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DOD Replicator Initiative: Background and Issues for Congress

Introduction

Replicator, unveiled on August 28, 2023, is a Department of Defense (DOD) initiative, led by DOD's Defense Innovation Unit (DIU), to field thousands of all-domain, attritable autonomous (ADA2) systems by August 2025. (Attritable systems are comparatively low-cost systems with which DOD tolerates a greater degree of risk of system loss.) A key issue facing Congress is whether to approve, reject, or modify DOD's funding requests for Replicator, and whether Congress has adequate information about Replicator to assess its merits and conduct effective oversight of the initiative.

Background

DOD officials state that the Replicator initiative draws from lessons learned in the ongoing Ukraine-Russia conflict, in which Ukraine has leveraged large numbers (estimated by observers to be as many as 10,000 per month) of low-cost attritable systems to counter the Russian military's advantage in force strength. Deputy Secretary of Defense Kathleen Hicks—who, with the Vice Chairman of the Joint Chiefs of Staff, oversees Replicator—has stated that Replicator is intended to "help [the United States] overcome [the Chinese military's] advantage in mass: more ships, more missiles, more forces."

DOD officials describe Replicator as an all-domain initiative that could include autonomous aerial, ground, surface, sub-surface, and/or space systems representing a range of capabilities and mission sets. For example, Deputy Secretary Hicks stated that Replicator could include "distributed pods of self-propelled ADA2 [sensor] systems" to provide near-real time intelligence, "fleets of ground-based ADA2 systems delivering novel logistics support … or securing DOD infrastructure," or space-based ADA2 systems to provide resilient communications.

Intent

Replicator is to deploy ADA2 systems en masse, allowing the U.S. military to disperse combat power over a large number of relatively inexpensive systems. Replicator is intended to

- avoid concentrating U.S. combat power into a smaller number of individually more expensive platforms (i.e., help avoid putting too many eggs into one basket);
- make it harder for an adversary to target and neutralize U.S. capabilities; and
- create an unfavorable cost-exchange ratio for the adversary, meaning a situation in which the adversary would need to use a countermeasure, such as an interceptor missile, that has a much higher cost than the Replicator system against which it is directed.

Some observers have stated that, depending on the capabilities of Replicator systems, the Replicator initiative could lead to the development of new military concepts of operation, such as swarming. Swarming is a form of cooperative behavior in a group of uncrewed systems, in which the uncrewed systems autonomously coordinate with one another to accomplish a mission. Swarming would likely require further advancements in artificial intelligence and/or networked communications to be deployed.

DOD officials state that, in contrast to large and individually expensive systems such as aircraft carriers, Replicator systems are intended to be built and deployed more quickly, and to be used for significantly shorter periods of time before being replaced by successor designs. These officials state that Replicator is thus intended to improve DOD's processes for rapidly scaling, fielding, and innovating new capabilities. They note that Replicator is also intended to accelerate the development of the U.S. drone industrial base.

Specific Replicator Capabilities and Systems

To date, DOD has declined to publicly identify specific Replicator capabilities or systems due to what DOD states are operational security concerns. Deputy Secretary Hicks has stated that DOD intends to reveal details about the Replicator initiative, including information about specific capabilities and systems, "at a time and place and manner of our choosing."

Status

DOD officials stated in January 2024 that they had selected a first tranche of Replicator systems from among competing proposals and, as of February, were reportedly finalizing proposals for a second tranche. These two tranches, one official stated, are likely to focus on software to enable system collaboration "to create lethal effects and respond to a very dynamic environment against different threats and … different adversary platforms."

As the lead for the Replicator initiative, DIU hosted a technology summit in February 2024 "to provide industry with more detail about broad Replicator opportunities, and include workshops on how dual-use technology solutions can be repurposed toward supporting warfighting needs."

Issues for Congress

Potential issues for Congress regarding the Replicator initiative include but are not necessarily limited to the following.

Adequacy of Information Available to Congress

One key issue is whether Congress has adequate information about Replicator to assess its merits and

conduct effective oversight of the initiative. Some Members of Congress have stated that it has been difficult for them to obtain information about Replicator, and have asked DOD to brief them with further details about Replicator capabilities, systems, and concepts of operation. DOD reportedly has promised to provide such briefings.

Lack of information on Replicator, either in the classified or unclassified realms, has the potential to raise doubts about whether DOD has adequately analyzed the initiative in terms of capabilities and costs. Congress has the option, as part of its action on annual DOD budget requests, to legislate reporting requirements for the Replicator initiative or direct the Government Accountability Office (GAO) to review and evaluate DOD's Replicator activities.

Cost and Sources of Funding

Another issue is how much the Replicator initiative might cost, and how DOD intends to finance that cost. In a September 6, 2023, speech, Deputy Secretary Hicks stated that "Replicator is not a new program of record … and [DOD] will not be asking for new money in FY[20]24." DOD submitted a classified FY2023 reprogramming request to Congress in January 2024, suggesting that DOD intends to fund FY2024 Replicator activities by reducing funding for other DOD programs. DOD requested $500 million for Replicator in FY2025 and is to submit an additional $500 million FY2024 reprogramming request for Replicator, if Congress does not appropriate those funds in the FY2024 budget.

Little information is available publicly about Replicator's potential total cost and the impact that funding requirements for Replicator could have on funding for other DOD programs. Some observers have expressed concern that funding Replicator could reduce funding for other Indo-Pacific Command (INDOPACOM) priorities, such as munitions and long-range anti-ship missiles.

Some observers have argued to Congress that providing funding that is not tied to a single fiscal year would be critical to Replicator's success, as doing so would expand the number of funding sources available to the initiative. Others might argue that providing such funding could weaken Congress's constitutional power of the purse by reducing Congress's control over annual DOD spending.

Effectiveness of Selected Systems

Another issue is whether specific systems selected for Replicator are likely to meet DOD's stated objectives for the initiative. Within this issue, one question concerns the ability of Replicator systems to meet the operational needs of INDOPACOM, particularly in terms of systems operating at the extended ranges needed to contribute to combat operations in the Indo-Pacific. Another consideration affecting effectiveness is the ability of selected systems to operate in adverse weather conditions unique to potential theaters of operation.

Technical, Schedule, and Cost Risk

Another issue concerns technical, schedule, and cost risk in the Replicator initiative. Military analyst Bill Greenwalt testified before a House Armed Services Committee hearing on October 19, 2023, that "the Pentagon's acquisition system is simply not capable of acting on the proposed timelines contemplated in the Replicator program, except in very limited circumstances … and then only when conducted outside the normal rules of acquisition budgeting."

Skeptics might argue that DOD historically has often struggled to overcome the so-called "valley of death" between the development of a system prototype and the deployment of that system in the field. Although DOD states that it is currently refining its acquisition strategy for Replicator, some potential industry partners have expressed concerns about DOD's approach, calling it "very disorganized and confusing."

Ethical Principles and International Commitments

Another issue is whether Replicator efforts would be executed in a manner consistent with DOD's ethical principles and international commitments, which are outlined in DOD documents such as *Responsible Artificial Intelligence Strategy and Implementation Pathway*; *Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy*; and DOD Directive 3000.09, *Autonomy in Weapon Systems*.

Military Personnel and Force Structure

Another issue concerns the potential implications of Replicator systems for military personnel and force structure. Within this issue, specific matters include the number of personnel that might be needed to operate thousands of ADA2 systems (and the resulting impact on numbers of personnel available for meeting other DOD needs), the training requirements for personnel operating Replicator systems, and whether fielding Replicator systems would require making changes in DOD and service organization. For example, some observers have proposed the establishment of specialized drone branches within the services.

CRS Products

CRS Report R47188, *Unmanned Aircraft Systems: Roles, Missions, and Future Concepts*, by Kelley M. Sayler and Michael E. DeVine.

CRS Report R46458, *Emerging Military Technologies: Background and Issues for Congress*, by Kelley M. Sayler.

CRS In Focus IF11150, *Defense Primer: U.S. Policy on Lethal Autonomous Weapon Systems*, by Kelley M. Sayler.

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