A Report to Congressional Committees   **June 2023**

Weapon Systems Annual Assessment

Programs Are Not Consistently Implementing Practices That Can Help Accelerate Acquisitions

AIR FORCE AND SPACE FORCE	NAVY AND MARINE CORPS	JOINT DOD	ARMY

T-AO 205 John Lewis Class Fleet Replenishment Oiler, Air and Missile Defense Radar (AMDR), and F-35 Lightning II (F-35)
Source: General Dynamics NASSCO, Raytheon Company, and U.S. Navy photo courtesy Lockheed Martin/Dane Wiedmann, respectively. | GAO-23-106059

Why GAO Did This Study

In 2020, in an effort to deliver more timely and effective solutions to the warfighter, DOD revamped its department-wide acquisition policies. These policy changes responded to statutory provisions and long-standing concerns from some members of Congress that the defense acquisition process was overly bureaucratic and too slow.

As part of these changes, DOD established the Adaptive Acquisition Framework, which has a variety of pathways for acquisition programs. This framework includes the major capability acquisition pathway to acquire and modernize DOD programs that provide enduring capability, including major defense acquisition programs, and the middle tier of acquisition pathway for rapid prototyping and rapid fielding.
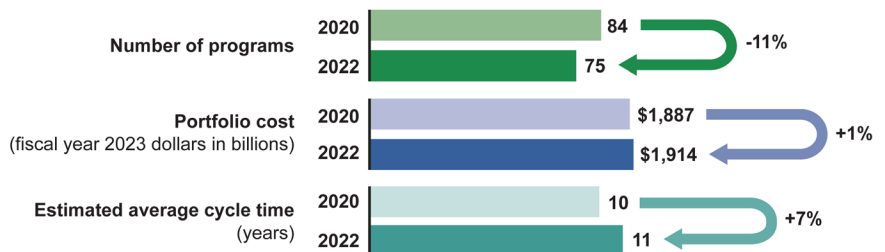
This report, GAO's 21st annual assessment, responds to a statutory provision for GAO to review selected DOD acquisition programs and efforts.

What GAO Found

The Department of Defense (DOD) continues to face challenges quickly developing innovative new weapons. These challenges persist even with recent reforms to its acquisition process intended to help deliver systems to the warfighter in a timelier manner.

Major defense acquisition programs. From DOD's 2020 submission of reports on their major defense acquisition programs to 2022, the number of these programs declined. However, the portfolio's total cost increased, and the average planned cycle time to deliver operational capabilities shows new delays. DOD did not produce these reports in 2021 due to the lack of future year funding data in the fiscal year 2022 budget request.

Major Defense Acquisition Programs Are Taking Longer to Deliver Capabilities

	2020	2022	
Number of programs	84	75	-11%
Portfolio cost (fiscal year 2023 dollars in billions)	$1,887	$1,914	+1%
Estimated average cycle time (years)	10	11	+7%

Source: GAO analysis of Department of Defense data. | GAO-23-106059

Over half of the 26 major defense acquisition programs GAO assessed that had yet to deliver operational capability reported new delays. Driving factors included supplier disruptions, software development delays, and quality control deficiencies. Additionally, these programs continue to make investment decisions without sufficient knowledge, which can increase the risk of delays. Net costs for the 32 major defense acquisition programs that GAO assessed both this year and last year increased by $37 billion. Rising modernization costs, production inefficiencies, and supply chain challenges drove the majority of costs.

Middle tier of acquisition (MTA) programs. Two MTA efforts transitioned to become major defense acquisition programs since GAO's last assessment and could begin delivering capabilities soon. However, other MTA efforts' schedule delays and lack of progress in maturing technologies raise questions about MTA programs' overall ability to deliver capabilities more quickly.

This report assesses the characteristics and performance of 101 of DOD's costliest weapon programs (75 major defense acquisition programs, 19 MTA programs, and 7 future major weapon acquisitions); and selected programs' implementation of leading acquisition practices and principles, modern software development approaches, and cybersecurity practices.
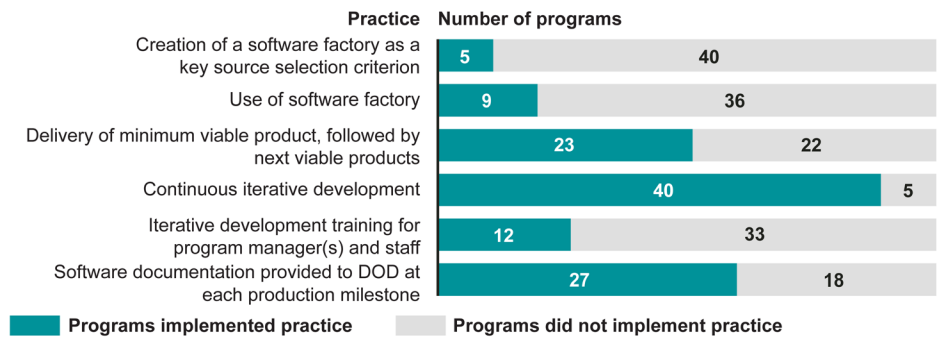
Additionally, the report describes recent legislative, organizational, and policy changes pertaining to modular open systems approaches; and the extent to which selected programs reported implementing a modular open systems approach.

GAO identified programs for review based on cost and acquisition status; reviewed relevant legislation and policy; collected program documents; used a questionnaire to obtain data from program offices; and interviewed DOD officials.

What GAO Recommends

GAO recommends that DOD ensure that any new guidance and updates to relevant policies include details on when programs using a modular open systems approach should complete verification testing and how they should document planning. DOD concurred with the recommendation.

Of the 16 rapid prototyping efforts included in both GAO's current and prior assessments, six have delayed planned operational demonstrations by at least 12 months. The later that demonstrations occur during the MTA effort, the less time programs will have to address emerging issues. This delay heightens the chance that programs will transition with more technical risk.

Software development approaches and cybersecurity practices. Programs reporting use of modern software development approaches increased over the past year from 43 of 59 programs (73 percent) to 45 of 58 programs (78 percent). But, programs reported limited implementation of the Defense Science Board's recommended practices to accelerate software development.

Programs Report Limited Implementation of the Defense Science Board's Recommended Practices to Accelerate Software Development (out of 45 programs)

Practice	Number of programs	
Creation of a software factory as a key source selection criterion	5	40
Use of software factory	9	36
Delivery of minimum viable product, followed by next viable products	23	22
Continuous iterative development	40	5
Iterative development training for program manager(s) and staff	12	33
Software documentation provided to DOD at each production milestone	27	18

■ Programs implemented practice   ■ Programs did not implement practice

Source: GAO analysis of Department of Defense data. | GAO-23-106059

GAO also observed mixed progress in cybersecurity planning. All programs had or planned to have a cybersecurity strategy. But, programs did not consistently report scheduling cybersecurity test events in time to inform key milestones. Without timely cybersecurity testing, programs are at greater risk of delays if issues are discovered later in development.

Key product development principles. GAO found that some—but not all—MTA and future programs used certain product development practices aligned with key product development principles employed by leading companies to deliver innovative capabilities quickly. Examples reported by programs included practices such as using 3D modeling and printing to help design and test products, and holding regular user testing events to obtain feedback. GAO has ongoing work to define associated metrics to help inform future assessments.
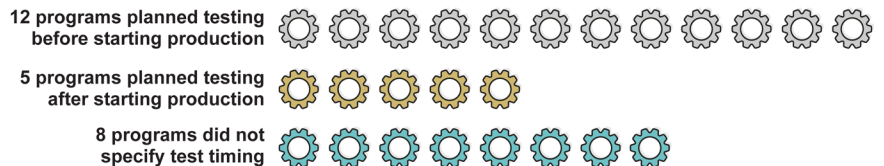
Modular open systems approach. Most programs GAO reviewed reported using a modular open systems approach. But they did not consistently report planning to verify successful implementation of the approach before key points in the acquisition process, such as before beginning production. A modular open systems approach enables weapon programs to better respond to changing threats, in part, by allowing them to more easily add, remove, and replace components over the system's life cycle.

More than Half of Major Defense Acquisition Programs Using a Modular Open Systems Approach Do Not Report Plans to Verify Conformance before Production

12 programs planned testing before starting production

5 programs planned testing after starting production

8 programs did not specify test timing

Source: GAO analysis of programs' questionnaire responses; GAO (icons). | GAO-23-106059

Neither DOD systems engineering policy nor modular open systems approach guidance specifically addresses when programs should complete or document verification testing. Ensuring that any new guidance and updates to relevant policies address when programs should conduct verification testing and document planning could help DOD ensure its systems can incorporate innovative technologies over time to remain responsive to emerging threats.