SYM-AM-25-325

Excerpt from the Proceedings

of the

Twenty-Second Annual Acquisition Research Symposium and Innovation Summit

Wednesday, May 7, 2025 Sessions
Volume I

DoD Needs Better Planning to Attain Benefits of Modular Open Systems

(Executive Summary)

Published: May 5, 2025

The research presented in this report was supported by the Acquisition Research Program at the Naval Postgraduate School.

To request defense acquisition research, to become a research sponsor, or to print additional copies of reports, please contact any of the staff listed on the Acquisition Research Program website (www.acquisitionresearch.net).

ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
NAVAL POSTGRADUATE SCHOOL

DoD Needs Better Planning to Attain Benefits of Modular Open Systems

(Executive Summary)

Nathaniel Vaught—is a Senior Defense Analyst with the U.S. Government Accountability Office, specializing in weapon system acquisitions. He has worked in this issue area for more than 10 years, reporting and making recommendations on a variety of systems including the KC-46A tanker aircraft, F-35 Joint Strike Fighter, Columbia class submarine, and Virginia class submarine. [VaughtN@gao.gov]

Abstract

A modular open systems approach (MOSA) is a business and technical strategy that can help the Department of Defense (DOD) design weapon systems that take less time and money to maintain and upgrade. Recent legislation requires acquisition programs to implement a MOSA to the maximum extent practicable. The benefits of designing weapon systems with a MOSA have been long established. However, GAO reported as recently as 2023 that implementation of a MOSA in acquisition programs was inconsistent. For its current report, anticipated to be published in January 2025, GAO reviewed the use of a MOSA in 20 selected acquisition programs and assessed policies and processes at the Office of the Secretary of Defense and military departments.

Background

Legislation enacted over the past several years required DoD to change the way it buys and designs weapon systems by implementing a modular open systems approach (MOSA) to the maximum extent practicable. A MOSA, which includes a modular design and standard interfaces, allows programs to easily replace components of a product. This approach allows the product to be competitively upgraded with new, improved components that can be made by a greater variety of suppliers. It may also help address concerns we have previously reported on about rising sustainment costs by increasing competition for sustainment among potential vendors. Otherwise, these costs may limit DoD's ability to afford the force structure it expects to need in future conflicts.

Objectives, Scope and Methodology

This report assesses the extent to which (1) programs implemented MOSAs and why; (2) programs and portfolios planned for MOSAs; (3) the military departments invested in necessary MOSA resources; and (4) DoD developed MOSA policy, regulations, and guidance. GAO reviewed planning documents for 20 acquisition programs that started after relevant laws were passed in 2016. GAO selected the programs based on their acquisition approach and military service. GAO also reviewed policy and guidance documents and interviewed DOD officials

Summary

GAO found that 14 of the 20 programs reviewed reported implementing a MOSA to at least some extent. Other programs cited barriers to doing so, such as added cost and time to conduct related design work. While a MOSA has potential benefits, it may also require programs to conduct additional planning, such as to ensure they address cybersecurity concerns. However, none of these 20 programs conducted a formal analysis of costs and benefits for a MOSA because DoD's policy does not explicitly require one. As GAO reported in March 2020,

program officials often focus on reducing acquisition time and costs. Unless required to consider the costs and benefits of a MOSA, officials may overlook long-term MOSA benefits.

Most programs did not address all key MOSA planning elements in acquisition documents, in part, because the military departments did not take effective steps to ensure they did so. As a result, programs may not be well-positioned to integrate a MOSA into early key investment decisions. Also, DoD's process for coordinating MOSAs across portfolios does not ensure the level of collaboration needed to achieve potential benefits such as lower costs from using common components across programs.

The military departments are statutorily required to ensure availability of certain resources and expertise related to MOSA implementation. However, they have yet to assess their departments' MOSA needs or determine how resources should be aligned across their respective departments. Until they do this, programs risk having insufficient resources and expertise to achieve the potential benefits of a MOSA.

DoD has updated some acquisition and engineering policies and is drafting regulations and guidance to address MOSAs. But gaps remain that could hinder MOSA implementation. For example, DoD policy does not address how MOSA requirements apply to programs using the middle tier of acquisition pathway those intending to complete rapid prototyping or fielding in 5 years or less.

Full Report: https://www.gao.gov/products/gao-25-106931

Acquisition Research Program
Department of Defense Management
Naval Postgraduate School
555 Dyer Road, Ingersoll Hall
Monterey, CA 93943

www.acquisitionresearch.net