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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.

Original 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**) was 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 was 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**) was 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 was to be transported by a C-130 transport aircraft. The RCV-M was to have increased onboard lethality to defeat light- to medium-armored threats. The RCV-M was 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**) was 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 was to have on-board direct fire weapon systems capable of defeating all known enemy armored vehicles. The RCV-H was 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.

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 the Army had plans to "defer RCV-M for the time being."

RCV Program Transitions

According to FY2025 Army budget documents submitted in March 2024

> The Robotic Combat Vehicle (RCV) has transitioned from a family of light, medium, and heavy variants to a single vehicle approach with a common chassis. The Army has decided to field a common platform that will pair elements of the previous RCV medium concept with the RCV common chassis. The development programs, which include a RCV Middle-Tier Acquisition Rapid Prototyping (MTA-RP) and a RCV Software Acquisition Pathway (SWP) program, will produce unmanned ground combat vehicle prototypes to inform Concepts of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTP) maturation, Capabilities Development Document (CDD) development, acquisition and integration of secure advanced autonomy and artificial intelligence algorithms, force design updates, robotic and autonomous systems (RAS) doctrine development, and follow-on production and fielding decisions.

Ongoing RCV Testing and Timeline

Reportedly, the Army plans to receive prototypes during the summer of 2024 from the four teams competing to build the RCV: McQ, Textron Systems, General Dynamics Land Systems, and Oshkosh Defense. The Army then plans to initiate a competition and "pick the best of breed" for eventual production. The Army intends to field to the first unit in FY2028 following a production decision scheduled for FY2027.

During the summer of 2024, the Army also reportedly plans to conduct two training rotations at the National Training Center (NTC) with on-hand RCV prototypes. A unit out of Fort Stewart, GA, is to go up against a RCV platoon attached to an opposing force (OPFOR). During the second NTC rotation, a unit out of Fort Riley, KS, is to utilize the same RCV platoon for simulated combat against the OPFOR.

FY2025 RCV Budgetary Information

Table 1. FY2025 RCV Budget Request

Funding Category	Total Request ($M)	Total Request (Qty.)
RDT&E	$92.540	—

Source: *Department of Defense Fiscal Year 2025 Budget Estimates, Army Justification Book Volume 2b of 2, Research, Development, Test & Evaluation, RDT&E – Volume II, Budget Activity 5a*, March 2024, p. 178.

Notes: RDT&E = Research, Development, Test, and Evaluation; **$M** = U.S. dollars in millions; **Qty.** = FY2025 procurement quantities.

Considerations for Congress

Oversight considerations for Congress could include the following:

- What variants are under consideration as part of the common chassis approach? Are there size and weight limitations associated with the new development effort?
- Are there planned per unit cost limitations for new RCV variants? Are RCVs still planned to have various degrees of expendability?
- Are there plans to develop fully autonomous RCV variants?
- What are the autonomous ground navigation and artificial intelligence (AI) challenges affecting RCV development?
- Are there lessons learned about RCV use by Russia and Ukraine in the ongoing conflict that are being factored into future Army RCV development?

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