



April 2023

DEFENSE ANALYSIS

Additional Actions Could Enhance DOD's Wargaming Efforts

Why GAO Did This Study

Wargames are an analytic method that can provide valuable insights to complex problems and inform decisions about warfighting concepts, capabilities, and plans. DOD credits wargames with making key contributions to military planning for pivotal operations in the Pacific during World War II. In 2015, DOD began an initiative to reinvigorate wargaming in line with the strategic shift to prepare for near-peer power competition.

GAO was asked to review DOD's use of analytic wargames. This report examines: (1) the scope of DOD's wargaming activities; (2) DOD's use of internal and external wargame providers; and (3) the extent to which DOD ensures wargame quality.

GAO analyzed wargame data for fiscal years 2017 through 2021; relevant DOD guidance and documentation; and leading practices for wargame quality. GAO also observed wargames and interviewed wargaming officials from DOD and external wargame providers.

What GAO Recommends

GAO is making 10 recommendations to DOD, including to assess the use of internal and external wargame providers; develop effective approaches for managing wargame data and sharing information about upcoming wargames; and evaluate the costs and benefits of developing standard wargaming education and qualifications. DOD concurred with our recommendations.

View [GAO-23-105351](#). For more information, contact Cary Russell at (202) 512-5431 or russellc@gao.gov.

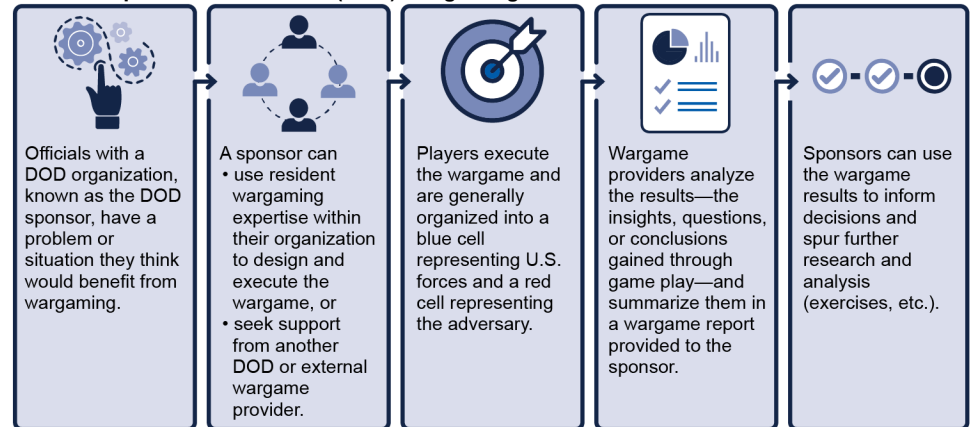
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What GAO Found

Wargames—representations of conflict in which the game's players make decisions and respond to the consequences of those decisions—are used widely across the Department of Defense (DOD) to provide insights on challenges and to inform decisions. DOD and other wargame providers plan, conduct, and analyze wargames (see figure), and DOD uses the results in conjunction with other analytic methods like military exercises and modeling. For example, in May 2022, GAO observed a Navy contested logistics wargame that included over 200 participants from over 40 organizations across DOD as well as international partners. The Navy planned to use the results to inform logistics planning in support of a distributed naval force.

General Department of Defense (DOD) Wargaming Process



Source: GAO analysis of Department of Defense information. | GAO-23-105351

A number of internal DOD organizations operate as wargame providers, and DOD also uses external wargame providers—federally funded research and development centers and contractors. The mix of wargame providers used across DOD varies and comes with advantages and disadvantages including varying capacity, timeliness, information access, expertise, and independence. However, DOD has not assessed its use of wargame providers, including the sufficiency of its internal wargaming capabilities or the risks associated with relying on external wargame providers. As such, DOD's wargaming resources may be misaligned.

GAO identified 13 common quality principles DOD organizations use to guide their wargaming. DOD has collaborative wargame forums, information systems, and some education related to wargames. However, GAO found that there are barriers to accessing wargame data, information on upcoming wargames is not shared, and the services have not developed standard education and qualifications for wargamers. Addressing these issues would enhance the effectiveness of DOD's wargaming efforts.

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Abbreviations

DOD	Department of Defense
FFRDC	federally funded research and development center
OSD	Office of the Secretary of Defense

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April 24, 2023

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

Wargames are representations of conflict in which the game’s players make decisions and respond to the consequences of those decisions. The Department of Defense (DOD) uses wargames to gain insights into complex issues or problems and to inform decisions about warfighting concepts, capabilities, and plans. Wargaming focuses on human decision-making, and differs from other methods that DOD uses to analyze potential conflicts and their probable outcomes. For example, military exercises involve moving actual forces and equipment, whereas wargames do not.¹ Wargames also are distinct from modeling and simulation, methods generally used to derive more quantitative outcomes.²

The U.S. military has used wargames throughout its history to analyze potential courses of action against likely threats and adversaries.³ The Navy’s extensive wargaming conducted prior to World War II was considered instrumental to its preparation for and ultimate victory in wartime operations in the Pacific theater. Multiple organizations within DOD continue to use wargames to prepare for national security threats

¹According to DOD, an exercise is a military maneuver or simulated wartime operation involving planning, preparation, and execution that is carried out for the purpose of training and evaluation. Chairman of the Joint Chiefs of Staff Manual 3500.03E: *Joint Training Manual for the Armed Forces of the United States* (Apr. 20, 2015). Exercises are conducted in the anticipated operational environment using military personnel and equipment. Exercises provide the most realistic experimentation method and best emulate the conditions that warfighters will likely face in combat.

²DOD defines a model as a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. A simulation is a method for implementing a model over time. Department of Defense Instruction 5000.70, *Management of DOD Modeling and Simulation (M&S) Activities* (May 10, 2012) (incorporating Change 3, Oct. 15, 2018).

³Matthew B. Caffrey, Jr., *On Wargaming: How Wargames Have Shaped History and How They May Shape the Future* (Newport, RI: Newport Papers, January 2019).

across the increasingly contested warfighting domains (ground, sea, air, space, and cyberspace). Internal DOD organizations as well as external entities, such as federally funded research and development centers (FFRDCs) and defense contractors, can run DOD wargames.⁴ Running a wargame includes designing and executing it, along with analyzing the results. Throughout this report, we use the term “wargame provider” to describe the primary entity that runs the wargame.

In 2015, the Deputy Secretary of Defense issued memoranda to revitalize and spur innovation in wargaming.⁵ In response, DOD subsequently developed a dedicated wargame funding source, a wargame information repository, and an alignment group. Subsequent National Defense Strategies have discussed a reorientation of U.S. defense from counterterrorism to near-peer competition and have emphasized the need to embrace a culture of experimentation.⁶ DOD has cited wargaming, a form of experimentation, as an important method for preparing for these threats.

You asked that we review DOD’s wargaming efforts. In this report, we examine (1) the scope of DOD’s wargaming activities; (2) DOD’s use of internal and external wargame providers; and (3) the extent to which DOD ensures the quality of wargames.⁷

In this report, we focus on analytic wargames, which are conducted to gain insights into complex problems and investigate scenarios. These differ from wargames that are conducted for instructional and educational purposes, and that focus primarily on player learning.

To address our objectives, we analyzed information and interviewed officials from wargaming organizations within DOD and from external

⁴To help meet its research needs, DOD sponsors 10 FFRDCs, which are nonprofit, university-affiliated, or industry organizations. Each DOD-sponsored FFRDC is managed by a specific military department or organization. FFRDCs are intended to meet DOD’s long-term research and development needs that cannot be met effectively by the department or private sector alone. For more information on FFRDCs, see GAO, *Federal Research Centers: Revising DOD Oversight Policy Could Assure Access to Performance and Effectiveness Information*, [GAO-22-105278](#) (Washington, D.C.: July 19, 2022).

⁵Deputy Secretary of Defense Memorandum: *Wargaming Summit Way Ahead* (May 8, 2015) and Deputy Secretary of Defense Memorandum, *Wargaming and Innovation* (Feb. 9, 2015).

⁶Department of Defense, *2022 National Defense Strategy of the United States of America* (Oct. 27, 2022) and *Summary of the 2018 National Defense Strategy of the United States of America* (2018).

⁷We also include information on wargame costs in appendix II.

providers of wargames. For our first and second objectives, we obtained and analyzed information from DOD organizations on their respective wargames held from fiscal years 2017 through 2021. For our third objective, we analyzed guidance and leading practices relevant to wargaming to identify common practices used by DOD organizations to ensure quality in their wargaming efforts. We also analyzed information and interviewed officials to obtain views on other efforts that contribute to quality wargaming such as collaboration, information sharing, and education.

We determined that two key principles of internal control, as outlined in *Standards for Internal Control in the Federal Government*, were significant to these objectives: (1) management should identify, analyze, and respond to risks related to achieving the defined objectives, and (2) that management should demonstrate a commitment to recruit, develop, and retain competent individuals.⁸ Our scope and methodology are discussed in detail in appendix I.

We conducted this performance audit from August 2021 to April 2023 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

Definition and Purpose of Wargames

Multiple DOD documents define wargames with slight variations. For the purposes of this report, we use the definition provided by Joint Publication 5-0: wargames are representations of conflict or competition in a synthetic environment, in which people make decisions and respond to the consequences of those decisions.⁹ Wargames occur in rooms with maps and game pieces representing forces as shown in figure 1, or within a computer program similarly representing the battle space.¹⁰ Wargame designers seek to immerse players in a realistic scenario where the

⁸GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: Sept. 2014).

⁹Joint Chiefs of Staff, Joint Pub. 5-0, *Joint Planning* (Dec. 1, 2020).

¹⁰Examples of software programs developed for wargaming include the Joint Staff's Standard Wargame Integration Facilitation Tool and the Defense Threat Reduction Agency's Mission Impacts of Nuclear Events Software.

consequences of actions within the game can be studied and then used to glean insights from the experience.

Figure 1: Marine Corps Wargames



Source: U.S. Marine Corps/Chavonne Ford. | GAO-23-105351

The Center for Army Analysis, one of the leading wargame providers within the Army, describes in its guidance that wargame sponsors are decision makers and that wargaming helps a sponsor understand the human element of a problem set. Specifically, wargaming highlights those aspects of a problem set that are affected by the complex, subjective, and sometimes illogical and irrational decisions of humans. As such, wargaming provides an understanding that is difficult to elucidate with more quantitative analytical tools.¹¹ Wargaming may be useful to decision makers as a technique to test assumptions, possibly uncovering unanticipated questions needing resolution before a policy is implemented.

Wargames can take different forms and use multiple methodologies to tackle the various problem sets confronting DOD. For example, the term tabletop exercise typically refers to structured wargames that entail warfighters working through scenarios to discover and define capability gaps and their boundaries, and discuss initial insights into the value of

¹¹Center for Army Analysis, *Wargaming Study Guide* (October 2021).

proposed solutions to those gaps.¹² The scale of a wargames can vary. Some are informal events where several people analyze a problem around a table over the course of a few hours. Others are larger events that take months to plan, organize, and execute and that involve hundreds of DOD personnel, international partners, and representatives from other U.S. government departments.

Wargame officials from across DOD said that the diversity of wargame types and approaches represent the tool's usefulness and adaptability. They added that using a "one size fits all" approach to wargames is overly limiting and restricts the potential benefits. Wargames can tackle problems at the tactical, operational, or strategic levels, and some wargame approaches may suit different problem sets better than others.¹³

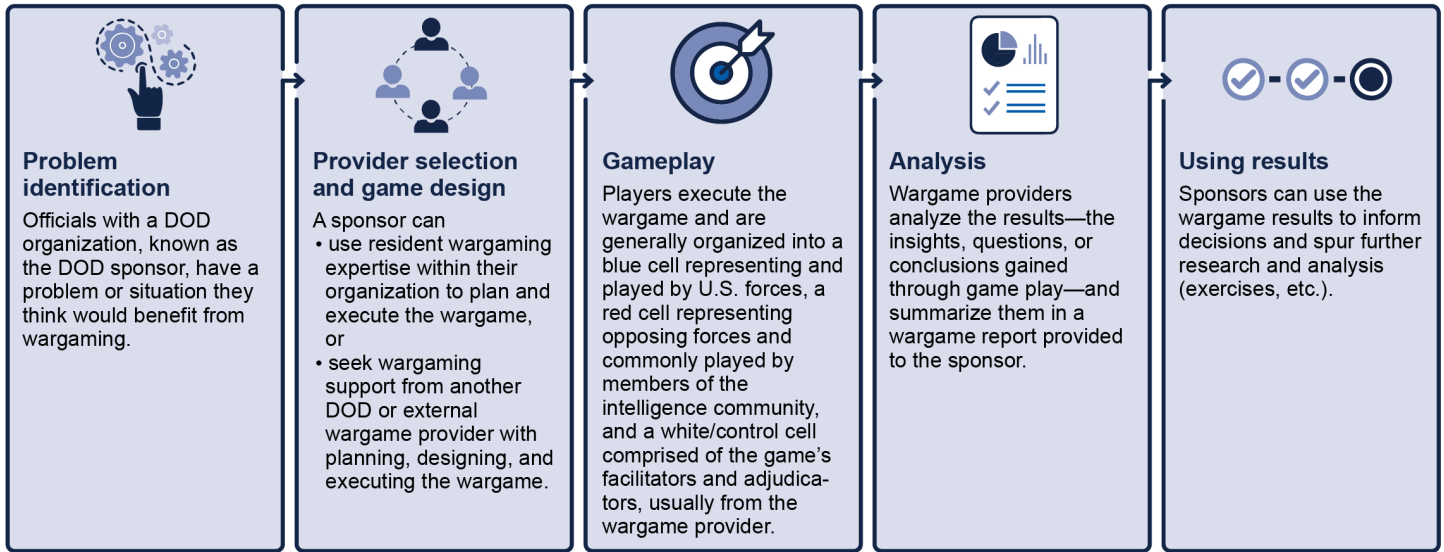
Process for Conducting Wargames

Although DOD organizations differ in how they plan, execute, and analyze wargames, they generally follow a similar wargaming process, as illustrated in figure 2.

¹²Office of the Under Secretary of Defense for Research and Engineering Prototypes and Experiments, *Department of Defense Experimentation Guidebook* (August 2019).

¹³According to Joint Publication 1, Volume 1, *Joint Warfighting* (Mar. 25, 2013) (incorporating change 1, July 12, 2019), the three levels of warfare—strategic, operational, and tactical—link tactical actions to achievement of national objectives. There are no finite limits or boundaries between these levels, but they help commanders plan and synchronize campaigns and operations, allocate resources, and assign tasks.

Figure 2: Department of Defense's (DOD) General Process for Conducting Wargames



Source: GAO analysis of Department of Defense information. | GAO-23-105351

As shown in figure 2, DOD officials generally decide to conduct a wargame to better understand or explore a complex problem set or issue they face. The officials' DOD organization requesting the wargame is known as the wargame sponsor, as it generally funds the wargame. A wargame sponsor either uses resident wargaming expertise within their organization to run the wargame, or seeks assistance from other DOD organizations to run the wargame. These wargaming organizations may use external support from FFRDCs and contractors to help them run the wargame. The sponsor may also choose to work directly with an FFRDC or contractor to run their wargame.

As the wargame event takes place, the wargame provider ensures that the game runs according to the design, and records the players' moves and insights. Wargames typically take place in person within secure facilities because they are usually classified, although DOD officials described some wargames they were able to run virtually over classified networks during the COVID-19 pandemic.

After the wargame has ended, wargame providers analyze the results and provide a report to the sponsor. The sponsor can use the wargame results at its discretion. The results may spur further research—such as additional wargames or other experiments, modeling and simulation, and exercises—or may inform decisions.

Wargames Are Used Widely Across DOD to Inform Key Decisions

Multiple organizations within DOD conduct wargames based on existing authorities. DOD organizations use wargames in conjunction with other analysis to inform key decisions such as developing plans and concepts, and determining the type of forces needed.

Wargaming Authorities and Roles

Multiple organizations within DOD—including the services, combatant commands, Joint Staff, and other agencies and offices—conduct wargames using a number of authorities including:

- *Title 10 of the U.S. Code*, which generally establishes the U.S. armed services' duties to organize, train, and equip their forces.¹⁴ According to DOD officials, the services—the Army, Navy, Air Force, Marine Corps, and Space Force—conduct wargames as part of their Title 10 authority.
- DOD's *Joint Planning* guidance, which is the keystone document for joint planning, a process that considers risks and facilitates implementation of strategic guidance. It establishes joint doctrine and applies to the Joint Staff, combatant commands, and the services, among others. The guidance provides the DOD definition of a wargame that we are using in this report. It includes instructions for wargaming potential courses of action that may be included in jointly-developed operational plans.¹⁵
- *Chairman of the Joint Chiefs of Staff Instruction 3030.01A*, which directs the Joint Staff to execute a Globally Integrated Wargame series to efficiently evaluate and assess operational needs and capabilities.¹⁶ This series focuses on enabling the future Joint Force to be prepared to support and defend national interests.
- Other statutory authority such as the *National Defense Authorization Act for Fiscal Year 2022*, which directed DOD to conduct wargames

¹⁴See, e.g., 10 U.S.C. §§ 7032(b), 7062(b), 8032(b), 8062(a), 8042(b), 8063(a), 9032(b), 9062(c), 9084(b), 9081(c).

¹⁵Joint Chiefs of Staff, Joint Pub. 5-0, *Joint Planning* (Dec. 1, 2020). A course of action is any sequence of activities that an individual or unit may follow. An operational plan is a complete and detailed plan containing a full description of the concept of operations, all annexes applicable to the plan, and a time-phased force and deployment list.

¹⁶Chairman of the Joint Chiefs of Staff Instruction 3030.01A, *Implementing Joint Force Development and Design* (Oct. 3, 2022). The Joint Staff has held multiple events as part of this recurring series of wargames.

as part of a plan to increase security in the Arctic region and as part of a long-term strategic plan centered on climate-driven crises.¹⁷

There is no enterprise-level DOD office with the responsibility for overseeing or managing all wargames across the department. However, a variety of DOD organizations have wargaming roles and responsibilities or conduct wargames.¹⁸

- **Office of the Secretary of Defense (OSD).** Within OSD, the Office of Net Assessment and the Cost Assessment and Program Evaluation office sponsor or run wargames.
- **The Analysis Working Group.** This group was created by the Deputy Secretary of Defense in 2021 to marshal and guide DOD's analytic capabilities so that they advance key strategic priorities and improve the information available to senior leaders. The Analysis Working Group is comprised of officials from the Joint Staff, Office of the Under Secretary of Defense for Policy, Cost Assessment and Program Evaluation, and the Chief Data Officer of the Department of Defense.¹⁹ In February 2022, the Deputy Secretary of Defense issued a memorandum directing that analysis underpinning decision products presented at a Deputy's Management Action Group or directly to the Secretary or Deputy Secretary of Defense should be transparent, robust, and well-designed.²⁰ These principles apply to analysis, including wargames, used to inform strategic decisions.
- **The Joint Staff.** The Force Structure, Resources, and Assessment Directorate (J8) manages the Wargaming Incentive Fund, Defense Wargaming Alignment Group, and Wargaming Repository, all established as part of the 2015 Deputy Secretary of Defense initiative to revitalize wargaming.²¹ The Studies, Analysis, and Gaming Division

¹⁷Pub. L. No. 117-81, §§ 1090, 334 (2021).

¹⁸DOD defines enterprise as a functional and administrative entity that exists to perform a specific, integrated set of missions and achieve associated goals and objectives, encompassing all of the primary functions necessary to perform those missions.

¹⁹Deputy Secretary of Defense Memorandum, *Analysis Working Group* (Apr. 5, 2021).

²⁰Deputy Secretary of Defense Memorandum, *Principles and Standards for Analysis Supporting Strategic Decisions* (Feb. 2, 2022).

²¹Since it was established in 2015, DOD's Wargaming Incentive Fund has received \$10 million per year to incentivize and fund wargames associated with senior leader national security focus areas. During this period, most awards from the Wargaming Incentive Fund were in the range of \$200,000 to \$500,000 and approximately 50 percent of requests were funded.

within the J8 Directorate also conducts wargames with a strategic and political-military focus for senior leader sponsors. The Joint Force Development Directorate (J7) executes the Globally Integrated War Game series and also manages the development of the Joint Experimentation Network.²²

- **The services.** Each of the services has organizations dedicated to wargaming. In addition, primary wargaming centers exist in senior service colleges such as the Army War College, the Naval War College, and the Air University. Within the services, there are varying levels of responsibility for overseeing or otherwise managing wargames. For example, the Navy has recently issued an Analytic Master Plan that designates roles and responsibilities for Navy wargames.²³
- **Combatant commands.** Combatant commands are responsible for producing plans for their respective areas of responsibility. According to Joint Publication 5-0, potential courses of action should be wargamed as part of joint planning.²⁴
- **Other DOD organizations.** The Defense Intelligence Agency, Defense Logistics Agency, Defense Threat Reduction Agency, Missile Defense Agency, and National Reconnaissance Office also sponsor or participate in wargames. The National Defense University is a center of wargaming education and also conducts wargames on behalf of DOD sponsors.

DOD Uses Wargames in Conjunction with Other Analysis to Inform Decisions

Officials across DOD and its external wargaming partners uniformly described the role and proper use of wargames as part of a cycle of research or a campaign of learning. DOD officials said that it is difficult to draw a direct link between any one wargame and a specific policy outcome, since wargames should ideally be run in series and in concert

²²The Joint Experimentation Network is a federated architecture of information platforms, services, databases, and networks—housed at the secret level—that share knowledge, information, and data about and produced by learning events including wargames, analyses, detailed study, experiments, exercises, demonstrations, and assessments. The Joint Experimentation Network is still under development.

²³Office of the Chief of Naval Operations Instruction F5420.120, *Analytic Master Plan Governance and Procedures* (May 18, 2022) (CUI). The Navy found that analysis had not been planned or coordinated at the enterprise level to deliver timely, actionable insights, and recommendations to its decision makers. The creation of its plan and governing bodies is intended to better enable force decisions to be informed by relevant analysis, and to emphasize collaboration and transparency to mitigate redundancy, stove-pipes, and gaps. Another goal is to enable greater efficiency in the application of analytic resources, to include funding and wargaming capacity.

²⁴Joint Chiefs of Staff, Joint Pub. 5-0, *Joint Planning* (Dec. 1, 2020).

with other analytical methods like live exercises, modeling and simulation, or other experiments. Officials emphasized that a single wargame should not be used as a justification for any major decision. Officials added that wargames are not predictive; that is, they do not tell decision makers what or how many weapons to buy, nor should they be solely used to prove or disprove operational concepts.

Joint planning guidance describes how wargames can be situated within a broader analytic effort. The guidance states that “wargaming and experimentation enhances [Joint Force development and design] by exploring concepts, capabilities, and future operations and by integrating results of multiple wargames and experiments to inform analysis. They provide objective substantiation, improve the credibility of analysis, enable Senior Leader validity determinations, and provide evidentiary basis for investment decisions.”²⁵

²⁵Chairman of the Joint Chiefs of Staff Instruction 3100.01E, *Joint Strategic Planning System* (May 21, 2021).

DOD Is Using Wargames to Study the National Security Risks of Climate Change



According to the 2021 National Intelligence Estimate, climate change will increasingly exacerbate risks to U.S. national security interests as the physical impacts increase and geopolitical tensions mount about how to respond to the challenge. The Department of Defense (DOD) is providing additional resources for wargames that examine the effects of climate change on DOD missions, operations, and global stability. According to Joint Staff officials, the Wargaming Incentive Fund (WIF) received an additional \$3 million in fiscal year 2022 for climate change wargames. Officials noted that the funding is particularly useful, since climate change is an issue that does not fit traditional organizational roles or have a clear space in acquisition, budget, or combat planning. DOD identifies several climate risks that can be studied through wargaming, including: critical infrastructure disruptions, sensor operations, aircraft performance, naval operations, and ground mobility and basing constraints.

Source: GAO analysis of DOD information and National Intelligence Estimate (October 21, 2021); U.S. Air Force/Airman 1st Class Sarah Dowe (photo). | GAO-23-105351

DOD organizations use wargames to inform the development of key analytical products such as strategy, doctrine and concepts, operational plans, and force structure options. Wargames may simulate potential conflicts with real-world adversaries. They may also explore specific problems like biological threats or climate change that are expected to affect national security (see sidebar). Service officials provided specific examples of how sponsors use wargames:

Army. In March-April 2022, we observed the second of a three-wargame series sponsored by the Army Futures Command to help develop, assess, and refine the Army's future operating concept.²⁶ The wargame conducted at the Army War College in Carlisle, Pennsylvania, by Army Futures Command was part of the Army's analytic effort to explore and examine the viability of future concepts for Army operations beyond 2035. The Army intends for these wargames to be experimental, not focused on achieving specific outcomes, but rather integrating human decision-making to develop a better understanding of future military problems facing the Army, joint force, allies, and partners. The wargame simulated a conflict and supported Army efforts to assess concerns related to ideas of future concepts, and examining projected capabilities, threats, and environments. Army officials said that the wargames help to inform analysis of science and technology that the Army may pursue, and help the Army target its use of modeling and simulation for further analysis on key topics identified in the wargames.

Navy. In May 2022, we observed the Naval Contested Logistics Wargame II, a wargame sponsored by the Deputy Chief of Naval Operations for Fleet Readiness and Logistics and run by the Wargaming Department of the Naval War College in Newport, Rhode Island. The wargame consisted of over 200 participants from more than 40 organizations from within the Navy and across DOD, and included players from Australia and Japan.²⁷ The wargame was the second in a three-part series supporting the sponsor's campaign of learning for contested logistics. Designers of this wargame used results from the first of the series, as well as two related logistics wargames conducted by the Center for Naval Analyses, an FFRDC, to inform its design. According to

²⁶The Army Operating Concept describes how future Army forces will prevent conflict, shape security environments, and win wars while operating as part of the Joint Force and working with multiple partners.

²⁷The wargame included players from multiple DOD organizations including the Joint Staff, Air Force, Marine Corps, Coast Guard, Indo-Pacific Command, Transportation Command, and Defense Logistics Agency. It also included players from the Royal Australian Navy and Japanese Maritime Self Defense Force.

the Navy, outputs from the wargame series will inform the development of logistics concepts of operation. Wargame results will also inform decisions on the organization, responsibilities, priorities, employment, and resourcing of distributed naval forces.

The Navy's key findings from this wargame included an advanced understanding of the types of investments—in concepts as well as in capabilities and capacities—that could most effectively deliver sustainment during a Pacific theater conflict. The wargame revealed that those investments that provided the greatest degree of flexibility for commanders, many of which are relatively low-cost, can increase resilience in the logistics system. Additionally, the wargame increased a collective understanding of the significant challenges and opportunities associated with delivering sustainment to operational forces in a contested Pacific theater.

Air Force. In odd-numbered years, the Air Force conducts a Global Engagement wargame series that focuses on combat operations in the mid-term future. The latest in this series, Global Engagement 21, was designed to explore the effectiveness of the programmed force, focused on a defense of NATO scenario with homeland defense and Arctic implications. In even-numbered years, the Air Force conducts a Futures wargame series that has a farther-future setting with a stronger focus on technology. Officials told us that lessons from these games have been applied to technology development.

Marine Corps. In 2020, the Marine Corps announced a major force design initiative planned to occur over the next 10 years, referred to as Force Design 2030. In this initiative, the Marine Corps aims to eliminate or reduce certain types of units, reorganize some formations, and reduce its total number of personnel. The Marine Corps described that the analytic underpinning for Force Design 2030 was a campaign of learning supported by a combination of exercises, experiments, wargames, and analysis.²⁸ In a 2022 update, the Marine Corps added that the outcomes of these methods underpin its investment and divestment decisions, and that its newest concepts continue to be tested through wargames, live force experiments, and exercises with the Navy and joint partners.²⁹ The Force Design 2030 Update directed that the Marine Corps Warfighting Laboratory—the service's primary wargaming organization—publish unclassified executive summaries of all service-level wargame reports

²⁸U.S. Marine Corps, *Force Design 2030 Annual Update* (April 2021).

²⁹U.S. Marine Corps, *Force Design 2030 Annual Update* (May 2022).

related to Force Design 2030 and make them available online. Additionally, the Marine Corps also plans to publish unclassified versions of all service-level war game reports within 90 days of event completion.

Space Force. In 2020, the U.S. Space Force led the Schriever Wargame for the first time.³⁰ The space-focused wargame began in 2001, was previously led by the Air Force Space Command, and is generally conducted every year.³¹ This series of wargames is designed to explore critical space issues to include investigating the military utility of new space systems, identifying solutions to common challenges, and advancing space support within air, land, sea, space, and cyberspace doctrine. Officials have cited the Schriever Wargame series as an example of using iterative wargames to explore a wide range of issues over time, and as a key mechanism for building partnerships with international participants.

The Schriever Wargames examine space and cyberspace using a multinational conflict scenario. The wargame series involves all elements of the space enterprise, including attendees from across DOD, the intelligence community, and other government departments, as well as representatives from international partners and the commercial sector. The Space Force credits the wargames with helping develop warfighters fluent in space issues; examining organizational constructs; advancing future operational concepts for space and cyberspace; influencing future strategy, doctrine, and providing information for future requirements; and informing United States and international space policy, strategy, force structure, and coalition operations. Insights and results have influenced development of the National Space Policy, National Security Space Strategy, Space Protection Strategy, and Space Doctrine. Additionally, the Space Force credits the Schriever Wargame series for influencing the creation or evolution of combined and integrated centers related to space operations.

³⁰The Schriever Wargame series is named in honor of retired Gen. Bernard A. Schriever, who is recognized as a founder of the Air Force's space and missile program.

³¹The U.S. Space Force is the newest branch of the Armed Forces, established in December 2019 under the National Defense Authorization Act for Fiscal Year 2020. As part of its creation, the Air Force Space Command was redesignated as the Space Force. Officials within the Space Force said the Space Warfighting Analysis Center conducts wargaming and other analyses to create operational concepts and for future force design, and the Space Training and Readiness Command conducts wargames and focuses on force employment, international engagement, and training.

DOD Has Not Evaluated Its Use of Internal and External Wargame Providers

DOD organizations vary in their use of internal and external wargame providers. Although internal and external wargame providers vary in their strengths and weaknesses, DOD organizations have not assessed risks associated with the department's current approach or evaluated the sufficiency of its internal wargaming capabilities. We define internal wargaming capabilities as DOD's ability to run wargames internally with government personnel—both uniformed and civilian employees—rather than contracting for wargames.

Use of Internal and External Wargame Providers Varies

DOD organizations varied in the extent to which they said they use internal and external wargaming providers. For example, U.S. Strategic Command officials told us they infrequently use external providers, such as FFRDCs and contractors, for wargaming services. Instead, they said they draw upon internal government staff and resources for nearly all of their wargaming needs. At the other end of the spectrum, officials from U.S. Indo-Pacific Command told us they rely almost exclusively on FFRDCs and contractors to run their wargames.

Secure Facilities Provide Much-Needed Space for DOD's Classified Wargames



The Marine Corp Wargaming and Analysis Center at Marine Corps Base Quantico—slated for completion in the summer of 2023, at a projected cost of \$79 million—is meant to help address DOD's need for secure spaces to conduct classified wargames. According to officials at the Marine Corps Warfighting Laboratory, most of their wargames are conducted at classified levels, and they are severely constrained from conducting highly classified wargames due to the low availability of adequately secure spaces. Officials further noted that this facility will allow the Marine Corps to double its current wargaming output and to support participation in wargames by joint, interagency, and multinational organizations.

Source: GAO analysis of Department of Defense (DOD) information (text); Naval Facilities Engineering Systems Command/Matthew Stinson (photo). | GAO-23-105351

Some DOD organizations have entities dedicated to wargames and officials told us they use contractors to varying degrees to support the efforts of these entities. For example, the Naval War College has a department that runs analytic wargames for primarily Navy sponsors, and officials told us they use contractors in a support capacity. Officials told us U.S. Central Command established a wargaming cell in 2016 and does not normally contract outside of its staff for wargaming services, although some members of its wargaming cell are contractor personnel. Similarly, the Marine Corps also has a wargaming division within its Marine Corps Warfighting Laboratory that is charged with planning and executing Marine Corps wargames, and officials told us that 15 of its 25 personnel are contractors.

Some DOD organizations are taking steps to enhance their internal wargaming capabilities. For example, the Marine Corps is constructing a new center in Quantico, Virginia, that will be able to host highly classified wargames (see sidebar). The Space Force and officials from several combatant commands told us they have efforts underway to increase their internal wargaming capabilities through creating dedicated internal wargaming positions.

Internal and External Wargame Providers Have Advantages and Disadvantages, but DOD Has Not Formally Assessed Any Risks or Evaluated Its Internal Wargaming Capabilities

DOD officials cited advantages and disadvantages of using internal and external wargame providers across several areas (see table 1).

Table 1: Areas of Concern in Using Internal and External Wargame Providers

Area of concern	Description
Capacity and timeliness	DOD relies upon external providers to meet demands from wargame sponsors, but doing so may result in reduced wargaming responsiveness and constitute an internal capability gap.
Access to sensitive information	For classified wargames, it can be more difficult for external providers to access the sensitive information they need to effectively run wargames. Lack of access to classified information can skew results.
Expertise	External providers may have specialized expertise that is lacking within DOD, but can also lack operational experience needed to run wargames.
Independence	Both internal and external providers can be subject to bias when running wargames.

Source: GAO analysis of Department of Defense (DOD) information. | GAO-23-105351

Capacity and timeliness. DOD officials said that FFRDCs and contractors provide critical surge capacity that helps DOD meet its wargame needs when internal resources are insufficient to meet demand for wargames from within the department. Officials across DOD noted that wargaming demand has either remained high or increased since 2015, and officials at the war colleges and other DOD wargaming centers told us that they cannot accept all wargame requests they receive. For example, officials at the Naval War College said they have the resources to fill about 40 percent of the demand for their wargames. To address this demand, officials from several DOD organizations said they have referred wargame requests to FFRDCs and contractors. Additionally, the Joint Staff provides funding for FFRDC and contractor-supported wargames that support senior leader priorities through the Wargaming Incentive Fund.

While officials from several organizations, including the Joint Staff's Studies, Analysis, and Gaming Division; the Center for Army Analysis; and the National Reconnaissance Office told us they had sufficient capacity and resources, officials at most combatant commands told us they do not have the wargaming personnel or other resources they need, which may constitute a wargaming capability gap. Of the 11 combatant commands, three of 11 combatant commands attested to having sufficient resources to meet current wargaming demands, and eight of 11 combatant commands told us they were not properly resourced to meet their respective wargaming needs.

Combatant command officials told us that not having dedicated wargaming staff has limited their ability to wargame rapidly and regularly when confronted with evolving real-world conditions in their area of responsibility, and has increased DOD's reliance on external wargaming providers. Other DOD officials stated that their limited wargaming

capabilities have required them to reprioritize, curtail, or even cancel some wargames.

According to officials, relying on external providers can delay sponsors' access to wargames and the resulting analytical insights. Combatant command officials said that FFRDC wargaming specialists are in high demand by the services, and this demand makes it difficult for them to get focused attention in a timely manner. Officials said that FFRDCs can take a long time to develop wargame reports after the wargame is completed, which slows the communication of results and lessons learned.

Access to sensitive information. Accessing sensitive or classified information is sometimes a challenge for external providers. Specifically, officials told us that government personnel have easier access to highly sensitive information and can order military operators' participation to achieve higher fidelity wargames. In contrast, officials told us that external wargame providers encounter access issues such as those related to the classification of wargames or supporting data. For example, restricted access to classified information on military capabilities combined with external providers' inability to compel the involvement of military operators in their wargames can cause design and execution problems. DOD officials told us that lack of access to relevant classified information during the design and execution of wargames can lead to less realistic outcomes, resulting in participants drawing flawed conclusions.

In several instances, DOD officials told us they encountered issues where the external provider lacked access to highly classified data from the intelligence community. Joint Staff officials said external wargame providers are often unable to overcome these access challenges, leading to diminished wargame design and execution. Contractor officials said that they have been delayed from receiving sensitive data and that their inability to obtain pre-decisional information from DOD had negatively affected their design and execution of future-based wargames.

Expertise. Officials told us that some external providers have critical subject matter expertise in areas where it may be lacking within DOD. For example, officials from Space Command noted their reliance on contractors for their specialized expertise with space capabilities and wargaming. They specifically noted their reliance on contractors for innovative information technology tools and technical support to meet their software programming needs. Defense industry officials noted that wargaming personnel must be properly trained for addressing cyber risks. Similar to other new or emerging threat areas, the most advanced levels of expertise may exist primarily within the private sector.

Other DOD officials told us that FFRDC expertise is particularly useful in other specific areas. For example, officials from several DOD organizations noted that certain FFRDCs have exceptional expertise with potential adversaries' military structures and operations, granting them an advantage when wargaming a scenario involving those threats. DOD officials also cited the benefits of using secure FFRDC and contractor facilities for classified wargames.

However, DOD officials also said external wargaming providers sometimes lack operational experience, resulting in uninformed analysis and insights from the wargame. For example, DOD agency officials noted that contractors can lack the military experience required for running their wargames in a realistic way. Another official noted an example where an FFRDC lacked knowledge of certain underwater capabilities that were vital to the wargame, which resulted in the FFRDC being unable to properly adjudicate player moves in the game.

Independence. DOD, FFRDC, and contractor officials said wargames are to some degree vulnerable to bias—such as designing a wargame that will likely result in a foregone conclusion or using unrealistic assumptions that could also skew results. They added that wargame providers must remain vigilant in protecting against bias as they design, execute, and analyze wargames.

DOD and FFRDC officials told us that while all external providers are subject to government oversight and acquisition regulations for contract performance, FFRDCs are purposefully structured to promote analytic independence and objectivity. For example, an FFRDC can refuse to provide wargaming support when its objectivity is compromised by a DOD sponsor. Contractors also told us they have safeguards to separate—or “firewall”—their wargaming services from their acquisition offices, and DOD officials said they evaluate contractors for potential conflicts of interest and provide oversight to the wargaming services provided by contractors. Similarly, Naval War College and Marine Corps Warfighting Laboratory officials told us that they can provide analytical independence since their wargame personnel are not in the same chain of command as their sponsors, so they can push back against sponsor pressure to unduly bias the wargames they run.

However, DOD officials said that other internal providers may not have sufficient independence from their sponsors and may be more prone to bias—either to avoid embarrassment if the results are unflattering to the sponsor, or if the results do not align with senior leaders' expectations. Additionally, DOD officials also told us that using contractors for wargames introduces the potential for bias and conflicts of interest, since

there is a financial incentive for producing outcomes that favor the wargame sponsor, instead of executing an objective wargame with results that may challenge the sponsor's assumptions or expectations. Combatant command officials told us of a wargame conducted by an aerospace contractor that led the command to question the extent to which the contractor may have been using the wargame to suggest the procurement of systems it was also selling.

Officials from multiple DOD organizations said that they favor government-developed and non-proprietary software programs and systems used for wargaming. These allow for transparency into the game system and control over the analysis. Officials said that they are aware of some proprietary systems being developed by external wargame providers, and stated that DOD wargame sponsors should exercise caution if proprietary systems are used.

DOD has not formally assessed its use of internal and external wargame providers, including the sufficiency of its internal wargaming capabilities, to identify and address or mitigate any risks or gaps. Multiple officials across DOD told us that these actions would better position the department to provide oversight of wargames. For example, Joint Staff officials told us they do not have a regular grading and feedback system for external wargaming providers, and officials from one service told us that contractors should have more controls placed on them, since they may design their wargames to please their sponsor and secure future contracts. Additionally, combatant command officials said that DOD would benefit from a standardized approach toward governance and oversight of external providers and their performance.

Standards for Internal Control in the Federal Government states that agency management should identify, analyze, and respond to risks related to achieving defined objectives.³² Additionally, management should consider all significant interactions within the entity and with external parties, changes within the entity's internal and external environment, and other internal and external factors to identify risks throughout the entity. In a 2015 memo on wargaming, the then Deputy Secretary of Defense stated that efforts must be made to incorporate commercial and defense industry expertise into the larger wargaming effort, adding that their integration into a broader wargaming enterprise will ensure its vitality and flexibility.³³

³²[GAO-14-704G](#).

³³Deputy Secretary of Defense Memorandum, *Wargaming and Innovation* (Feb. 9, 2015).

Absent an assessment of the issues posed by its use of internal and external wargame providers, DOD may not identify or effectively mitigate risks associated with its reliance on external wargaming providers, limited access to information, lack of expertise in key areas, or exposure to potential bias and conflicts of interest. Additionally, without assessing the sufficiency of its internal wargaming capabilities, DOD lacks an understanding of the extent and distribution of its internal wargaming capabilities and may lack information to identify and resolve potential internal capability gaps. Taking such action would enable DOD to more efficiently and effectively steer analytic resources where they are most needed, mitigate any risks posed by DOD's current approach to providing wargaming capability, and ensure that decision makers can draw from the valuable insights wargaming provides.

DOD Employs Practices to Ensure Wargame Quality, but Efforts Can Be Enhanced

DOD wargaming organizations use frameworks to help ensure quality in their wargames and participate in collaborative forums on wargaming.³⁴ However, officials throughout the department cited several difficulties that inhibit collaboration and wargame quality including: (1) barriers to accessing wargame data, (2) reliance on informal information sharing about upcoming wargames, and (3) the lack of standard education and qualifications for wargamers.

DOD Uses Wargame Frameworks That Share Common Principles

While DOD organizations conducting wargames use no single quality framework, the frameworks used by DOD organizations share common quality principles. Officials from services and combatant commands identified 10 wargame quality frameworks in use across DOD.³⁵ Some DOD organizations developed their own frameworks, including those of the Army War College, Center for Army Analysis, Marine Corps Warfighting Laboratory, Naval War College, and U.S. Central Command. DOD officials also cited the United Kingdom Ministry of Defence wargaming handbook and three books published by private authors as helpful in guiding their wargaming activities.




Though the 10 quality frameworks identified by DOD officials differ in source and purpose, we identified 13 common principles shared across the frameworks. DOD officials reviewed the common principles we identified and generally agreed that they represent basic principles for wargame quality. As shown in figure 3, these 13 common principles cover

³⁴The documents that DOD organizations identified as being the source of wargaming leading practices range from handbooks, guidebooks, standard operating procedures, regulation, planning guidance, and books on wargaming. We are calling these frameworks.

³⁵See appendix III for a list of the 10 quality frameworks identified by DOD officials.

wargame design and development, the conduct of the wargame, and wargame documentation and analysis.

Figure 3: GAO Identified 13 Common Principles of the Wargame Quality Frameworks Used by Department of Defense Organizations

Wargame design and development 	Sponsors and designers should coordinate to set appropriate wargame objectives.
	Wargame play should focus on activities that are well-simulated by wargames.
	Wargame design should include an analysis plan that involves appropriate data collection and analysis.
	Players should be selected based on their expertise related to necessary game roles.
	Scenario design should have flexible methods available and should select a design to best address the wargame objectives.
	Players should have access to information, databases, and models that support game decisions.
	Wargames should have an assigned control group of adjudicators or umpires to manage game actions and determine outcomes of actions.
	Wargame designers should document their design through rules that can be understood by the players.
Wargame conduct 	Wargame design should be tested through a development process.
	The adversary or “Red Cell” should be played by relevant experts in a faithful but unpredictable manner.
Wargame documentation and analysis 	Wargames should have concluding discussions with participants that identify reasons for decisions made during the game and lessons learned during the game.
	Wargame design, conduct, findings, and conclusions should be documented in a post-game report.
	Conclusions from wargames should be used for analysis but should not be the sole source for decisions; rather, they should be integrated with other analytic methods to help inform decisions.

Source: GAO analysis of U.S. Department of Defense, United Kingdom Ministry of Defence, and private author information. | GAO-23-105351

While these principles are common across the 10 quality frameworks, their application may vary based on the type of wargame, the framework guidance, and the organizational preference of the wargame sponsor or provider. For example,

- **Game types can affect the application of quality principles.** Adjudication may vary in nature based on the complexity of the wargame. Some wargames may use a team of experts to determine

outcomes, while others may use more rigid game mechanics such as chance or a table of values.³⁶

- **Framework guidance and organizational preference can also affect the application of quality principles.** For example, some frameworks recommend the use of intelligence analysts to portray the adversary as red cell players, but some frameworks also recommend staffing the red cell with operations experts that can help develop realistic plans where intelligence analysts may lack experience.

Officials in OSD, Joint Staff, service, and combatant command wargaming organizations each emphasized the variation of wargame types and organizational needs as a reason for the use of multiple frameworks across the department.

DOD Participates in Collaborative Wargaming Forums

DOD officials and FFRDC representatives identified collaborative forums that support quality in wargaming efforts. These forums serve various purposes in enhancing wargaming efforts, such as through sharing information, leading practices, and resources, and helping to educate potential wargaming professionals. See table 2 for a list of collaborative wargaming forums identified by DOD officials and FFRDC representatives.

³⁶Adjudication is the method by which the outcome of actions by a player or interactions of players are determined. Adjudication methods vary based on game type, including the use of outcomes decided by subject matter experts, more rigid adjudication based on tables of pre-determined probabilities, or other methods.

Table 2: Collaborative Wargaming Forums Used by DOD

Forum	Sponsor	Purpose	Classification level
Defense Wargaming Alignment Group	Joint Staff J8: Force Structure, Resources, and Assessment Directorate	Holds monthly conference call among Department of Defense (DOD) wargaming professionals to discuss ongoing and upcoming DOD wargaming activities and the use of Wargaming Incentive Fund resources.	Secret
Connections Wargaming Conference	Connections is an independent organization ^a	Holds annual conference to promote collaboration among all segments of the wargaming community. Also provides online public wargaming resources.	Unclassified
Georgetown University Wargaming Society	Georgetown University	Hosts public events featuring wargaming professionals, and provides Georgetown University students education in professional wargaming, access to wargaming events and resources, and interface with federal officials.	Unclassified
Military Operations Research Society (MORS)	MORS is an independent organization ^b	Conducts meetings and workshops on wargaming and other topics. Also provides a 5-day professional wargaming course.	Unclassified and Secret
Women's Wargaming Network	The network is an independent organization	Provides networking opportunities and wargaming experience to enhance inclusion of women in professional wargaming.	Unclassified

Source: GAO analysis of wargame forum information and interviews. | GAO-23-105351

^aConnections originated with the U.S. Air Force as its sponsor.

^bThe Military Operations Research Society originated with the U.S. Navy as its sponsor.

DOD's primary internal collaborative forum for wargames is the Joint Staff-led Defense Wargaming Alignment Group, which holds secret-level conference calls every month. The then Deputy Secretary of Defense established the Wargaming Alignment Group in 2015 as part of an initiative to reinvigorate wargaming, and participation in it is voluntary.³⁷ Officials from Joint Staff J8, its hosting office, cited benefits from the Wargaming Alignment Group including information sharing, networking, and communication about the Wargaming Incentive Fund. Officials from

³⁷Deputy Secretary of Defense Memorandum, *Wargaming Summit Way Ahead* (May 8, 2015). The Defense Wargaming Alignment Group is meant to better link wargames with senior leader priorities, with a strong focus on information dissemination. The memorandum adds that with input from the group, the wargaming enterprise will be designed to share senior leader priorities with wargame sponsors and the community of practice, incentivize wargames associated with those priorities, collect and share wargaming best practices, and highlight wargame results in appropriate senior leader forums.

some services and combatant commands stated that the Wargaming Alignment Group is a valuable means of collaboration and access to Wargaming Incentive Fund resources. However, officials from other services and combatant commands stated that the forum is overly focused on administration of Wargaming Incentive Fund resources, and they participate less in the forum because they are unlikely to receive these resources.

Several Factors Inhibit Collaboration and Wargame Quality

Officials throughout the department cited several factors that inhibit collaboration and wargame quality including: (1) barriers to accessing wargame data, (2) reliance on informal information sharing about upcoming wargames, and (3) the lack of standard education and qualifications for wargamers.

Barriers to Accessing Wargame Data Hinder Learning

DOD has taken some actions to improve the sharing of wargame data, but wargame officials reported several difficulties with the collection, storage, and management of these data that hinder the ability of DOD organizations to access this information and learn from each other's wargaming efforts. Wargame data include the final reports that describe wargames' design, conduct, findings, and conclusions. It also can include additional records of interest to wargame designers and consumers, such as data sets used during the game on red and blue force capabilities, the organization of forces, and contact information for further inquiries related to wargames.

First, in 2015, DOD took an initial step toward managing wargame data. The then Deputy Secretary of Defense directed DOD's wargaming centers to populate a wargaming repository with information about wargaming organizations and available tools, as well as a summary of recent and planned wargames. The effort was intended to help the department "understand the existing capacity and capability available throughout the wargaming enterprise."³⁸ In response, DOD created the Wargaming Repository (Repository), which officials told us is now managed by the Joint Staff J8 Force Structure, Resources, and Assessment Directorate. Officials from some services and combatant commands stated that the Repository is valuable to their work, helping them to be aware of existing analysis and network with other wargaming professionals.

³⁸Deputy Secretary of Defense Memorandum, *Wargaming Summit Way Ahead* (May 8, 2015).

However, wargaming officials across the department raised concerns about the Repository. In particular,

- Joint Staff officials responsible for managing the Repository said that its entries are not comprehensive, and that DOD organizations are not required to upload their wargame data to the Repository.³⁹
- Other officials said they do not upload their wargame information to the Repository, stating that it is difficult to navigate, contains entries without actionable information, lacks consistent wargame reporting standards, is limited to the secret classification level, and is of limited value due to low participation.
- Several service wargaming officials we spoke with were not aware that the Repository existed and had not accessed wargame information there. Others were under the false impression that it was no longer being maintained.

Second, we found that organizations across DOD were using different information systems to collect and store wargame data. For example, in 2020, the Joint Staff J7 Directorate for Joint Force Development established a DOD-wide information system called the Joint Experimentation Network that is being designed to house data related to all forms of DOD experimentation, including wargame data. The Army uses an information system called Forge to store wargame data, and the Navy is developing a digital platform in support of its Analytic Master Plan that also houses Navy wargame data. Additionally, officials from the National Reconnaissance Office told us that it also maintains and plans to upgrade its own classified, online wargame repository.

Officials said that it is not necessarily problematic that some wargaming organizations are proactively managing their own data in these ways, but these data are housed in unlinked systems without protocols for regularly sharing data. Officials explained that the Joint Experimentation Network is not meant to replace or consolidate other information systems, but to pull relevant data about exercises and experiments through system-to-system linkages. A Joint Experimentation Network goal is to link DOD analytic information systems to support information sharing, and officials from OSD Cost Assessment and Program Evaluation stated that relevant contents of the Repository were identified and replicated in the Joint Experimentation Network shortly after its establishment in 2020.

³⁹According to Joint Staff officials, any sponsors responsible for wargames funded by the Wargaming Incentive Fund are required to upload information about their wargames to the Wargaming Repository, though there is not a requirement for other wargame sponsors to upload their wargame information to the Repository.

However, officials said that Repository information has not been transferred regularly to the Joint Experimentation Network since that time.

The Army and the Navy have ongoing efforts to better manage and link their analytic information. According to officials from the Army, Navy, and Joint Staff, they have begun to link the Army and Navy systems with the Joint Experimentation Network. However, data linkages have not yet been formalized or completed between the service systems and the Joint Experimentation Network.

Despite actions across the department to collect, store, and manage wargame data, the data remains fragmented because DOD does not have a department-wide approach for effectively managing wargame data. Such an approach would, at minimum, have requirements or standards for reporting wargame data and address the fragmentation of data across multiple systems. Officials from across DOD expressed the importance of more effectively recording and sharing wargame data and said it could improve wargame quality and further innovation in the field.

Furthermore, DOD has emphasized the importance of data management and enterprise-wide data access and availability. DOD's September 2020 data strategy states that data is a strategic asset for DOD, is a high-interest commodity, and must be leveraged in a way that brings both immediate and lasting military advantage DOD.⁴⁰ Further, data must be made available for use by all authorized individuals and entities through appropriate mechanisms. DOD's 2020 data strategy further establishes goals to make data accessible, linked, and interoperable. Additionally, GAO Fragmentation, Overlap, and Duplication guidance emphasizes the reduction of fragmentation when more than one federal agency or organization within an agency is involved in the same broad area of national need and opportunities exist to improve service delivery.⁴¹

In the absence of a department-wide data management approach, barriers to accessing wargame reports and other information remain—results are left completely unrecorded or unshared within organizational stovepipes. As a result, wargame sponsors or designers do not have the benefit of consulting a comprehensive database of wargames prior to pursuing their own, losing opportunities to learn from others and leverage earlier work. Additionally, DOD officials seeking to perform meta-analysis

⁴⁰Department of Defense, *DOD Data Strategy: Unleashing Data to Advance the National Defense Strategy* (Sept.30, 2020).

⁴¹GAO, *Fragmentation, Overlap, and Duplication: An Evaluation and Management Guide*, [GAO-15-49SP](#) (Washington, D.C., April 14, 2015).

of wargames conducted on specific scenarios or adversaries are currently limited from effectively doing so, and are hindered from overseeing the department's wargaming efforts to ensure they are adequately addressing analytical priorities.

Informal Approach to Sharing Information on Upcoming Wargames Inhibits Collaboration

A lack of information sharing on upcoming wargames inhibits effective collaboration, resulting in missed opportunities to leverage expertise, share resources, and obtain maximum value from wargames. In particular, DOD officials told us that their lack of visibility of wargames being conducted outside their organizations has hindered collaboration. Officials from some services and combatant commands told us they maintain their own wargame calendars to keep track of different events, to de-conflict their schedules, and to plan to participate in multiple wargames where their presence has been requested. Joint Staff officials stated that schedule coordination occurs largely through discussions during Defense Wargaming Alignment Group calls, voluntary submissions on the Joint Experimentation Network, and personal networking among DOD organizations.⁴²

However, wargame officials stated that this informal approach to information sharing was inhibiting effective collaboration. Specifically, combatant command officials stated they often receive requests for support on short notice, and as a result, are not able to prioritize and assist to their greatest extent possible. These officials stated that it would be valuable to have a common operational picture to help wargamers prioritize their support to other organizations' wargames. Officials from OSD Cost Assessment and Program Evaluation and from some services and combatant commands stated that a more formal approach to information sharing about upcoming wargames would be helpful and likely improve collaboration on wargaming.

DOD guidance emphasizes the importance of information sharing. Chairman of the Joint Chiefs of Staff Instruction 3150.25H, *Joint Lessons Learned Program* states that DOD should maintain a knowledge management and continuous improvement program that supports organizational learning from experience gained in wargames and from

⁴²According to Joint Staff officials, the Joint Experimentation Network aims to include wargames in an integrated calendar of learning events and activities, but does not currently have that feature.

other sources.⁴³ This program should incorporate collaborative discussion and decision-making across DOD organizations that supports this organizational learning. A February 2022 Deputy Secretary of Defense Memorandum, *Principles and Standards for Analysis Supporting Strategic Decisions*, provides principles and standards from the DOD Analysis Working Group to guide strategic analysis.⁴⁴ One principle of quality strategic analysis listed in the memorandum is that analysis should be transparent, as greater transparency will foster collaboration, understanding, and better decisions. Additionally, documenting analytic work will assist future analysis and support DOD efforts to communicate with the public, Congress, and allies.

DOD's information sharing is inhibited in part by two challenges: (1) DOD has not identified a clear lead organization to create a common operational picture or master calendar of what wargames are occurring when and where, and as such none has been created, and (2) DOD organizations are not required to share basic information about upcoming wargames. These challenges impede any effort to keep a common operational picture or master wargame calendar so that organizations can effectively collaborate and leverage expertise. DOD officials told us that these issues—if addressed—would improve collaboration across the department on wargaming.

DOD's wargaming information sharing efforts would benefit from the designation of a lead organization to create and maintain a common operational picture or master wargaming calendar and guidance requiring DOD organizations to share information about their upcoming wargames. These steps would improve visibility of what wargames will be occurring and when, and allow wargaming personnel to effectively prioritize and schedule their activities, leverage their expertise, and share resources.

The Lack of Standard Wargaming Education and Qualifications for Personnel May Impede Wargame Quality

No service has developed a standard educational curriculum or program to teach wargaming skills and develop wargaming competency. As a result, there are no professional qualifications for wargamers, meaning that the services have no designators, codes, or other identifiers for those

⁴³Chairman of the Joint Chiefs of Staff Instruction 3150.25H, *Joint Lessons Learned Program* (Dec. 30, 2021)

⁴⁴Deputy Secretary of Defense Memorandum, *Principles and Standards for Analysis Supporting Strategic Decisions* (Feb. 2, 2022).

who possess wargaming skills, knowledge, and experience. Some services have elective wargaming courses. For example:

- The Army War College piloted a Wargame Designer Course in 2022, intended to develop skilled designers of wargames that can improve decision-making, training, and education in Army, DOD, and other government organizations.
- The Naval Postgraduate School offers three wargaming courses, according to officials, and one course is required for operations analysis and defense analysis graduate students. Further, it provides 1-week and 2-week wargaming courses at other locations based on demand.
- Air Force officials stated that they have elective courses in place and under development.
- Marine Corps officials stated that Marine Corps University supplements officer education with wargaming electives and seminars.

Additionally, DOD sometimes sends personnel to wargaming courses sponsored by wargaming forums, such as a 5-day wargaming certification course offered by the Military Operations Research Society. Further, military personnel may attend wargaming forum meetings to support their ongoing professional development. However, none of these educational efforts result in service-approved wargaming qualifications—a way to certify or accredit those who have wargaming skills, knowledge, and experience—making it difficult for wargaming organizations to identify competent wargaming professionals.

For example, DOD officials from multiple organizations reported difficulty in finding or developing sufficiently qualified experts who can portray the adversary in wargames. Experts who can portray an adversary are referred to as red cell players; are experts commonly drawn from the intelligence community; and are heavily tasked to participate in DOD's many wargames. DOD has made efforts to enhance red cells, creating an advisory office—the OSD Red Team—to assist with quality representation of adversaries. Officials from some DOD organizations told us that they have established relationships with DOD intelligence offices to provide red cell expertise, and use FFRDC and contractor experts to help address staff shortcomings. Despite these efforts, DOD officials said that they still face problems with identifying qualified red cell players due to the lack of standard education or qualifications for these players, reducing the fidelity of adversary representation in wargames.

Absent standard wargaming education and qualifications, DOD officials said they seek out personnel who have related analytic expertise to fill wargaming positions. According to these officials, analytic professionals such as operations research analysts receive some wargaming education as part of their professional development. The officials stated that operations research analysts, systems analysts, simulation operations specialists, and strategists have some preparation for wargaming positions due to their analytic, planning, and field experience. Officials from some services and combatant commands also use other methods for filling their wargaming positions, such as selecting personnel that attend elective wargaming courses and seminars or finding individuals with wargame hobby interest. Even with these efforts, officials emphasized that DOD organizations must frequently train their staff on the job or send them for further education when they assume wargaming roles. This reduces the time these staff are available to fulfill their core duties.

DOD guidance identifies the value of strategies and staff development to pursue agency goals. Chairman of the Joint Chiefs of Staff Instruction 1800.01F, *Officer Professional Military Education Policy*, states that the intent of the professional military education vision is the development of strategically-minded joint warfighters who think critically and can creatively apply military power to inform national strategy, conduct globally integrated operations, and fight under conditions of disruptive change.⁴⁵ Additionally, the Joint Chiefs of Staff's *Developing Today's Joint Officers for Tomorrow's Ways of War* states that the professional military education enterprise must be dynamic, periodically assessing its programs, validating missions and focus, and determining gaps and where new programs are needed.⁴⁶ Further, *Standards for Internal Control in the Federal Government* states that agency management should demonstrate a commitment to recruit, develop, and retain competent individuals.⁴⁷

However, services continue an ad hoc approach to attaining qualified wargamers and have not evaluated the costs and benefits of developing standard education and corresponding qualifications for wargaming

⁴⁵Chairman of the Joint Chiefs of Staff Instruction 1800.01F, *Officer Professional Military Education Policy* (May 15, 2020).

⁴⁶Joint Chiefs of Staff, *Developing Today's Joint Officers for Tomorrow's Ways of War: The Joint Chiefs of Staff Vision and Guidance for Professional Military Education and Talent Management* (May 1, 2020).

⁴⁷[GAO-14-704G](#).

personnel, including those for red cell players. Service officials acknowledged that more effectively educating wargamers and creating qualifications could increase wargame quality. Additionally, officials said that the services have unique wargaming needs, and that each service should be responsible for evaluating the costs and benefits of creating standard education and qualifications.

Until the services take steps to evaluate whether they should develop standard wargaming qualifications and education, DOD may be missing opportunities to build a more competent wargaming workforce, reduce reliance on external wargame providers, improve wargame quality, and gain full value from this useful analytic method.

Conclusions

There is general acceptance of wargaming as a valuable analytic method across DOD, and wargames are used widely across the department for different purposes. DOD organizations largely have autonomy to wargame according to their needs and preferences. DOD uses internal and external wargame providers to run wargames, but doing so poses several issues, including reliance upon external providers to meet wargame demand. However, DOD has not assessed its use of internal and external wargame providers or any risk or gaps in its current approach. Without such an assessment and taking action to address or mitigate any risks, DOD cannot effectively ensure its approach is meeting the needs of the department.

DOD organizations use multiple frameworks of leading practices to guide the design, execution, and analysis of their wargames. However, DOD wargaming could be enhanced through several actions. First, DOD could better benefit from wargames and the insights they offer by developing an approach for effectively managing wargame data. Second, DOD could take steps to improve collaboration by designating a lead organization to create a master wargaming calendar and guidance requiring DOD organizations to share information about their upcoming wargames. This would foster more enterprise-level knowledge, awareness, and expert participation. Lastly, the services could evaluate the costs and benefits of developing standard education or qualifications for their wargaming personnel, including those who serve in the important role of representing adversaries. By taking these actions, DOD could better ensure the quality of its wargaming efforts as it prepares for the challenges of countering near-peer adversaries.

Recommendations for Executive Action

We are making the following 10 recommendations to DOD:

The Secretary of Defense should ensure that the appropriate officials conduct an assessment of the department's use of internal and external wargaming providers, including the sufficiency of its internal wargaming capabilities, to identify any risks or gaps. (Recommendation 1)

The Secretary of Defense should ensure, following a completed assessment of the department's use of internal and external wargame providers, that the appropriate officials take actions to address or mitigate any identified risks or gaps. (Recommendation 2)

The Secretary of Defense should ensure the Analysis Working Group develops and implements a department-wide approach for effectively sharing wargame data that, at a minimum, establishes requirements or standards for reporting wargame data and addresses the fragmentation of data across multiple systems. (Recommendation 3)

The Secretary of Defense should identify a lead organization to create and maintain a common operational picture or master calendar for wargames. (Recommendation 4)

The Secretary of Defense should issue guidance requiring DOD organizations to share information about their planned wargames with the lead organization designated to maintain a common operational picture or master calendar for wargames. (Recommendation 5)

The Secretary of the Army should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation. (Recommendation 6)

The Secretary of the Navy should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation. (Recommendation 7)

The Secretary of the Navy should ensure the Commandant of the Marine Corps evaluates the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implements any findings from the evaluation. (Recommendation 8)

The Secretary of the Air Force should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation. (Recommendation 9)

The Secretary of the Air Force should ensure the Chief of Space Operations evaluates the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implements any findings from the evaluation. (Recommendation 10)

Agency Comments

We provided a draft of this report to DOD for review and comment. In written comments (reproduced in appendix IV), DOD concurred with our recommendations. DOD also provided two additional comments. First, DOD commented that it agreed that adversary representation in wargames is an area needing continued improvement and that the OSD Red Team created in 2020 is well positioned to assist with improving representation in wargames. We cited this organization in our report and agree that it is well positioned to assist with addressing adversary representation. Second, the Army clarified that the Army Futures Command, instead of the Army War College, ran a wargame examining the viability of future Army concepts beyond 2035. As a result, we made this technical correction update in our report.

We are sending copies of this report to appropriate congressional committees; the Secretaries of Defense, the Army, the Navy, and the Air Force; the Chairman of the Joint Chiefs of Staff; the Commandant of the Marine Corps; the Chief of Space Operations; and other interested parties. The report is also available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-5431 or RussellC@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 V.



Cary B. Russell
Director, Defense Capabilities and Management

Appendix I: Objectives, Scope, and Methodology

Objectives

This report examines (1) the scope of the Department of Defense's (DOD) wargaming activities; (2) DOD's use of internal and external wargame providers; and (3) the extent to which DOD ensures the quality of wargames.

Scope and Methodology

For all our objectives, we reviewed relevant requirements, policies, budgeting and cost information, handbooks, and wargaming literature. We focused on DOD organizations identified as currently active, or being knowledgeable, in DOD analytic wargaming based upon our review of background information.¹ The scope of our analysis included over 50 organizations drawn from the Joint Staff, combatant commands, military departments, DOD agencies and offices, and from external wargaming providers—federally funded research and development centers (FFRDCs) and contractors.

For our first objective, we obtained and analyzed documentation, interviewed and corresponded with knowledgeable officials, and reviewed relevant DOD wargaming policies and guidance. We used literature reviews and expert referral to identify and directly observe two DOD service-level wargames in 2022, one wargaming course offering, and one collaborative wargaming forum.² We collected qualitative data from each of these four events through direct observation and qualitative analysis to identify key themes that emerged based on our observations.

For our second objective, we selected a subset of organizations identified for our first objective in addition to organizations identified during the course of the audit using a non-generalizable sampling approach

¹Background information included guidance; DOD instructions; Joint Publication 5-0, *Joint Planning* (Dec. 1, 2020) and then-Deputy Secretary of Defense Robert Work's wargaming memoranda (2015) as well as other sources such as wargaming literature and background materials from DOD academic institutions, federally funded research and development centers reports; Congressional Research Service reports, and wargaming articles published by DOD and others.

²The service-level wargames included an Army Futures Command Future Study Program wargame involving future concepts held in Carlisle Barracks, Pennsylvania, and a Naval War College wargame involving contested logistics held in Newport, Rhode Island. The wargaming course attended was the Military Operations Research Society certificate in wargaming offering, held online. The collaborative wargaming forum was the Connections 2022 conference held in Alexandria, Virginia.

involving a combination of sampling strategies.³ We obtained and analyzed documentation and reviewed relevant DOD wargaming policies and guidance. We also interviewed and corresponded with knowledgeable officials related to the sufficiency of internal DOD wargaming capabilities and the use of external wargaming support. We determined that the component of risk assessment was significant to this portion of our second objective, along with the underlying principle that management should identify, analyze, and respond to risks related to achieving defined objectives.⁴ Additionally, management should consider all significant interactions within the entity and with external parties, changes within the entity's internal and external environment, and other internal and external factors to identify risks throughout the entity.

For our third objective, we obtained and analyzed documentation, interviewed and corresponded with knowledgeable officials, and reviewed relevant DOD wargaming policies and guidance. We asked officials from each service and combatant command to identify wargame quality frameworks in use by their organization. An analyst reviewed each of the 10 frameworks these officials identified to assess them for common principles, and a second analyst reviewed this assessment to determine agreement. DOD officials reviewed the common principles we identified and generally agreed that they represent basic principles for wargame quality.

We also analyzed information and interviewed officials to obtain views on other practices that contribute to quality wargaming such as collaboration, information sharing, and training and education. We identified collaborative wargaming forums in which DOD officials participate and attended one of these forums.⁵ We collected qualitative data from each of these efforts to identify key themes that emerged based on our observations and compared them against DOD criteria and other evaluative criteria to support our recommendations.

³Sampling strategies included purposeful, expert referral, and certainty (i.e., entire population of combatant commands).

⁴[GAO-14-704G](#).

⁵The collaborative wargaming forum was the Connections 2022 conference held in Alexandria, Virginia.

We determined that the control environment component of internal control was significant to this objective, along with the underlying principle that management should demonstrate a commitment to recruit, develop, and retain competent individuals.

We interviewed officials or, where appropriate, obtained documentation from the following organizations:

Office of the Secretary of Defense (OSD)

- Cost Assessment and Program Evaluation
- Office of Net Assessment
- Office of the Under Secretary of Defense (Policy)
- Red Team

Joint Staff

- Joint Force Development Directorate (J7)
- Joint Force Structure, Resources, and Assessment Directorate (J8)
 - Studies, Analysis, and Gaming Division

Services

Army

- Army War College
- Army Futures Command
 - Combat Capabilities Development Command Analysis Center
 - Combat Capabilities Development Command Aviation and Missile Center
 - Combat Capabilities Development Command Soldier Center
 - The Research and Analysis Center
 - Army Futures and Concept Center
 - Center for Army Analysis

Navy

- Office of the Chief of Naval Operations
- Fleet Forces Command
- Naval Forces Central Command
- Naval Postgraduate School
- Naval Special Warfare Command
- Naval War College
- Navy Warfare Development Command

Air Force

- Air Force Headquarters
- Air Force Futures
- Air Force Materiel Command
- Air Force Air Mobility Command
- Air University – LeMay Center for Doctrine Development and Education
- Air Force Research Laboratory

Marine Corps

- Marine Corps Warfighting Laboratory

Space Force

- Space Force Headquarters
- Space Warfighting Analysis Center
- Space Training and Readiness Command

Combatant Commands

- Africa Command
- Central Command
- Cyber Command
- European Command
- Indo-Pacific Command

- Northern Command
- Southern Command
- Space Command
- Special Operations Command
- Strategic Command
- Transportation Command

Other DOD Agencies and Offices

- Defense Advanced Research Projects Agency
- Defense Intelligence Agency
- Defense Logistics Agency
- Defense Threat Reduction Agency
- Missile Defense Agency
- National Defense University
- National Reconnaissance Office

FFRDCs

- Center for Naval Analyses
- Institute for Defense Analyses
- MITRE Corporation
- RAND Corporation

Contractors

- BAE Systems
- Booz Allen Hamilton
- Lockheed Martin

Other Non-DOD Institutions

- Georgetown University Wargaming Society
- Military Operations Research Society

Appendix II: Wargame Costs

To describe DOD's level of investment in wargaming, we requested information on the costs of wargames from fiscal year 2017 through 2021 from 42 DOD organizations by developing and distributing a standard data request. To conduct the data request, we developed informational fields covering, among other things, wargame names and objectives, budgeting and funding details, and costs. We provided a draft of the data request to a Joint Staff subject matter expert for their review. To maximize our responses to the data request, we sent reminder emails to encourage officials to complete the request. Upon receiving the data, we requested further information to assess its reliability. Of the 42 DOD organizations we queried, 35 organizations provided wargaming costs and seven organizations did not provide any costs.

DOD organizations reported to us that they spent at least \$279 million on wargames from fiscal years 2017 through 2021, but this is not a comprehensive or reliable cost calculation because DOD organizations are not required to budget for or track their wargaming costs.¹ Thus, this represents the minimum amount of costs incurred by DOD as reported by DOD organizations who responded to our request for wargaming cost data.

Officials at several DOD organizations told us that they request funds for wargames as part of their annual budgeting process. Officials at other DOD organizations said that they do not specifically budget for wargames and instead use various types of funding on an as-needed basis. For example, DOD's Wargaming Incentive Fund makes available \$10 million per year to incentivize and fund wargames associated with senior leader national security focus areas.² According to DOD officials and documentation, the Wargaming Incentive Fund allocated 60 percent of its funds for contracts with several FFRDCs to design and execute wargames, and the remaining 40 percent of funds is intended to cover other wargaming costs, such as travel costs.

DOD officials said isolating wargaming costs was difficult because wargaming is one among several analytic tools that they continuously use as part of their analytic mission. For example, an official with the Joint Staff (J8) Studies, Analysis, and Gaming Division stated that wargaming

¹DOD officials told us that organizations have the responsibility to resource and meet their own analytic needs, and there would be no perceived benefits from imposing separate budgeting requirements for wargaming.

²DOD established the Wargaming Incentive Fund in 2015. According to officials, most awards from the Wargaming Incentive Fund are in the range of \$200,000 to \$500,000 and approximately 50 percent of requests are funded.

expenses are included within the overall costs of executing the division's routine analytic operations, and they do not track staff hours and the amount of salaries spent on wargaming. This Joint Staff J8 division conducts wargames in the Pentagon with full-time civilian and military staff, and does not bill wargame sponsors for the wargaming support they provide, so they could not isolate specific wargaming costs.

According to DOD officials, summing the costs spent on external wargaming providers is also problematic. For example, officials with the U.S. European Command told us they do not track the percentage of time each contractor spends on wargaming-specific efforts. In another instance, officials from the Defense Logistics Agency said obtaining costs from external wargaming providers would require extensive forensic research into military interdepartmental purchase requests.³

³The General Services Administration describes a Military Interdepartmental Purchase Request as allowing military agencies the opportunity to obligate funds from a finance and accounting office to federal agencies for the purpose of purchasing products and services.

Appendix III: Wargame Quality Frameworks Identified by Department of Defense Officials

We interviewed or corresponded with Department of Defense (DOD) officials from analytic wargaming offices within each of the services and each combatant command and asked whether they apply any specific quality frameworks to their wargaming activities. Table 3 lists the quality frameworks identified by DOD officials from the relevant wargaming offices.

Table 3: Wargame Quality Frameworks Identified by DOD Wargaming Professionals

Analytic Wargame Quality Frameworks

Center for Army Analysis. *Wargaming Study Guide*. Fort Belvoir, VA, October 2021.

COL Appleget, Jeff, USA (RET.), COL. Robert Burks, USA (RET.), and Fred Cameron. *The Craft of Wargaming: A Detailed Planning Guide for Defense Planners and Analysts*. Annapolis, MD: Naval Institute Press, 2020.

Joint Chiefs of Staff. *Joint Publication 5-0: Joint Planning*. December 1, 2020.

Longley-Brown, Graham, and John Curry, *Successful Professional Wargames: A Practitioner's Handbook*, First Printing. The History of Wargaming Project, 2019.

Marine Corps Warfighting Laboratory, Wargaming Division. *Standard Operating Procedures*. February 2021.

Perla, Peter, and John Curry. *The Art of Wargaming: A Guide for Professionals and Hobbyists*, 2011 edition. History of Wargaming Project, 2011.

United Kingdom Ministry of Defence; Development, Concepts and Doctrine Centre. *Wargaming Handbook*. Swindon, United Kingdom, August 2017.

U.S. Army War College. *Strategic Wargaming Series Handbook*, 2nd printing of 1st edition. Carlisle, PA, July 1, 2015.

U.S. Central Command, United States Central Command Wargaming Cell. *Central Command Regulation 525-43*. MacDill Air Force Base, FL, May 22, 2019.

U.S. Naval War College, War Gaming Department. *War Gamers' Handbook: A Guide for Professional War Gamers*. Newport, RI.

Source: Department of Defense (DOD) officials. | GAO-23-105351

Appendix IV: Comments from the Department of Defense



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
2200 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-2200

STRATEGY, PLANS
AND CAPABILITIES

Mr. Cary Russell
Director, Defense Capabilities Management
U.S. Government Accountability Office
441 G Street, NW
Washington DC 20548

Dear Mr. Russell,

The attached document is the Department of Defense (DoD) response to the GAO Draft Report GAO-23-105351, "DEFENSE ANALYSIS: Additional Actions Could Enhance DOD's Wargaming Efforts" dated March 3, 2023 (GAO Code 105351). My point of contact is Ms. Brittany Parker, Deputy Director for Analysis, who can be reached at brittany.n.parker26.civ@mail.mil and 703-571-2501.

Sincerely,

A handwritten signature in blue ink that reads "M. Mortelmans".

Madeline L. Mortelmans
Performing the Duties of Assistant Secretary
of Defense for Strategy, Plans, and
Capabilities

Attachment:
DoD Response to GAO Draft Report, GAO-23-105351

**GAO DRAFT REPORT DATED MARCH 3, 2023
GAO-23-105351 (GAO CODE 105351)**

**“DEFENSE ANALYSIS: ADDITIONAL ACTIONS COULD ENHANCE DOD’S
WARGAMING EFFORTS”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION**

RECOMMENDATION 1: The Secretary of Defense should ensure that the appropriate officials conduct an assessment of the department’s use of internal and external wargaming providers, including the sufficiency of its internal wargaming capabilities, to identify any risks or gaps.

DoD RESPONSE: Concur. The AWG has already begun an effort to assess use of, sufficiency, risks, and gaps of wargame providers.

RECOMMENDATION 2: The Secretary of Defense should ensure, following a completed assessment of the department’s use of internal and external wargame providers, that the appropriate officials take actions to address or mitigate any identified risks or gaps.

DoD RESPONSE: Concur.

RECOMMENDATION 3: The Secretary of Defense should ensure the Analysis Working Group develops and implements a department-wide approach for effectively sharing wargame data that, at a minimum, establishes requirements or standards for reporting wargame data and addresses the fragmentation of data across multiple systems. (Recommendation 3)

DoD RESPONSE: Concur.

RECOMMENDATION 4: The Secretary of Defense should identify a lead organization to create and maintain a common operational picture or master calendar for wargames.

DoD RESPONSE: Concur.

RECOMMENDATION 5: The Secretary of Defense should issue guidance requiring DOD organizations to share information about their planned wargames with the lead organization designated to maintain a common operational picture or master calendar for wargames.

DoD RESPONSE: Concur.

RECOMMENDATION 6: The Secretary of the Army should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation.

DoD RESPONSE: Concur

RECOMMENDATION 7: The Secretary of the Navy should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implements any findings from the evaluation.

DoD RESPONSE: Concur.

RECOMMENDATION 8: The Secretary of the Navy should ensure the Commandant of the Marine Corps evaluates the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation.

DoD RESPONSE: Concur.

RECOMMENDATION 9: The Secretary of the Air Force should evaluate the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implement any findings from the evaluation.

DoD RESPONSE: Concur.

RECOMMENDATION 10: The Secretary of the Air Force should ensure the Chief of Space Operations evaluates the costs and benefits of developing standard wargaming education and qualifications for wargaming personnel, including red cell players, and implements any findings from the evaluation.

DoD RESPONSE: Concur.

OTHER:

In addition to the responses above, the Department would like to provide two additional comments on behalf of the Office of Cost Assessment and Program Evaluation (CAPE) and the Department of the Army:

- CAPE concurs that adversary representation in war games (“red cells”) remains an area for improvement. The establishment of the OSD Red Team in 2020 created a standing, cross-cleared red cell to support DoD’s highest priority war games and analytic efforts. OSD Red Team combines both intelligence and operational experts and has emerged as

the DoD's most innovative and experienced war game red cell. OSD Red Team is chartered to support across DoD within the limits of its capacity and has been a key partner of the Analysis Working Group (AWG). The AWG found the Red Team very valuable and as a result invested in additional Red Team personnel (e.g., new sub-teams), facilities, and collaboration tools/resources. As services seek to implement GAO recommendations, OSD Red Team is well positioned to offer both best practices in adversary representation and serve as an example of an effective red cell.

- Army requests the GAO amend page 12 to clarify that Army Futures Command, not the Army War College, ran the wargame examining viability of the future Army concepts beyond 2035. New text should read as follows:
 - “The wargame conducted at the Army War College in Carlisle, Pennsylvania, by Army Futures Command was part of the Army analytic effort to explore and examine the viability of future concepts for Army operations beyond 2035.”

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

Cary B. Russell, (202) 512-5431 or RussellC@gao.gov

Staff Acknowledgments

In addition to the contact named above, Suzanne Wren (Assistant Director), Steven Banovac (Analyst-in-Charge), David Beardwood, John Bornmann, Juliee Conde-Medina, Andrew Duggan, Amie Lesser, Jean McSween, Clarice Ransom, and Michael Shaughnessy made key contributions to this report.

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