

GAO Highlights

Highlights of [GAO-23-105868](#), a report to congressional committees

Why GAO Did This Study

DOD spends about \$1 billion annually on directed energy—concentrated electromagnetic energy—weapons, including high energy lasers and high power microwaves. DOD has pursued these potentially transformative technologies for decades because they could provide considerable advantages. They can deliver destructive or disruptive effects to targets at the speed of light and have potentially significant advantages over kinetic weapons, such as missiles, including lower per-use cost.

A Senate report includes a provision for GAO to review DOD's directed energy work including the technologies, industrial base and related infrastructure, and transition efforts. This report (1) describes the status of DOD and military department directed energy weapon efforts, and (2) assesses challenges with transitioning directed energy weapon efforts from prototyping. GAO selected seven directed energy efforts to obtain insights on a variety of types of efforts, intended uses environment, and military departments. GAO reviewed DOD documentation and interviewed DOD officials and industry representatives.

What GAO Recommends

GAO is making four recommendations to DOD, including that the Navy and the Air Force develop transition agreements between prototype developers and planned transition partners. DOD concurred with three recommendations and partially concurred with one recommendation. GAO continues to believe that the recommendation should be fully implemented.

View [GAO-23-105868](#). For more information, contact Jon Ludwigson at (202) 512-4841 or LudwigsonJ@gao.gov.

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DIRECTED ENERGY WEAPONS

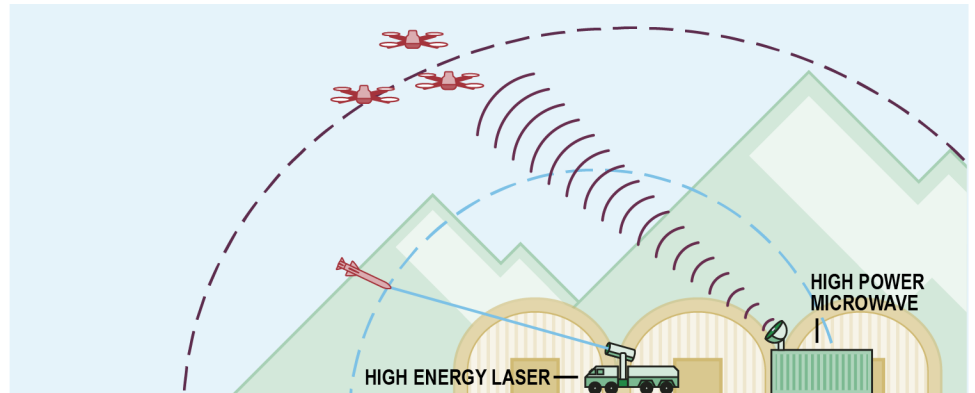
DOD Should Focus on Transition Planning

What GAO Found

The Department of Defense (DOD) is currently developing directed energy weapons with the goal of defeating a range of threats, including drones and missiles. However, GAO found that, even as DOD makes progress developing these capabilities, its efforts to transition prototypes to acquisition programs face challenges.

DOD and the military departments have efforts underway to develop directed energy weapons. For example, DOD and military departments developed multiple laser weapon system demonstrators and prototypes, which have been used in live fire demonstrations to successfully shoot down drones. DOD and the military departments are also developing higher-powered laser weapons to counter bigger threats. Additionally, the departments developed a range of high power microwave capabilities for purposes such as engaging missile or drone swarm attacks against a military base.

Notional Depiction of High Power Microwave and High Energy Laser Defending an Installation



Source: GAO analysis of Department of Defense information. | [GAO-23-105868](#)

However, DOD has long noted a gap—sometimes called “the valley of death”—between its development and its acquisition communities that impede technology transition. For example, the acquisition community may require a higher level of technology maturity than the development community is able to produce.

For prototypes that a military department expects to eventually transition to a new or existing acquisition program, it needs to identify a transition partner that can support the further development of the new technology. To support transition, the Army developed a detailed plan describing schedules and stakeholder roles to build supporting activities around the use of directed energy weapons and early capabilities documents. However, while the Navy fielded several directed energy weapon prototypes and identified a potential transition partner, it does not have documented transition agreements for the directed energy programs that GAO reviewed. The Air Force has not consistently prioritized establishing transition partners, which makes planning for future transition even more challenging. Without these transition planning steps, the Navy and Air Force risk developing directed energy weapons that may be misaligned with operational needs.