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The Army's Robotic Combat Vehicle (RCV) Program

Background

The RCV is being developed as part of the Army's Next Generation Combat Vehicle (NGCV) family of vehicles. As originally planned, the Army intended to develop three RCV variants: Light, Medium, and Heavy. The Army reportedly envisioned employing RCVs as "scouts" and "escorts" for manned fighting vehicles to deter ambushes and to guard the flanks of mechanized formations. RCVs are intended to be controlled by operators riding in NGCVs, but the Army hopes that improved ground navigation technology and artificial intelligence (AI) might eventually permit a single operator to control multiple RCVs or for RCVs to operate in a more autonomous mode.

Three RCV Variants

According to the *Army's Robotic Combat Vehicle Campaign Plan, January 16, 2019*, obtained by CRS, the Army planned to develop three RCV variants:

RCV Light (RCV-L)

The RCV-L (**Figure 1**) is to weigh no more than 10 tons, with dimensions (length, width, height) of no more than 224 x 88 x 94 inches. In terms of transportability, a single RCV-L would be transported by rotary wing aircraft. The RCV-L would also have limited on-board lethality such as self-defense systems, anti-tank guided missiles (ATGMs), or recoilless weapons. The RCV-L is considered an expendable weapon system, meaning its destruction in combat is expected and acceptable.

Figure 1. Example of an RCV-L Prototype

Source: https://www.qinetiq.com/en/news/first-robotic-combat-vehicle-light, accessed July 12, 2021.

RCV Medium (RCV-M)

The RCV-M (**Figure 2**) is to weigh between 10 and 20 tons, with dimensions (length, width, height) of no more than 230 x 107 x 94 inches. In terms of transportability, a single RCV-M is to be transported by a C-130 transport aircraft. The RCV-M is to have increased onboard lethality to defeat light- to medium-armored threats. The RCV-M is considered "durable" by the Army, meaning the Army would like the RCV-M to be more survivable than the RCV-L.

Figure 2. Example of an RCV-M Prototype

Source: https://www.defensedaily.com/textron-team-readying-delivery-first-rcv-m-prototypes-received-deal-electric-variant/army/, accessed July 12, 2021.

RCV Heavy (RCV-H)

The RCV-H (**Figure 3**) is to weigh between 20 and 30 tons, with dimensions (length, width, height) of no more than 350 x 144 x 142 inches. In terms of transportability, two RCV-Hs would be transported by a C-17 transport aircraft. The RCV-H is to have on-board direct fire weapon systems capable of defeating all known enemy armored vehicles. The RCV-H is considered a nonexpendable weapon system, meaning that it should be as survivable as a crewed system.

Figure 3. Example of an RCV-H Prototype

Source: https://sites.breakingmedia.com/uploads/sites/3/2020/10/ALAS-Turret-front-close-IMG_0174.jpg, accessed July 12, 2021.

Status of RCV Effort

According to an August 2020 Government Accountability Office (GAO) report:

> The Robotic Combat Vehicle (RCV) effort is currently employing other transaction agreements (OTA) to conduct experiments to determine the availability and maturity of technologies and the validity of operating concepts. The outcome of these experiments will be used to determine whether an acquisition program is feasible, with plans for three vehicle variants—a light, a medium, and a heavy variant. As RCV is not yet a program of record, no acquisition approach has been selected.

On January 10, 2020, the Army announced it would award an Other Transaction Agreement (OTA) to QinetiQ North America (Virginia—main headquarters is in the United Kingdom) to build four RCV-Ls and Textron (Rhode Island) to build four RCV-Ms.

Other Transaction Authority or Agreement (OTA) refers to the authority (10 U.S.C. §2371b) of the Department of Defense (DOD) to carry out certain prototypes, research, and production projects. Other Transaction (OT) authorities were created to give DOD the flexibility necessary to adopt and incorporate business practices that reflect commercial industry standards and best practices into its award instruments. As of the 2016 National Defense Authorization Act (NDAA; P.L. 114-92) Section 845, the DOD currently has permanent authority to award OT under 10 U.S.C. §2371, for research, prototype, and production purposes.

RCV Testing

The Army reportedly conducted operational experiments for Light and Medium RCVs from June to August 2022 at Ft. Hood, TX. General Dynamics Land Systems reportedly provided four RCV-M prototypes for the Army to test at Ft. Hood as well. The Army planned to decide in FY2023 whether to proceed to the Engineering and Manufacturing Development (EMD) phase for the RCV-L.

Army Decides to Focus Efforts on RCV-L

Reportedly, in August 2023, the Assistant Secretary of the Army for Acquisitions, Logistics, and Technology (ASA [ALT]) stated:

> The Army is still broadly, of course, interested in robots of many different sizes. But we're focusing on RCV-L because we think that's a necessary first step before going to larger platforms.

The ASA (ALT) reportedly noted that the Army has plans to "defer RCV-M for the time being."

Army's Request for Prototype Proposal (RPP) for Further RCV-L Development

Reportedly, on March 29, 2023, the Army released a Request for Prototype Proposal (RPP) for the RCV Program, detailing a three-phased effort that could select up to four vendors to deliver test vehicles by August 2024. The first phase for the RCV effort includes awarding contracts worth up to $13.8 million to no more than four vendors, with each vendor tasked to deliver nine full-system prototypes for evaluation.

Reportedly, a potential $607 million follow-on production contract could be awarded, with the Army noting the contract could be awarded "without the use of competitive procedures, so long as the participant in this transaction successfully completes the prototype project."

It was further reported that following the RPP release, Oshkosh Defense and BAE Systems indicated their interest in the RCV effort, which could result in a production contract of approximately $607 million for 211 RCVs.

FY2024 RCV Budgetary Information

Table 1. FY2024 RCV Budget Request

Funding Category	Total Request ($M)	Total Request (Qty.)
RDT&E	$142.125	—

Source: Department of Defense Fiscal Year 2024 Budget Estimates, Army Justification Book Volume 2b of 2, Research, Development, Test & Evaluation, RDT&E − Volume II, Budget Activity 5a, March 2023, p. 188.

Notes: RDT&E = Research, Development, Test, and Evaluation; **$M** = U.S. dollars in millions; **Qty.** = FY2024 procurement quantities.

Considerations for Congress

Oversight questions Congress could consider include the following:

- What is the Army's current "concept of operation" for employing RCVs in combat? What are the perceived benefits and drawbacks of RCVs?
- What are the planned per unit costs of the "expendable" RCV-L? Are these systems less expensive than the crewed systems they are intended to replace/supplement?
- What are the autonomous ground navigation and artificial intelligence (AI) technological challenges affecting the development of autonomous RCVs?
- Are there plans to develop fully autonomous RCV variants?
- Under what circumstances could the Army reinstate RCV-M development?
- What is the Army's current thinking regarding the way ahead for the RCV-H? While the Army has reportedly deferred the RCV-M, the status of any RCV-H development appears to be less definitive.

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