

GAO Highlights

Highlights of [GAO-23-105867](#), a report to congressional committees

Why GAO Did This Study

Congress included a provision in statute for GAO to examine DOD's software modernization efforts. This report assesses the extent to which DOD has (1) policy and guidance that establish requirements processes to support the use of Agile software development in weapon programs; (2) policy and guidance to provide direction for overseeing Agile software development in weapon programs; and (3) enabled program adoption of modern engineering tools for Agile.

GAO reviewed DOD's software acquisition and requirements policies and guidance, and GAO's leading practices in Agile and iterative development. GAO selected a nongeneralizable sample of five weapon programs based on their use of Agile, and other factors. GAO also interviewed relevant DOD officials, program officials, and user representatives.

What GAO Recommends

GAO is making three recommendations to DOD, including that for all programs using Agile for software development, DOD incorporate Agile principles into policies and guidance used for requirements processes as well as oversight; and that DOD establish an overarching plan—and identify resources—to enable the adoption of modern engineering tools across programs. DOD partially concurred with all three recommendations and identified some planned actions that would address elements of the recommendations. However, GAO noted additional steps DOD needs to take to fully address the recommendations.

View [GAO-23-105867](#). For more information, contact Shelby S. Oakley at (202) 512-4841 or oakleys@gao.gov.

July 2023

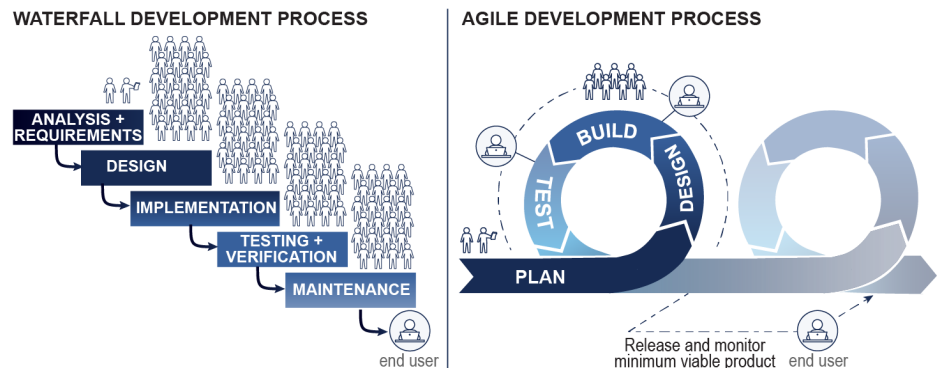
DEFENSE SOFTWARE ACQUISITIONS

Changes to Requirements, Oversight, and Tools Needed for Weapon Programs

What GAO Found

The Department of Defense's (DOD) ability to respond to evolving threats is increasingly determined by its ability to rapidly develop and deploy software. Efforts to modernize DOD's software acquisition include a transition to Agile development principles from a traditional waterfall approach. Agile is intended to deliver working software to users in less than a year and add capability iteratively based on user needs. In contrast, the waterfall approach could take over 10 years to deliver software and involves greater risk.

Comparison of Waterfall and Agile Methods for Developing Software



Source: GAO analysis of Department of Defense information and other sources; GAO (icons). | GAO-23-105867

In 2020, DOD established six acquisition pathways—or sets of policy and guidance—that are tailored to the type of capabilities being acquired. DOD requires programs on its software pathway to use requirements processes tailored to support Agile development. For example, software pathway programs are to use streamlined requirements documents and develop user agreements, which help ensure programs iteratively develop software aligned with user needs. However, DOD requirements processes used by weapon programs developing software on a different pathway generally do not incorporate Agile principles. By not incorporating Agile principles into requirements processes, these programs risk developing capabilities that may not reflect changing user needs or threats.

DOD developed policies and guidance for oversight of programs on the software pathway, including using metrics and value assessments that measure Agile development outcomes. However, DOD has not issued corresponding policies or guidance for weapon programs using Agile software development on other pathways. As a result, programs on other acquisition pathways, such as those developing new aircraft or ships, may not be positioned to conduct effective oversight of iteratively delivered software capabilities.

The iterative and fast-paced nature of Agile relies on the use of modern engineering tools to help identify needs, develop capabilities, and understand outcomes. DOD, however, has not developed a plan or identified resources to enable the adoption of modern engineering tools across all programs. The absence of a plan prevents DOD from fully realizing the benefits of Agile.