year.

- A description of the ongoing, achieved, and deferred objectives for the preceding fiscal year.

- A description of the challenges encountered and the lessons learned the preceding fiscal year.

- A description of the modifications made or planned so as to incorporate such lessons learned into subsequent efforts to address challenges for the preceding fiscal year.

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[3]National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92.

- A description of the cost, schedule, and performance effects of such modifications for the preceding fiscal year.

- A full survey of combatant command requirements, including Commanders' Integrated Priorities Lists, and impacts with respect to the program.[4]

- A description of potential future combatant command requirements being considered with respect to the program.

In addition, we reviewed both annual reports to understand key changes between them and assessed program office planning documentation, such as the Space C2 program draft acquisition strategy and quarterly program increment reports, to gain insights into how the program is delivering Space C2 capabilities to the user and to determine the status of the program.[5] We also interviewed officials from the Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD(A&S)), Office of Cost Assessment and Program Evaluation, Office of the Assistant Secretary of the Air Force (Acquisition, Technology & Logistics) Directorate of Space Programs (now the Office of the Assistant Secretary of the Air Force for Space Programs), U.S. Space Command, Space Force Space Operations Command, the Space Force Space Systems Command, and the Combined Force Space Component Command. During these interviews, we discussed the Space C2 program annual report development process and key information included in these reports.

To determine the extent to which the Space C2 program annual reports provide effective information for program oversight, we leveraged our assessment of the annual reports as part of our first objective and reviewed key program office planning documentation. We then assessed the 2020 and 2021 annual reports against *Standards for Internal Control in the Federal Government*, including defining objectives and risk tolerances, use of quality information, and external communication.[6] In addition, we reviewed agency policies and guidance related to Agile

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[4]Integrated priority lists outline each of the combatant commander's highest-priority requirements, defining program shortfalls that could adversely affect the ability of the combatant commander's forces to carry out their missions.

[5]The Department of the Air Force provides the Space C2 program increment reports to congressional defense committees to provide additional information on the program.

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

program management, including DOD Instruction 5000.02, "Operation of the Adaptive Acquisition Framework," and DOD Instruction 5000.87, "Operation of the Software Acquisition Pathway."[7] We also reviewed relevant information related to results-oriented management and leading practices for Agile development, such as the Government Performance and Results Act (GPRA) of 1993, as amended by GPRA Modernization Act of 2010, and GAO's *Agile Assessment Guide*.[8]

In addition, we interviewed the officials cited above to discuss the usefulness of the Space C2 program annual reports for oversight and perspectives on determining return on investment and measuring program value. We also met with congressional staff from the Senate and House Armed Services and Appropriations Committees to discuss the information included in the annual reports to determine if the information provided was sufficient to meet the needs of the committees in their oversight roles. Appendix I provides further details about our scope and methodology.

We conducted this performance audit from December 2020 to December 2021 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.

Background

The President's March 2021 *Interim National Security Strategic Guidance* indicated that ensuring the safety, stability, and security of outer space activities is a top U.S. national security priority.[9] Effective space command and control systems are important for addressing this priority. In addition to increasing threats against space assets, DOD space capabilities are globally distributed and operated from geographically

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[7]Department of Defense Instruction 5000.02, *Operation of the Adaptive Acquisition Framework* (Jan. 23, 2020); and Department of Defense Instruction 5000.87, *Operation of the Software Acquisition Pathway* (Oct. 2, 2020).

[8]Government Performance and Results Act of 1993 (GPRA), Pub. L. No. 103-62, as modified by GPRA Modernization Act of 2010, Pub. L. No. 111-352. Also, GAO, *Agile Assessment Guide: Best Practices for Agile Adoption and Implementation,* GAO-20-590G (Washington, D.C.: Sept. 28, 2020).

[9]The White House, *Interim National Security Strategic Guidance* (Washington, D.C.: Mar. 3, 2021).

diverse locations. As a result, the ability to quickly respond or take action can mean the difference between mission success and failure.

Since the 1980s, the Department of the Air Force has been taking steps to modernize and consolidate its space command and control systems and improve its space situational awareness capabilities. Space situational awareness generally refers to the current and predictive knowledge and characterization of space objects and the operational environment upon which space operations depend. Space situational awareness data are the foundation of command and control systems because the data are critical for planning, operating, and protecting space assets and informing government and military operations.

Overview of Prior Space Command and Control Development Efforts

The Air Force's last three space command and control programs—over more than the past 3 decades—have ended significantly over budget and schedule, with key capabilities undelivered. These programs include: Cheyenne Mountain Upgrade, Combatant Commanders' Integrated Command and Control System, and Joint Space Operations Center Mission System (JMS).

- **Cheyenne Mountain Upgrade:** This program was intended to modernize systems that provide critical strategic surveillance and attack warning and assessment information. In April 1991, we found that the program planned to complete only a portion of its requirements in an attempt to stay within budget and schedule constraints.[10] We also found that the Air Force had adopted a strategy of deferring some requirements on the optimistic assumption that these requirements could be achieved during later stages of system development. We concluded that, while such deferrals may have permitted the Air Force to meet revised short-term goals, they also masked the magnitude of problems the program experienced as it moved forward. The program became operational in 1998; however, some critical capabilities were not delivered. At that time, the program was nearly $1 billion over budget and 11 years late. That same year, DOD determined that some of the program's components were not well integrated and would be unresponsive to future mission needs.

- **Combatant Commanders' Integrated Command and Control System:** This program—begun in 2000—was intended to replace the space situational awareness data computer system called the Space

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[10]GAO, *Attack Warning: Cost to Modernize NORAD's Computer System Significantly Understated*, GAO/IMTEC-91-23 (Washington, D.C.: Apr. 10, 1991).

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Defense Operations Center (SPADOC).[11] At that time, SPADOC was significantly overtaxed and in need of replacement by a system that could handle larger volumes of data. In July 2006, we found that Combatant Commanders' Integrated Command and Control System program costs had increased by approximately $240 million, 51 percent over initial estimates, and the program was at least 3 years behind schedule.[12] In addition, we found that that some capabilities had been deferred indefinitely, resulting in increased risks to performing future operations. We also found that the Air Force did not effectively assess the appropriateness of the program's requirements prior to initiating the program, leading to significant additions, deletions, and modifications to the program's initial requirements. Similar to what transpired within the Cheyenne Mountain Upgrade program, significant amounts of work were deferred to address the cost increases associated with requirements changes. Ultimately, the program was not able to successfully replace SPADOC.

- **Joint Space Operations Center Mission System:** In 2009, the Air Force started the Joint Space Operations Center Mission System (JMS) program to meet command and control capability and space situational awareness data needs as well as replace the legacy SPADOC system. This program was a software-intensive system designed to be delivered in three increments: (1) provide the foundational structure for the overall program; (2) provide numerous operational capabilities to users, including replacing the legacy SPADOC system by the end of fiscal year 2014; and (3) provide command and control capabilities and the ability to incorporate data from highly classified programs. Of the three increments, only Increment 1 is fully operational. In 2018, Air Force operational testing revealed significant issues with Increment 2 performance. The Air Force's test team determined that Increment 2 was not suitable for operations, as it was unable to automatically determine if objects in space were likely to collide (called conjunction assessments) or maintain a catalog of space objects. Following these and other findings, the Air Force stopped further development on JMS in 2018. Consequently, JMS was unable to replace SPADOC, which remains

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[11]The Air Force developed SPADOC in the 1980s and it was designed to process space situational awareness data and maintain orbital information of space objects. In October 2019, we reported that SPADOC was significantly beyond its estimated end-of-life and was operating on an outdated computer mainframe—production of which was discontinued in 1998.

[12]GAO, *Defense Acquisitions: Further Management and Oversight Changes Needed for Efforts to Modernize Cheyenne Mountain Attack Warning System*, GAO-06-666 (Washington, D.C.: July 6, 2006).

in use today. When it was canceled, JMS was almost 3 years behind schedule and about $139 million (or 42 percent) over budget. Key requirements from Increment 2, including automated conjunction assessments and the ability to maintain a high-accuracy space catalog, as well as all of the requirements from Increment 3, were deferred to a subsequent effort, called the Space Command and Control (C2) program.

Overview of the Space C2 Program

The Space C2 program, which began in 2018, is the Air Force's latest software-intensive program that plans to deliver deferred JMS requirements as well as develop and field new advanced capabilities, using an Agile software development model. The Space C2 program is designed to consolidate operational-level command and control capabilities for DOD space assets into an integrated system, allowing operators and decision makers to have a single point-of-access to command and control space assets around the globe in a timely manner. Aside from maintaining enterprise infrastructure, platform, and data services, the Space C2 program aims to deliver mission applications to enable responsive, resilient, operational-level Space C2 capabilities for the National Space Defense Center, Combined Space Operations Center, and the 18th Space Control Squadron, among other command and control centers.[13] Specifically, the Space C2 program is intended to

- allow operators to comprehensively identify and monitor threats to U.S. space assets;

- identify possible courses of action to mitigate or eliminate threats;

- communicate courses of action to decision makers; and

- direct action to respond to threats.

The overall design of the Space C2 program is to gather data from space- and ground-based sensors, which are then transmitted to a repository

[13]DOD and the intelligence community established the National Space Defense Center to create unity of effort and facilitate information sharing across the national security space enterprise. The Center, among other things, develops and improves U.S. ability to detect, warn, characterize, attribute, and defend against threats to U.S. space systems. The Space Force's 18th Space Control Squadron provides support to the space surveillance network, maintaining the space catalog and managing the space situational awareness sharing program. In addition, it also conducts analyses, including analysis related to sensor optimization and launch.

that acts as the data source for space domain awareness.[14] The various applications developed by the Space C2 program will process those data to provide timely information to warfighters—space operators and commanders—on known threats to space assets and objects exhibiting anomalous behavior in the space environment. Operators and commanders will then be able to leverage this information to promptly direct actions and make decisions, such as tasking sensors to collect additional data or taking tactical action in response to threats. Figure 1 shows the planned construct of the Space C2 system.

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[14]According to the U.S. Space Force, space domain awareness encompasses the effective identification, characterization, and understanding of any factor associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of the United States.

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Figure 1: Space Command and Control (C2) Program Planned Construct
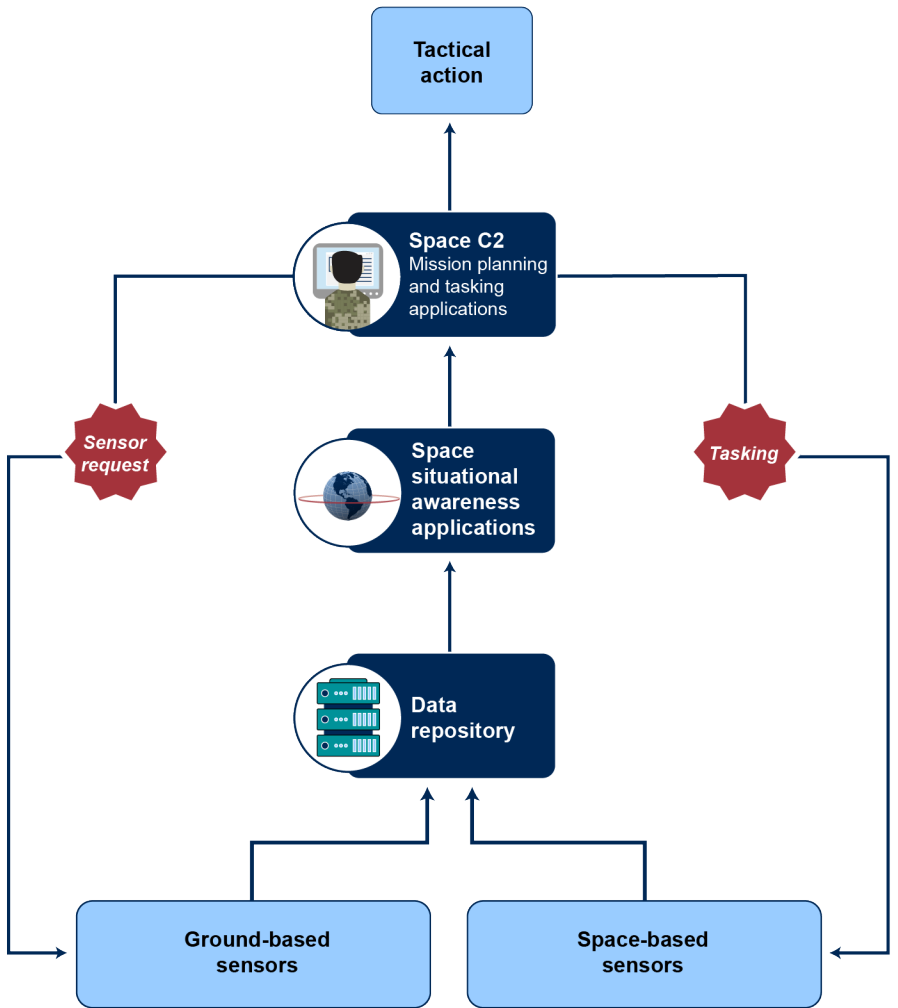
Source: GAO analysis of Air Force information. | GAO-22-104685

Space C2 Acquisition Approach

According to the Space C2 program's draft acquisition strategy, the program plans to deliver capability to the warfighter through a series of product lines (see table 1).

Table 1: Space Command and Control Program Product Lines

Product Line	Description
Battle Management Command and Control (BMC2)	BMC2 delivers battle management and integrated sensor support capabilities and provides operational synchronization and integrated planning for new capabilities. BMC2 solutions provide indication and warning alerts and threat assessments, which are used to rapidly generate courses of action, generate tasks, and monitor status through execution.
Space Domain Awareness	Space Domain Awareness enables space domain awareness operations at the 18th Space Control Squadron and Combined Space Operations Center, focusing initially on replacing the functions of the legacy space domain awareness system, the Space Defense Operations Center, while also focusing on automating space domain awareness tasks and functions.
Data Analytics and Visualization	Data Analytics and Visualization is intended to acquire and deliver capabilities related to gathering, analyzing, visualizing, and proliferating data to enable intelligence and indications and warnings execution to space operators and professionals.
Theater and Coalition Support	Theater and Coalition Support provides space force packaging, authority management, orders generation, planning and dissemination, and electro-magnetic interference visualization capabilities and leads the effort to build allied participation in the Space C2 program.
Platform and Infrastructure	Platform and Infrastructure provides the foundation of the enterprise Continuous Integration/Continuous Deployment pipeline, and other enterprise infrastructure and platform services.
Enterprise Engineering	Enterprise Engineering provides overarching systems engineering, architectural oversight, and requirements management functions to ensure Space C2 delivers integrated, responsive capabilities that meet user needs.

Source: GAO summary of Space Command and Control program documentation. | GAO-22-104685

In October 2019, we found that a lack of a formal acquisition strategy was a key management challenge facing the Space C2 program.[15] We recommended that the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S))—the Decision Authority that has oversight and approval authority over the program—ensure that the final acquisition strategy includes several elements, such as: a program management structure, a requirements management and development approach, and requirements for reporting program progress to decision makers. In May 2021, USD(A&S) directed the Space C2 program to submit a revised acquisition strategy that, among other things, reflects current roadmaps and describes the Space C2 governance process. As of August 2021, the program was in the process of revising its draft acquisition strategy to align with the requirements prescribed in the May 2021 memorandum. According to an OUSD(A&S) official, the Space Force is experiencing delays in delivering several of the documents required by the May 2021 memorandum, including the acquisition strategy.

[15]GAO-20-146.
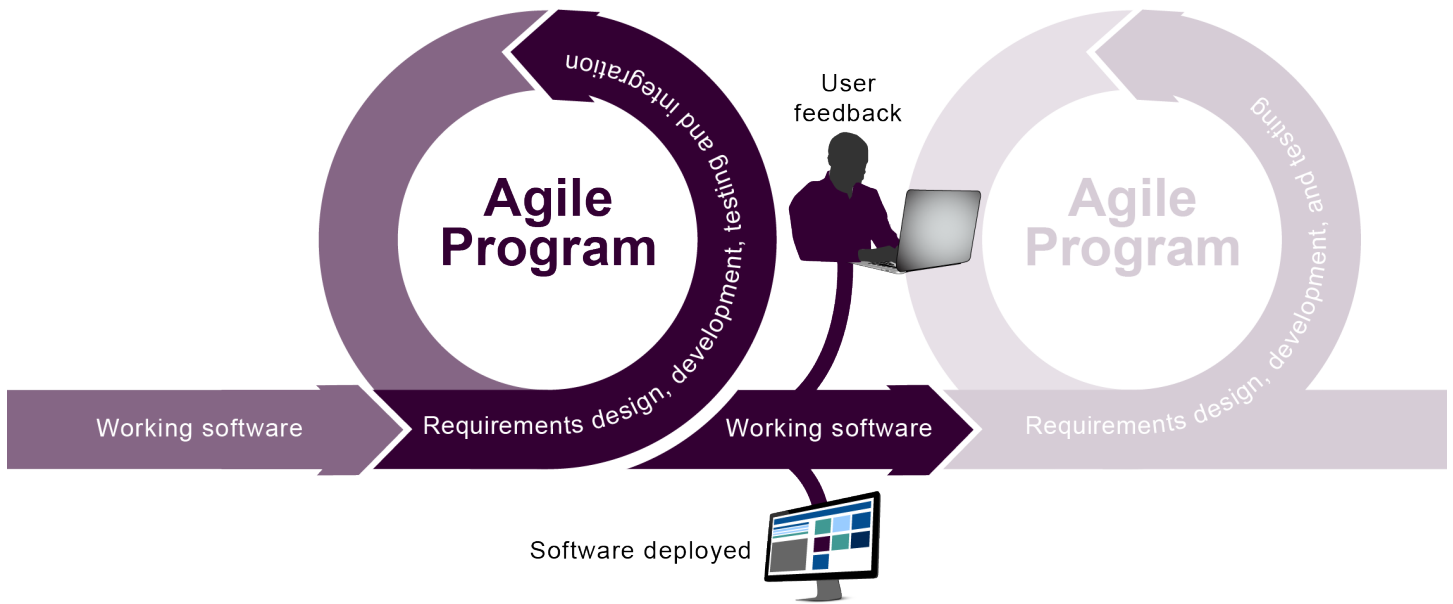
Agile Software Development Approach

Agile development is a flexible, iterative way of developing software that delivers working capabilities to users earlier than traditional DOD software development processes, known as the waterfall approach.[16] Agile practices integrate planning, design, development, and testing into an iterative life cycle to deliver software early and often, ranging from every few weeks to every 60-90 days. The frequent iterations are intended to effectively measure progress toward delivery of the full suite of capabilities, reduce technical and programmatic risk, and be responsive to feedback from stakeholders and users. This is different from the way DOD has developed software in the past, in which requirements were solidified in advance of development and software was delivered as a single completed program at the end of the development cycle—without continual involvement or feedback from users or the ability to modify requirements without cost increases and schedule delays. Traditional software development mirrored the development of a hardware system. We have previously reported on past DOD software programs that experienced challenges due, in part, to that traditional development approach.[17] Figure 2 compares Agile and waterfall methods for developing software.
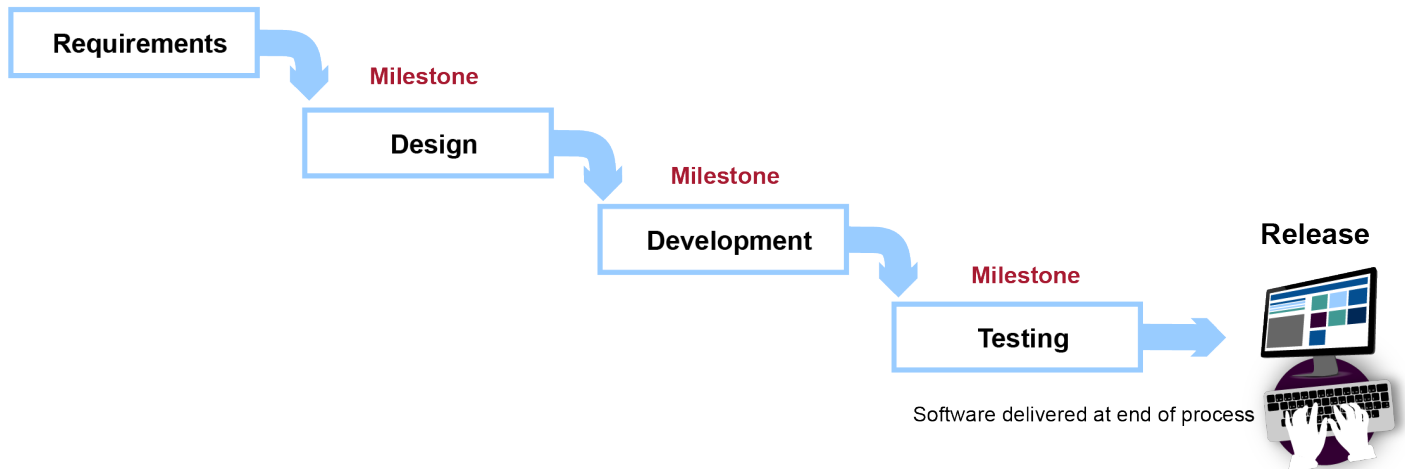
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[16]GAO-20-590G.

[17]GAO, *GPS: Actions Needed to Address Ground System Development Problems and User Equipment Production Readiness,* GAO-15-657 (Washington, D.C.: Sept. 9, 2015); and *DOD Space Acquisitions: Including Users Early and Often in Software Development Could Benefit Programs,* GAO-19-136 (Washington, D.C.: Mar. 18, 2019).

Figure 2: Comparison of Agile and Waterfall Methods for Developing Software

A: Agile iterations

User feedback

Integration and testing, development, design Requirements

Agile Program

Working software

Requirements design, development, testing and integration

Working software

Agile Program

Requirements design, development, and testing

Software deployed

B: Waterfall phases

Requirements

Milestone

Design

Milestone

Development

Milestone

Release

Testing

Software delivered at end of process

Source: GAO analysis of Department of Defense and U.S. Citizenship and Immigration Services information. | GAO-22-104685

There are numerous approaches, or frameworks, available for Agile programs to use. A framework is a basic structure to guide projects, rather than a prescriptive process. Each framework is unique and may have its own terminology for processes and artifacts (documents, data, or other information describing what was planned or completed), though the frameworks are not mutually exclusive and so can be combined.

Space C2 Development Approach

The Space C2 program employs an Agile-based Development, Security, and Operations (DevSecOps) rapid delivery framework with a 90-day program increment construct.[18] During each program increment, the Space C2 program aims to accomplish a series of objectives within each product line. These objectives are based on current, prioritized requirements developed by the user community. Work is planned to be completed through a sprint until a minimum viable product is produced; over time, the minimum viable product is intended to evolve, incorporating increased capabilities and addressing the concerns of users of the system.[19] At the end of each 90-day increment, the program holds planning and retrospective events, which involve planning for the next program increment and an evaluation of the previous program increment.

DOD's Software Acquisition Pathway

In January 2020, DOD reissued and updated its acquisition guidance, emphasizing speed and agility in the acquisition process.[20] The new guidance established the Adaptive Acquisition Framework, which includes six acquisition pathways based on the characteristics and risk profile of the system being acquired. One of these pathways, called the Software Acquisition Pathway, is to provide for the efficient and effective acquisition, development, integration, and timely delivery of secure

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[18]According to DOD, DevSecOps is a software engineering culture and practice that aims at unifying software development, security, and operations. The main characteristic of DevSecOps is to automate, monitor, and apply security at all phases of software development.

[19]According to GAO's *Agile Assessment Guide*, a sprint is a predefined, time boxed, recurring period of time in which working software is created. Instead of relying on extensive planning and design, an iteration relies on rework informed by customer feedback. In addition, a minimum viable product is the simplest version of a product that can be released. A minimally viable product should have enough value that it is still usable, demonstrates future benefit early on to retain customer buy in, and provides a feedback loop to help guide future development.

[20]Department of Defense Directive 5000.01, *The Defense Acquisition System* (Sept. 9, 2020); and Department of Defense Instruction 5000.02, *Operation of the Adaptive Acquisition Framework* (Jan. 23, 2020).

software.[21] The Software Acquisition Pathway creates a framework for software acquisition and development investment decisions that addresses tradeoffs between capabilities, affordability, risk tolerance, and other considerations. The software acquisition pathway has two phases: planning and execution. In May 2021, DOD issued an acquisition decision memorandum authorizing the Space C2 program to begin transitioning to the Software Acquisition Pathway. The acquisition decision memorandum directed the program to return for an acquisition decision review to formally enter the Software Acquisition Pathway by the end of October 2021. According to an OUSD(A&S) official, the Space Force is experiencing delays in delivering several of the artifacts required by the May 2021 memorandum, including the acquisition strategy.

The Space C2 Program Annual Reports Addressed Key Statutory Reporting Elements

As shown in table 2, the 2020 and 2021 Space C2 program annual reports addressed each of the eight required reporting elements outlined in the NDAA for Fiscal Year 2020.

Table 2: Extent to Which the Space Command and Control (C2) Program's 2020 and 2021 Annual Reports Address Reporting Elements Outlined in Statute

Required reporting elements in the National Defense Authorization Act for Fiscal Year 2020	GAO assessment of the 2020 annual report	GAO assessment of the 2021 annual report[a]	GAO comments
1. A description of any modification to the metrics established by the Secretary in the acquisition strategy for the program	Addressed	Addressed	The annual reports outlined the five metrics established and defined in the draft acquisition strategy and reported no modifications to these metrics.
2. The short-term objectives for the subsequent fiscal year[b]	Addressed	Addressed	The annual reports outlined the top capabilities for delivery in the near-term.
3. A description of the ongoing, achieved, and deferred objectives for the preceding fiscal year	Addressed	Addressed	The annual reports outlined the ongoing, achieved, and deferred objectives.

[21]Department of Defense Instruction, 5000.87, *Operation of the Software Acquisition Pathway* (Oct. 2, 2020).

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Required reporting elements in the National Defense Authorization Act for Fiscal Year 2020	GAO assessment of the 2020 annual report	GAO assessment of the 2021 annual report[a]	GAO comments
4. The challenges encountered and lessons learned for the preceding fiscal year	Addressed	Addressed	The 2020 annual report outlined three challenges: 1) scaling the number of product teams to meet user demand for capabilities; 2) financial management policies keeping pace with Agile software practices; and 3) effective governance and integration. Elsewhere in the 2020 annual report, the Department of the Air Force provided information on lessons learned. The 2021 annual report stated that there are no new identified challenges or lessons learned.
5. The modifications made or planned so as to incorporate such lessons learned into subsequent efforts to address challenges for the preceding fiscal year	Addressed	Addressed	The annual reports outlined efforts the program took to address challenges in general. In addition, elsewhere in the 2020 annual report, the Department of the Air Force provided information on efforts aimed at addressing the challenge of financial management policies keeping pace with Agile software practices. The 2021 annual report stated that there are no new identified modifications.
6. The cost, schedule, and performance effects of such modifications for the preceding fiscal year	Addressed	Addressed	The annual reports contain information that generally addressed budget-related impacts of issues the program identified. The 2021 annual report stated that there are no new identified cost, schedule, or performance effects.
7. A full survey of combatant command requirements, including Commanders' Integrated Priorities Lists, and impacts with respect to the program	Addressed	Addressed	The 2020 report instructs the reader to "refer to the classified addendum," which includes information related to the Commander's Integrated Priority List. The 2021 report stated that the Department of the Air Force conducted a survey of combatant command requirements and how they align with user priorities through the Requirements and Planning Council process.
8. A description of potential future combatant command requirements being considered with respect to the program	Addressed	Addressed	The reports stated that no new requirements have been proposed beyond what is documented in program documentation.

Source: GAO assessment of 2020 and 2021 Space C2 program annual reports. | GAO-22-104685

Note: The Space C2 program submitted the initial annual report in July 2020 (we refer to this as the 2020 annual report). The Space C2 program submitted its second annual report in February 2021 (we refer to this as the 2021 annual report).

[a]We assessed an element as addressed if the annual reports included information relevant to the specific reporting element.

[b]Short-term objectives consist of the top Space C2 capabilities for delivery in the near–term.

Usefulness of the Space C2 Annual Reports Is Limited Because They Lack Key Information for Effective Oversight

While the Space C2 program annual reports we reviewed included the information required by statute, future reports could include additional information to make them more useful for decision-making. For example, including improved contextual information to assess key program changes would provide a more complete picture of the status of the Space C2 program. Also, information related to return on investment could be enhanced by documenting the operational benefits associated with the capabilities the program delivers.

Space C2 Annual Reports Lack Specific Contextual Information to Assess Key Program Changes

The Space C2 program annual reports lack contextual information that makes it difficult to assess key program changes and fully understand the status of the program. For example:

- In response to the second statutory reporting element—to document the short-term objectives for the subsequent fiscal year—the Space C2 program provided information on the program's top capabilities for delivery in the near-term. However, the 2021 report does not contain the context needed to enable decision makers to fully understand the status of these capabilities. This is because the documented top capabilities were consolidated and re-prioritized from 20 capabilities in the 2020 report to 14 in the 2021 report. Based on our review, we found that only six of the 20 capabilities outlined in the 2020 report were traceable to the 14 capabilities in the 2021 report. For example, the capability to decommission SPADOC appears in both reports.[22]

  However, we were not able to trace the other 14 of the top 20 capabilities from the 2020 report to the priorities in the 2021 report because the 2021 report did not contain sufficient information to track the status of these capabilities. For example, a solution that allows operators to conduct near real-time ground- and space-based sensor tasking, outlined in the 2020 report, was not included in the 2021 report. No information was provided to indicate why this capability was no longer included as a top capability. According to Air Force officials, this solution was consolidated into another capability in the 2021 report. Based on additional information obtained from the program office, we were able to trace each of the 20 capabilities documented in the 2020 to the capabilities listed in the 2021 report.

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[22]The development of the Advanced Tracking and Launch Analysis System application is intended to replace SPADOC, the legacy system for space domain awareness, formerly space situational awareness.

- In response to the third statutory reporting element—a description of the ongoing, achieved, and deferred objectives for the preceding fiscal year—the Space C2 program annual reports do not provide context to enable decision makers to fully understand the status of ongoing and deferred program objectives. For example, the 2020 report indicates that an objective in one program increment—to integrate a launch tracking capability development effort onto a new software coding system—was deferred to the next program increment. However, the 2021 report does not indicate whether the objective was ultimately achieved. According to the reports, objectives are defined by what can be accomplished during a program increment.[23] If additional work remains, objectives can be deferred to a later date. Alternately, objectives can be removed if they are overcome by events, such as changed threats in the space domain. Without providing the context for why objectives are deferred or removed, or whether they are ultimately achieved, decision makers lack complete information to understand the status of these objectives and conduct effective oversight.

- In response to the fifth statutory reporting element—the modifications made or planned to incorporate lessons learned—the 2020 report documents various lessons learned, but not plans to address all identified challenges. Lessons included the need to foster relationships across Space C2 participants, such as the program office and users, the importance of continual self-evaluation to improve program development, and following a user-centered design. However, the annual report does not state how the program plans to address all of the challenges the program identified. For example, the 2020 report documents the challenge of scaling to the number of product teams commensurate with user demand for the various Space C2 capabilities. However, there is no information regarding how the program addressed or planned to address this challenge, such as by hiring additional product team staff.

   Likewise, the 2021 report stated the program did not identify any new modifications, but a modification that addressed one of the challenges did occur. Specifically, in December 2020, the Consolidated Appropriations Act of Fiscal Year 2021 formally named the Space C2

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[23]The 2020 and 2021 Space C2 program annual reports outline the planned objectives for the most recent program increment. For instance, the 2020 report shows the planned objectives for program increment 7 (May through July 2020) and the 2021 report shows the planned objectives for program increment 8 (August through October 2020).

program a Software and Digital Technology Pilot program.[24] The designation of Space C2 as a pilot program directly addressed the challenge documented in the 2020 report related to financial management policies not keeping pace with Agile software practices. Specifically, the pilot realigns funding from various appropriations into a single research, development, test and evaluation appropriation to provide flexibility to modern software development programs to deliver software in a timely manner.[25]

- In response to the sixth reporting element—the cost, schedule, and performance effects of modifications for the preceding fiscal year—the 2020 report includes general information on the cost, schedule, and performance effects of the modifications highlighted in the fifth statutory reporting element. For example, the 2020 report states that due to the Space C2 program office's ability to identify issues quickly and early via program increment events, cost, schedule, and performance effects are kept to a minimum. However, the report does not make it clear what the specific cost, schedule, and performance effects for each of the modifications are, including if project scope was decreased to minimize cost, schedule, and performance effects, and does not provide decision makers with a complete picture of the impacts the modifications had on the program.

- In response to the seventh reporting element—a full survey of combatant command requirements and impacts with respect to the program—the 2020 report instructs the reader to "refer to the classified addendum," which includes information related to the Commander's Integrated Priority List. While the 2021 report states that the program conducted a survey of combatant command requirements and notes that the program continues to align development efforts to current, prioritized needs through the Requirements and Planning Council process, the report does not discuss the impacts with respect to the program. Without describing the results of the survey and impacts on the program, decision makers lack complete information to conduct effective oversight.

Standards for Internal Control in the Federal Government state that decision makers need information to manage risks and call for the communication of quality information from relevant and reliable data that

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[24]Consolidated Appropriations Act, 2021, Pub. L. No. 116-260, § 8131.

[25]According to program officials, many of the anticipated efficiencies of the software and digital technology pilot program will likely begin to emerge in 2022.

is appropriate and complete, among other things.[26] While the Space C2 program annual reports generally address the eight required reporting elements outlined in the NDAA for Fiscal Year 2020, future reports would benefit from additional contextual information related to whether and why there have been significant changes from the prior year. Given that previous efforts to improve space command and control capabilities have ended significantly over budget and schedule, with key capabilities undelivered, congressional decision makers would benefit from additional information relating to changes to top capabilities and the status of meeting objectives. This information would provide a more complete picture of the status of the program, over the remaining 3 required reporting years, and make oversight more effective by enhancing knowledge-based decision-making.

Space C2 Return on Investment Metric Does Not Include User Perspectives on the Operational Benefits of Program Efforts

Return on investment information reported in the Space C2 annual reports is consistent with the program's draft acquisition strategy, but does not include user perspectives on the operational benefits of program efforts.[27] As shown in table 3, the Space C2 program's draft acquisition strategy outlines five metrics to assess program performance.

Table 3: Space Command and Control Program Metrics for Assessing Program Performance

Metric	Description
Deployment frequency	Deployment frequency measures how often product teams deploy software to production. This can be a direct or indirect measure of response time, team cohesiveness, developer capabilities, development tool effectiveness, and team efficiency.
Lead time	Lead time measures the time required to go from developing new code to successfully running the code in a production environment. Lead time is a measure of the efficiency of the development process and may indicate the process contains inefficiencies.
Mean time to restore	Mean time to restore measures the time from a failure to recovery from that failure.
Change fail rate	Change fail rate measures how often deployments fail.
Return on investment	Return on investment measures the value or benefit an effort provided and can include program efficiencies or direct benefits to users, such as reduction in time or cost to complete tasks.

Source: GAO assessment of the Space Command and Control Program draft acquisition strategy. | GAO-22-104685

GAO's *Agile Assessment Guide* also states that programs should establish an appropriate set of metrics to use to measure performance.

[26]GAO-14-704G.

[27]GAO-20-590G.

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The guide notes that one frequently-used metric includes how often a feature is delivered and its value, which can be determined by measuring specific benefits derived from that feature, such as increased productivity or measuring the use of a new feature delivered to a customer. The guide also outlines the need for metrics that align with organizational objectives and reinforce connections between long-term strategic goals and day-to-day activities.

In November 2002, we identified key attributes of performance measures, one of which is referred to as linkage, or the extent to which a measure is aligned with division or agency-wide goals and mission.[28] Further, we found that agencies that were successful in measuring performance strived to establish performance measures that, among other things, provide useful information for decision-making. Linkage between key performance measures, such as return on investment and agency mission and goals, provides managers and staff with a road map that shows how operational, day-to-day activities contribute to attaining agency-wide goals and mission.

In addition, the GPRA Modernization Act emphasizes that, in addition to performance indicators that agencies may need to manage programs on a day-to-day basis—such as quantity, quality, timeliness, and cost—agencies also need outcome-oriented goals and measures that assess the actual results, effects, or impact of a program or activity compared to its intended purpose.[29]

Return on investment information in the Space C2 annual reports shows increased efficiencies, resulting from program efforts. However, the information could be enhanced by consistently detailing user perspectives on the operational benefits associated with these efforts. For example, the 2021 report states that an application called Surefire—a web-based application for coordination that automates radio frequency selection—is converting days of processing time into minutes. In another example, an application called Vue—intended to task radar and space-based satellites for space object identification collection—is improving speed and accuracy of sensor matching by 60 percent, and reducing manual processing from 6 hours to 30 minutes. In both instances, the return on

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[28]GAO, *Tax Administration: IRS Needs to Further Refine Its Tax Filing Season Performance Measures*, GAO-03-143 (Washington, D.C.: Nov. 22, 2002).

[29]Government Performance and Results Act of 1993 (GPRA), Pub. L. No. 103-62, as modified by GPRA Modernization Act of 2010, Pub. L. No. 111-352, § 306(a)(2).

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investment metric documents increased efficiencies, such as a reduction in time to complete tasks. However, according to user community officials, while applications like Surefire have resulted in a reduction in processing time for a specific task, the time savings did not translate into additional operational capability or organizational efficiencies.

As noted above, in May 2021, USD(A&S) issued an acquisition decision memorandum authorizing the Space C2 program to begin transitioning to the Software Acquisition Pathway.[30] The Software Acquisition Pathway, in part, requires the sponsor and user communities to perform value assessments at least annually to determine if mission improvements or efficiencies realized are worth the investment.[31] That same month, the Space C2 sponsor submitted a value assessment for program increment 10.[32] According to that assessment, the Surefire application resulted in replacing email communications with a designated webpage, intending to streamline the administrative process. However, the sponsor and users stated that benefits had been marginal to date as the process of obtaining access to Surefire for new users was disjointed, and the time saved by avoiding the use of email was offset by the administration of these accounts.

According to an OUSD(A&S) official and software acquisition guidance, understanding the operational outcomes is critical to understanding program value and return on investment. In addition, Space C2 program officials stated that, moving forward, it is important to document the operational outcome, or operational and mission effectiveness of

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[30]Department of Defense, Office of the Undersecretary of Defense (Acquisition and Sustainment), Space Command and Control Acquisition Decision Memorandum, Memorandum for Secretary of the Air Force, Commander, U.S. Space Command (May 28, 2021).

[31]Department of Defense Instruction 5000.87, *Operation of the Software Acquisition Pathway* (Oct. 2, 2020). Sponsors are the individuals that hold the authority and advocate for needed user capabilities and associated resource commitments. For DOD space systems, users include operators of the system as well as end users of the data produced by the system.

[32]Space C2 program employs an Agile-based DevSecOps rapid delivery framework with a 90-day program increment construct. Within each program increment, work is executed through a series of sprints until a minimum viable product is produced; over time, the minimum viable product evolves into more capable code that satisfies users' pain points. At the end of each 90-day program increment, the program holds program increment planning and retrospective events, which involves planning for the next program increment and an evaluation of the previous program increment.

applications or capabilities in the annual reports to show the program is solving users' needs. We previously found that user involvement is critical to the success of software development efforts in our examination of software intensive space programs, and that obtaining frequent feedback is linked to reducing risk, improving customer commitment, and improving technical staff motivation.[33] OUSD(A&S) officials told us that, without value assessments from the user perspective indicating the program is delivering what users need, process metrics are of limited value. Moreover, user community officials told us that, if the goal of the program is to solve users' issues, there should be value in capturing operational and mission effectiveness in the annual reports. As the program transitions to the Software Acquisition Pathway, incorporating user perspectives on operational benefits in future annual reports, such as those outlined in these value assessments, would provide congressional decision makers with key information to enhance program oversight and inform program funding decisions.

Conclusions

DOD's ability to command and control U.S. space assets, as well as anticipate and respond to the threats they face, is important for safe operations in space and has become even more so since adversaries may target U.S. space capabilities. Past difficulties in enhancing space command and control capabilities led to requirements aimed at improving opportunities for congressional oversight of the Space C2 program and annual reports submitted by the Secretary of the Air Force on its progress. The 2020 and 2021 Space C2 program annual reports have delivered the required information, but, nonetheless, they could be improved to be more useful to decision makers. Including additional contextual information in future reports, such as the reasons for changes to short-term objectives, would provide a more comprehensive picture on the status of the Space C2 program and the goals the program seeks to achieve. Additionally, ensuring that return on investment metrics include user perspectives on operational benefits of Space C2 program efforts would provide insight into whether the program is making progress in delivering needed capabilities to the warfighter and help inform decisions for making future investments into the program.

Recommendations for Executive Action

We are making two recommendations to the Department of Defense.

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[33]GAO, *DOD Space Acquisitions: Including Users Early and Often in Software Development Could Benefit Programs,* GAO-19-136 (Washington, D.C.: Mar. 18, 2019).

The Secretary of the Air Force should ensure that the Department of the Air Force include additional contextual information in its annual reports related to significant changes from the previous report, such as the reasons for changes to short-term objectives. (Recommendation 1)

The Secretary of the Air Force should ensure that, for describing return on investment in future annual reports, the Department of the Air Force include user perspectives on operational benefits of Space C2 program efforts. (Recommendation 2)

Agency Comments and Our Evaluation

We provided a draft of this report to DOD for review and comment. In its written comments (reproduced in appendix II), DOD partially concurred with our recommendations and generally identified steps it plans to take to address them. DOD also provided technical comments, which we incorporated as appropriate.
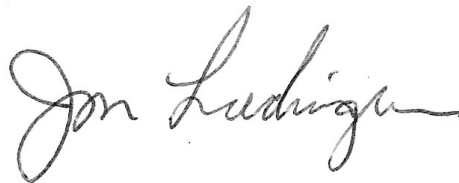
DOD partially concurred with our first recommendation, which in our draft report directed USD(A&S) to ensure that the Secretary of the Air Force include additional contextual information in its annual reports related to significant changes from the previous report. DOD stated that the recommendation should be directed to the Secretary of the Air Force, and not USD(A&S), because the Secretary of the Air Force is statutorily required to prepare and submit the annual reports. However, notwithstanding to whom the recommendation was directed, DOD agreed with the substance of the recommendation and noted that the Department of the Air Force plans to include such information in the next report. In response to DOD's comments, we redirected the recommendation to the Secretary of the Air Force. We support the Department of the Air Force's plan to include additional contextual information in future reports and believe this information could provide a more comprehensive picture on the status of the Space C2 program and the goals the program seeks to achieve.

DOD partially concurred with our second recommendation, which in our draft report directed USD(A&S) to ensure that, for describing return on investment in future annual reports, the Department of the Air Force include user perspectives on operational benefits of Space C2 program efforts. Similar to the first recommendation, DOD stated that this recommendation should be directed to the Secretary of the Air Force, and not USD(A&S). Again, notwithstanding its concerns over to whom the recommendation was directed, DOD agreed with the substance of the recommendation and noted that the Department of the Air Force plans to include a value assessment prepared by the operational community in the

next report. In response to DOD's comments, we redirected the recommendation to the Secretary of the Air Force. We support the Department of the Air Force's plan to include user perspectives on operational benefits of Space C2 program efforts in the reports and believe such information could provide valuable insight into whether the program is making progress in delivering needed capabilities to the warfighter and informing future investments.

We are sending copies of this report to the appropriate congressional committees and the Secretary of Defense. 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 about this report, please contact me at (202) 512-4841 or ludwigsonj@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 III.

Jon Ludwigson
Director, Contracting and National Security Acquisitions

List of Committees

The Honorable Jack Reed
Chairman
The Honorable James M. Inhofe
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Jon Tester
Chairman
The Honorable Richard C. Shelby
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

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

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

Appendix I: Objectives, Scope, and Methodology

This report assesses the extent to which (1) the Department of the Air Force's 2020 and 2021 Space Command and Control (C2) program annual reports include and address the key elements outlined in the National Defense Authorization Act (NDAA) for Fiscal Year 2020; and (2) the annual reports provide effective information for program oversight.

To determine the extent to which the Space C2 annual reports include and address the key elements outlined in the NDAA for Fiscal Year 2020, we analyzed the 2020 and 2021 reports against the statutory requirements.[1] The NDAA requires the annual reports to include the following eight key elements:

- A description of any modification to the metrics established by the Secretary in the acquisition strategy for the program.

- The short-term objectives for the subsequent fiscal year.

- A description of the ongoing, achieved, and deferred objectives for the preceding fiscal year.

- A description of the challenges encountered and the lessons learned the preceding fiscal year.

- A description of the modifications made or planned so as to incorporate such lessons learned into subsequent efforts to address challenges for the preceding fiscal year.

- A description of the cost, schedule, and performance effects of such modifications for the preceding fiscal year.

- A full survey of combatant command requirements, including Commanders' Integrated Priorities Lists, and impacts with respect to the program.[2]

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[1]The Secretary of the Air Force submitted the initial annual report in August 2020 (we refer to this as the 2020 annual report). The report discusses the strategy for providing Space C2 mission capability, fiscal year 2020 short-term objectives, and fiscal year 2019 progress, among other things. In February 2021, the Secretary of the Air Force submitted the second annual report (we refer to this as the 2021 annual report), which discusses the strategy for providing Space C2 mission capability, fiscal year 2021 short-term objectives, and fiscal year 2020 progress, among other things. The Department of the Air Force submitted the 2020 and 2021 annual reports to Congress to inform the fiscal year 2021 and fiscal year 2022 budget requests, respectively.

[2]Integrated priority lists outline each of the combatant commander's highest-priority requirements, defining program shortfalls that could adversely affect the ability of the combatant commander's forces to carry out their missions.

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- A description of potential future combatant command requirements being considered with respect to the program.

In addition, we reviewed both annual reports to understand key changes between them and assessed program office planning documentation, such as the Space C2 program draft acquisition strategy and quarterly program increment reports, to gain insights into how the program is delivering Space C2 capabilities to the user and to determine the status of the program.[3] We also interviewed officials from the following entities to discuss the Space C2 program annual report development process and key information included in these reports:

- **The Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD(A&S)).** OUSD(A&S) supports the Under Secretary of Defense for Acquisition and Sustainment's (USD(A&S)) role in overseeing Department of Defense (DOD) acquisition and sustainment activities, including establishing departmental policies relating to, among other things, procurement of goods and services and logistics and maintenance.

- **Office of Cost Assessment and Program Evaluation.** The Office of Cost Assessment and Program Evaluation provides independent cost assessment and program evaluation for DOD.

- **Office of the Assistant Secretary of the Air Force (Acquisition, Technology & Logistics) Directorate of Space Programs (now the Office of the Assistant Secretary of the Air Force for Space Programs).** The Office of the Assistant Secretary of the Air Force (Acquisition, Technology & Logistics) Directorate of Space Programs aims to cost-effectively modernize and deliver space capabilities to the warfighter.

- **U.S. Space Command.** Established as a unified combatant command in August 2019, U.S. Space Command conducts operations in space and plays a key role in defending U.S. national interests. Within U.S. Space Command, the Combined Force Space Component Command plans, integrates, conducts, and assesses global space operations in order to deliver combat relevant space capabilities to Combatant Commanders, Coalition partners, the Joint Force, and the United States.

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[3]The Department of the Air Force provides the Space C2 program increment reports to congressional defense committees to provide additional information on the program.

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- **Space Force Space Operations Command.** Space Force Space
  Operations Command generates, presents, and sustains combat-
  ready intelligence, cyber, space and combat support forces and
  serves as the U.S. Space Force Service Component to U.S. Space
  Command.

- **Space Force Space Systems Command (formerly the Space and
  Missile Systems Center).** As the acquisition center for U.S. Space
  Force space programs, Space Systems Command develops and
  delivers sustainable joint space warfighting capabilities to defend the
  nation and its allies and disrupt adversaries in the contested space
  domain. In addition, the Space C2 program office resides within
  Space Systems Command.

To determine the extent to which the Space C2 annual reports provide
effective information for program oversight, we leveraged our assessment
of the annual reports as part of our first objective and review of key
program office planning documentation. We then assessed the 2020 and
2021 annual reports against *Standards for Internal Control in the Federal
Government*, including defining objectives and risk tolerances, use of
quality information, and external communication.[4] In addition, we
reviewed agency policies and guidance related to Agile program
management, including DOD Instruction 5000.02, "Operation of the
Adaptive Acquisition Framework" and DOD Instruction 5000.87,
"Operation of the Software Acquisition Pathway."[5] We also reviewed
relevant materials related to results-oriented management and leading
practices for Agile development, such as the Government Performance
and Results Act (GPRA) of 1993, as amended by GPRA Modernization
Act of 2010, and GAO's *Agile Assessment Guide*.[6]

In addition, we interviewed the officials cited above to discuss the
usefulness of the Space C2 program annual reports for oversight and
perspectives on determining return on investment and measuring
program value. We also met with congressional staff from the Senate and

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

[5]Department of Defense Instruction 5000.02, *Operation of the Adaptive Acquisition
Framework* (Jan. 23, 2020); and Department of Defense Instruction 5000.87, *Operation of
the Software Acquisition Pathway* (Oct. 2, 2020).

[6]Government Performance and Results Act of 1993 (GPRA), Pub. L. No. 103-62, as
modified by GPRA Modernization Act of 2010, Pub. L. No. 111-352. Also, GAO, *Agile
Assessment Guide: Best Practices for Agile Adoption and Implementation,* GAO-20-590G
(Washington, D.C.: Sept. 28, 2020).

House Armed Services and Appropriations Committees to discuss the information included in the annual reports to determine if the information provided was sufficient to meet the needs of the committees in their oversight roles.

We conducted this performance audit from December 2020 to December 2021 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.

Appendix II: Comments from the Department of Defense

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

SAF/SQ   10 Dec 2021
1060 Air Force Pentagon
Washington, DC 20330-1060

Mr. Jon Ludwigson
Director, Contracting and National Security Acquisitions
U.S. Government Accountability Office
441 G Street, NW
Washington DC 20548

Dear Mr. Ludwigson,

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-22-104685, 'SPACE COMMAND AND CONTROL: Opportunities Exist to Enhance Annual Reporting,' dated October 26, 2021 (GAO Code 104685).

The DoD's response to the subject report is attached. The DoD partially concurs with the two recommendations (Atch 1). The DoD also has several other administrative and substantive comments to the report (Atch 2). My point of contact is Col Gregory Hoffman who can be reached at gregory.hoffman.1@us.af.mil and phone (571) 256-0886.

Sincerely,

STEVEN P. WHITNEY, Brig Gen, USSF
Military Deputy, Office of the Assistant
Secretary of the Air Force
(Space Acquisition and Integration)

Attachments
1. DoD Response to Recommendations (GAO 104685)
2. DoD Comment Resolution Matrix (GAO 104685)

GAO DRAFT REPORT DATED DECEMBER 2021

GAO-22-104685 (GAO CODE 104685)

"GAO-22-104685, SPACE COMMAND AND CONTROL: OPPORTUNITIES

EXIST TO ENHANCE ANNUAL REPORTING"

DEPARTMENT OF DEFENSE COMMENTS

TO THE GAO RECOMMENDATION

RECOMMENDATION 1: The GAO recommends that the Under Secretary of Defense for Acquisition and Sustainment should ensure that the Department of the Air Force include additional contextual information in its annual reports related to significant changes from the previous report, such as the reasons for changes to short-term objectives.

DoD RESPONSE: The Department of Defense partially concurs with this recommendation. The DoD does not agree that the USD(A&S) should ensure the annual reports comply with the recommendations in the report. The Fiscal Year (FY) 2020 National Defense Authorization Act (NDAA) directs the Secretary of the Air Force (SECAF) to prepare and submit the annual reports to the USD(A&S), the congressional defense committees, and the GAO. While there is close coordination between the Department of the Air Force and the Office of the USD(A&S), the SECAF does not routinely coordinate congressional reports through USD(A&S). Requiring pre-submission coordination through USD(A&S) is inconsistent with USD(A&S) being a recipient of the final report. Accordingly, the recommendation should be directed to the SECAF rather than the USD(A&S). Notwithstanding the previous comment, the DoD agrees with the recommendation to include additional contextual information in its annual reports. In its draft FY 2022 report the Department of the Air Force has added such information.

RECOMMENDATION 2: The GAO recommends that the Under Secretary of Defense for Acquisition and Sustainment should ensure that, for describing return on investment in future reports, the Department of the Air Force include user perspectives on operational benefits of Space C2 program efforts.

DoD RESPONSE: The Department of Defense partially concurs with this recommendation. The DoD does not agree that the USD(A&S) should ensure the annual reports comply with the recommendations in the report. The Fiscal Year 2020 National Defense Authorization Act (NDAA) directs the Secretary of the Air Force (SECAF) to prepare and submit the annual reports to USD(A&S), the congressional defense committees, and the GAO. While there is close coordination between the Department of the Air Force and the Office of the USD(A&S), the SECAF does not routinely coordinate congressional reports through USD(A&S). Requiring pre-submission coordination through USD(A&S) is inconsistent with USD(A&S) being a recipient of the final report. Accordingly, the recommendation should be directed to the SECAF rather than the USD(A&S). Notwithstanding the previous comment, the DoD agrees with the recommendation to include user perspectives on Space C2 program operational benefits. In its draft FY 2022 report the Department of the Air Force has added a Value Assessment prepared by the operational community as described in Department of Defense Instruction 5000.87, *Operation of the Software Acquisition Pathway*, dated October 2, 2020.

Attachment 1

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact	Jon Ludwigson, (202) 512-4841 or ludwigsonj@gao.gov
Staff Acknowledgments	In addition to the contact named above, Rich Horiuchi (Assistant Director), Andrew Burton (Analyst-in-Charge), Marie Ahearn, Pete Anderson, Claire Buck, Emile Ettedgui, Brian Fersch, Jennifer Leotta, Sophia Payind, Christine Pecora, and Roxanna Sun made key contributions to this report.